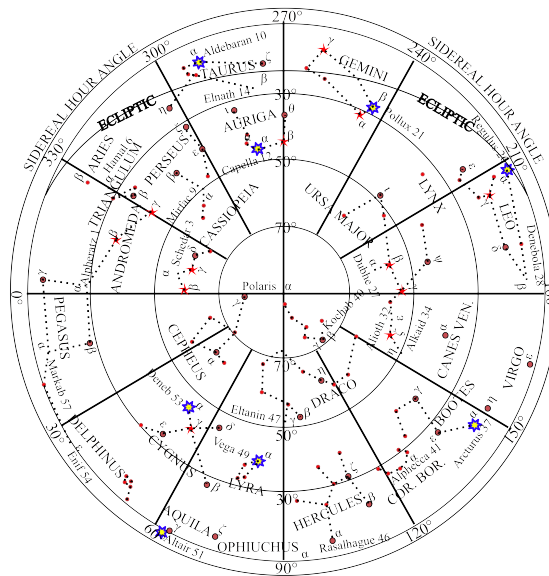


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THE NAUTICAL ALMANAC

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Author:
Enno RODEGERDTS

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January 01, 02 ,03 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	100°23.3	160°39.0	-22°02.2	33°29.8	24°35.3	98°46.9	-0°42.4	135°11.7	-15°12.9			Alpheratz	357°36.6	29°13.1			
1	115°25.8	175°38.2	-22°01.6	48°32.7	24°35.3	113°49.1	-0°42.2	150°13.9	-15°12.8			Ankaa	353°08.8	-42°11.2			
2	130°28.2	190°37.3	-22°01.1	63°35.5	24°35.2	128°51.3	-0°42.1	165°16.1	-15°12.7			Schedar	349°32.9	56°40.0			
3	145°30.7	205°36.5	-22°00.5	78°38.4	24°35.2	143°53.5	-0°42.0	180°18.4	-15°12.6			Diphda	348°48.9	-17°51.8			
4	160°33.2	220°35.6	-21°59.9	93°41.3	24°35.1	158°55.7	-0°41.9	195°20.6	-15°12.6			Achernar	335°21.3	-57°07.5			
5	175°35.6	235°34.7	-21°59.4	108°44.2	24°35.1	173°57.9	-0°41.7	210°22.8	-15°12.5			Hamal	327°53.0	23°34.3			
6	190°38.1	250°33.9	-21°58.8	123°47.1	24°35.0	189°00.1	-0°41.6	225°25.0	-15°12.4			Polaris	314°32.5	89°21.9			
7	205°40.6	265°33.0	-21°58.2	138°50.0	24°35.0	204°02.3	-0°41.5	240°27.2	-15°12.3			Akamar	315°12.8	-40°13.0			
8	220°43.0	280°32.2	-21°57.6	153°52.9	24°34.9	219°04.5	-0°41.3	255°29.5	-15°12.2			Menkar	314°07.7	4°10.8			
9	235°45.5	295°31.3	-21°57.1	168°55.8	24°34.9	234°06.6	-0°41.2	270°31.7	-15°12.1			Mirfak	308°30.3	49°56.7			
10	250°48.0	310°30.5	-21°56.5	183°58.7	24°34.9	249°08.8	-0°41.1	285°33.9	-15°12.1			Aldebaran	290°41.2	16°33.3			
11	265°50.4	325°29.6	-21°55.9	199°01.6	24°34.8	264°11.0	-0°40.9	300°36.1	-15°12.0			Rigel	281°05.2	-8°10.6			
12	280°52.9	340°28.8	-21°55.3	214°04.4	24°34.8	279°13.2	-0°40.8	315°38.3	-15°11.9			Capella	280°23.9	46°01.4			
13	295°55.4	355°27.9	-21°54.8	229°07.3	24°34.7	294°15.4	-0°40.7	330°40.6	-15°11.8			Bellatrix	278°24.3	6°22.2			
14	310°57.8	10°27.1	-21°54.2	244°10.2	24°34.7	309°17.6	-0°40.6	345°42.8	-15°11.7			Elnath	278°03.6	28°37.6			
15	326°00.3	25°26.2	-21°53.6	259°13.1	24°34.6	324°19.8	-0°40.4	0°45.0	-15°11.7			Alnilam	275°39.1	-1°11.3			
16	341°02.7	40°25.4	-21°53.0	274°16.0	24°34.6	339°22.0	-0°40.3	15°47.2	-15°11.6			Betelgeuse	270°53.6	7°24.7			
17	356°05.2	55°24.5	-21°52.4	289°18.8	24°34.6	354°24.2	-0°40.2	30°49.4	-15°11.5			Canopus	263°52.6	-52°42.5			
18	11°07.7	70°23.7	-21°51.8	304°21.7	24°34.5	9°26.3	-0°40.0	45°51.7	-15°11.4			Sirius	258°27.3	-16°44.7			
19	26°10.1	85°22.8	-21°51.3	319°24.6	24°34.5	24°28.5	-0°39.9	60°53.9	-15°11.3			Adara	255°06.8	-29°00.2			
20	41°12.6	100°22.0	-21°50.7	334°27.4	24°34.4	39°30.7	-0°39.8	75°56.1	-15°11.2			Procyon	244°52.2	5°10.1			
21	56°15.1	115°21.1	-21°50.1	349°30.3	24°34.4	54°32.9	-0°39.6	90°58.3	-15°11.2			Pollux	243°18.9	27°58.2			
22	71°17.5	130°20.3	-21°49.5	4°33.2	24°34.3	69°35.1	-0°39.5	106°00.5	-15°11.1			Avior	234°14.8	-59°34.8			
23	86°20.0	145°19.4	-21°48.9	19°36.0	24°34.3	84°37.3	-0°39.4	121°02.7	-15°11.0			Suhail	222°47.2	-43°31.3			
Mer.pass.:17:15			v-0.9 d0.6 m-3.8			v2.9 d-0.0 m-1.2			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	101°22.5	160°18.6	-21°48.3	34°38.9	24°34.3	99°39.5	-0°39.2	136°05.0	-15°10.9			Regulus	207°36.0	11°51.3			
1	116°24.9	175°17.7	-21°47.7	49°41.8	24°34.2	114°41.6	-0°39.1	151°07.2	-15°10.8			Dubhe	193°42.8	61°37.4			
2	131°27.4	190°16.9	-21°47.1	64°44.6	24°34.2	129°43.8	-0°39.0	166°09.4	-15°10.7			Denebola	182°26.5	14°26.6			
3	146°29.9	205°16.0	-21°46.5	79°47.5	24°34.1	144°46.0	-0°38.8	181°11.6	-15°10.7			Gienah	175°45.2	-17°40.0			
4	161°32.3	220°15.2	-21°45.9	94°50.3	24°34.1	159°48.2	-0°38.7	196°13.8	-15°10.6			Acrux	173°01.9	-63°13.2			
5	176°34.8	235°14.3	-21°45.3	109°53.2	24°34.1	174°50.4	-0°38.6	211°16.1	-15°10.5			Gacrux	171°53.5	-57°14.2			
6	191°37.2	250°13.5	-21°44.7	124°56.1	24°34.0	189°52.6	-0°38.4	226°18.3	-15°10.4			Alioth	166°14.5	55°49.9			
7	206°39.7	265°12.7	-21°44.1	139°58.9	24°34.0	204°54.8	-0°38.3	241°20.5	-15°10.3			Spica	158°24.1	-11°16.8			
8	221°42.2	280°11.8	-21°43.5	155°01.8	24°33.9	219°56.9	-0°38.2	256°22.7	-15°10.2			Alcaid	152°53.5	49°11.7			
9	236°44.6	295°11.0	-21°42.9	170°04.6	24°33.9	234°59.1	-0°38.0	271°24.9	-15°10.2			Hadar	148°38.6	-60°28.7			
10	251°47.1	310°10.1	-21°42.3	185°07.5	24°33.8	250°01.3	-0°37.9	286°27.1	-15°10.1			Menkent	147°59.8	-36°28.8			
11	266°49.6	325°09.3	-21°41.7	200°10.3	24°33.8	265°03.5	-0°37.8	301°29.4	-15°10.0			Arcturus	145°49.4	19°04.0			
12	281°52.0	340°08.5	-21°41.1	215°13.1	24°33.8	280°05.7	-0°37.6	316°31.6	-15°09.9			Rigel Kent.	139°42.9	-60°55.5			
13	296°54.5	355°07.6	-21°40.5	230°16.0	24°33.7	295°07.8	-0°37.5	331°33.8	-15°09.8			Zubenelg.	136°58.1	-16°08.1			
14	311°57.0	10°06.8	-21°39.9	245°18.8	24°33.7	310°10.0	-0°37.4	346°36.0	-15°09.7			Kochab	137°20.4	74°03.4			
15	326°59.4	25°05.9	-21°39.3	260°21.7	24°33.6	325°12.2	-0°37.2	1°38.2	-15°09.7			Alphecca	126°05.4	26°38.1			
16	342°01.9	40°05.1	-21°38.7	275°24.5	24°33.6	340°14.4	-0°37.1	16°40.4	-15°09.6			Antares	112°18.2	-26°28.9			
17	357°04.3	55°04.3	-21°38.0	290°27.3	24°33.6	355°16.6	-0°37.0	31°42.7	-15°09.5			Atria	107°14.5	-69°03.9			
18	12°06.8	70°03.4	-21°37.4	305°30.2	24°33.5	10°18.8	-0°36.8	46°44.9	-15°09.4			Sabik	102°05.0	-15°45.2			
19	27°09.3	85°02.6	-21°36.8	320°33.0	24°33.5	25°20.9	-0°36.7	61°47.1	-15°09.3			Shaula	96°13.0	-37°07.1			
20	42°11.7	100°01.7	-21°36.2	335°35.8	24°33.4	40°23.1	-0°36.6	76°49.3	-15°09.2			Rasalhague	96°00.5	12°32.6			
21	57°14.2	115°00.9	-21°35.6	350°38.7	24°33.4	55°25.3	-0°36.4	91°51.5	-15°09.2			Etamin	90°43.5	51°29.0			
22	72°16.7	130°00.1	-21°35.0	5°41.5	24°33.4	70°27.5	-0°36.3	106°53.7	-15°09.1			Kaus Aust.	83°35.1	-34°22.4			
23	87°19.1	144°59.2	-21°34.4	20°44.3	24°33.3	85°29.7	-0°36.2	121°56.0	-15°09.0			Vega	80°34.8	38°48.2			
Mer.pass.:17:11			v-0.8 d0.6 m-3.8			v2.9 d-0.0 m-1.1			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	102°21.6	159°58.4	-21°33.7	35°47.2	24°33.3	100°31.8	-0°36.0	136°58.2	-15°08.9			Enif	33°40.7	9°58.8			
1	117°24.1	174°57.6	-21°33.1	50°50.0	24°33.2	115°34.0	-0°35.9	152°00.4	-15°08.8			Alnair	27°35.3	-46°51.2			
2	132°26.5	189°56.7	-21°32.5	65°52.8	24°33.2	130°36.2	-0°35.8	167°02.6	-15°08.7			Fomalhaut	15°16.6	-29°30.2			
3	147°29.0	204°55.9	-21°31.9	80°55.6	24°33.2	145°38.4	-0°35.6	182°04.8	-15°08.7			Scheat	13°47.0	28°12.5			
4	162°31.5	219°55.1	-21°31.2	95°58.4	24°33.1	160°40.6	-0°35.5	197°07.0	-15°08.6			Markab	13°31.7	15°19.7			
5	177°33.9	234°54.2	-21°30.6	111°01.3	24°33.1	175°42.7	-0°35.4	212°09.2	-15°08.5			2023/1/1			SHA	Mer.pass	
6	192°36.4	249°53.4	-21°30.0	126°04.1	24°33.1	190°44.9	-0°35.2	227°11.5	-15°08.4			Venus	60°15.7	13:18			
7	207°38.8	264°52.6	-21°29.4	141°06.9	24°33.0	205°47.1	-0°35.1	242°13.7	-15°08.3			Mars	293°06.4	21:42			
8	222°41.3	279°51.7	-21°28.7	156°09.7	24°33.0	220°49.3	-0°35.0	257°15.9	-15°08.2			Jupiter	358°23.6	17:22			
9	237°43.8	294°50.9	-21°28.1	171°12.5	24°32.9	235°51.4	-0°34.8	272°18.1	-15°08.2			Saturn	34°48.4	14:57			
10	252°46.2	309°50.1	-21°27.5	186°15.3	24°32.9	250°53.6	-0°34.7	287°20.3	-15°08.1			2023/1/2			SHA	Mer.pass	

Sun				Moon													
Sun	GHA	Dec		GHA	ν	Dec	d	HP									
0	179°12.1	-23°02.4		68°43.6	13.8	12°03.2	13.4	56.3	Lat.	Twilight			Twilight				
1	194°11.8	-23°02.2		83°16.4	13.8	12°16.6	13.3	56.3	72	08:23	Civil	Sunrise	Sunset	Civil	Naut.		
2	209°11.5	-23°02.0		97°49.2	13.8	12°29.9	13.3	56.2	70	08:04				14:20	16:04		
3	224°11.2	-23°01.8		112°22.0	13.8	12°43.2	13.2	56.2	68	07:49				14:52	16:19		
4	239°10.9	-23°01.6		126°54.7	13.7	12°56.4	13.1	56.2	66	07:37	08:52	10:26	13:42	15:16	16:31		
5	254°10.7	-23°01.4		141°27.5	13.7	13°09.5	13.1	56.2	64	07:26	08:34	09:49	14:19	15:34	16:42		
6	269°10.4	-23°01.2		156°00.2	13.7	13°22.5	13.0	56.1	62	07:17	08:18	09:22	14:46	15:50	16:51		
7	284°10.1	-23°01.0		170°32.9	13.7	13°35.5	12.9	56.1	60	07:09	08:05	09:02	15:06	16:03	16:59		
8	299°09.8	-23°00.8		185°05.5	13.6	13°48.4	12.9	56.1	58	07:02	07:54	08:45	15:23	16:14	17:06		
9	314°09.5	-23°00.6		199°38.1	13.6	14°01.2	12.8	56.0	56	06:55	07:44	08:31	15:37	16:24	17:13		
10	329°09.2	-23°00.4		214°10.7	13.6	14°14.0	12.7	56.0	54	06:50	07:35	08:19	15:49	16:33	17:18		
11	344°08.9	-23°00.2		228°43.3	13.5	14°26.7	12.7	56.0	52	06:44	07:28	08:08	16:00	16:40	17:24		
12	359°08.6	-22°60.0		243°15.8	13.5	14°39.3	12.6	56.0	50	06:39	07:20	07:58	16:10	16:48	17:29		
13	14°08.3	-22°59.8		257°48.3	13.5	14°51.8	12.5	55.9	45	06:28	07:05	07:38	16:30	17:03	17:40		
14	29°08.0	-22°59.6		272°20.8	13.4	15°04.3	12.4	55.9	40	06:18	06:52	07:22	16:46	17:16	17:50		
15	44°07.7	-22°59.3		286°53.2	13.4	15°16.7	12.3	55.9	35	06:09	06:40	07:08	16:60	17:28	17:59		
16	59°07.4	-22°59.1		301°25.6	13.4	15°29.0	12.3	55.9	30	06:00	06:30	06:56	17:12	17:38	18:08		
17	74°07.1	-22°58.9		315°57.9	13.3	15°41.2	12.2	55.8	20	05:44	06:11	06:35	17:33	17:56	18:24		
18	89°06.8	-22°58.7		330°30.3	13.3	15°53.4	12.1	55.8	10	05:28	05:54	06:17	17:51	18:13	18:40		
19	104°06.5	-22°58.5		345°02.5	13.3	16°05.4	12.0	55.8	0	05:12	05:38	06:00	18:08	18:30	18:56		
20	119°06.2	-22°58.3		359°34.8	13.2	16°17.4	12.0	55.8	-10	04:53	05:20	05:43	18:25	18:48	19:15		
21	134°05.9	-22°58.1		14°07.0	13.2	16°29.3	11.9	55.7	-20	04:31	04:60	05:24	18:43	19:08	19:37		
22	149°05.7	-22°57.9		28°39.2	13.2	16°41.2	11.8	55.7	-30	04:02	04:36	05:03	19:05	19:32	20:05		
23	164°05.4	-22°57.6		43°11.3	13.1	16°52.9	11.7	55.7	-35	03:44	04:21	04:50	19:17	19:47	20:23		
SD.=16.3 d=0.2				S.D.=15.4													
Mon	GHA	Dec		GHA	ν	Dec	d	HP									
0	179°05.1	-22°57.4		57°43.4	13.1	17°04.6	11.6	55.7	-52	01:42	02:57	03:45	20:22	21:10	22:24		
1	194°04.8	-22°57.2		72°15.5	13.0	17°16.2	11.5	55.7	-54	01:03	02:40	03:33	20:34	21:27	23:03		
2	209°04.5	-22°57.0		86°47.5	13.0	17°27.7	11.5	55.6	-56	—:—	02:19	03:20	20:47	21:48	—:—		
3	224°04.2	-22°56.8		101°19.4	12.9	17°39.1	11.4	55.6	-58	—:—	01:51	03:04	21:03	22:15	—:—		
4	239°03.9	-22°56.6		115°51.4	12.9	17°50.4	11.3	55.6	-60	—:—	01:08	02:44	21:23	22:57	—:—		
5	254°03.6	-22°56.3		130°23.2	12.9	18°01.6	11.2	55.6									
6	269°03.3	-22°56.1		144°55.1	12.8	18°12.8	11.1	55.5									
7	284°03.0	-22°55.9		159°26.9	12.8	18°23.8	11.0	55.5									
8	299°02.7	-22°55.7		173°58.6	12.7	18°34.8	10.9	55.5									
9	314°02.4	-22°55.5		188°30.4	12.7	18°45.7	10.8	55.5									
10	329°02.1	-22°55.2		203°02.0	12.6	18°56.5	10.7	55.5									
11	344°01.9	-22°55.0		217°33.7	12.6	19°07.1	10.6	55.4									
12	359°01.6	-22°54.8		232°05.2	12.6	19°17.7	10.6	55.4									
13	14°01.3	-22°54.6		246°36.8	12.5	19°28.2	10.5	55.4									
14	29°01.0	-22°54.3		261°08.2	12.5	19°38.7	10.4	55.4									
15	44°00.7	-22°54.1		275°39.7	12.4	19°49.0	10.3	55.3									
16	59°00.4	-22°53.9		290°11.1	12.4	19°59.2	10.2	55.3									
17	74°00.1	-22°53.7		304°42.4	12.3	20°09.3	10.1	55.3									
18	88°59.8	-22°53.4		319°13.7	12.3	20°19.3	10.0	55.3									
19	103°59.5	-22°53.2		333°45.0	12.2	20°29.2	9.9	55.3									
20	118°59.2	-22°53.0		348°16.2	12.2	20°39.1	9.8	55.2									
21	133°59.0	-22°52.7		2°47.3	12.1	20°48.8	9.7	55.2									
22	148°58.7	-22°52.5		17°18.5	12.1	20°58.4	9.6	55.2									
23	163°58.4	-22°52.3		31°49.5	12.0	21°07.9	9.5	55.2									
SD.=16.3 d=0.2				S.D.=15.2													
Tue	GHA	Dec		GHA	ν	Dec	d	HP									
0	178°58.1	-22°52.0		46°20.5	12.0	21°17.3	9.4	55.2									
1	193°57.8	-22°51.8		60°51.5	11.9	21°26.7	9.3	55.1									
2	208°57.5	-22°51.6		75°22.4	11.9	21°35.9	9.2	55.1									
3	223°57.2	-22°51.3		89°53.3	11.8	21°45.0	9.1	55.1									
4	238°56.9	-22°51.1		104°24.1	11.8	21°54.0	8.9	55.1									
5	253°56.6	-22°50.8		118°54.9	11.8	22°02.9	8.8	55.1									
6	268°56.4	-22°50.6		133°25.6	11.7	22°11.7	8.7	55.1									
7	283°56.1	-22°50.4		147°56.3	11.7	22°20.3	8.6	55.0									
8	298°55.8	-22°50.1		162°26.9	11.6	22°28.9	8.5	55.0									
9	313°55.5	-22°49.9		176°57.5	11.6	22°37.4	8.4	55.0									
10	328°55.2	-22°49.6		191°28.1	11.5	22°45.7	8.3	55.0									
11	343°54.9	-22°49.4		205°58.6	11.5	22°53.9	8.2	55.0									
12	358°54.6	-22°49.2		220°29.0	11.4	23°02.1	8.1	54.9									
13	13°54.3	-22°48.9		234°59.4	11.4	23°10.1	8.0	54.9									
14	28°54.1	-22°48.7		249°29.7	11.3	23°18.0	7.8	54.9									
15	43°53.8	-22°48.4		264°00.0	11.3	23°25.8	7.7	54.9									
16	58°53.5	-22°48.2		278°30.3	11.2	23°33.4	7.6	54.9									
17	73°53.2	-22°47.9		293°00.5	11.2	23°41.0	7.5	54.9									
18	88°52.9	-22°47.7		307°30.7	11.1	23°48.4	7.4	54.8									
19	103°52.6	-22°47.4		322°00.8	11.1	23°55.8	7.3	54.8									
20	118°52.3	-22°47.2		336°30.9	11.1	24°03.0	7.2	54.8									
21	133°52.1	-22°46.9		351°00.9	11.0	24°10.1	7.0	54.8									
22	148°51.8	-22°46.7		5°30.9	11.0	24°17.0	6.9	54.8									
23	163°51.5	-22°46.4		20°00.9	10.9	24°23.9	6.8	54.8									
SD.=16.3 d=0.2				S.D.=15.0													
										Sun		Mer.		Moon		Age	
Day		Eqn. of Time		00 ⁿ		12 ^h		Pass		Upper		Lower					
1		03:12		03:26		12:03				20:01		07:39		9(74%)			
2		03:40		03:54		12:03				20:48		08:24		10(83%)			
3		04:08		04:22		12:04				21:37		09:12		11(89%)			

January 04, 05 ,06 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	103°20.7	159°38.5	-21°18.5	36°54.5	24°32.4	101°24.1	-0°32.8	137°51.3	-15°06.9	Alpheratz	357°36.6	29°13.1					
1	118°23.2	174°37.7	-21°17.9	51°57.3	24°32.3	116°26.2	-0°32.6	152°53.5	-15°06.8	Ankaa	353°08.8	-42°11.2					
2	133°25.7	189°36.9	-21°17.2	67°00.1	24°32.3	131°28.4	-0°32.5	167°55.8	-15°06.7	Schedar	349°33.0	56°40.0					
3	148°28.1	204°36.1	-21°16.6	82°02.9	24°32.3	146°30.6	-0°32.4	182°58.0	-15°06.6	Diphda	348°48.9	-17°51.8					
4	163°30.6	219°35.2	-21°15.9	97°05.6	24°32.2	161°32.8	-0°32.2	198°00.2	-15°06.6	Achernar	335°21.3	-57°07.5					
5	178°33.1	234°34.4	-21°15.3	112°08.4	24°32.2	176°34.9	-0°32.1	213°02.4	-15°06.5	Hamal	327°53.0	23°34.3					
6	193°35.5	249°33.6	-21°14.6	127°11.2	24°32.2	191°37.1	-0°32.0	228°04.6	-15°06.4	Polaris	314°33.4	89°21.9					
7	208°38.0	264°32.8	-21°14.0	142°14.0	24°32.1	206°39.3	-0°31.8	243°06.8	-15°06.3	Akamar	315°12.8	-40°13.0					
8	223°40.5	279°32.0	-21°13.3	157°16.7	24°32.1	221°41.5	-0°31.7	258°09.0	-15°06.2	Menkar	314°07.7	4°10.8					
9	238°42.9	294°31.1	-21°12.7	172°19.5	24°32.1	236°43.6	-0°31.6	273°11.2	-15°06.1	Mirfak	308°30.3	49°56.7					
10	253°45.4	309°30.3	-21°12.0	187°22.3	24°32.0	251°45.8	-0°31.4	288°13.5	-15°06.0	Aldebaran	290°41.2	16°33.3					
11	268°47.8	324°29.5	-21°11.3	202°25.1	24°32.0	266°48.0	-0°31.3	303°15.7	-15°06.0	Rigel	281°05.1	-8°10.6					
12	283°50.3	339°28.7	-21°10.7	217°27.8	24°32.0	281°50.1	-0°31.1	318°17.9	-15°05.9	Capella	280°23.9	46°01.4					
13	298°52.8	354°27.9	-21°10.0	232°30.6	24°31.9	296°52.3	-0°31.0	333°20.1	-15°05.8	Bellatrix	278°24.3	6°22.2					
14	313°55.2	9°27.1	-21°09.4	247°33.4	24°31.9	311°54.5	-0°30.9	348°22.3	-15°05.7	Elnath	278°03.6	28°37.6					
15	328°57.7	24°26.2	-21°08.7	262°36.1	24°31.8	326°56.6	-0°30.7	3°24.5	-15°05.6	Alnilam	275°39.1	-1°11.3					
16	344°00.2	39°25.4	-21°08.0	277°38.9	24°31.8	341°58.8	-0°30.6	18°26.7	-15°05.5	Betelgeuse	270°53.6	7°24.6					
17	359°02.6	54°24.6	-21°07.4	292°41.7	24°31.8	357°01.0	-0°30.4	33°29.0	-15°05.5	Canopus	263°52.6	-52°42.5					
18	14°05.1	69°23.8	-21°06.7	307°44.4	24°31.7	12°03.2	-0°30.3	48°31.2	-15°05.4	Sirius	258°27.3	-16°44.7					
19	29°07.6	84°23.0	-21°06.0	322°47.2	24°31.7	27°05.3	-0°30.2	63°33.4	-15°05.3	Adara	255°06.8	-29°00.2					
20	44°10.0	99°22.2	-21°05.4	337°49.9	24°31.7	42°07.5	-0°30.0	78°35.6	-15°05.2	Procyon	244°52.2	5°10.1					
21	59°12.5	114°21.4	-21°04.7	352°52.7	24°31.6	57°09.7	-0°29.9	93°37.8	-15°05.1	Pollux	243°18.9	27°58.2					
22	74°15.0	129°20.6	-21°04.0	7°55.4	24°31.6	72°11.8	-0°29.8	108°40.0	-15°05.0	Avior	234°14.8	-59°34.8					
23	89°17.4	144°19.8	-21°03.4	22°58.2	24°31.6	87°14.0	-0°29.6	123°42.2	-15°04.9	Suhail	222°47.1	-43°31.4					
Mer.pass.:17:03			v-0.8 d0.6 m-3.8			v2.8 d-0.0 m-1.1			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	104°19.9	159°18.9	-21°02.7	38°00.9	24°31.5	102°16.2	-0°29.5	138°44.4	-15°04.9	Dubhe	193°42.7	61°37.4					
1	119°22.3	174°18.1	-21°02.0	53°03.7	24°31.5	117°18.3	-0°29.3	153°46.6	-15°04.8	Denebola	182°26.5	14°26.6					
2	134°24.8	189°17.3	-21°01.3	68°06.4	24°31.5	132°20.5	-0°29.2	168°48.9	-15°04.7	Gienah	175°45.2	-17°40.0					
3	149°27.3	204°16.5	-21°00.7	83°09.2	24°31.4	147°22.7	-0°29.1	183°51.1	-15°04.6	Acrux	173°01.9	-63°13.2					
4	164°29.7	219°15.7	-20°60.0	98°11.9	24°31.4	162°24.8	-0°28.9	198°53.3	-15°04.5	Gacrux	171°53.4	-57°14.2					
5	179°32.2	234°14.9	-20°59.3	113°14.7	24°31.4	177°27.0	-0°28.8	213°55.5	-15°04.4	Alioth	166°14.5	55°49.9					
6	194°34.7	249°14.1	-20°58.6	128°17.4	24°31.3	192°29.2	-0°28.6	228°57.7	-15°04.3	Spica	158°24.1	-11°16.8					
7	209°37.1	264°13.3	-20°58.0	143°20.1	24°31.3	207°31.3	-0°28.5	243°59.9	-15°04.3	Alcaid	152°53.4	49°11.7					
8	224°39.6	279°12.5	-20°57.3	158°22.9	24°31.3	222°33.5	-0°28.4	259°02.1	-15°04.2	Hadar	148°38.6	-60°28.7					
9	239°42.1	294°11.7	-20°56.6	173°25.6	24°31.2	237°35.7	-0°28.2	274°04.3	-15°04.1	Menkent	147°59.7	-36°28.8					
10	254°44.5	309°10.9	-20°55.9	188°28.4	24°31.2	252°37.8	-0°28.1	289°06.6	-15°04.0	Arcturus	145°49.4	19°04.0					
11	269°47.0	324°10.1	-20°55.2	203°31.1	24°31.2	267°40.0	-0°27.9	304°08.8	-15°03.9	Rigel Kent.	139°42.9	-60°55.5					
12	284°49.4	339°09.3	-20°54.5	218°33.8	24°31.2	282°42.2	-0°27.8	319°11.0	-15°03.8	Zubenelg.	136°58.0	-16°08.1					
13	299°51.9	354°08.5	-20°53.9	233°36.5	24°31.1	297°44.3	-0°27.7	334°13.2	-15°03.7	Kochab	137°20.4	74°03.4					
14	314°54.4	9°07.7	-20°53.2	248°39.3	24°31.1	312°46.5	-0°27.5	349°15.4	-15°03.7	Alphecca	126°05.4	26°38.1					
15	329°56.8	24°06.9	-20°52.5	263°42.0	24°31.1	327°48.7	-0°27.4	4°17.6	-15°03.6	Antares	112°18.2	-26°28.9					
16	344°59.3	39°06.1	-20°51.8	278°44.7	24°31.0	342°50.8	-0°27.2	19°19.8	-15°03.5	Atria	107°14.4	-69°03.9					
17	0°01.8	54°05.3	-20°51.1	293°47.5	24°31.0	357°53.0	-0°27.1	34°22.0	-15°03.4	Sabik	102°05.0	-15°45.2					
18	15°04.2	69°04.5	-20°50.4	308°50.2	24°31.0	12°55.1	-0°26.9	49°24.2	-15°03.3	Shaula	96°13.0	-37°07.1					
19	30°06.7	84°03.7	-20°49.7	323°52.9	24°30.9	27°57.3	-0°26.8	64°26.4	-15°03.2	Rasalhague	96°00.4	12°32.6					
20	45°09.2	99°02.9	-20°49.0	338°55.6	24°30.9	42°59.5	-0°26.7	79°28.7	-15°03.1	Etamin	90°43.5	51°29.0					
21	60°11.6	114°02.1	-20°48.3	353°58.3	24°30.9	58°01.6	-0°26.5	94°30.9	-15°03.1	Kaus Aust.	83°35.1	-34°22.4					
22	75°14.1	129°01.3	-20°47.6	9°01.0	24°30.8	73°03.8	-0°26.4	109°33.1	-15°03.0	Vega	80°34.8	38°48.2					
23	90°16.6	144°00.5	-20°46.9	24°03.8	24°30.8	88°06.0	-0°26.2	124°35.3	-15°02.9	Nunki	75°50.2	-26°16.1					
Mer.pass.:16:59			v-0.8 d0.7 m-3.8			v2.7 d-0.0 m-1.1			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	105°19.0	158°59.7	-20°46.2	39°06.5	24°30.8	103°08.1	-0°26.1	139°37.5	-15°02.8								
1	120°21.5	173°58.9	-20°45.5	54°09.2	24°30.8	118°10.3	-0°26.0	154°39.7	-15°02.7								
2	135°23.9	188°58.1	-20°44.8	69°11.9	24°30.7	133°12.4	-0°25.8	169°41.9	-15°02.6								
3	150°26.4	203°57.3	-20°44.1	84°14.6	24°30.7	148°14.6	-0°25.7	184°44.1	-15°02.5								
4	165°28.9	218°56.5	-20°43.4	99°17.3	24°30.7	163°16.8	-0°25.5	199°46.3	-15°02.5								
5	180°31.3	233°55.7	-20°42.7	114°20.0	24°30.6	178°18.9	-0°25.4	214°48.5	-15°02.4								
6	195°33.8	248°54.9	-20°42.0	129°22.7	24°30.6	193°21.1	-0°25.2	229°50.8	-15°02.3								
7	210°36.3	263°54.1	-20°41.3	144°25.4	24°30.6	208°23.2	-0°25.1	244°53.0	-15°02.2								
8	225°38.7	278°53.3	-20°40.6	159°28.1	24°30.5	223°25.4	-0°25.0	259°55.2	-15°02.1								

Sun				Moon											
Wed	GHA	Dec		GHA	ν	Dec	d	HP		Twilight			Twilight		
0	178°51.2	-22°46.2		34°30.8	10.9	24°30.6	6.7	54.8	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	193°50.9	-22°45.9		49°00.6	10.8	24°37.3	6.6	54.7	72	08:20	10:31	--	--	13:41	15:51
2	208°50.6	-22°45.7		63°30.4	10.8	24°43.7	6.4	54.7	70	08:02	09:43	--	--	14:28	16:09
3	223°50.4	-22°45.4		78°00.2	10.8	24°50.1	6.3	54.7	68	07:47	09:12	11:31	12:40	14:58	16:24
4	238°50.1	-22°45.1		92°30.0	10.7	24°56.4	6.2	54.7	66	07:35	08:50	10:20	13:51	15:21	16:36
5	253°49.8	-22°44.9		106°59.7	10.7	25°02.5	6.1	54.7	64	07:25	08:32	09:45	14:26	15:39	16:46
6	268°49.5	-22°44.6		121°29.3	10.6	25°08.5	5.9	54.7	62	07:16	08:17	09:20	14:51	15:54	16:55
7	283°49.2	-22°44.4		135°58.9	10.6	25°14.4	5.8	54.7	60	07:08	08:04	08:60	15:11	16:07	17:03
8	298°48.9	-22°44.1		150°28.5	10.6	25°20.1	5.7	54.6	58	07:01	07:53	08:44	15:27	16:18	17:10
9	313°48.7	-22°43.9		164°58.1	10.5	25°25.8	5.6	54.6	56	06:55	07:43	08:30	15:41	16:27	17:16
10	328°48.4	-22°43.6		179°27.6	10.5	25°31.3	5.4	54.6	54	06:49	07:35	08:18	15:53	16:36	17:22
11	343°48.1	-22°43.3		193°57.0	10.5	25°36.7	5.3	54.6	52	06:44	07:27	08:07	16:04	16:44	17:27
12	358°47.8	-22°43.1		208°26.5	10.4	25°41.9	5.2	54.6	50	06:39	07:20	07:58	16:13	16:51	17:32
13	13°47.5	-22°42.8		222°55.9	10.4	25°47.1	5.1	54.6	45	06:28	07:05	07:38	16:33	17:06	17:43
14	28°47.2	-22°42.5		237°25.3	10.4	25°52.1	4.9	54.6	40	06:18	06:52	07:22	16:49	17:19	17:53
15	43°47.0	-22°42.3		251°54.6	10.3	25°56.9	4.8	54.5	35	06:09	06:41	07:08	17:02	17:30	18:02
16	58°46.7	-22°42.0		266°23.9	10.3	26°01.7	4.7	54.5	30	06:01	06:30	06:57	17:14	17:40	18:10
17	73°46.4	-22°41.7		280°53.2	10.3	26°06.3	4.6	54.5	20	05:45	06:12	06:36	17:34	17:58	18:26
18	88°46.1	-22°41.5		295°22.4	10.2	26°10.8	4.4	54.5	10	05:29	05:56	06:18	17:52	18:15	18:41
19	103°45.8	-22°41.2		309°51.6	10.2	26°15.2	4.3	54.5	0	05:13	05:39	06:02	18:09	18:31	18:57
20	118°45.5	-22°40.9		324°20.8	10.2	26°19.4	4.2	54.5	-10	04:55	05:22	05:45	18:26	18:49	19:16
21	133°45.3	-22°40.7		338°50.0	10.1	26°23.5	4.0	54.5	-20	04:33	05:02	05:26	18:44	19:08	19:37
22	148°45.0	-22°40.4		353°19.1	10.1	26°27.5	3.9	54.5	-30	04:05	04:38	05:05	19:05	19:32	20:05
23	163°44.7	-22°40.1		7°48.2	10.1	26°31.3	3.8	54.4	-35	03:47	04:23	04:53	19:18	19:47	20:23
SD.=16.3			d=0.3	S.D.=14.9					-40	03:25	04:06	04:38	19:32	20:04	20:45
									-45	02:56	03:44	04:21	19:49	20:26	21:14
									-50	02:13	03:16	03:59	20:11	20:54	21:56
									-52	01:48	03:02	03:49	20:21	21:08	22:21
									-54	01:12	02:45	03:37	20:33	21:25	22:56
									-56	--	02:24	03:24	20:46	21:45	--
									-58	--	01:58	03:08	21:01	22:11	--
									-60	--	01:18	02:49	21:20	22:50	--
									Lat.	Moonrise			Moonset		
									Wed	Thu	Fri	Wed	Thu	Fri	
									72	--	--	--	--	--	--
									70	--	--	--	--	--	--
									68	--	--	--	--	--	--
									66	--	--	--	--	--	--
									64	10:52	--	--	09:05	--	--
									62	11:49	11:60	12:46	08:08	09:44	10:46
									60	12:22	12:48	13:37	07:36	08:56	09:54
									58	12:47	13:18	14:09	07:11	08:26	09:22
									56	13:06	13:42	14:32	06:52	08:03	08:59
									54	13:23	14:01	14:52	06:36	07:44	08:39
									52	13:37	14:17	15:08	06:22	07:28	08:23
									50	13:50	14:30	15:22	06:10	07:14	08:09
									45	14:15	14:59	15:50	05:45	06:46	07:41
									40	14:36	15:21	16:12	05:25	06:24	07:18
									35	14:53	15:39	16:31	05:08	06:06	06:60
									30	15:08	15:55	16:47	04:54	05:51	06:44
									20	15:33	16:22	17:14	04:30	05:24	06:17
									10	15:55	16:45	17:37	04:09	05:01	05:53
									0	16:15	17:07	17:58	03:49	04:40	05:32
									-10	16:36	17:28	18:20	03:30	04:19	05:10
									-20	16:58	17:52	18:43	03:09	03:56	04:47
									-30	17:24	18:19	19:10	02:45	03:30	04:19
									-35	17:39	18:35	19:25	02:31	03:14	04:03
									-40	17:56	18:53	19:44	02:15	02:56	03:45
									-45	18:18	19:16	20:06	01:56	02:35	03:22
									-50	18:45	19:45	20:34	01:31	02:07	02:53
									-52	18:58	19:59	20:48	01:20	01:54	02:39
									-54	19:13	20:15	21:04	01:07	01:38	02:22
									-56	19:31	20:35	21:23	00:52	01:20	02:03
									-58	19:53	20:59	21:46	00:34	00:58	01:38
									-60	20:21	21:32	22:16	00:12	00:29	01:05
									Day	Sun			Moon		
										Eqn. of Time	Mer.	Mer. Pass.		Age	
										00 ^h	12 ^h	Pass	Upper	Lower	
									4	04:35	04:49	12:04	22:27	10:02	12(95%)
									5	05:02	05:16	12:05	23:19	10:53	13(98%)
									6	05:29	05:42	12:05	00:10	11:44	14(100%)
</															

January 07, 08 ,09 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	106°18.2	158°40.7	-20°29.2	40°11.1	24°30.1	103°59.9	-0°22.7	140°30.5	-15°00.7					Alpheratz	357°36.6	29°13.1	
1	121°20.6	173°39.9	-20°28.5	55°13.8	24°30.1	119°02.1	-0°22.5	155°32.7	-15°00.7					Ankaa	353°08.8	-42°11.2	
2	136°23.1	188°39.1	-20°27.7	70°16.5	24°30.0	134°04.2	-0°22.4	170°34.9	-15°00.6					Schedar	349°33.0	56°40.0	
3	151°25.6	203°38.3	-20°27.0	85°19.1	24°30.0	149°06.4	-0°22.2	185°37.1	-15°00.5					Diphda	348°48.9	-17°51.8	
4	166°28.0	218°37.6	-20°26.3	100°21.8	24°30.0	164°08.6	-0°22.1	200°39.3	-15°00.4					Achernar	335°21.4	-57°07.5	
5	181°30.5	233°36.8	-20°25.6	115°24.5	24°30.0	179°10.7	-0°21.9	215°41.6	-15°00.3					Hamal	327°53.0	23°34.3	
6	196°32.9	248°36.0	-20°24.8	130°27.1	24°29.9	194°12.9	-0°21.8	230°43.8	-15°00.2					Polaris	314°34.4	89°21.9	
7	211°35.4	263°35.2	-20°24.1	145°29.8	24°29.9	209°15.0	-0°21.7	245°46.0	-15°00.1					Akamar	315°12.8	-40°13.0	
8	226°37.9	278°34.4	-20°23.4	160°32.5	24°29.9	224°17.2	-0°21.5	260°48.2	-15°00.0					Menkar	314°07.7	4°10.8	
9	241°40.3	293°33.7	-20°22.6	175°35.1	24°29.9	239°19.3	-0°21.4	275°50.4	-14°60.0					Mirfak	308°30.3	49°56.7	
10	256°42.8	308°32.9	-20°21.9	190°37.8	24°29.8	254°21.5	-0°21.2	290°52.6	-14°59.9					Aldebaran	290°41.2	16°33.3	
11	271°45.3	323°32.1	-20°21.2	205°40.5	24°29.8	269°23.6	-0°21.1	305°54.8	-14°59.8					Rigel	281°05.1	-8°10.6	
12	286°47.7	338°31.3	-20°20.4	220°43.1	24°29.8	284°25.8	-0°20.9	320°57.0	-14°59.7					Capella	280°23.9	46°01.4	
13	301°50.2	353°30.6	-20°19.7	235°45.8	24°29.8	299°27.9	-0°20.8	335°59.2	-14°59.6					Bellatrix	278°24.3	6°22.2	
14	316°52.7	8°29.8	-20°19.0	250°48.4	24°29.7	314°30.1	-0°20.6	351°01.4	-14°59.5					Elnath	278°03.6	28°37.6	
15	331°55.1	23°29.0	-20°18.2	265°51.1	24°29.7	329°32.3	-0°20.5	6°03.6	-14°59.4					Alnilam	275°39.1	-1°11.3	
16	346°57.6	38°28.2	-20°17.5	280°53.7	24°29.7	344°34.4	-0°20.4	21°05.8	-14°59.4					Betelgeuse	270°53.5	7°24.6	
17	2°00.1	53°27.4	-20°16.7	295°56.4	24°29.7	359°36.6	-0°20.2	36°08.0	-14°59.3					Canopus	263°52.6	-52°42.5	
18	17°02.5	68°26.7	-20°16.0	310°59.0	24°29.6	14°38.7	-0°20.1	51°10.2	-14°59.2					Sirius	258°27.2	-16°44.7	
19	32°05.0	83°25.9	-20°15.3	326°01.7	24°29.6	29°40.9	-0°19.9	66°12.5	-14°59.1					Adara	255°06.8	-29°00.2	
20	47°07.4	98°25.1	-20°14.5	341°04.3	24°29.6	44°43.0	-0°19.8	81°14.7	-14°59.0					Procyon	244°52.1	5°10.1	
21	62°09.9	113°24.4	-20°13.8	356°07.0	24°29.6	59°45.2	-0°19.6	96°16.9	-14°58.9					Pollux	243°18.8	27°58.2	
22	77°12.4	128°23.6	-20°13.0	11°09.6	24°29.5	74°47.3	-0°19.5	111°19.1	-14°58.8					Avior	234°14.8	-59°34.8	
23	92°14.8	143°22.8	-20°12.3	26°12.2	24°29.5	89°49.5	-0°19.3	126°21.3	-14°58.7					Suhail	222°47.1	-43°31.4	
Mer.pass.:16:52			v-0.8 d0.7 m-3.8			v2.7 d-0.0 m-1.0			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	107°17.3	158°22.0	-20°11.5	41°14.9	24°29.5	104°51.6	-0°19.2	141°23.5	-14°58.7					Dubhe	193°42.7	61°37.4	
1	122°19.8	173°21.3	-20°10.8	56°17.5	24°29.5	119°53.8	-0°19.0	156°25.7	-14°58.6					Denebola	182°26.4	14°26.6	
2	137°22.2	188°20.5	-20°10.0	71°20.1	24°29.4	134°55.9	-0°18.9	171°27.9	-14°58.5					Gienah	175°45.2	-17°40.1	
3	152°24.7	203°19.7	-20°09.3	86°22.8	24°29.4	149°58.1	-0°18.7	186°30.1	-14°58.4					Acrux	173°01.8	-63°13.2	
4	167°27.2	218°19.0	-20°08.5	101°25.4	24°29.4	165°00.2	-0°18.6	201°32.3	-14°58.3					Gacrux	171°53.4	-57°14.2	
5	182°29.6	233°18.2	-20°07.8	116°28.0	24°29.4	180°02.4	-0°18.4	216°34.5	-14°58.2					Alioth	166°14.5	55°49.8	
6	197°32.1	248°17.4	-20°07.0	131°30.7	24°29.4	195°04.5	-0°18.3	231°36.7	-14°58.1					Spica	158°24.1	-11°16.8	
7	212°34.6	263°16.7	-20°06.3	146°33.3	24°29.3	210°06.7	-0°18.2	246°38.9	-14°58.0					Alcaid	152°53.4	49°11.7	
8	227°37.0	278°15.9	-20°05.5	161°35.9	24°29.3	225°08.8	-0°18.0	261°41.1	-14°58.0					Hadar	148°38.5	-60°28.7	
9	242°39.5	293°15.1	-20°04.8	176°38.6	24°29.3	240°11.0	-0°17.9	276°43.3	-14°57.9					Menkent	147°59.7	-36°28.8	
10	257°41.9	308°14.4	-20°04.0	191°41.2	24°29.3	255°13.1	-0°17.7	291°45.5	-14°57.8					Arcturus	145°49.4	19°03.9	
11	272°44.4	323°13.6	-20°03.3	206°43.8	24°29.2	270°15.3	-0°17.6	306°47.8	-14°57.7					Rigel Kent.	139°42.9	-60°55.5	
12	287°46.9	338°12.8	-20°02.5	221°46.4	24°29.2	285°17.4	-0°17.4	321°50.0	-14°57.6					Zubenelg.	136°58.0	-16°08.1	
13	302°49.3	353°12.1	-20°01.7	236°49.0	24°29.2	300°19.6	-0°17.3	336°52.2	-14°57.5					Kochab	137°20.3	74°03.4	
14	317°51.8	8°11.3	-20°01.0	251°51.7	24°29.2	315°21.7	-0°17.1	351°54.4	-14°57.4					Alphecca	126°05.4	26°38.1	
15	332°54.3	23°10.5	-20°00.2	266°54.3	24°29.2	330°23.8	-0°17.0	6°56.6	-14°57.3					Antares	112°18.1	-26°28.9	
16	347°56.7	38°09.8	-19°59.4	281°56.9	24°29.1	345°26.0	-0°16.8	21°58.8	-14°57.3					Atria	107°14.4	-69°03.9	
17	2°59.2	53°09.0	-19°58.7	296°59.5	24°29.1	0°28.1	-0°16.7	37°01.0	-14°57.2					Sabik	102°05.0	-15°45.2	
18	18°01.7	68°08.3	-19°57.9	312°02.1	24°29.1	15°30.3	-0°16.5	52°03.2	-14°57.1					Shaula	96°13.0	-37°07.1	
19	33°04.1	83°07.5	-19°57.2	327°04.7	24°29.1	30°32.4	-0°16.4	67°05.4	-14°57.0					Rasalhague	96°00.4	12°32.6	
20	48°06.6	98°06.7	-19°56.4	342°07.3	24°29.1	45°34.6	-0°16.2	82°07.6	-14°56.9					Etamin	90°43.5	51°29.0	
21	63°09.0	113°06.0	-19°55.6	357°09.9	24°29.0	60°36.7	-0°16.1	97°09.8	-14°56.8					Kaus Aust.	83°35.1	-34°22.4	
22	78°11.5	128°05.2	-19°54.8	12°12.5	24°29.0	75°38.9	-0°15.9	112°12.0	-14°56.7					Vega	80°34.8	38°48.2	
23	93°14.0	143°04.5	-19°54.1	27°15.1	24°29.0	90°41.0	-0°15.8	127°14.2	-14°56.6					Nunki	75°50.2	-26°16.1	
Mer.pass.:16:48			v-0.8 d0.7 m-3.8			v2.6 d-0.0 m-1.0			v2.2 d0.1 m-2.2			v2.2 d0.1 m0.8					
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	108°16.4	158°03.7	-19°53.3	42°17.7	24°29.0	105°43.2	-0°15.6	142°16.4	-14°56.6					2023/1/7	SHA	Mer.pass	
1	123°18.9	173°02.9	-19°52.5	57°20.3	24°29.0	120°45.3	-0°15.5	157°18.6	-14°56.5					Venus	52°22.5	13:26	
2	138°21.4	188°02.2	-19°51.8	72°22.9	24°28.9	135°47.4	-0°15.3	172°20.8	-14°56.4					Mars	293°53.0	21:15	
3	153°23.8	203°01.4	-19°51.0	87°25.5	24°28.9	150°49.6	-0°15.2	187°23.0	-14°56.3					Jupiter	357°41.8	17:02	
4	168°26.3	218°00.7	-19°50.2	102°28.1	24°28.9	165°51.7	-0°15.0	202°25.2	-14°56.2					Saturn	34°12.4	14:36	
5	183°28.8	232°59.9	-19°49.4	117°30.7	24°28.9	180°53.9	-0°14.9	217°27.4	-14°56.1					2023/1/8	SHA	Mer.pass	
6	198°31.2	247°59.2	-19°48.7	132°33.3	24°28.9	195°56.0	-0°14.7	232°29.6	-14°56.0					Venus	51°04.7	13:27	
7	213°33.7	262°58.4	-19°47.9	147°35.9	24°28.8	210°58.2	-0°14.6	247°31.8	-14°55.9					Mars	293°57.6	21:11	
8	228°36.2	277°57.7	-19°47.1	162°38.5	24°28.8	226°00.3	-0°14.4	262°34.0	-14°55.9					Jupiter	357°34.3	16:58	
9	243°38.6	292°56.9	-19°46.3	177°41.1	24°28.8	241°02.5	-0°14.3	277°36.3	-14°55.8					Saturn	34°06.2	14:32	
10	258°41.1	307°56.2	-19°45.5	192°43.7	24°28.8	256°04.6	-0°14.1	292°38.5	-14°55.7					2023/1/9			

h		Sun		Moon					
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	178°31.2	-22°25.9	357°27.5	10.3	26°55.7	-2.8	54.0	72	Naut. Civil Sunrise Sunset Civil Naut.
1	193°30.9	-22°25.6	11°56.8	10.3	26°52.9	-2.9	54.0	70	08:15 10:20 -- -- -- 13:54 15:59
2	208°30.6	-22°25.3	26°26.2	10.4	26°50.0	-3.0	54.0	68	07:58 09:37 -- -- -- 14:37 16:16
3	223°30.4	-22°25.0	40°55.6	10.4	26°46.9	-3.1	54.0	66	07:44 09:08 11:10 13:03 15:06 16:29
4	238°30.1	-22°24.6	55°25.0	10.5	26°43.7	-3.3	54.0	64	07:33 08:46 10:13 14:00 15:27 16:41
5	253°29.8	-22°24.3	69°54.5	10.5	26°40.4	-3.4	54.0	62	07:23 08:29 09:40 14:33 15:45 16:51
6	268°29.6	-22°24.0	84°24.0	10.5	26°36.9	-3.5	54.0	60	07:14 08:14 09:16 14:57 15:59 16:59
7	283°29.3	-22°23.7	98°53.6	10.6	26°33.3	-3.6	54.0	58	07:07 08:02 08:57 15:16 16:11 17:07
8	298°29.0	-22°23.4	113°23.1	10.6	26°29.6	-3.8	54.0	56	06:60 07:51 08:41 15:32 16:22 17:14
9	313°28.8	-22°23.1	127°52.8	10.7	26°25.8	-3.9	54.0	54	06:54 07:42 08:28 15:46 16:31 17:20
10	328°28.5	-22°22.8	142°22.4	10.7	26°21.8	-4.0	54.0	52	06:48 07:34 08:16 15:57 16:40 17:25
11	343°28.2	-22°22.4	156°52.2	10.7	26°17.7	-4.1	54.0	50	06:43 07:26 08:06 16:07 16:47 17:30
12	358°28.0	-22°22.1	171°21.9	10.8	26°13.5	-4.3	54.0	48	06:38 07:19 07:57 16:17 16:54 17:35
13	13°27.7	-22°21.8	185°51.7	10.8	26°09.2	-4.4	54.0	46	06:28 07:04 07:38 16:36 17:09 17:46
14	28°27.4	-22°21.5	200°21.6	10.9	26°04.7	-4.5	54.0	44	06:18 06:52 07:22 16:51 17:22 17:55
15	43°27.1	-22°21.2	214°51.5	10.9	26°00.1	-4.6	54.0	42	06:09 06:41 07:09 17:05 17:33 18:04
16	58°26.9	-22°20.8	229°21.4	11.0	25°55.4	-4.8	54.0	40	06:01 06:31 06:57 17:16 17:42 18:12
17	73°26.6	-22°20.5	243°51.4	11.0	25°50.6	-4.9	54.0	38	05:46 06:13 06:37 17:36 18:00 18:27
18	88°26.3	-22°20.2	258°21.4	11.1	25°45.7	-5.0	54.0	36	05:31 05:57 06:19 17:54 18:16 18:43
19	103°26.1	-22°19.9	272°51.5	11.1	25°40.6	-5.1	54.0	34	05:15 05:41 06:03 18:10 18:33 18:59
20	118°25.8	-22°19.5	287°21.7	11.2	25°35.4	-5.2	54.0	32	04:57 05:23 05:46 18:27 18:50 19:16
21	133°25.5	-22°19.2	301°51.9	11.2	25°30.1	-5.4	54.0	30	04:35 05:04 05:28 18:45 19:09 19:38
22	148°25.3	-22°18.9	316°22.1	11.3	25°24.7	-5.5	54.0	28	04:07 04:40 05:07 19:05 19:33 20:05
23	163°25.0	-22°18.6	330°52.4	11.3	25°19.2	-5.6	54.0	26	03:50 04:26 04:55 19:18 19:47 20:23
SD.=16.3		d=0.3	S.D.=14.7					24	03:28 04:09 04:41 19:32 20:04 20:44
								22	02:60 03:48 04:24 19:49 20:25 21:13
								20	02:19 03:20 04:03 20:10 20:52 21:53
								18	01:55 03:06 03:53 20:20 21:06 22:16
								16	01:22 02:50 03:42 20:31 21:22 22:49
								14	-- 02:30 03:29 20:44 21:42 --
								12	-- 02:05 03:13 20:59 22:06 --
								10	-- 01:29 02:55 21:17 22:42 --
								Lat.	Moonrise Moonset
								Sat Sun Mon Sat Sun Mon	
								72 -- -- -- -- -- --	
								70 -- -- -- -- -- --	
								68 -- -- 15:59 -- -- 12:38	
								66 -- 14:10 16:39 -- 12:50 11:57	
								64 -- 15:17 17:07 -- 11:43 11:28	
								62 14:13 15:51 17:28 11:04 11:07 11:07	
								60 14:51 16:17 17:45 10:26 10:41 10:49	
								58 15:17 16:37 17:59 09:59 10:21 10:34	
								56 15:38 16:53 18:11 09:38 10:04 10:21	
								54 15:55 17:07 18:22 09:21 09:50 10:10	
								52 16:10 17:19 18:31 09:06 09:37 10:00	
								50 16:23 17:30 18:40 08:53 09:26 09:51	
								48 16:49 17:52 18:57 08:26 09:03 09:32	
								46 17:10 18:10 19:12 08:05 08:44 09:17	
								44 17:27 18:25 19:24 07:47 08:29 09:04	
								42 17:42 18:38 19:34 07:32 08:15 08:52	
								40 18:07 19:00 19:52 07:06 07:52 08:33	
								38 18:28 19:19 20:08 06:44 07:31 08:16	
								36 18:49 19:37 20:23 06:23 07:12 07:59	
								34 19:09 19:55 20:37 06:02 06:53 07:43	
								32 19:30 20:13 20:53 05:39 06:33 07:26	
								30 19:55 20:35 21:11 05:13 06:09 07:05	
								28 20:10 20:48 21:21 04:57 05:55 06:53	
								26 20:27 21:02 21:33 04:39 05:38 06:40	
								24 20:47 21:20 21:46 04:17 05:19 06:23	
								22 21:12 21:41 22:03 03:50 04:54 06:03	
								20 21:24 21:51 22:11 03:36 04:42 05:53	
								18 21:38 22:02 22:19 03:20 04:29 05:43	
								16 21:54 22:15 22:29 03:02 04:13 05:30	
								14 22:14 22:30 22:40 02:39 03:54 05:16	
								12 22:38 22:48 22:53 02:08 03:30 04:59	
								Day	Sun Mer. Moon Age
								Eqn.of Time 00 ^h 12 ^h Pass Upper Lower	
								7 05:55 06:08 12:06 00:10 12:35 15(100%)	
								8 06:21 06:34 12:06 01:00 13:24 16(98%)	
								9 06:46 06:59 12:06 01:48 14:11 17(94%)	
			</						

January 10, 11 ,12 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	109°15.6	157°45.7	-19°34.5	43°19.7	24°28.5	106°34.6	-0°12.0	143°09.3	-14°54.4	Alpheratz	357°36.6	29°13.1					
1	124°18.0	172°44.9	-19°33.7	58°22.3	24°28.5	121°36.7	-0°11.9	158°11.5	-14°54.3	Ankaa	353°08.9	-42°11.2					
2	139°20.5	187°44.2	-19°32.9	73°24.9	24°28.5	136°38.8	-0°11.7	173°13.7	-14°54.3	Schedar	349°33.0	56°40.0					
3	154°23.0	202°43.5	-19°32.1	88°27.4	24°28.5	151°41.0	-0°11.6	188°15.9	-14°54.2	Diphda	348°48.9	-17°51.8					
4	169°25.4	217°42.7	-19°31.3	103°30.0	24°28.5	166°43.1	-0°11.4	203°18.1	-14°54.1	Achernar	335°21.4	-57°07.5					
5	184°27.9	232°42.0	-19°30.5	118°32.6	24°28.5	181°45.3	-0°11.3	218°20.3	-14°54.0	Hamal	327°53.0	23°34.3					
6	199°30.4	247°41.2	-19°29.7	133°35.1	24°28.4	196°47.4	-0°11.1	233°22.5	-14°53.9	Polaris	314°35.7	89°21.9					
7	214°32.8	262°40.5	-19°28.9	148°37.7	24°28.4	211°49.5	-0°11.0	248°24.7	-14°53.8	Akamar	315°12.8	-40°13.0					
8	229°35.3	277°39.8	-19°28.1	163°40.2	24°28.4	226°51.7	-0°10.8	263°26.9	-14°53.7	Menkar	314°07.7	4°10.8					
9	244°37.8	292°39.0	-19°27.3	178°42.8	24°28.4	241°53.8	-0°10.7	278°29.1	-14°53.6	Mirfak	308°30.3	49°56.7					
10	259°40.2	307°38.3	-19°26.5	193°45.3	24°28.4	256°56.0	-0°10.5	293°31.3	-14°53.6	Aldebaran	290°41.2	16°33.3					
11	274°42.7	322°37.5	-19°25.7	208°47.9	24°28.4	271°58.1	-0°10.4	308°33.5	-14°53.5	Rigel	281°05.1	-8°10.6					
12	289°45.2	337°36.8	-19°24.9	223°50.4	24°28.4	287°00.2	-0°10.2	323°35.7	-14°53.4	Capella	280°23.9	46°01.4					
13	304°47.6	352°36.1	-19°24.1	238°53.0	24°28.3	302°02.4	-0°10.1	338°37.9	-14°53.3	Bellatrix	278°24.3	6°22.2					
14	319°50.1	7°35.3	-19°23.3	253°55.5	24°28.3	317°04.5	-0°09.9	353°40.1	-14°53.2	Elnath	278°03.6	28°37.6					
15	334°52.5	22°34.6	-19°22.5	268°58.1	24°28.3	332°06.6	-0°09.8	8°42.3	-14°53.1	Alnilam	275°39.1	-1°11.3					
16	349°55.0	37°33.9	-19°21.6	284°00.6	24°28.3	347°08.8	-0°09.6	23°44.5	-14°53.0	Betelgeuse	270°53.5	7°24.6					
17	4°57.5	52°33.1	-19°20.8	299°03.1	24°28.3	2°10.9	-0°09.5	38°46.7	-14°52.9	Canopus	263°52.6	-52°42.5					
18	19°59.9	67°32.4	-19°20.0	314°05.7	24°28.3	17°13.0	-0°09.3	53°48.9	-14°52.8	Sirius	258°27.2	-16°44.7					
19	35°02.4	82°31.7	-19°19.2	329°08.2	24°28.3	32°15.2	-0°09.2	68°51.1	-14°52.8	Adara	255°06.8	-29°00.2					
20	50°04.9	97°30.9	-19°18.4	344°10.7	24°28.2	47°17.3	-0°09.0	83°53.3	-14°52.7	Procyon	244°52.1	5°10.1					
21	65°07.3	112°30.2	-19°17.6	359°13.3	24°28.2	62°19.4	-0°08.9	98°55.5	-14°52.6	Pollux	243°18.8	27°58.2					
22	80°09.8	127°29.5	-19°16.8	14°15.8	24°28.2	77°21.6	-0°08.7	113°57.7	-14°52.5	Avior	234°14.8	-59°34.9					
23	95°12.3	142°28.7	-19°15.9	29°18.3	24°28.2	92°23.7	-0°08.5	128°59.9	-14°52.4	Suhail	222°47.1	-43°31.4					
Mer.pass.:16:40			v-0.7 d0.8 m-3.8			v2.6 d-0.0 m-0.9			v2.1 d0.2 m-2.2			v2.2 d0.1 m0.8					

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec						
0	110°14.7	157°28.0	-19°15.1	44°20.9	24°28.2	107°25.8	-0°08.4	144°02.1	-14°52.3	Dubhe	193°42.6	61°37.4					
1	125°17.2	172°27.3	-19°14.3	59°23.4	24°28.2	122°28.0	-0°08.2	159°04.3	-14°52.2	Denebola	182°26.4	14°26.6					
2	140°19.6	187°26.5	-19°13.5	74°25.9	24°28.2	137°30.1	-0°08.1	174°06.5	-14°52.1	Gienah	175°45.2	-17°40.1					
3	155°22.1	202°25.8	-19°12.7	89°28.5	24°28.2	152°32.2	-0°07.9	189°08.7	-14°52.0	Acrux	173°01.8	-63°13.3					
4	170°24.6	217°25.1	-19°11.8	104°31.0	24°28.1	167°34.4	-0°07.8	204°10.9	-14°52.0	Gacrux	171°53.4	-57°14.2					
5	185°27.0	232°24.4	-19°11.0	119°33.5	24°28.1	182°36.5	-0°07.6	219°13.1	-14°51.9	Alioth	166°14.4	55°49.8					
6	200°29.5	247°23.6	-19°10.2	134°36.0	24°28.1	197°38.6	-0°07.5	234°15.3	-14°51.8	Spica	158°24.0	-11°16.8					
7	215°32.0	262°22.9	-19°09.4	149°38.5	24°28.1	212°40.8	-0°07.3	249°17.5	-14°51.7	Alcaid	152°53.4	49°11.7					
8	230°34.4	277°22.2	-19°08.6	164°41.1	24°28.1	227°42.9	-0°07.2	264°19.7	-14°51.6	Hadar	148°38.5	-60°28.7					
9	245°36.9	292°21.5	-19°07.7	179°43.6	24°28.1	242°45.0	-0°07.0	279°21.9	-14°51.5	Menkent	147°59.7	-36°28.8					
10	260°39.4	307°20.7	-19°06.9	194°46.1	24°28.1	257°47.2	-0°06.9	294°24.2	-14°51.4	Arcturus	145°49.4	19°03.9					
11	275°41.8	322°20.0	-19°06.1	209°48.6	24°28.1	272°49.3	-0°06.7	309°26.4	-14°51.3	Rigel Kent.	139°42.8	-60°55.5					
12	290°44.3	337°19.3	-19°05.2	224°51.1	24°28.0	287°51.4	-0°06.5	324°28.6	-14°51.2	Zubenelg.	136°58.0	-16°08.2					
13	305°46.8	352°18.6	-19°04.4	239°53.6	24°28.0	302°53.6	-0°06.4	339°30.8	-14°51.1	Kochab	137°20.3	74°03.3					
14	320°49.2	7°17.8	-19°03.6	254°56.1	24°28.0	317°55.7	-0°06.2	354°33.0	-14°51.1	Alphecca	126°05.4	26°38.1					
15	335°51.7	22°17.1	-19°02.7	269°58.6	24°28.0	332°57.8	-0°06.1	9°35.2	-14°51.0	Antares	112°18.1	-26°28.9					
16	350°54.1	37°16.4	-19°01.9	285°01.2	24°28.0	347°60.0	-0°05.9	24°37.4	-14°50.9	Atria	107°14.3	-69°03.9					
17	5°56.6	52°15.7	-19°01.1	300°03.7	24°28.0	3°02.1	-0°05.8	39°39.6	-14°50.8	Sabik	102°05.0	-15°45.2					
18	20°59.1	67°15.0	-19°00.2	315°06.2	24°28.0	18°04.2	-0°05.6	54°41.8	-14°50.7	Shaula	96°13.0	-37°07.1					
19	36°01.5	82°14.2	-18°59.4	330°08.7	24°28.0	33°06.4	-0°05.5	69°43.9	-14°50.6	Rasalhague	96°00.4	12°32.5					
20	51°04.0	97°13.5	-18°58.6	345°11.2	24°28.0	48°08.5	-0°05.3	84°46.1	-14°50.5	Etamin	90°43.4	51°29.0					
21	66°06.5	112°12.8	-18°57.7	0°13.7	24°28.0	63°10.6	-0°05.2	99°48.3	-14°50.4	Kaus Aust.	83°35.1	-34°22.4					
22	81°08.9	127°12.1	-18°56.9	15°16.2	24°27.9	78°12.7	-0°05.0	114°50.5	-14°50.3	Vega	80°34.8	38°48.1					
23	96°11.4	142°11.4	-18°56.1	30°18.7	24°27.9	93°14.9	-0°04.8	129°52.7	-14°50.2	Nunki	75°50.2	-26°16.1					
Mer.pass.:16:36			v-0.7 d0.8 m-3.8			v2.5 d-0.0 m-0.9			v2.1 d0.2 m-2.2			v2.2 d0.1 m0.8					

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec						
0	111°13.9	157°10.6	-18°55.2	45°21.1	24°27.9	108°17.0	-0°04.7	144°54.9	-14°50.2	Alnair	27°35.4	-46°51.2					
1	126°16.3	172°09.9	-18°54.4	60°23.6	24°27.9	123°19.1	-0°04.5	159°57.1	-14°50.1	Fomalhaut	15°16.6	-29°30.2					
2	141°18.8	187°09.2	-18°53.5	75°26.1	24°27.9	138°21.3	-0°04.4	174°59.3	-14°50.0	Scheat	13°47.0	28°12.5					
3	156°21.3	202°08.5	-18°52.7	90°28.6	24°27.9	153°23.4	-0°04.2	190°01.5	-14°49.9	Markab	13°31.7	15°19.7					
4	171°23.7	217°07.8	-18°51.8	105°31.1	24°27.9	168°25.5	-0°04.1	205°03.7	-14°49.8								
5	186°26.2	232°07.1	-18°51.0	120°33.6	24°27.9	183°27.6	-0°03.9	220°05.9	-14°49.7								
6	201°28.6	247°06.4	-18°50.1	135°36.1	24°27.9	198°29.8	-0°03.8	235°08.1	-14°49.6								
7	216°31.1	262°05.6	-18°49.3	150°38.6	24°27.9	213°31.9	-0°03.6	250°10.3	-14°49.5								
8	231																

Sun				Moon											
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	178°12.2	-22°01.6		322°47.3	14.2	18°40.7	-10.4	54.1	72	08:10	10:08	—:—	—:—	14:08	16:07
1	193°12.0	-22°01.3		337°20.5	14.2	18°30.3	-10.4	54.1	70	07:54	09:29	—:—	—:—	14:47	16:23
2	208°11.7	-22°00.9		351°53.7	14.3	18°19.8	-10.5	54.1	68	07:40	09:02	10:54	13:22	15:14	16:36
3	223°11.5	-22°00.5		6°27.0	14.3	18°09.2	-10.6	54.1	66	07:29	08:42	10:05	14:11	15:34	16:47
4	238°11.2	-22°00.2		21°00.4	14.4	17°58.6	-10.7	54.1	64	07:20	08:25	09:35	14:41	15:51	16:56
5	253°11.0	-21°59.8		35°33.8	14.4	17°47.9	-10.7	54.1	62	07:12	08:11	09:12	15:04	16:05	17:04
6	268°10.7	-21°59.4		50°07.2	14.5	17°37.1	-10.8	54.1	60	07:05	07:59	08:54	15:22	16:17	17:11
7	283°10.5	-21°59.1		64°40.7	14.5	17°26.3	-10.9	54.1	58	06:58	07:49	08:38	15:38	16:27	17:18
8	298°10.2	-21°58.7		79°14.3	14.6	17°15.3	-11.0	54.1	56	06:52	07:40	08:26	15:50	16:36	17:24
9	313°10.0	-21°58.3		93°47.9	14.6	17°04.3	-11.0	54.1	54	06:47	07:32	08:14	16:02	16:44	17:29
10	328°09.7	-21°58.0		108°21.6	14.7	16°53.3	-11.1	54.2	52	06:42	07:25	08:04	16:12	16:51	17:34
11	343°09.4	-21°57.6		122°55.3	14.7	16°42.1	-11.2	54.2	50	06:37	07:18	07:55	16:20	16:58	17:39
12	358°09.2	-21°57.2		137°29.0	14.8	16°30.9	-11.2	54.2	45	06:27	07:04	07:37	16:39	17:12	17:49
13	13°08.9	-21°56.8		152°02.9	14.8	16°19.7	-11.3	54.2	40	06:18	06:51	07:21	16:55	17:24	17:58
14	28°08.7	-21°56.5		166°36.7	14.9	16°08.3	-11.4	54.2	35	06:09	06:41	07:08	17:07	17:35	18:06
15	43°08.4	-21°56.1		181°10.6	14.9	15°56.9	-11.4	54.2	30	06:01	06:31	06:57	17:19	17:45	18:14
16	58°08.2	-21°55.7		195°44.6	15.0	15°45.4	-11.5	54.2	20	05:46	06:14	06:37	17:38	18:02	18:29
17	73°07.9	-21°55.3		210°18.6	15.0	15°33.9	-11.6	54.2	10	05:32	05:58	06:20	17:55	18:18	18:44
18	88°07.7	-21°55.0		224°52.6	15.1	15°22.3	-11.6	54.2	0	05:16	05:42	06:04	18:11	18:34	18:60
19	103°07.4	-21°54.6		239°26.7	15.1	15°10.6	-11.7	54.2	-10	04:58	05:25	05:48	18:28	18:50	19:17
20	118°07.2	-21°54.2		254°00.8	15.2	14°58.9	-11.8	54.2	-20	04:37	05:06	05:30	18:45	19:09	19:38
21	133°06.9	-21°53.8		268°35.0	15.2	14°47.1	-11.8	54.3	-30	04:10	04:43	05:10	19:05	19:32	20:05
22	148°06.7	-21°53.5		283°09.2	15.2	14°35.2	-11.9	54.3	-35	03:53	04:29	04:58	19:17	19:46	20:22
23	163°06.4	-21°53.1		297°43.5	15.3	14°23.3	-11.9	54.3	-40	03:32	04:12	04:44	19:31	20:03	20:43
SD.=16.3			d=0.4	S.D.=14.8											
								-45	03:04	03:51	04:28	19:48	20:24	21:11	
								-50	02:25	03:25	04:07	20:08	20:50	21:50	
								-52	02:02	03:11	03:57	20:18	21:03	22:12	
								-54	01:32	02:55	03:46	20:29	21:19	22:41	
								-56	00:29	02:37	03:34	20:41	21:38	23:37	
								-58	—:—	02:13	03:19	20:56	22:01	—:—	
								-60	—:—	01:40	03:01	21:13	22:33	—:—	
								Lat.	Moonrise			Moonset			
									Tue	Wed	Thu	Tue	Wed	Thu	
								72	17:06	19:32	21:36	13:06	12:08	11:32	
								70	17:45	19:49	21:42	12:26	11:49	11:23	
								68	18:11	20:02	21:47	11:58	11:34	11:16	
								66	18:31	20:13	21:51	11:36	11:22	11:09	
								64	18:47	20:22	21:54	11:19	11:11	11:04	
								62	19:00	20:30	21:57	11:05	11:02	10:59	
								60	19:12	20:36	21:60	10:53	10:55	10:55	
								58	19:21	20:42	22:02	10:42	10:48	10:52	
								56	19:30	20:47	22:04	10:33	10:42	10:49	
								54	19:37	20:52	22:06	10:25	10:36	10:46	
								52	19:44	20:56	22:07	10:18	10:31	10:43	
								50	19:50	20:59	22:09	10:11	10:27	10:41	
								45	20:03	21:07	22:12	09:57	10:17	10:36	
								40	20:13	21:14	22:15	09:45	10:09	10:31	
								35	20:22	21:20	22:17	09:35	10:02	10:27	
								30	20:30	21:25	22:19	09:26	09:56	10:24	
								20	20:43	21:33	22:23	09:10	09:45	10:18	
								10	20:55	21:41	22:26	08:57	09:35	10:13	
								0	21:06	21:48	22:29	08:44	09:26	10:08	
								-10	21:17	21:55	22:32	08:31	09:17	10:03	
								-20	21:29	22:02	22:35	08:17	09:08	09:57	
								-30	21:42	22:11	22:38	08:01	08:57	09:51	
								-35	21:50	22:16	22:40	07:52	08:50	09:47	
								-40	21:58	22:21	22:43	07:41	08:43	09:43	
								-45	22:08	22:28	22:45	07:29	08:34	09:39	
								-50	22:20	22:35	22:49	07:13	08:23	09:33	
								-52	22:26	22:39	22:50	07:06	08:18	09:30	
								-54	22:32	22:43	22:52	06:58	08:13	09:27	
								-56	22:39	22:47	22:53	06:49	08:07	09:24	
								-58	22:47	22:51	22:55	06:39	08:00	09:20	
								-60	22:55	22:57	22:57	06:27	07:52	09:16	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								10	07:11	07:23	12:07	02:33	14:55	18(89%)	
								11	07:35	07:47	12:07	03:16	15:37	19(83%)	
								12	07:59	08:11	12:08	03:57	16:18	20(75%)	
SD.=16.3			d=0.4	S.D.=14.9											

January 13, 14 ,15 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA		Dec	
0	112°13.0	156°53.6	-18°34.8	46°20.6	24°27.8	109°08.0	-0°00.9	145°47.7	-14°48.0	Alpheratz 357°36.6 29°13.1 Ankaa 353°08.9 -42°11.2 Schedar 349°33.0 56°40.0 Diphda 348°48.9 -17°51.8 Achernar 335°21.4 -57°07.5 Hamal 327°53.0 23°34.3 Polaris 314°37.1 89°21.9 Akamar 315°12.8 -40°13.0 Menkar 314°07.7 4°10.7 Mirfak 308°30.3 49°56.7 Aldebaran 290°41.3 16°33.3 Rigel 281°05.2 -8°10.6 Capella 280°23.9 46°01.4 Bellatrix 278°24.3 6°22.2 Elnath 278°03.6 28°37.6 Alnilam 275°39.1 -1°11.3 Betelgeuse 270°53.6 7°24.6 Canopus 263°52.6 -52°42.5 Sirius 258°27.2 -16°44.7 Adara 255°06.8 -29°00.2 Procyon 244°52.1 5°10.1 Pollux 243°18.8 27°58.2 Avior 234°14.8 -59°34.9 Suhail 222°47.1 -43°31.4 Miaplacidus 221°37.8 -69°48.5 Alphard 217°49.1 -8°45.5 Regulus 207°35.9 11°51.2 Dubhe 193°42.6 61°37.4 Denebola 182°26.4 14°26.5 Gienah 175°45.1 -17°40.1 Acrux 173°01.7 -63°13.3 Gacrux 171°53.3 -57°14.2 Alioth 166°14.4 55°49.8 Spica 158°24.0 -11°16.8 Alcaid 152°53.3 49°11.7 Hadar 148°38.5 -60°28.7 Menkent 147°59.6 -36°28.8 Arcturus 145°49.3 19°03.9 Rigel Kent. 139°42.8 -60°55.5 Zubenelg. 136°58.0 -16°08.2 Kochab 137°20.2 74°03.3 Alphecca 126°05.4 26°38.1 Antares 112°18.1 -26°28.9 Atria 107°14.3 -69°03.9 Sabik 102°04.9 -15°45.2 Shaula 96°13.0 -37°07.1 Rasalhague 96°00.4 12°32.5 Etamin 90°43.4 51°29.0 Kaus Aust. 83°35.1 -34°22.4 Vega 80°34.8 38°48.1 Nunki 75°50.2 -26°16.1 Altair 62°02.0 8°55.6 Peacock 53°08.9 -56°39.8 Deneb 49°27.4 45°21.7 Enif 33°40.7 9°58.8 Alnair 27°35.4 -46°51.2 Fomalhaut 15°16.6 -29°30.2 Scheat 13°47.0 28°12.5 Markab 13°31.7 15°19.7 2023/1/1SHAMer.pass Venus44°40.613:33 Mars294°07.620:51 Jupiter356°55.016:41 Saturn33°34.714:15 2023/1/1SHAMer.pass Venus43°24.813:34 Mars294°07.020:47 Jupiter356°46.816:38 Saturn33°28.314:11 2023/1/1SHAMer.pass Venus42°09.313:35 Mars294°05.720:44 Jupiter356°38.416:34 Saturn33°21.914:08 Horizontal paralax Venus:0.1 Mars:0.2							
1	127°15.5	171°52.9	-18°33.9	61°23.0	24°27.7	124°10.1	-0°00.8	160°49.9	-14°47.9								
2	142°17.9	186°52.2	-18°33.0	76°25.5	24°27.7	139°12.3	-0°00.6	175°52.1	-14°47.8								
3	157°20.4	201°51.5	-18°32.2	91°27.9	24°27.7	154°14.4	-0°00.5	190°54.3	-14°47.7								
4	172°22.9	216°50.8	-18°31.3	106°30.4	24°27.7	169°16.5	-0°00.3	205°56.5	-14°47.6								
5	187°25.3	231°50.1	-18°30.4	121°32.8	24°27.7	184°18.6	-0°00.1	220°58.7	-14°47.5								
6	202°27.8	246°49.4	-18°29.6	136°35.3	24°27.7	199°20.8	0°00.0	236°00.9	-14°47.5								
7	217°30.2	261°48.7	-18°28.7	151°37.7	24°27.7	214°22.9	0°00.2	251°03.1	-14°47.4								
8	232°32.7	276°48.0	-18°27.8	166°40.2	24°27.7	229°25.0	0°00.3	266°05.3	-14°47.3								
9	247°35.2	291°47.3	-18°27.0	181°42.6	24°27.7	244°27.1	0°00.5	281°07.5	-14°47.2								
10	262°37.6	306°46.6	-18°26.1	196°45.1	24°27.7	259°29.2	0°00.6	296°09.7	-14°47.1								
11	277°40.1	321°45.9	-18°25.2	211°47.5	24°27.7	274°31.4	0°00.8	311°11.9	-14°47.0								
12	292°42.6	336°45.2	-18°24.3	226°50.0	24°27.7	289°33.5	0°01.0	326°14.1	-14°46.9								
13	307°45.0	351°44.5	-18°23.5	241°52.4	24°27.7	304°35.6	0°01.1	341°16.3	-14°46.8								
14	322°47.5	6°43.8	-18°22.6	256°54.9	24°27.7	319°37.7	0°01.3	356°18.5	-14°46.7								
15	337°50.0	21°43.1	-18°21.7	271°57.3	24°27.7	334°39.8	0°01.4	11°20.7	-14°46.6								
16	352°52.4	36°42.4	-18°20.8	286°59.7	24°27.7	349°42.0	0°01.6	26°22.9	-14°46.5								
17	7°54.9	51°41.7	-18°19.9	302°02.2	24°27.7	4°44.1	0°01.8	41°25.1	-14°46.5								
18	22°57.3	66°41.1	-18°19.1	317°04.6	24°27.7	19°46.2	0°01.9	56°27.3	-14°46.4								
19	37°59.8	81°40.4	-18°18.2	332°07.0	24°27.7	34°48.3	0°02.1	71°29.5	-14°46.3								
20	53°02.3	96°39.7	-18°17.3	347°09.5	24°27.7	49°50.4	0°02.2	86°31.7	-14°46.2								
21	68°04.7	111°39.0	-18°16.4	2°11.9	24°27.7	64°52.6	0°02.4	101°33.8	-14°46.1								
22	83°07.2	126°38.3	-18°15.5	17°14.3	24°27.7	79°54.7	0°02.6	116°36.0	-14°46.0								
23	98°09.7	141°37.6	-18°14.7	32°16.7	24°27.7	94°56.8	0°02.7	131°38.2	-14°45.9								
Mer.pass.:16:28			v-0.7 d0.9 m-3.8			v2.5 d-0.0 m-0.8			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	113°12.1	156°36.9	-18°13.8	47°19.2	24°27.7	109°58.9	0°02.9	146°40.4	-14°45.8					
1	128°14.6	171°36.2	-18°12.9	62°21.6	24°27.7	125°01.0	0°03.0	161°42.6	-14°45.7					
2	143°17.1	186°35.5	-18°12.0	77°24.0	24°27.7	140°03.1	0°03.2	176°44.8	-14°45.6					
3	158°19.5	201°34.8	-18°11.1	92°26.4	24°27.7	155°05.3	0°03.4	191°47.0	-14°45.5					
4	173°22.0	216°34.2	-18°10.2	107°28.8	24°27.7	170°07.4	0°03.5	206°49.2	-14°45.5					
5	188°24.5	231°33.5	-18°09.3	122°31.3	24°27.7	185°09.5	0°03.7	221°51.4	-14°45.4					
6	203°26.9	246°32.8	-18°08.5	137°33.7	24°27.7	200°11.6	0°03.8	236°53.6	-14°45.3					
7	218°29.4	261°32.1	-18°07.6	152°36.1	24°27.7	215°13.7	0°04.0	251°55.8	-14°45.2					
8	233°31.8	276°31.4	-18°06.7	167°38.5	24°27.7	230°15.8	0°04.2	266°58.0	-14°45.1					
9	248°34.3	291°30.7	-18°05.8	182°40.9	24°27.7	245°18.0	0°04.3	282°00.2	-14°45.0					
10	263°36.8	306°30.1	-18°04.9	197°43.3	24°27.7	260°20.1	0°04.5	297°02.4	-14°44.9					
11	278°39.2	321°29.4	-18°04.0	212°45.7	24°27.7	275°22.2	0°04.6	312°04.6	-14°44.8					
12	293°41.7	336°28.7	-18°03.1	227°48.1	24°27.7	290°24.3	0°04.8	327°06.8	-14°44.7					
13	308°44.2	351°28.0	-18°02.2	242°50.6	24°27.7	305°26.4	0°05.0	342°09.0	-14°44.6					
14	323°46.6	6°27.3	-18°01.3	257°53.0	24°27.7	320°28.5	0°05.1	357°11.2	-14°44.5					
15	338°49.1	21°26.6	-18°00.4	272°55.4	24°27.7	335°30.7	0°05.3	12°13.4	-14°44.5					
16	353°51.6	36°26.0	-17°59.5	287°57.8	24°27.7	350°32.8	0°05.4	27°15.6	-14°44.4					
17	8°54.0	51°25.3	-17°58.6	303°00.2	24°27.7	5°34.9	0°05.6	42°17.8	-14°44.3					
18	23°56.5	66°24.6	-17°57.7	318°02.6	24°27.7	20°37.0	0°05.8	57°20.0	-14°44.2					
19	38°59.0	81°23.9	-17°56.8	333°05.0	24°27.7	35°39.1	0°05.9	72°22.2	-14°44.1					
20	54°01.4	96°23.2	-17°55.9	348°07.4	24°27.7	50°41.2	0°06.1	87°24.3	-14°44.0					
21	69°03.9	111°22.6	-17°55.0	3°09.7	24°27.7	65°43.3	0°06.2	102°26.5	-14°43.9					
22	84°06.3	126°21.9	-17°54.1	18°12.1	24°27.7	80°45.5	0°06.4	117°28.7	-14°43.8					
23	99°08.8	141°21.2	-17°53.2	33°14.5	24°27.7	95°47.6	0°06.6	132°30.9	-14°43.7					
Mer.pass.:16:24			v-0.7 d0.9 m-3.8			v2.4 d-0.0 m-0.8			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8		

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	114°11.3	156°20.5	-17°52.3	48°16.9	24°27.7	110°49.7	0°06.7	147°33.1	-14°43.6					
1	129°13.7	171°19.9	-17°51.4	63°19.3	24°27.7	125°51.8	0°06.9	162°35.3	-14°43.5					
2	144°16.2	186°19.2	-17°50.5	78°21.7	24°27.7	140°53.9	0°07.1	177°37.5	-14°43.4					
3	159°18.7	201°18.5	-17°49.6	93°24.1	24°27.7	155°56.0	0°07.2	192°39.7	-14°43.4					
4	174°21.1	216°17.8	-17°48.7	108°26.5	24°27.7	170°58.1	0°07.4	207°41.9	-14°43.3					
5	189°23.6	231°17.2	-17°47.7	123°28.9	24°27.7	186°00.2	0°07.5	222°44.1	-14°43.2					
6	204°26.1	246°16.5	-17°46.8	138°31.2	24°27.7	201°02.3	0°07.7	237°46.3	-14°43.1					
7	219°28.5	261°15.8	-17°45.9	153°33.6	24°27.7	216°04.5	0°07.9	252°48.5	-14°43.0					
8	234°31.0	276°15.2	-17°45.0	168°36.0	24°27.7	231°06.6	0°08.0	267°50.7	-14°42.9					
9	249°33.4	291°14.5	-17°44.1	183°38.4	24°27.7	246°08.7	0°08.2	282°52.9	-14°42.8					
10	264°35.9	306°13.8	-17°43.2	198°40.7	24°27.7	261°10.8	0°08.4	297°55.1	-14°42.7					
11	279°38.4	321°13.1	-17°42.3	213°43.1	24°27.7	276°12.9	0°08.5	312°57.3	-14°42.6					
12	294°40.8	336°12.5	-17°41.3	228°45.5	24°27.7	291°15.0	0°08.7	327°59.5	-14°42.5					
13	309°43.3	351°11.8	-17°40.4	243°47.9	24°27.7	306°17.1	0°08.8	343°01.7	-14°42.4					
14	324°45.8	6°11.1	-17°39.5	258°50.2	24°27.7	321°19.2	0°09.0	358°03.8	-14°42.3					
15	339°48.2	21°10.5	-17°38.6	273°52.6	24°27.7	336°21.3	0°09.2	13°06.0	-14°42.3					
16	354°50.7	36°09.8	-17°37.7	288°55.0	24°27.7	351°23.5	0°09.3	28°08.2	-14°42.2					
17	9°53.2	51°09.1	-17°36.8	303°57.3	24°27.7	6°25.6	0°09.5	43°10.4	-14°42.1					
18	24°55.6	66°08.5	-17°35.8	318°59.7	24°27.7	21°27.7	0°09.7	58°12.6	-14°42.0					
19	39°58.1	81°07.8	-17°34.9	334°02.1	24°27.7	36°29.8	0°09.8	73°14.8	-14°41.9					
20	55°00.6	96°07.2	-17°34.0	349°04.4	24°27.7	51°31.9	0°10.0	88°17.0	-14°41.8					
21	70°03.0	111°06.5	-17°33.1	4°06.8	24°27.7	66°34.0	0°10.2	103°19.2	-14°41.7					
22	85°05.5	126°05.8	-17°32.1	19°09.1	24°27.7	81°36.1	0°10.3	118°21.4	-14°41.6					
23	100°07.9	141°05.2	-17°31.2	34°11.5	24°27.8	96°38.2	0°10.5	133°23.6	-14°41.5					
Mer.pass.:16:20			v-0.7 d0.9 m-3.8			v2.4 d0.0 m-0.7			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8		

2023/1/1			SHA	Mer.pass
Venus			44°40.6	13:33
Mars			294°07.6	20:51
Jupiter			356°55.0	16:41
Saturn			33°34.7	14:15
2023/1/1			SHA	Mer.pass
Venus			43°24.8	13:34
Mars			294°07.0	20:47
Jupiter			356°	

Sun			Moon				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	177°54.5	-21°33.5	292°15.4	16.2	3°40.4	-14.0	55.1
1	192°54.3	-21°33.1	306°50.6	16.2	3°26.4	-14.0	55.1
2	207°54.0	-21°32.7	321°25.8	16.2	3°12.4	-14.1	55.2
3	222°53.8	-21°32.3	336°01.0	16.2	2°58.3	-14.1	55.2
4	237°53.6	-21°31.8	350°36.2	16.2	2°44.2	-14.1	55.2
5	252°53.3	-21°31.4	5°11.4	16.2	2°30.1	-14.1	55.2
6	267°53.1	-21°31.0	19°46.5	16.1	2°16.0	-14.1	55.3
7	282°52.9	-21°30.6	34°21.6	16.1	2°01.8	-14.2	55.3
8	297°52.6	-21°30.2	48°56.8	16.1	1°47.6	-14.2	55.3
9	312°52.4	-21°29.7	63°31.9	16.1	1°33.4	-14.2	55.3
10	327°52.1	-21°29.3	78°06.9	16.1	1°19.2	-14.2	55.4
11	342°51.9	-21°28.9	92°42.0	16.1	1°05.0	-14.2	55.4
12	357°51.7	-21°28.5	107°17.1	16.0	0°50.8	-14.3	55.4
13	12°51.4	-21°28.0	121°52.1	16.0	0°36.5	-14.3	55.4
14	27°51.2	-21°27.6	136°27.1	16.0	0°22.2	-14.3	55.5
15	42°51.0	-21°27.2	151°02.1	16.0	0°07.9	-14.3	55.5
16	57°50.7	-21°26.8	165°37.0	15.9	-0°06.4	-14.3	55.5
17	72°50.5	-21°26.3	180°12.0	15.9	-0°20.7	-14.3	55.5
18	87°50.3	-21°25.9	194°46.9	15.9	-0°35.0	-14.3	55.6
19	102°50.0	-21°25.5	209°21.8	15.9	-0°49.4	-14.3	55.6
20	117°49.8	-21°25.0	223°56.6	15.8	-1°03.7	-14.4	55.6
21	132°49.6	-21°24.6	238°31.4	15.8	-1°18.1	-14.4	55.7
22	147°49.4	-21°24.2	253°06.2	15.8	-1°32.5	-14.4	55.7
23	162°49.1	-21°23.7	267°41.0	15.7	-1°46.8	-14.4	55.7
SD.=16.3 d=0.4			S.D.=15.0				

Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	177°48.9	-21°23.3	282°15.7	15.7	-2°01.2	-14.4	55.7
1	192°48.7	-21°22.9	296°50.4	15.7	-2°15.6	-14.4	55.8
2	207°48.4	-21°22.4	311°25.0	15.6	-2°30.0	-14.4	55.8
3	222°48.2	-21°22.0	325°59.6	15.6	-2°44.4	-14.4	55.8
4	237°48.0	-21°21.6	340°34.2	15.5	-2°58.8	-14.4	55.9
5	252°47.7	-21°21.1	355°08.7	15.5	-3°13.2	-14.4	55.9
6	267°47.5	-21°20.7	9°43.2	15.5	-3°27.7	-14.4	55.9
7	282°47.3	-21°20.3	24°17.6	15.4	-3°42.1	-14.4	56.0
8	297°47.1	-21°19.8	38°52.0	15.4	-3°56.5	-14.4	56.0
9	312°46.8	-21°19.4	53°26.4	15.3	-4°10.9	-14.4	56.0
10	327°46.6	-21°18.9	68°00.7	15.3	-4°25.3	-14.4	56.0
11	342°46.4	-21°18.5	82°34.9	15.2	-4°39.7	-14.4	56.1
12	357°46.1	-21°18.0	97°09.1	15.2	-4°54.1	-14.4	56.1
13	12°45.9	-21°17.6	111°43.3	15.1	-5°08.5	-14.4	56.1
14	27°45.7	-21°17.2	126°17.4	15.1	-5°23.0	-14.4	56.2
15	42°45.5	-21°16.7	140°51.4	15.0	-5°37.3	-14.4	56.2
16	57°45.2	-21°16.3	155°25.4	15.0	-5°51.7	-14.4	56.2
17	72°45.0	-21°15.8	169°59.3	14.9	-6°06.1	-14.4	56.3
18	87°44.8	-21°15.4	184°33.2	14.8	-6°20.5	-14.4	56.3
19	102°44.6	-21°14.9	199°07.0	14.8	-6°34.9	-14.4	56.3
20	117°44.3	-21°14.5	213°40.8	14.7	-6°49.2	-14.3	56.4
21	132°44.1	-21°14.0	228°14.4	14.7	-7°03.6	-14.3	56.4
22	147°43.9	-21°13.6	242°48.1	14.6	-7°17.9	-14.3	56.4
23	162°43.7	-21°13.1	257°21.6	14.5	-7°32.2	-14.3	56.5
SD.=16.3 d=0.4			S.D.=15.2				

Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	177°43.4	-21°12.7	271°55.1	14.5	-7°46.5	-14.3	56.5
1	192°43.2	-21°12.2	286°28.5	14.4	-8°00.8	-14.3	56.5
2	207°43.0	-21°11.8	301°01.9	14.3	-8°15.1	-14.3	56.6
3	222°42.8	-21°11.3	315°35.2	14.2	-8°29.3	-14.2	56.6
4	237°42.5	-21°10.9	330°08.4	14.2	-8°43.5	-14.2	56.6
5	252°42.3	-21°10.4	344°41.5	14.1	-8°57.8	-14.2	56.7
6	267°42.1	-21°10.0	359°14.6	14.0	-9°11.9	-14.2	56.7
7	282°41.9	-21°09.5	13°47.6	13.9	-9°26.1	-14.2	56.8
8	297°41.6	-21°09.0	28°20.5	13.9	-9°40.3	-14.1	56.8
9	312°41.4	-21°08.6	42°53.3	13.8	-9°54.4	-14.1	56.8
10	327°41.2	-21°08.1	57°26.1	13.7	-10°08.5	-14.1	56.9
11	342°41.0	-21°07.7	71°58.7	13.6	-10°22.6	-14.1	56.9
12	357°40.8	-21°07.2	86°31.3	13.5	-10°36.6	-14.0	56.9
13	12°40.5	-21°06.8	101°03.8	13.5	-10°50.6	-14.0	57.0
14	27°40.3	-21°06.3	115°36.2	13.4	-11°04.6	-14.0	57.0
15	42°40.1	-21°05.8	130°08.5	13.3	-11°18.5	-13.9	57.0
16	57°39.9	-21°05.4	144°40.8	13.2	-11°32.5	-13.9	57.1
17	72°39.7	-21°04.9	159°12.9	13.1	-11°46.4	-13.9	57.1
18	87°39.4	-21°04.4	173°45.0	13.0	-12°00.2	-13.8	57.2
19	102°39.2	-21°04.0	188°17.0	12.9	-12°14.0	-13.8	57.2
20	117°39.0	-21°03.5	202°48.8	12.8	-12°27.8	-13.8	57.2
21	132°38.8	-21°03.0	217°20.6	12.7	-12°41.5	-13.7	57.3
22	147°38.6	-21°02.6	231°52.3	12.6	-12°55.2	-13.7	57.3
23	162°38.3	-21°02.1	246°23.9	12.5	-13°08.9	-13.6	57.3
SD.=16.3 d=0.5			S.D.=15.4				

Twilight			Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
72	08:04	09:57	—:—	—:—	14:22	16:15
70	07:48	09:21	—:—	—:—	14:57	16:30
68	07:36	08:56	10:39	13:40	15:22	16:43
66	07:26	08:37	09:57	14:22	15:42	16:53
64	07:17	08:21	09:28	14:50	15:58	17:02
62	07:09	08:08	09:07	15:12	16:11	17:09
60	07:02	07:56	08:49	15:29	16:22	17:16
58	06:56	07:47	08:35	15:43	16:32	17:22
56	06:50	07:38	08:23	15:56	16:41	17:28
54	06:45	07:30	08:12	16:07	16:48	17:33
52	06:40	07:23	08:02	16:16	16:55	17:38
50	06:36	07:17	07:54	16:25	17:02	17:42
45	06:26	07:03	07:35	16:43	17:16	17:52
40	06:17	06:51	07:20	16:58	17:27	18:01
35	06:09	06:40	07:08	17:10	17:38	18:09
30	06:01	06:31	06:57	17:21	17:47	18:17
20	05:47	06:14	06:38	17:40	18:04	18:31
10	05:33	05:59	06:21	17:57	18:19	18:45
0	05:17	05:43	06:05	18:13	18:35	19:01
-10	05:00	05:27	05:49	18:28	18:51	19:18
-20	04:40	05:08	05:32	18:45	19:10	19:38
-30	04:13	04:46	05:12	19:05	19:32	20:04
-35	03:56	04:32	05:01	19:17	19:46	20:21
-40	03:36	04:15	04:47	19:30	20:02	20:42
-45	03:09	03:55	04:31	19:46	20:22	21:08
-50	02:31	03:29	04:11	20:06	20:47	21:45
-52	02:10	03:16	04:02	20:15	21:00	22:06
-54	01:42	03:01	03:51	20:26	21:15	22:33
-56	00:55	02:43	03:39	20:38	21:33	23:17
-58	—:—	02:21	03:25	20:52	21:55	—:—
-60	—:—	01:51	03:08	21:08	22:24	—:—

Lat.	Moonrise			Moonset		
	Fri	Sat	Sun	Fri	Sat	Sun
72	23:35	—:—	01:42	11:01	10:31	09:55
70	23:32	—:—	01:29	10:60	10:37	10:11
68	23:30	—:—	01:18	10:59	10:42	10:23
66	23:28	—:—	01:10	10:58	10:46	10:34
64	23:26	—:—	01:02	10:57	10:50	10:43
62	23:25	—:—	00:56	10:56	10:53	10:50
60	23:24	—:—	00:51	10:56	10:56	10:57
58	23:23	—:—	00:46	10:55	10:59	11:03
56	23:22	—:—	00:42	10:55	11:01	11:08
54	23:21	—:—	00:38	10:54	11:03	11:13
52	23:20	—:—	00:35	10:54	11:05	11:17
50	23:19	—:—	00:32	10:54	11:07	11:21
45	23:18	—:—	00:26	10:53	11:10	11:30
40	23:16	—:—	00:20	10:52	11:14	11:37
35	23:15	—:—	00:15	10:52	11:16	11:43
30	23:14	—:—	00:11	10:51	11:19	11:48
20	23:13	—:—	00:04	10:50	11:23	11:58
10	23:11	23:58	—:—	10:49	11:27	12:06
0	23:10	23:53	—:—	10:48	11:30	12:14
-10	23:09	23:47	—:—	10:48	11:34	12:22
-20	23:07	23:41	—:—	10:47	11:37	12:30
-30	23:06	23:34	—:—	10:46	11:42	12:40
-35	23:05	23:30	23:59	10:45	11:44	12:45
-40	23:04	23:26	23:51	10:44	11:47	12:52
-45	23:03	23:21	23:42	10:44	11:50	12:59
-50	23:01	23:15	23:31	10:43	11:54	13:08
-52	23:01	23:12	23:26	10:42	11:56	13:12
-54	23:00	23:09	23:20	10:42	11:58	13:17
-56	22:59	23:06	23:14	10:41	11:60	13:22
-58	22:59	23:03	23:08	10:40	12:02	13:28
-60	22:58	22:59	23:00	10:40	12:05	13:34

Day	Sun			Moon		
	Eqn.of Time	Mer.		Mer.Pass.	Age	
	00 ^h	12 ^h	Pass	Upper	Lower	
13	08:22	08:33	12:08	04:38	16:59	21(66%)
14	08:45	08:56	12:08	05:19	17:41	22(56%)
15	09:06	09:17	12:09	06:03	18:25	23(46%)

January 16, 17 ,18 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	115°10.4	156°04.5	-17°30.3	49°13.9	24°27.8	111°40.3	0°10.6	148°25.8	-14°41.4	Alpheratz	357°36.6	29°13.1					
1	130°12.9	171°03.8	-17°29.4	64°16.2	24°27.8	126°42.4	0°10.8	163°28.0	-14°41.3	Ankaa	353°08.9	-42°11.2					
2	145°15.3	186°03.2	-17°28.4	79°18.6	24°27.8	141°44.5	0°11.0	178°30.2	-14°41.2	Schedar	349°33.0	56°40.0					
3	160°17.8	201°02.5	-17°27.5	94°20.9	24°27.8	156°46.6	0°11.1	193°32.4	-14°41.1	Diphda	348°48.9	-17°51.8					
4	175°20.3	216°01.9	-17°26.6	109°23.3	24°27.8	171°48.8	0°11.3	208°34.6	-14°41.1	Achernar	335°21.4	-57°07.5					
5	190°22.7	231°01.2	-17°25.6	124°25.6	24°27.8	186°50.9	0°11.5	223°36.7	-14°41.0	Hamal	327°53.0	23°34.3					
6	205°25.2	246°00.5	-17°24.7	139°28.0	24°27.8	201°53.0	0°11.6	238°38.9	-14°40.9	Polaris	314°38.3	89°22.0					
7	220°27.7	260°59.9	-17°23.8	154°30.3	24°27.8	216°55.1	0°11.8	253°41.1	-14°40.8	Akamar	315°12.9	-40°13.0					
8	235°30.1	275°59.2	-17°22.8	169°32.7	24°27.8	231°57.2	0°12.0	268°43.3	-14°40.7	Menkar	314°07.7	4°10.7					
9	250°32.6	290°58.6	-17°21.9	184°35.0	24°27.8	246°59.3	0°12.1	283°45.5	-14°40.6	Mirfak	308°30.4	49°56.7					
10	265°35.1	305°57.9	-17°21.0	199°37.3	24°27.8	262°01.4	0°12.3	298°47.7	-14°40.5	Aldebaran	290°41.3	16°33.3					
11	280°37.5	320°57.3	-17°20.0	214°39.7	24°27.8	277°03.5	0°12.5	313°49.9	-14°40.4	Rigel	281°05.2	-8°10.6					
12	295°40.0	335°56.6	-17°19.1	229°42.0	24°27.8	292°05.6	0°12.6	328°52.1	-14°40.3	Capella	280°23.9	46°01.4					
13	310°42.4	350°55.9	-17°18.2	244°44.4	24°27.8	307°07.7	0°12.8	343°54.3	-14°40.2	Bellatrix	278°24.3	6°22.2					
14	325°44.9	5°55.3	-17°17.2	259°46.7	24°27.9	322°09.8	0°12.9	358°56.5	-14°40.1	Elnath	278°03.6	28°37.6					
15	340°47.4	20°54.6	-17°16.3	274°49.0	24°27.9	337°11.9	0°13.1	13°58.7	-14°40.0	Alnilam	275°39.1	-1°11.3					
16	355°49.8	35°54.0	-17°15.4	289°51.4	24°27.9	352°14.0	0°13.3	29°00.9	-14°39.9	Betelgeuse	270°53.6	7°24.6					
17	10°52.3	50°53.3	-17°14.4	304°53.7	24°27.9	7°16.1	0°13.4	44°03.1	-14°39.9	Canopus	263°52.6	-52°42.6					
18	25°54.8	65°52.7	-17°13.5	319°56.0	24°27.9	22°18.2	0°13.6	59°05.2	-14°39.8	Sirius	258°27.2	-16°44.7					
19	40°57.2	80°52.0	-17°12.5	334°58.4	24°27.9	37°20.3	0°13.8	74°07.4	-14°39.7	Adara	255°06.8	-29°00.2					
20	55°59.7	95°51.4	-17°11.6	350°00.7	24°27.9	52°22.4	0°13.9	89°09.6	-14°39.6	Procyon	244°52.1	5°10.1					
21	71°02.2	110°50.7	-17°10.6	5°03.0	24°27.9	67°24.5	0°14.1	104°11.8	-14°39.5	Pollux	243°18.8	27°58.2					
22	86°04.6	125°50.1	-17°09.7	20°05.3	24°27.9	82°26.6	0°14.3	119°14.0	-14°39.4	Avior	234°14.8	-59°34.9					
23	101°07.1	140°49.4	-17°08.8	35°07.7	24°27.9	97°28.7	0°14.4	134°16.2	-14°39.3	Suhail	222°47.1	-43°31.4					
Mer.pass.:16:16			v-0.7 d0.9 m-3.8			v2.4 d0.0 m-0.7			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	116°09.5	155°48.8	-17°07.8	50°10.0	24°27.9	112°30.8	0°14.6	149°18.4	-14°39.2	Miaplacidus	221°37.7	-69°48.5					
1	131°12.0	170°48.1	-17°06.9	65°12.3	24°27.9	127°32.9	0°14.8	164°20.6	-14°39.1	Alphard	217°49.0	-8°45.5					
2	146°14.5	185°47.5	-17°05.9	80°14.6	24°28.0	142°35.0	0°14.9	179°22.8	-14°39.0	Regulus	207°35.9	11°51.2					
3	161°16.9	200°46.8	-17°05.0	95°17.0	24°28.0	157°37.1	0°15.1	194°25.0	-14°38.9	Dubhe	193°42.6	61°37.4					
4	176°19.4	215°46.2	-17°04.0	110°19.3	24°28.0	172°39.3	0°15.3	209°27.2	-14°38.8	Denebola	182°26.4	14°26.5					
5	191°21.9	230°45.6	-17°03.1	125°21.6	24°28.0	187°41.4	0°15.4	224°29.4	-14°38.7	Gienah	175°45.1	-17°40.1					
6	206°24.3	245°44.9	-17°02.1	140°23.9	24°28.0	202°43.5	0°15.6	239°31.5	-14°38.6	Acrux	173°01.7	-63°13.3					
7	221°26.8	260°44.3	-17°01.2	155°26.2	24°28.0	217°45.6	0°15.8	254°33.7	-14°38.6	Gacrux	171°53.3	-57°14.2					
8	236°29.3	275°43.6	-17°00.2	170°28.5	24°28.0	232°47.7	0°15.9	269°35.9	-14°38.5	Alioth	166°14.3	55°49.8					
9	251°31.7	290°43.0	-16°59.3	185°30.8	24°28.0	247°49.8	0°16.1	284°38.1	-14°38.4	Spica	158°24.0	-11°16.8					
10	266°34.2	305°42.3	-16°58.3	200°33.1	24°28.0	262°51.9	0°16.3	299°40.3	-14°38.3	Alcaid	152°53.3	49°11.6					
11	281°36.7	320°41.7	-16°57.3	215°35.5	24°28.0	277°54.0	0°16.4	314°42.5	-14°38.2	Hadar	148°38.4	-60°28.7					
12	296°39.1	335°41.1	-16°56.4	230°37.8	24°28.1	292°56.1	0°16.6	329°44.7	-14°38.1	Menkent	147°59.6	-36°28.8					
13	311°41.6	350°40.4	-16°55.4	245°40.1	24°28.1	307°58.2	0°16.8	344°46.9	-14°38.0	Arcturus	145°49.3	19°03.9					
14	326°44.0	5°39.8	-16°54.5	260°42.4	24°28.1	323°00.3	0°16.9	359°49.1	-14°37.9	Rigel Kent.	139°42.7	-60°55.5					
15	341°46.5	20°39.1	-16°53.5	275°44.7	24°28.1	338°02.4	0°17.1	14°51.3	-14°37.8	Zubenelg.	136°57.9	-16°08.2					
16	356°49.0	35°38.5	-16°52.6	290°47.0	24°28.1	353°04.5	0°17.3	29°53.5	-14°37.7	Kochab	137°20.1	74°03.3					
17	11°51.4	50°37.9	-16°51.6	305°49.3	24°28.1	8°06.6	0°17.4	44°55.6	-14°37.6	Alphecca	126°05.3	26°38.1					
18	26°53.9	65°37.2	-16°50.6	320°51.6	24°28.1	23°08.7	0°17.6	59°57.8	-14°37.5	Antares	112°18.1	-26°28.9					
19	41°56.4	80°36.6	-16°49.7	335°53.9	24°28.1	38°10.8	0°17.8	75°00.0	-14°37.4	Atria	107°14.2	-69°03.9					
20	56°58.8	95°35.9	-16°48.7	350°56.2	24°28.1	53°12.9	0°17.9	90°02.2	-14°37.3	Sabik	102°04.9	-15°45.2					
21	72°01.3	110°35.3	-16°47.7	5°58.5	24°28.2	68°15.0	0°18.1	105°04.4	-14°37.3	Shaula	96°13.0	-37°07.1					
22	87°03.8	125°34.7	-16°46.8	21°00.8	24°28.2	83°17.0	0°18.3	120°06.6	-14°37.2	Rasalhague	96°00.4	12°32.5					
23	102°06.2	140°34.0	-16°45.8	36°03.0	24°28.2	98°19.1	0°18.4	135°08.8	-14°37.1	Etamin	90°43.4	51°29.0					
Mer.pass.:16:12			v-0.6 d0.9 m-3.8			v2.3 d0.0 m-0.7			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	117°08.7	155°33.4	-16°44.8	51°05.3	24°28.2	113°21.2	0°18.6	150°11.0	-14°37.0	Kaus Aust.	83°35.0	-34°22.4					
1	132°11.2	170°32.8	-16°43.9	66°07.6	24°28.2	128°23.3	0°18.8	165°13.2	-14°36.9	Vega	80°34.8	38°48.1					
2	147°13.6	185°32.1	-16°42.9	81°09.9	24°28.2	143°25.4	0°18.9	180°15.4	-14°36.8	Nunki	75°50.2	-26°16.1					
3	162°16.1	200°31.5	-16°41.9	96°12.2	24°28.2	158°27.5	0°19.1	195°17.6	-14°36.7	Altair	62°02.0	8°55.6					
4	177°18.5	215°30.9	-16°41.0	111°14.5	24°28.3	173°29.6	0°19.3	210°19.7	-14°36.6	Peacock	53°08.9	-56°39.8					
5	192°21.0	230°30.2	-16°40.0	126°16.8	24°28.3	188°31.7	0°19.5	225°21.9	-14°36.5	Deneb	49°27.4	45°21.7					
6	207°23.5	245°29.6	-16°39.0	141°19.0	24°28.3	203°33.8	0°19.6	240°24.1	-14°36.4	Enif	33°40.7	9°58.8					
7	222°25.9	260°29.0	-16°38.1	156°21.3	24°28.3	218°35.9	0°19.8	255°26.3	-14°36.3	Alnair	27°35.4	-46°51.2					
8	237°28.4	275°28.3	-16°37.1	171°23.6	24°28.3	233°38.0	0°20.0	270°28.5	-14°36.2	Fomalhaut	15°16.6	-29°30.2					
9	252°30.9	290°27.7	-16°36.1	186°25.9	24°28.3	248°40.1	0°20.1	285°30.7	-14°36.1	Scheat	13°47.1	28°12.5					
10	267°33.3	305°27.1	-16°35.1	201°28.2	24°28.3	263°42.2	0°20.3	300°32.9	-14°36.0	Markab	13°31.7	15°19.7					
11	282°35.8	320°26.5	-16°34.2	216°30.4	24°28.4	278°44.3	0°20.5	315°35.1	-14°35.9	2023/1/1	SHA	Mer.pass					
12	297°38.3	335°25.8	-16°33.2	231°32.7	24°28.4	293°46.4	0°20.6	330°37.3	-14°35.8	Venus	39°39.2	13:37					
13	312°40.7	350°25.2	-16°32.2	246°35.0	24°28.4	308°48.5	0°20.8	345°39.4	-14°35.8	Mars	294°00.4	20:36					
14	327°43.2	5°24.6	-16°31.2	261°37.2	24°28.4	323°50.6	0°21.0	0°41.6	-14°35.7	Jupiter	356°21.3	16:28					
15	342°45.7	20°24.0	-16°30.3	276°39.5	24°28.4	338°52.7	0°21.1	15°43.8	-14°35.6	Saturn	33°08.8	14:01					
16	357°48.1	35°23.3	-16°29.3	291°41.8	24°28.4	353°54.8	0°21.3	30°46.0	-14°35.5	2023/1/1	SHA	Mer.pass					
17	12°50.6	50°22.7	-16°28.3	306°44.1	24°28.4	8°56.9	0°21.5	45°48.2	-14°35.4	Venus	38°24.7	13:38					
18	27°53.0	65°22.1	-16°27.3	321°46.3	24°28.5	23°59.0	0°21.7	60°50.4	-14°35.3	Mars	293°56.6	20:33					
19	42°55.5	80°21.5	-16°26.3	336°48.6	24°28.5	39°01.1	0°21.8	75°52.6	-14°35.2	Jupiter	356°12.6	16:24					
20	57°58.0	95°20.8	-16°25.4	351°50.8	24°28.5	54°03.2	0°22.0	90°54.8	-14°35.1	Saturn	33°02.3	13:57					
21	73°00.4	110°20.2	-16°24.4	6°53.1	24°28.5	69°05.2	0°22.2	105°57.0	-14°35.0	Horizontal parallax							
22	88°02.9	125°19.6	-16°23.4	21°55.4	24°28.5	84°07.3	0°22.3	120°59.2	-14°34.9	Venus:	0.1						
23	103°05.4	140°19.0	-16°22.4	36°57.6	24°28.5	99°09.4	0°22.5	136°01.3	-14°34.8	Mars:	0.2						
Mer.pass.:16:08			v-0.6 d1.0 m-3.8			v2.3 d0.0 m-0.7			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					

Sun				Moon				
Mon	GHA	Dec		GHA	ν	Dec	d	HP
0	177°38.1	-21°01.6		260°55.3	12.4	-13°22.5	-13.6	57.4
1	192°37.9	-21°01.2		275°26.7	12.3	-13°36.1	-13.5	57.4
2	207°37.7	-21°00.7		289°58.0	12.2	-13°49.6	-13.5	57.5
3	222°37.5	-21°00.2		304°29.2	12.1	-14°03.1	-13.5	57.5
4	237°37.3	-20°59.8		319°00.2	12.0	-14°16.5	-13.4	57.5
5	252°37.0	-20°59.3		333°31.2	11.9	-14°29.9	-13.3	57.6
6	267°36.8	-20°58.8		348°02.0	11.8	-14°43.2	-13.3	57.6
7	282°36.6	-20°58.4		2°32.8	11.7	-14°56.5	-13.2	57.7
8	297°36.4	-20°57.9		17°03.4	11.6	-15°09.7	-13.2	57.7
9	312°36.2	-20°57.4		31°34.0	11.5	-15°22.8	-13.1	57.7
10	327°36.0	-20°56.9		46°04.4	11.4	-15°35.9	-13.1	57.8
11	342°35.8	-20°56.5		60°34.7	11.2	-15°49.0	-13.0	57.8
12	357°35.5	-20°56.0		75°04.8	11.1	-16°02.0	-13.0	57.8
13	12°35.3	-20°55.5		89°34.9	11.0	-16°14.9	-12.9	57.9
14	27°35.1	-20°55.0		104°04.9	10.9	-16°27.7	-12.8	57.9
15	42°34.9	-20°54.5		118°34.7	10.8	-16°40.5	-12.8	58.0
16	57°34.7	-20°54.1		133°04.4	10.7	-16°53.2	-12.7	58.0
17	72°34.5	-20°53.6		147°34.0	10.5	-17°05.9	-12.6	58.0
18	87°34.3	-20°53.1		162°03.5	10.4	-17°18.5	-12.5	58.1
19	102°34.1	-20°52.6		176°32.8	10.3	-17°31.0	-12.5	58.1
20	117°33.8	-20°52.1		191°02.1	10.2	-17°43.4	-12.4	58.2
21	132°33.6	-20°51.7		205°31.2	10.0	-17°55.8	-12.3	58.2
22	147°33.4	-20°51.2		220°00.1	9.9	-18°08.1	-12.2	58.2
23	162°33.2	-20°50.7		234°29.0	9.8	-18°20.3	-12.2	58.3
	SD.=16.3	d=0.5		S.D.=15.7				
Tue	GHA	Dec		GHA	ν	Dec	d	HP
0	177°33.0	-20°50.2		248°57.7	9.7	-18°32.4	-12.1	58.3
1	192°32.8	-20°49.7		263°26.3	9.5	-18°44.4	-12.0	58.4
2	207°32.6	-20°49.2		277°54.8	9.4	-18°56.4	-11.9	58.4
3	222°32.4	-20°48.8		292°23.1	9.3	-19°08.2	-11.8	58.5
4	237°32.2	-20°48.3		306°51.3	9.1	-19°20.0	-11.7	58.5
5	252°31.9	-20°47.8		321°19.4	9.0	-19°31.7	-11.6	58.5
6	267°31.7	-20°47.3		335°47.3	8.9	-19°43.3	-11.5	58.6
7	282°31.5	-20°46.8		350°15.1	8.7	-19°54.8	-11.5	58.6
8	297°31.3	-20°46.3		4°42.8	8.6	-20°06.2	-11.4	58.7
9	312°31.1	-20°45.8		19°10.3	8.5	-20°17.5	-11.3	58.7
10	327°30.9	-20°45.3		33°37.7	8.3	-20°28.7	-11.2	58.7
11	342°30.7	-20°44.8		48°05.0	8.2	-20°39.8	-11.1	58.8
12	357°30.5	-20°44.3		62°32.1	8.1	-20°50.8	-10.9	58.8
13	12°30.3	-20°43.8		76°59.1	7.9	-21°01.7	-10.8	58.9
14	27°30.1	-20°43.4		91°25.9	7.8	-21°12.5	-10.7	58.9
15	42°29.9	-20°42.9		105°52.7	7.6	-21°23.2	-10.6	58.9
16	57°29.7	-20°42.4		120°19.2	7.5	-21°33.8	-10.5	59.0
17	72°29.5	-20°41.9		134°45.7	7.4	-21°44.2	-10.4	59.0
18	87°29.3	-20°41.4		149°12.0	7.2	-21°54.6	-10.3	59.1
19	102°29.0	-20°40.9		163°38.1	7.1	-22°04.8	-10.2	59.1
20	117°28.8	-20°40.4		178°04.2	7.0	-22°14.9	-10.0	59.1
21	132°28.6	-20°39.9		192°30.0	6.8	-22°24.8	-9.9	59.2
22	147°28.4	-20°39.4		206°55.8	6.7	-22°34.7	-9.8	59.2
23	162°28.2	-20°38.9		221°21.4	6.5	-22°44.4	-9.7	59.3
	SD.=16.3	d=0.5		S.D.=15.9				
Wed	GHA	Dec		GHA	ν	Dec	d	HP
0	177°28.0	-20°38.4		235°46.9	6.4	-22°54.0	-9.5	59.3
1	192°27.8	-20°37.9		250°12.2	6.3	-23°03.5	-9.4	59.3
2	207°27.6	-20°37.4		264°37.4	6.1	-23°12.8	-9.3	59.4
3	222°27.4	-20°36.9		279°02.4	6.0	-23°22.0	-9.1	59.4
4	237°27.2	-20°36.4		293°27.4	5.8	-23°31.1	-9.0	59.4
5	252°27.0	-20°35.9		307°52.1	5.7	-23°40.0	-8.9	59.5
6	267°26.8	-20°35.4		322°16.8	5.6	-23°48.8	-8.7	59.5
7	282°26.6	-20°34.8		336°41.3	5.4	-23°57.5	-8.6	59.6
8	297°26.4	-20°34.3		351°05.6	5.3	-24°06.0	-8.4	59.6
9	312°26.2	-20°33.8		5°29.9	5.2	-24°14.3	-8.3	59.6
10	327°26.0	-20°33.3		19°54.0	5.0	-24°22.5	-8.1	59.7
11	342°25.8	-20°32.8		34°17.9	4.9	-24°30.6	-8.0	59.7
12	357°25.6	-20°32.3		48°41.8	4.8	-24°38.5	-7.8	59.8
13	12°25.4	-20°31.8		63°05.5	4.6	-24°46.2	-7.7	59.8
14	27°25.2	-20°31.3		77°29.0	4.5	-24°53.8	-7.5	59.8
15	42°25.0	-20°30.8		91°52.5	4.4	-25°01.2	-7.3	59.9
16	57°24.8	-20°30.3		106°15.8	4.2	-25°08.5	-7.2	59.9
17	72°24.6	-20°29.8		120°39.0	4.1	-25°15.6	-7.0	59.9
18	87°24.4	-20°29.2		135°02.0	4.0	-25°22.5	-6.9	60.0
19	102°24.2	-20°28.7		149°24.9	3.9	-25°29.3	-6.7	60.0
20	117°24.0	-20°28.2		163°47.8	3.7	-25°35.9	-6.5	60.0
21	132°23.8	-20°27.7		178°10.4	3.6	-25°42.4	-6.3	60.1
22	147°23.6	-20°27.2		192°33.0	3.5	-25°48.6	-6.2	60.1
23	162°23.4	-20°26.7		206°55.4	3.4	-25°54.7	-6.0	60.1
	SD.=16.3	d=0.5		S.D.=16.2				
Lat.		Twilight			Twilight			
Naut.	Civil	Sunrise	Sunset	Civil	Naut.			
72	07:56	09:44	---	---	14:37	16:25		
70	07:42	09:12	11:47	12:34	15:08	16:39		
68	07:31	08:49	10:25	13:56	15:32	16:50		
66	07:21	08:31	09:47	14:33	15:50	16:60		
64	07:13	08:16	09:21	14:59	16:05	17:08		
62	07:05	08:03	09:01	15:19	16:17	17:15		
60	06:59	07:53	08:45	15:36	16:28	17:22		
58	06:53	07:43	08:31	15:49	16:37	17:27		
56	06:48	07:35	08:19	16:01	16:46	17:33		
54	06:43	07:27	08:09	16:12	16:53	17:37		
52	06:39	07:21	07:60	16:21	16:60	17:42		
50	06:34	07:15	07:51	16:29	17:06	17:46		
45	06:25	07:01	07:34	16:47	17:19	17:56		
40	06:16	06:50	07:19	17:01	17:31	18:04		
35	06:09	06:40	07:07	17:13	17:41	18:12		
30	06:01	06:31	06:56	17:24	17:50	18:19		
20	05:47	06:14	06:38	17:42	18:06	18:33		
10	05:33	05:59	06:22	17:58	18:21	18:47		
0	05:18	05:44	06:06	18:14	18:36	19:01		
-10	05:02	05:28	05:51	18:29	18:52	19:18		
-20	04:42	05:10	05:34	18:45	19:09	19:38		
-30	04:16	04:48	05:15	19:05	19:31	20:03		
-35	03:60	04:35	05:04	19:16	19:45	20:20		
-40	03:40	04:19	04:51	19:29	20:00	20:39		
-45	03:14	03:60	04:35	19:44	20:20	21:05		
-50	02:38	03:35	04:16	20:03	20:44	21:41		
-52	02:18	03:22	04:07	20:12	20:57	22:00		
-54	01:52	03:08	03:57	20:22	21:11	22:25		
-56	01:13	02:51	03:45	20:34	21:28	23:02		
-58	---	02:30	03:31	20:47	21:48	---		
-60	---	02:02	03:15	21:03	22:15	---		
Lat.		Moonrise			Moonset			
Mon	Tue	Wed	Mon	Tue	Wed			
72	04:15	---	---	08:59	---	---		
70	03:42	---	---	09:34	---	---		
68	03:18	05:49	---	09:59	09:14	---		
66	03:00	05:09	---	10:18	09:55	---		
64	02:46	04:42	06:60	10:34	10:23	10:03		
62	02:34	04:21	06:19	10:48	10:45	10:44		
60	02:24	04:04	05:52	10:59	11:03	11:12		
58	02:15	03:50	05:30	11:09	11:18	11:34		
56	02:07	03:38	05:13	11:17	11:31	11:52		
54	02:00	03:27	04:58	11:25	11:42	12:07		
52	01:54	03:18	04:45	11:32	11:52	12:21		
50	01:49	03:10	04:34	11:38	12:01	12:32		
45	01:37	02:52	04:11	11:52	12:20	12:57		
40	01:27	02:38	03:52	12:03	12:35	13:16		
35	01:19	02:26	03:37	12:13	12:48	13:32		
30	01:11	02:15	03:23	12:21	13:00	13:47		
20	00:59	01:58	03:01	12:36	13:20	14:11		
10	00:48	01:42	02:41	12:49	13:37	14:32		
0	00:38	01:28	02:23	13:01	13:53	14:51		
-10	00:28	01:14	02:05	13:13	14:10	15:11		
-20	00:17	00:58	01:46	13:26	14:27	15:32		
-30	00:05	00:41	01:24	13:42	14:47	15:57		
-35	---	00:31	01:11	13:50	14:59	16:11		
-40	---	00:20	00:56	14:00	15:13	16:28		
-45	---	00:07	00:39	14:12	15:29	16:48		
-50	23:51	---	00:18	14:27	15:49	17:14		
-52	23:43	---	00:07					

January 19, 20 ,21 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars				
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	118°07.8	155°18.3	-16°21.4	51°59.9	24°28.6	114°11.5	0°22.7	151°03.5	-14°34.7	Alpheratz	357°36.6	29°13.1							
1	133°10.3	170°17.7	-16°20.4	67°02.1	24°28.6	129°13.6	0°22.8	166°05.7	-14°34.6	Ankaa	353°08.9	-42°11.2							
2	148°12.8	185°17.1	-16°19.5	82°04.4	24°28.6	144°15.7	0°23.0	181°07.9	-14°34.5	Schedar	349°33.1	56°40.0							
3	163°15.2	200°16.5	-16°18.5	97°06.6	24°28.6	159°17.8	0°23.2	196°10.1	-14°34.4	Diphda	348°48.9	-17°51.8							
4	178°17.7	215°15.9	-16°17.5	112°08.9	24°28.6	174°19.9	0°23.4	211°12.3	-14°34.3	Achernar	335°21.4	-57°07.5							
5	193°20.2	230°15.2	-16°16.5	127°11.1	24°28.6	189°22.0	0°23.5	226°14.5	-14°34.3	Hamal	327°53.0	23°34.3							
6	208°22.6	245°14.6	-16°15.5	142°13.4	24°28.7	204°24.1	0°23.7	241°16.7	-14°34.2	Polaris	314°39.3	89°22.0							
7	223°25.1	260°14.0	-16°14.5	157°15.6	24°28.7	219°26.2	0°23.9	256°18.9	-14°34.1	Akamar	315°12.9	-40°13.0							
8	238°27.5	275°13.4	-16°13.5	172°17.9	24°28.7	234°28.3	0°24.0	271°21.0	-14°34.0	Menkar	314°07.7	4°10.7							
9	253°30.0	290°12.8	-16°12.5	187°20.1	24°28.7	249°30.4	0°24.2	286°23.2	-14°33.9	Mirfak	308°30.4	49°56.7							
10	268°32.5	305°12.2	-16°11.5	202°22.4	24°28.7	264°32.4	0°24.4	301°25.4	-14°33.8	Aldebaran	290°41.3	16°33.3							
11	283°34.9	320°11.6	-16°10.5	217°24.6	24°28.8	279°34.5	0°24.5	316°27.6	-14°33.7	Rigel	281°05.2	-8°10.6							
12	298°37.4	335°10.9	-16°09.5	232°26.9	24°28.8	294°36.6	0°24.7	331°29.8	-14°33.6	Capella	280°23.9	46°01.4							
13	313°39.9	350°10.3	-16°08.7	247°29.1	24°28.8	309°38.7	0°24.9	346°32.0	-14°33.5	Bellatrix	278°24.3	6°22.2							
14	328°42.3	5°09.7	-16°07.6	262°31.3	24°28.8	324°40.8	0°25.1	1°34.2	-14°33.4	Elnath	278°03.6	28°37.6							
15	343°44.8	20°09.1	-16°06.6	277°33.6	24°28.8	339°42.9	0°25.2	16°36.4	-14°33.3	Alnilam	275°39.1	-1°11.3							
16	358°47.3	35°08.5	-16°05.6	292°35.8	24°28.8	354°45.0	0°25.4	31°38.5	-14°33.2	Betelgeuse	270°53.5	7°24.6							
17	13°49.7	50°07.9	-16°04.6	307°38.1	24°28.9	9°47.1	0°25.6	46°40.7	-14°33.1	Canopus	263°52.6	-52°42.6							
18	28°52.2	65°07.3	-16°03.6	322°40.3	24°28.9	24°49.2	0°25.7	61°42.9	-14°33.0	Sirius	258°27.2	-16°44.7							
19	43°54.7	80°06.7	-16°02.6	337°42.5	24°28.9	39°51.3	0°25.9	76°45.1	-14°32.9	Adara	255°06.8	-29°00.3							
20	58°57.1	95°06.0	-16°01.6	352°44.7	24°28.9	54°53.3	0°26.1	91°47.3	-14°32.8	Procyon	244°52.1	5°10.1							
21	73°59.6	110°05.4	-16°00.6	7°47.0	24°28.9	69°55.4	0°26.3	106°49.5	-14°32.7	Pollux	243°18.8	27°58.2							
22	89°02.0	125°04.8	-15°59.6	22°49.2	24°29.0	84°57.5	0°26.4	121°51.7	-14°32.7	Avior	234°14.7	-59°34.9							
23	104°04.5	140°04.2	-15°58.6	37°51.4	24°29.0	99°59.6	0°26.6	136°53.9	-14°32.6	Suhail	222°47.1	-43°31.4							
Mer.pass.:16:04			v-0.6 d1.0 m-3.8			v2.3 d0.0 m-0.6			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8							
															Miaplacidus	221°37.7	-69°48.5		
															Alphard	217°49.0	-8°45.5		
															Regulus	207°35.8	11°51.2		
															Dubhe	193°42.5	61°37.4		
															Denebola	182°26.4	14°26.5		
															Gienah	175°45.1	-17°40.1		
															Acrux	173°01.7	-63°13.3		
															Gacrux	171°53.2	-57°14.2		
															Alioth	166°14.3	55°49.8		
															Spica	158°24.0	-11°16.8		
															Alcaid	152°53.3	49°11.6		
															Hadar	148°38.4	-60°28.7		
															Menkent	147°59.6	-36°28.8		
															Arcturus	145°49.3	19°03.9		
															Rigel Kent.	139°42.7	-60°55.5		
															Zubenelg.	136°57.9	-16°08.2		
															Kochab	137°20.1	74°03.3		
															Alphecca	126°05.3	26°38.1		
															Antares	112°18.1	-26°28.9		
															Atria	107°14.2	-69°03.9		
															Sabik	102°04.9	-15°45.2		
															Shaula	96°12.9	-37°07.1		
															Rasalhague	96°00.4	12°32.5		
															Etamin	90°43.4	51°28.9		
															Kaus Aust.	83°35.0	-34°22.4		
															Vega	80°34.8	38°48.1		
															Nunki	75°50.1	-26°16.1		
															Altair	62°01.9	8°55.6		
															Peacock	53°08.9	-56°39.7		
															Deneb	49°27.4	45°21.7		
															Enif	33°40.7	9°58.7		
															Alnair	27°35.4	-46°51.2		
															Fomalhaut	15°16.6	-29°30.2		
															Scheat	13°47.1	28°12.5		
															Markab	13°31.7	15°19.7		
															2023/1/1	SHA	Mer.pass		
															Venus	37°10.5	13:39		
															Mars	293°52.1	20:29		
															Jupiter	356°03.7	16:21		
															Saturn	32°55.7	13:54		
															2023/1/2	SHA	Mer.pass		
															Venus	35°56.6	13:40		
															Mars	293°46.7	20:25		
															Jupiter	355°54.7	16:18		
															Saturn	32°49.1	13:50		
															2023/1/2	SHA	Mer.pass		
															Venus	34°43.1	13:41		
															Mars	293°40.6	20:22		
															Jupiter	355°45.6	16:14		
															Saturn	32°42.4	13:47		
															Horizontal parallax				
															Venus:	0.1			
															Mars:	0.2			
Mer.pass.:15:56			v-0.6 d1.0 m-3.8			v2.2 d0.0 m-0.6			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8							

Sun				Moon				
Thu	GHA	Dec		GHA	ν	Dec	d	HP
0	177°23.2	-20°26.1		221°17.8	3.3	-26°00.6	-5.8	60.2
1	192°23.0	-20°25.6		235°40.0	3.2	-26°06.3	-5.6	60.2
2	207°22.8	-20°25.1		250°02.1	3.0	-26°11.9	-5.5	60.2
3	222°22.6	-20°24.6		264°24.1	2.9	-26°17.3	-5.3	60.3
4	237°22.5	-20°24.1		278°46.0	2.8	-26°22.4	-5.1	60.3
5	252°22.3	-20°23.5		293°07.7	2.7	-26°27.4	-4.9	60.3
6	267°22.1	-20°23.0		307°29.4	2.6	-26°32.2	-4.7	60.4
7	282°21.9	-20°22.5		321°51.0	2.5	-26°36.9	-4.5	60.4
8	297°21.7	-20°22.0		336°12.4	2.4	-26°41.3	-4.3	60.4
9	312°21.5	-20°21.5		350°33.8	2.3	-26°45.5	-4.1	60.5
10	327°21.3	-20°20.9		4°55.1	2.2	-26°49.6	-3.9	60.5
11	342°21.1	-20°20.4		19°16.2	2.1	-26°53.4	-3.8	60.5
12	357°20.9	-20°19.9		33°37.3	2.0	-26°57.1	-3.6	60.6
13	12°20.7	-20°19.4		47°58.3	2.0	-27°00.5	-3.4	60.6
14	27°20.5	-20°18.8		62°19.2	1.9	-27°03.8	-3.2	60.6
15	42°20.3	-20°18.3		76°40.1	1.8	-27°06.8	-3.0	60.7
16	57°20.1	-20°17.8		91°00.8	1.7	-27°09.7	-2.7	60.7
17	72°19.9	-20°17.2		105°21.5	1.6	-27°12.3	-2.5	60.7
18	87°19.8	-20°16.7		119°42.1	1.6	-27°14.8	-2.3	60.7
19	102°19.6	-20°16.2		134°02.6	1.5	-27°17.0	-2.1	60.8
20	117°19.4	-20°15.7		148°23.1	1.4	-27°19.0	-1.9	60.8
21	132°19.2	-20°15.1		162°43.5	1.4	-27°20.9	-1.7	60.8
22	147°19.0	-20°14.6		177°03.8	1.3	-27°22.5	-1.5	60.9
23	162°18.8	-20°14.1		191°24.1	1.3	-27°23.9	-1.3	60.9
SD.=16.3		d=0.5	S.D.=16.4					

Fri	GHA	Dec		GHA	ν	Dec	d	HP
0	177°18.6	-20°13.5		205°44.3	1.2	-27°25.1	-1.1	60.9
1	192°18.4	-20°13.0		220°04.5	1.2	-27°26.1	-0.9	60.9
2	207°18.2	-20°12.5		234°24.6	1.1	-27°26.8	-0.7	61.0
3	222°18.1	-20°11.9		248°44.7	1.1	-27°27.4	-0.4	61.0
4	237°17.9	-20°11.4		263°04.8	1.0	-27°27.7	-0.2	61.0
5	252°17.7	-20°10.9		277°24.8	1.0	-27°27.8	-0.0	61.0
6	267°17.5	-20°10.3		291°44.7	1.0	-27°27.7	0.2	61.0
7	282°17.3	-20°09.8		306°04.7	0.9	-27°27.4	0.4	61.1
8	297°17.1	-20°09.2		320°24.6	0.9	-27°26.9	0.6	61.1
9	312°16.9	-20°08.7		334°44.5	0.9	-27°26.2	0.8	61.1
10	327°16.7	-20°08.2		349°04.4	0.9	-27°25.2	1.1	61.1
11	342°16.6	-20°07.6		3°24.2	0.8	-27°24.1	1.3	61.1
12	357°16.4	-20°07.1		17°44.1	0.8	-27°22.7	1.5	61.2
13	12°16.2	-20°06.5		32°03.9	0.8	-27°21.1	1.7	61.2
14	27°16.0	-20°06.0		46°23.7	0.8	-27°19.2	1.9	61.2
15	42°15.8	-20°05.4		60°43.5	0.8	-27°17.2	2.2	61.2
16	57°15.6	-20°04.9		75°03.4	0.8	-27°14.9	2.4	61.2
17	72°15.5	-20°04.4		89°23.2	0.8	-27°12.5	2.6	61.3
18	87°15.3	-20°03.8		103°43.0	0.8	-27°09.8	2.8	61.3
19	102°15.1	-20°03.3		118°02.9	0.9	-27°06.9	3.0	61.3
20	117°14.9	-20°02.7		132°22.7	0.9	-27°03.7	3.2	61.3
21	132°14.7	-20°02.2		146°42.6	0.9	-27°00.4	3.4	61.3
22	147°14.5	-20°01.6		161°02.5	0.9	-26°56.8	3.7	61.3
23	162°14.4	-20°01.1		175°22.4	0.9	-26°53.1	3.9	61.3
SD.=16.3		d=0.5	S.D.=16.6					

Sat	GHA	Dec		GHA	ν	Dec	d	HP
0	177°14.2	-20°00.5		189°42.4	1.0	-26°49.1	4.1	61.4
1	192°14.0	-19°59.0		204°02.4	1.0	-26°44.9	4.3	61.4
2	207°13.8	-19°58.9		218°22.4	1.0	-26°40.5	4.5	61.4
3	222°13.6	-19°58.9		232°42.5	1.1	-26°35.8	4.7	61.4
4	237°13.5	-19°58.3		247°02.6	1.1	-26°31.0	4.9	61.4
5	252°13.3	-19°57.8		261°22.8	1.2	-26°25.9	5.2	61.4
6	267°13.1	-19°57.2		275°43.0	1.2	-26°20.7	5.4	61.4
7	282°12.9	-19°56.7		290°03.2	1.3	-26°15.2	5.6	61.4
8	297°12.7	-19°56.1		304°23.5	1.3	-26°09.5	5.8	61.4
9	312°12.6	-19°55.6		318°43.9	1.4	-26°03.7	6.0	61.4
10	327°12.4	-19°55.0		333°04.3	1.5	-25°57.6	6.2	61.5
11	342°12.2	-19°54.4		347°24.8	1.5	-25°51.3	6.4	61.5
12	357°12.0	-19°53.9		1°45.4	1.6	-25°44.8	6.6	61.5
13	12°11.9	-19°53.3		16°06.0	1.7	-25°38.1	6.8	61.5
14	27°11.7	-19°52.8		30°26.7	1.7	-25°31.2	7.0	61.5
15	42°11.5	-19°52.2		44°47.5	1.8	-25°24.1	7.2	61.5
16	57°11.3	-19°51.7		59°08.3	1.9	-25°16.8	7.4	61.5
17	72°11.2	-19°51.1		73°29.3	2.0	-25°09.4	7.6	61.5
18	87°11.0	-19°50.5		87°50.3	2.1	-25°01.7	7.8	61.5
19	102°10.8	-19°50.0		102°11.4	2.1	-24°53.8	8.0	61.5
20	117°10.6	-19°49.4		116°32.6	2.2	-24°45.8	8.2	61.5
21	132°10.5	-19°48.9		130°53.9	2.3	-24°37.5	8.3	61.5
22	147°10.3	-19°48.3		145°15.2	2.4	-24°29.1	8.5	61.5
23	162°10.1	-19°47.7		159°36.7	2.5	-24°20.5	8.7	61.5
SD.=16.3		d=0.5	S.D.=16.7					

Twilight		Twilight			
Naut.	Civil	Sunrise	Sunset	Civil	Naut.
72	07:48	09:32	--:--	--:--	14:51
70	07:36	09:03	11:07	13:16	15:20
68	07:25	08:42	10:11	14:12	15:41
66	07:16	08:24	09:38	14:45	15:58
64	07:08	08:10	09:14	15:09	16:12
62	07:01	07:59	08:55	15:27	16:24
60	06:55	07:48	08:40	15:43	16:34
58	06:50	07:40	08:27	15:56	16:43
56	06:45	07:32	08:15	16:07	16:51
54	06:40	07:25	08:05	16:17	16:58
52	06:36	07:18	07:56	16:26	17:04
50	06:32	07:12	07:49	16:34	17:10
45	06:23	06:59	07:32	16:51	17:23
40	06:15	06:48	07:18	17:04	17:34
35	06:08	06:39	07:06	17:16	17:43
30	06:01	06:30	06:56	17:26	17:52
20	05:47	06:14	06:38	17:44	18:08
10	05:34	05:60	06:22	17:60	18:22
0	05:20	05:45	06:07	18:15	18:37
-10	05:03	05:30	05:52	18:29	18:52
-20	04:44	05:12	05:36	18:45	19:09
-30	04:19	04:51	05:18	19:04	19:30
-35	04:03	04:38	05:07	19:15	19:43
-40	03:44	04:23	04:54	19:27	19:58
-45	03:19	04:04	04:39	19:42	20:17
-50	02:45	03:40	04:21	20:00	20:41
-52	02:26	03:28	04:12	20:09	20:52
-54	02:03	03:14	04:02	20:19	21:06
-56	01:29	02:58	03:51	20:30	21:22
-58	--:--	02:39	03:38	20:42	21:41
-60	--:--	02:13	03:23	20:57	22:06

Moonrise		Moonset				
Lat.	Thu	Fri	Sat	Thu	Fri	Sat
72	--:--	--:--	--:--	--:--	--:--	--:--
70	--:--	--:--	--:--	--:--	--:--	--:--
68	--:--	--:--	--:--	--:--	--:--	--:--
66	--:--	--:--	--:--	--:--	--:--	--:--
64	--:--	--:--	11:39	--:--	--:--	12:16
62	08:26	10:01	10:17	10:47	11:32	13:37
60	07:39	09:01	09:40	11:35	12:32	14:13
58	07:09	08:27	09:14	12:05	13:06	14:39
56	06:46	08:02	08:53	12:29	13:31	14:60
54	06:27	07:42	08:35	12:48	13:51	15:17
52	06:11	07:25	08:21	13:04	14:08	15:31
50	05:57	07:11	08:07	13:18	14:22	15:44
45	05:30	06:41	07:41	13:46	14:51	16:10
40	05:08	06:18	07:19	14:08	15:14	16:31
35	04:50	05:59	07:02	14:27	15:33	16:48
30	04:34	05:43	06:46	14:43	15:49	17:02
20	04:08	05:16	06:20	15:10	16:16	17:27
10	03:45	04:52	05:58	15:33	16:40	17:48
0	03:24	04:30	05:37	15:55	17:02	18:08
-10	03:03	04:08	05:16	16:17	17:23	18:28
-20	02:41	03:44	04:53	16:40	17:47	18:49
-30	02:15	03:17	04:27	17:07	18:14	19:13
-35	02:00	03:01	04:12	17:23	18:30	19:27
-40	01:43	02:42	03:54	17:42	18:48	19:43
-45	01:22	02:19	03:32	18:04	19:10	20:03
-50	00:56	01:50	03:04	18:33	19:38	20:27
-52	00:43	01:36	02:51	18:47	19:52	20:38
-54	00:28	01:20	02:35	19:03	20:08	20:51
-56	00:12	01:01	02:17	19:22	20:26	21:06
-58	--:--	00:37	01:55	19:46	20:49	21:23
-60	--:--	00:05	01:25	20:18	21:18	21:45

Sun		Moon			
Day	Eqn.of Time 00 ^h 12 ^h	Mer. Pass	Mer.Pass. Upper Lower	Age	
19	10:27	10:37	12:10	09:39 22:12	27(8%)
20	10:46	10:55	12:10	10:45 23:19	28(3%)
21	11:03	11:12	12:11	11:52 00:25	29(0%)

January 22, 23 ,24 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	121°05.3	154°35.1	-15°08.5	54°38.9	24°30.1	116°41.7	0°35.1	153°41.0	-14°27.9	Alpheratz	357°36.6	29°13.1					
1	136°07.7	169°34.5	-15°07.5	69°41.1	24°30.2	131°43.8	0°35.3	168°43.2	-14°27.8	Ankaa	353°08.9	-42°11.1					
2	151°10.2	184°33.9	-15°06.4	84°43.2	24°30.2	146°45.8	0°35.5	183°45.4	-14°27.7	Schedar	349°33.1	56°40.0					
3	166°12.6	199°33.4	-15°05.4	99°45.4	24°30.2	161°47.9	0°35.7	198°47.6	-14°27.6	Diphda	348°48.9	-17°51.8					
4	181°15.1	214°32.8	-15°04.4	114°47.6	24°30.3	176°50.0	0°35.8	213°49.7	-14°27.5	Achernar	335°21.5	-57°07.5					
5	196°17.6	229°32.2	-15°03.3	129°49.7	24°30.3	191°52.1	0°36.0	228°51.9	-14°27.4	Hamal	327°53.0	23°34.3					
6	211°20.0	244°31.6	-15°02.3	144°51.9	24°30.3	206°54.1	0°36.2	243°54.1	-14°27.3	Polaris	314°40.6	89°22.0					
7	226°22.5	259°31.1	-15°01.2	159°54.0	24°30.3	221°56.2	0°36.4	258°56.3	-14°27.2	Akamar	315°12.9	-40°13.0					
8	241°25.0	274°30.5	-15°00.2	174°56.2	24°30.4	236°58.3	0°36.5	273°58.5	-14°27.1	Menkar	314°07.7	4°10.7					
9	256°27.4	289°29.9	-14°59.1	189°58.3	24°30.4	252°00.4	0°36.7	289°00.7	-14°27.1	Mirfak	308°30.4	49°56.7					
10	271°29.9	304°29.3	-14°58.1	205°00.5	24°30.4	267°02.4	0°36.9	304°02.8	-14°27.0	Aldebaran	290°41.3	16°33.3					
11	286°32.4	319°28.8	-14°57.0	220°02.6	24°30.4	282°04.5	0°37.1	319°05.0	-14°26.9	Rigel	281°05.2	-8°10.6					
12	301°34.8	334°28.2	-14°56.0	235°04.8	24°30.5	297°06.6	0°37.2	334°07.2	-14°26.8	Capella	280°23.9	46°01.4					
13	316°37.3	349°27.6	-14°54.9	250°06.9	24°30.5	312°08.7	0°37.4	349°09.4	-14°26.7	Bellatrix	278°24.3	6°22.2					
14	331°39.8	4°27.0	-14°53.9	265°09.1	24°30.5	327°10.8	0°37.6	4°11.6	-14°26.6	Elnath	278°03.6	28°37.6					
15	346°42.2	19°26.5	-14°52.9	280°11.2	24°30.6	342°12.8	0°37.8	19°13.8	-14°26.5	Alnilam	275°39.1	-1°11.3					
16	1°44.7	34°25.9	-14°51.8	295°13.4	24°30.6	357°14.9	0°38.0	34°16.0	-14°26.4	Betelgeuse	270°53.5	7°24.6					
17	16°47.1	49°25.3	-14°50.7	310°15.5	24°30.6	12°17.0	0°38.1	49°18.1	-14°26.3	Canopus	263°52.6	-52°42.6					
18	31°49.6	64°24.7	-14°49.7	325°17.6	24°30.7	27°19.1	0°38.3	64°20.3	-14°26.2	Sirius	258°27.2	-16°44.8					
19	46°52.1	79°24.2	-14°48.6	340°19.8	24°30.7	42°21.1	0°38.5	79°22.5	-14°26.1	Adara	255°06.8	-29°00.3					
20	61°54.5	94°23.6	-14°47.6	355°21.9	24°30.7	57°23.2	0°38.7	94°24.7	-14°26.0	Procyon	244°52.1	5°10.1					
21	76°57.0	109°23.0	-14°46.5	10°24.0	24°30.7	72°25.3	0°38.8	109°26.9	-14°25.9	Pollux	243°18.8	27°58.2					
22	91°59.5	124°22.5	-14°45.5	25°26.2	24°30.8	87°27.4	0°39.0	124°29.1	-14°25.8	Avior	234°14.7	-59°34.9					
23	107°01.9	139°21.9	-14°44.4	40°28.3	24°30.8	102°29.4	0°39.2	139°31.2	-14°25.7	Suhail	222°47.0	-43°31.5					
Mer.pass.:15:53			v-0.6 d1.0 m-3.8			v2.2 d0.0 m-0.5			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	122°04.4	154°21.3	-14°43.4	55°30.4	24°30.8	117°31.5	0°39.4	154°33.4	-14°25.6	Dubhe	193°42.5	61°37.4					
1	137°06.9	169°20.8	-14°42.3	70°32.6	24°30.9	132°33.6	0°39.5	169°35.6	-14°25.5	Denebola	182°26.3	14°26.5					
2	152°09.3	184°20.2	-14°41.3	85°34.7	24°30.9	147°35.6	0°39.7	184°37.8	-14°25.4	Gienah	175°45.1	-17°40.1					
3	167°11.8	199°19.6	-14°40.2	100°36.8	24°30.9	162°37.7	0°39.9	199°40.0	-14°25.3	Acrux	173°01.6	-63°13.3					
4	182°14.3	214°19.1	-14°39.1	115°39.0	24°31.0	177°39.8	0°40.1	214°42.2	-14°25.2	Gacrux	171°53.2	-57°14.3					
5	197°16.7	229°18.5	-14°38.1	130°41.1	24°31.0	192°41.9	0°40.3	229°44.3	-14°25.1	Alioth	166°14.3	55°49.8					
6	212°19.2	244°17.9	-14°37.0	145°43.2	24°31.0	207°43.9	0°40.4	244°46.5	-14°25.0	Spica	158°23.9	-11°16.8					
7	227°21.6	259°17.4	-14°36.0	160°45.3	24°31.1	222°46.0	0°40.6	259°48.7	-14°24.9	Alcaid	152°53.2	49°11.6					
8	242°24.1	274°16.8	-14°34.9	175°47.5	24°31.1	237°48.1	0°40.8	274°50.9	-14°24.8	Hadar	148°38.3	-60°28.7					
9	257°26.6	289°16.2	-14°33.8	190°49.6	24°31.1	252°50.2	0°41.0	289°53.1	-14°24.8	Menkent	147°59.5	-36°28.8					
10	272°29.0	304°15.7	-14°32.8	205°51.7	24°31.1	267°52.2	0°41.2	304°55.3	-14°24.7	Arcturus	145°49.3	19°03.9					
11	287°31.5	319°15.1	-14°31.7	220°53.8	24°31.2	282°54.3	0°41.3	319°57.5	-14°24.6	Rigel Kent.	139°42.6	-60°55.5					
12	302°34.0	334°14.6	-14°30.7	235°55.9	24°31.2	297°56.4	0°41.5	334°59.6	-14°24.5	Zubenelg.	136°57.9	-16°08.2					
13	317°36.4	349°14.0	-14°29.6	250°58.0	24°31.2	312°58.4	0°41.7	350°01.8	-14°24.4	Kochab	137°20.0	74°03.3					
14	332°38.9	4°13.4	-14°28.5	266°00.2	24°31.3	328°00.5	0°41.9	5°04.0	-14°24.3	Alphecca	126°05.3	26°38.1					
15	347°41.4	19°12.9	-14°27.5	281°02.3	24°31.3	343°02.6	0°42.0	20°06.2	-14°24.2	Antares	112°18.0	-26°28.9					
16	2°43.8	34°12.3	-14°26.4	296°04.4	24°31.3	358°04.7	0°42.2	35°08.4	-14°24.1	Atria	107°14.1	-69°03.9					
17	17°46.3	49°11.8	-14°25.3	311°06.5	24°31.4	13°06.7	0°42.4	50°10.6	-14°24.0	Sabik	102°04.9	-15°45.2					
18	32°48.8	64°11.2	-14°24.3	326°08.6	24°31.4	28°08.8	0°42.6	65°12.7	-14°23.9	Shaula	96°12.9	-37°07.1					
19	47°51.2	79°10.7	-14°23.2	341°10.7	24°31.4	43°10.9	0°42.8	80°14.9	-14°23.8	Rasalhague	96°00.3	12°32.5					
20	62°53.7	94°10.1	-14°22.1	356°12.8	24°31.5	58°12.9	0°42.9	95°17.1	-14°23.7	Etamin	90°43.4	51°28.9					
21	77°56.1	109°09.5	-14°21.1	11°14.9	24°31.5	73°15.0	0°43.1	110°19.3	-14°23.6	Kaus Aust.	83°35.0	-34°22.4					
22	92°58.6	124°09.0	-14°20.0	26°17.0	24°31.5	88°17.1	0°43.3	125°21.5	-14°23.5	Vega	80°34.7	38°48.1					
23	108°01.1	139°08.4	-14°18.9	41°19.1	24°31.6	103°19.1	0°43.5	140°23.7	-14°23.4	Nunki	75°50.1	-26°16.1					
Mer.pass.:15:49			v-0.6 d1.1 m-3.8			v2.1 d0.0 m-0.5			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	123°03.5	154°07.9	-14°17.8	56°21.2	24°31.6	118°21.2	0°43.7	155°25.8	-14°23.3								
1	138°06.0	169°07.3	-14°16.8	71°23.3	24°31.6	133°23.3	0°43.8	170°28.0	-14°23.2								
2	153°08.5	184°06.8	-14°15.7	86°25.4	24°31.7	148°25.4	0°44.0	185°30.2	-14°23.1								
3	168°10.9	199°06.2	-14°14.6	101°27.5	24°31.7	163°27.4	0°44.2	200°32.4	-14°23.0								
4	183°13.4	214°05.7	-14°13.5	116°29.6	24°31.7	178°29.5	0°44.4	215°34.6	-14°22.9								
5	198°15.9	229°05.1	-14°12.5	131°31.7	24°31.8	193°31.6	0°44.6	230°36.7	-14°22.8								
6	213°18.3	244°04.6	-14°11.4	146°33.8	24°31.8	208°33.6	0°44.7	245°38.9	-14°22.7								
7	228°20.8	259°04.0	-14°10.3	161°35.9	24°31.8	223°35.7	0°44.9	260°41.1	-14°22.6								
8	243°23.2	274°03.5	-14°09.2	176°38.0	24°31.9	238°37.8	0°45.1	275°43.3	-14°22.5								
9	258°25.7	289°02.9	-14°08.2	191°40.1	24°31.9	253°39.8	0°45.3	290°45.5	-14°22.4								
10	273°28.2	304°02.4	-14°07.1	206°42.2	24°32.0	268°41.9	0°45.5	305°47.7	-14°22.3								
11	288°30.6	319°01.8	-14°06.0	221°44.3	24°32.0</												

Sun				Moon				
Sun	GHA	Dec		GHA	ν	Dec	d	HP
0	177°09.9	-19°47.2		173°58.3	2.6	-24°11.7	8.9	61.5
1	192°09.8	-19°46.6		188°19.9	2.7	-24°02.7	9.1	61.5
2	207°09.6	-19°46.0		202°41.7	2.8	-23°53.5	9.3	61.5
3	222°09.4	-19°45.5		217°03.5	2.9	-23°44.2	9.4	61.5
4	237°09.2	-19°44.9		231°25.5	3.0	-23°34.6	9.6	61.5
5	252°09.1	-19°44.3		245°47.6	3.1	-23°25.0	9.8	61.5
6	267°08.9	-19°43.8		260°09.7	3.2	-23°15.1	9.9	61.5
7	282°08.7	-19°43.2		274°32.0	3.3	-23°05.1	10.1	61.5
8	297°08.6	-19°42.6		288°54.4	3.4	-22°54.9	10.3	61.5
9	312°08.4	-19°42.1		303°16.9	3.6	-22°44.5	10.4	61.4
10	327°08.2	-19°41.5		317°39.5	3.7	-22°34.0	10.6	61.4
11	342°08.1	-19°40.9		332°02.3	3.8	-22°23.3	10.8	61.4
12	357°07.9	-19°40.3		346°25.1	3.9	-22°12.4	10.9	61.4
13	12°07.7	-19°39.8		0°48.0	4.0	-22°01.4	11.1	61.4
14	27°07.5	-19°39.2		15°11.1	4.1	-21°50.3	11.2	61.4
15	42°07.4	-19°38.6		29°34.3	4.2	-21°39.0	11.4	61.4
16	57°07.2	-19°38.0		43°57.6	4.4	-21°27.5	11.5	61.4
17	72°07.0	-19°37.5		58°21.0	4.5	-21°15.9	11.7	61.4
18	87°06.9	-19°36.9		72°44.6	4.6	-21°04.2	11.8	61.4
19	102°06.7	-19°36.3		87°08.3	4.7	-20°52.3	12.0	61.3
20	117°06.5	-19°35.7		101°32.1	4.8	-20°40.2	12.1	61.3
21	132°06.4	-19°35.2		115°56.0	5.0	-20°28.1	12.2	61.3
22	147°06.2	-19°34.6		130°20.0	5.1	-20°15.8	12.4	61.3
23	162°06.0	-19°34.0		144°44.1	5.2	-20°03.3	12.5	61.3
SD.=16.3			d=0.6	S.D.=16.8				

Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	177°05.9	-19°33.4	159°08.4	5.3	-19°50.8	12.6	61.3
1	192°05.7	-19°32.8	173°32.8	5.5	-19°38.1	12.8	61.3
2	207°05.6	-19°32.3	187°57.3	5.6	-19°25.2	12.9	61.2
3	222°05.4	-19°31.7	202°22.0	5.7	-19°12.3	13.0	61.2
4	237°05.2	-19°31.1	216°46.8	5.8	-18°59.2	13.1	61.2
5	252°05.1	-19°30.5	231°11.6	6.0	-18°46.0	13.2	61.2
6	267°04.9	-19°29.9	245°36.7	6.1	-18°32.7	13.4	61.2
7	282°04.7	-19°29.3	260°01.8	6.2	-18°19.3	13.5	61.1
8	297°04.6	-19°28.8	274°27.1	6.3	-18°05.8	13.6	61.1
9	312°04.4	-19°28.2	288°52.4	6.4	-17°52.1	13.7	61.1
10	327°04.2	-19°27.6	303°17.9	6.6	-17°38.4	13.8	61.1
11	342°04.1	-19°27.0	317°43.6	6.7	-17°24.5	13.9	61.1
12	357°03.9	-19°26.4	332°09.3	6.8	-17°10.6	14.0	61.0
13	12°03.8	-19°25.8	346°35.2	6.9	-16°56.5	14.1	61.0
14	27°03.6	-19°25.2	1°01.2	7.1	-16°42.4	14.2	61.0
15	42°03.4	-19°24.6	15°27.3	7.2	-16°28.1	14.3	61.0
16	57°03.3	-19°24.1	29°53.5	7.3	-16°13.8	14.4	60.9
17	72°03.1	-19°23.5	44°19.9	7.4	-15°59.4	14.5	60.9
18	87°03.0	-19°22.9	58°46.3	7.5	-15°44.9	14.6	60.9
19	102°02.8	-19°22.3	73°12.9	7.6	-15°30.3	14.6	60.9
20	117°02.6	-19°21.7	87°39.6	7.8	-15°15.6	14.7	60.8
21	132°02.5	-19°21.1	102°06.4	7.9	-15°00.8	14.8	60.8
22	147°02.3	-19°20.5	116°33.4	8.0	-14°46.0	14.9	60.8
23	162°02.2	-19°19.9	131°00.4	8.1	-14°31.1	15.0	60.8
SD.=16.2			d=0.6	S.D.=16.7			

Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	177°02.0	-19°19.3	145°27.6	8.2	-14°16.1	15.0	60.7
1	192°01.9	-19°18.7	159°54.9	8.3	-14°01.0	15.1	60.7
2	207°01.7	-19°18.1	174°22.3	8.4	-13°45.9	15.2	60.7
3	222°01.6	-19°17.5	188°49.8	8.6	-13°30.6	15.2	60.7
4	237°01.4	-19°16.9	203°17.4	8.7	-13°15.4	15.3	60.6
5	252°01.2	-19°16.3	217°45.1	8.8	-13°00.0	15.4	60.6
6	267°01.1	-19°15.7	232°12.9	8.9	-12°44.7	15.4	60.6
7	282°00.9	-19°15.1	246°40.8	9.0	-12°29.2	15.5	60.5
8	297°00.8	-19°14.5	261°08.9	9.1	-12°13.7	15.5	60.5
9	312°00.6	-19°13.9	275°37.0	9.2	-11°58.1	15.6	60.5
10	327°00.5	-19°13.3	290°05.3	9.3	-11°42.5	15.6	60.4
11	342°00.3	-19°12.7	304°33.6	9.4	-11°26.9	15.7	60.4
12	357°00.2	-19°12.1	319°02.1	9.5	-11°11.1	15.7	60.4
13	12°00.0	-19°11.5	333°30.6	9.6	-10°55.4	15.8	60.3
14	26°59.9	-19°10.9	347°59.3	9.7	-10°39.6	15.8	60.3
15	41°59.7	-19°10.3	2°28.1	9.8	-10°23.7	15.9	60.3
16	56°59.6	-19°09.7	16°56.9	9.9	-10°07.8	15.9	60.2
17	71°59.4	-19°09.1	31°25.8	10.0	-9°51.9	15.9	60.2
18	86°59.3	-19°08.5	45°54.9	10.1	-9°36.0	16.0	60.2
19	101°59.1	-19°07.9	60°24.0	10.2	-9°20.0	16.0	60.1
20	116°59.0	-19°07.3	74°53.2	10.3	-9°03.9	16.0	60.1
21	131°58.8	-19°06.7	89°22.6	10.4	-8°47.9	16.1	60.1
22	146°58.7	-19°06.1	103°52.0	10.4	-8°31.8	16.1	60.0
23	161°58.5	-19°05.5	118°21.5	10.5	-8°15.7	16.1	60.0
SD.=16.2			d=0.6	S.D.=16.6			

Twilight		Twilight				
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
72	07:40	09:19	--:--	--:--	15:06	16:45
70	07:28	08:53	10:43	13:42	15:31	16:56
68	07:18	08:33	09:57	14:27	15:51	17:06
66	07:10	08:18	09:28	14:56	16:07	17:14
64	07:03	08:04	09:06	15:18	16:20	17:21
62	06:57	07:53	08:49	15:36	16:31	17:27
60	06:51	07:44	08:34	15:50	16:40	17:33
58	06:46	07:35	08:22	16:03	16:49	17:38
56	06:42	07:28	08:11	16:13	16:56	17:42
54	06:37	07:21	08:01	16:23	17:03	17:47
52	06:33	07:15	07:53	16:31	17:09	17:51
50	06:30	07:09	07:45	16:39	17:15	17:54
45	06:21	06:57	07:29	16:55	17:27	18:03
40	06:14	06:47	07:16	17:08	17:37	18:10
35	06:07	06:38	07:05	17:19	17:46	18:17
30	06:00	06:29	06:55	17:29	17:55	18:24
20	05:47	06:14	06:37	17:46	18:09	18:36
10	05:34	06:00	06:22	18:01	18:23	18:49
0	05:21	05:46	06:08	18:15	18:37	19:03
-10	05:05	05:31	05:54	18:30	18:52	19:18
-20	04:46	05:14	05:38	18:45	19:09	19:37
-30	04:22	04:54	05:20	19:03	19:29	20:01
-35	04:07	04:41	05:10	19:13	19:41	20:16
-40	03:48	04:27	04:58	19:25	19:56	20:34
-45	03:24	04:09	04:43	19:40	20:14	20:58
-50	02:52	03:46	04:26	19:57	20:37	21:30
-52	02:34	03:34	04:17	20:05	20:48	21:47
-54	02:13	03:21	04:08	20:14	21:01	22:08
-56	01:44	03:06	03:57	20:25	21:16	22:36
-58	00:52	02:48	03:45	20:37	21:34	23:23
-60	--:--	02:25	03:31	20:51	21:56	--:--

Moonrise		Moonset				
Lat.	Sun	Mon	Tue	Sun	Mon	Tue
72	--:--	12:42	11:18	--:--	15:37	18:54
70	--:--	11:49	10:59	--:--	16:28	19:10
68	--:--	11:15	10:44	--:--	16:59	19:22
66	11:26	10:51	10:32	14:43	17:22	19:33
64	10:46	10:31	10:22	15:23	17:40	19:41
62	10:18	10:16	10:13	15:50	17:55	19:48
60	09:56	10:02	10:05	16:11	18:07	19:55
58	09:38	09:51	09:58	16:28	18:17	20:00
56	09:23	09:41	09:52	16:43	18:26	20:05
54	09:10	09:32	09:47	16:55	18:34	20:09
52	08:58	09:24	09:42	17:06	18:42	20:13
50	08:48	09:16	09:38	17:16	18:48	20:17
45	08:26	09:01	09:28	17:36	19:02	20:24
40	08:09	08:48	09:20	17:52	19:13	20:30
35	07:54	08:37	09:13	18:06	19:23	20:36
30	07:41	08:27	09:07	18:18	19:31	20:40
20	07:19	08:11	08:56	18:38	19:45	20:48
10	06:60	07:56	08:46	18:55	19:58	20:55
0	06:42	07:42	08:37	19:11	20:09	21:02
-10	06:24	07:28	08:28	19:27	20:20	21:08
-20	06:04	07:14	08:19	19:44	20:32	21:15
-30	05:42	06:56				

January 25, 26 ,27 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	124°02.7	153°54.7	-13°51.9	57°11.3	24°32.5	119°10.8	0°48.0	156°18.2	-14°21.0	Alpheratz	357°36.6	29°13.1					
1	139°05.1	168°54.2	-13°50.8	72°13.4	24°32.5	134°12.9	0°48.2	171°20.4	-14°20.9	Ankaa	353°08.9	-42°11.1					
2	154°07.6	183°53.6	-13°49.7	87°15.4	24°32.5	149°14.9	0°48.3	186°22.6	-14°20.8	Schedar	349°33.1	56°40.0					
3	169°10.1	198°53.1	-13°48.7	102°17.5	24°32.6	164°17.0	0°48.5	201°24.8	-14°20.7	Diphda	348°48.9	-17°51.8					
4	184°12.5	213°52.6	-13°47.6	117°19.6	24°32.6	179°19.1	0°48.7	216°26.9	-14°20.6	Achernar	335°21.5	-57°07.5					
5	199°15.0	228°52.0	-13°46.5	132°21.6	24°32.6	194°21.1	0°48.9	231°29.1	-14°20.5	Hamal	327°53.0	23°34.3					
6	214°17.5	243°51.5	-13°45.4	147°23.7	24°32.7	209°23.2	0°49.1	246°31.3	-14°20.4	Polaris	314°42.1	89°22.0					
7	229°19.9	258°50.9	-13°44.3	162°25.8	24°32.7	224°25.3	0°49.3	261°33.5	-14°20.3	Akamar	315°12.9	-40°13.0					
8	244°22.4	273°50.4	-13°43.2	177°27.8	24°32.8	239°27.3	0°49.4	276°35.7	-14°20.2	Menkar	314°07.7	4°10.7					
9	259°24.9	288°49.9	-13°42.1	192°29.9	24°32.8	254°29.4	0°49.6	291°37.8	-14°20.1	Mirfak	308°30.4	49°56.7					
10	274°27.3	303°49.3	-13°41.0	207°32.0	24°32.8	269°31.5	0°49.8	306°40.0	-14°20.0	Aldebaran	290°41.3	16°33.3					
11	289°29.8	318°48.8	-13°39.9	222°34.0	24°32.9	284°33.5	0°50.0	321°42.2	-14°19.9	Rigel	281°05.2	-8°10.6					
12	304°32.2	333°48.3	-13°38.8	237°36.1	24°32.9	299°35.6	0°50.2	336°44.4	-14°19.8	Capella	280°23.9	46°01.4					
13	319°34.7	348°47.7	-13°37.7	252°38.1	24°32.9	314°37.6	0°50.3	351°46.6	-14°19.7	Bellatrix	278°24.3	6°22.2					
14	334°37.2	3°47.2	-13°36.6	267°40.2	24°33.0	329°39.7	0°50.5	6°48.8	-14°19.6	Elnath	278°03.6	28°37.6					
15	349°39.6	18°46.7	-13°35.5	282°42.2	24°33.0	344°41.8	0°50.7	21°50.9	-14°19.5	Alnilam	275°39.1	-1°11.3					
16	4°42.1	33°46.1	-13°34.4	297°44.3	24°33.1	359°43.8	0°50.9	36°53.1	-14°19.4	Betelgeuse	270°53.5	7°24.6					
17	19°44.6	48°45.6	-13°33.3	312°46.4	24°33.1	14°45.9	0°51.1	51°55.3	-14°19.3	Canopus	263°52.6	-52°42.6					
18	34°47.0	63°45.1	-13°32.2	327°48.4	24°33.1	29°48.0	0°51.3	66°57.5	-14°19.3	Sirius	258°27.2	-16°44.8					
19	49°49.5	78°44.5	-13°31.1	342°50.5	24°33.2	44°50.0	0°51.4	81°59.7	-14°19.2	Adara	255°06.8	-29°00.3					
20	64°52.0	93°44.0	-13°30.0	357°52.5	24°33.2	59°52.1	0°51.6	97°01.8	-14°19.1	Procyon	244°52.1	5°10.1					
21	79°54.4	108°43.5	-13°28.9	12°54.5	24°33.3	74°54.1	0°51.8	112°04.0	-14°19.0	Pollux	243°18.8	27°58.2					
22	94°56.9	123°42.9	-13°27.8	27°56.6	24°33.3	89°56.2	0°52.0	127°06.2	-14°18.9	Avior	234°14.7	-59°34.9					
23	109°59.3	138°42.4	-13°26.7	42°58.6	24°33.3	104°58.3	0°52.2	142°08.4	-14°18.8	Suhail	222°47.0	-43°31.5					
Mer.pass.:15:41			v-0.5 d1.1 m-3.8			v2.1 d0.0 m-0.4			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	125°01.8	153°41.9	-13°25.6	58°00.7	24°33.4	120°00.3	0°52.4	157°10.6	-14°18.7	Dubhe	193°42.4	61°37.4					
1	140°04.3	168°41.3	-13°24.5	73°02.7	24°33.4	135°02.4	0°52.5	172°12.8	-14°18.6	Denebola	182°26.3	14°26.5					
2	155°06.7	183°40.8	-13°23.4	88°04.8	24°33.5	150°04.4	0°52.7	187°14.9	-14°18.5	Gienah	175°45.0	-17°40.1					
3	170°09.2	198°40.3	-13°22.3	103°06.8	24°33.5	165°06.5	0°52.9	202°17.1	-14°18.4	Acrux	173°01.6	-63°13.3					
4	185°11.7	213°39.8	-13°21.2	118°08.8	24°33.5	180°08.6	0°53.1	217°19.3	-14°18.3	Gacrux	171°53.2	-57°14.3					
5	200°14.1	228°39.2	-13°20.1	133°10.9	24°33.6	195°10.6	0°53.3	232°21.5	-14°18.2	Alioth	166°14.2	55°49.8					
6	215°16.6	243°38.7	-13°19.0	148°12.9	24°33.6	210°12.7	0°53.5	247°23.7	-14°18.1	Spica	158°23.9	-11°16.9					
7	230°19.1	258°38.2	-13°17.9	163°15.0	24°33.7	225°14.7	0°53.6	262°25.8	-14°18.0	Alcaid	152°53.2	49°11.6					
8	245°21.5	273°37.7	-13°16.8	178°17.0	24°33.7	240°16.8	0°53.8	277°28.0	-14°17.9	Hadar	148°38.3	-60°28.7					
9	260°24.0	288°37.1	-13°15.7	193°19.0	24°33.7	255°18.8	0°54.0	292°30.2	-14°17.8	Menkent	147°59.5	-36°28.8					
10	275°26.5	303°36.6	-13°14.6	208°21.0	24°33.8	270°20.9	0°54.2	307°32.4	-14°17.7	Arcturus	145°49.2	19°03.9					
11	290°28.9	318°36.1	-13°13.5	223°23.1	24°33.8	285°23.0	0°54.4	322°34.6	-14°17.6	Rigel Kent.	139°42.6	-60°55.5					
12	305°31.4	333°35.6	-13°12.4	238°25.1	24°33.9	300°25.0	0°54.6	337°36.7	-14°17.5	Zubenelg.	136°57.9	-16°08.2					
13	320°33.8	348°35.0	-13°11.2	253°27.1	24°33.9	315°27.1	0°54.7	352°38.9	-14°17.4	Kochab	137°20.0	74°03.3					
14	335°36.3	3°34.5	-13°10.1	268°29.2	24°34.0	330°29.1	0°54.9	7°41.1	-14°17.3	Alphecca	126°05.3	26°38.0					
15	350°38.8	18°34.0	-13°09.0	283°31.2	24°34.0	345°31.2	0°55.1	22°43.3	-14°17.2	Antares	112°18.0	-26°28.9					
16	5°41.2	33°33.5	-13°07.9	298°33.2	24°34.0	0°33.3	0°55.3	37°45.5	-14°17.1	Atria	107°14.1	-69°03.9					
17	20°43.7	48°32.9	-13°06.8	313°35.2	24°34.1	15°35.3	0°55.5	52°47.6	-14°17.0	Sabik	102°04.9	-15°45.2					
18	35°46.2	63°32.4	-13°05.7	328°37.3	24°34.1	30°37.4	0°55.7	67°49.8	-14°16.9	Shaula	96°12.9	-37°07.1					
19	50°48.6	78°31.9	-13°04.6	343°39.3	24°34.2	45°39.4	0°55.8	82°52.0	-14°16.8	Rasalhague	96°00.3	12°32.5					
20	65°51.1	93°31.4	-13°03.5	358°41.3	24°34.2	60°41.5	0°56.0	97°54.2	-14°16.7	Etamin	90°43.4	51°28.9					
21	80°53.6	108°30.9	-13°02.3	13°43.3	24°34.2	75°43.5	0°56.2	112°56.4	-14°16.6	Kaus Aust.	83°35.0	-34°22.4					
22	95°56.0	123°30.4	-13°01.2	28°45.3	24°34.3	90°45.6	0°56.4	127°58.5	-14°16.5	Vega	80°34.7	38°48.1					
23	110°58.5	138°29.8	-13°00.1	43°47.4	24°34.3	105°47.7	0°56.6	143°00.7	-14°16.4	Nunki	75°50.1	-26°16.1					
Mer.pass.:15:37			v-0.5 d1.1 m-3.8			v2.0 d0.0 m-0.4			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	126°00.9	153°29.3	-12°59.0	58°49.4	24°34.4	120°49.7	0°56.8	158°02.9	-14°16.3								
1	141°03.4	168°28.8	-12°57.9	73°51.4	24°34.4	135°51.8	0°57.0	173°05.1	-14°16.2								
2	156°05.9	183°28.3	-12°56.7	88°53.4	24°34.5	150°53.8	0°57.1	188°07.3	-14°16.1								
3	171°08.3	198°27.8	-12°55.6	103°55.4	24°34.5	165°55.9	0°57.3	203°09.4	-14°16.0								
4	186°10.8	213°27.3	-12°54.5	118°57.4	24°34.5	180°57.9	0°57.5	218°11.6	-14°15.9								
5	201°13.3	228°26.7	-12°53.4	133°59.4	24°34.6	195°60.0	0°57.7	233°13.8	-14°15.8								
6	216°15.7	243°26.2	-12°52.3	149°01.4	24°34.6	211°02.0	0°57.9	248°16.0	-14°15.7								
7	231°18.2	258°25.7	-12°51.1	164°03.4	24°34.7	226°04.1	0°58.1	263°18.2	-14°15.7								
8	246°20.7	273°25.2	-12°50.0	179°05.4	24°34.7	241°06.2	0°58.2	278°20.3	-14°15.6								
9	261°23.1	288°24.7	-12°48.9	194°07.5	24°34.8	256°08.2	0°58.4	293°22.5	-14°15.5								
10	276°25.6	303°24.2	-12°47.8	209°09.5	24°34.8	271°10.3	0°58.6	308°24.7	-14°15.4								
11																	

Sun			Moon				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	176°58.4	-19°04.9	132°51.0	10.6	-7°59.5	16.1	60.0
1	191°58.2	-19°04.2	147°20.7	10.7	-7°43.4	16.2	59.9
2	206°58.1	-19°03.6	161°50.4	10.8	-7°27.2	16.2	59.9
3	221°57.9	-19°03.0	176°20.3	10.9	-7°11.0	16.2	59.9
4	236°57.8	-19°02.4	190°50.2	11.0	-6°54.8	16.2	59.8
5	251°57.6	-19°01.8	205°20.2	11.0	-6°38.5	16.2	59.8
6	266°57.5	-19°01.2	219°50.2	11.1	-6°22.3	16.3	59.7
7	281°57.3	-19°00.6	234°20.4	11.2	-6°06.0	16.3	59.7
8	296°57.2	-18°60.0	248°50.6	11.3	-5°49.8	16.3	59.7
9	311°57.0	-18°59.3	263°20.9	11.3	-5°33.5	16.3	59.6
10	326°56.9	-18°58.7	277°51.3	11.4	-5°17.2	16.3	59.6
11	341°56.7	-18°58.1	292°21.7	11.5	-5°00.9	16.3	59.6
12	356°56.6	-18°57.5	306°52.2	11.5	-4°44.6	16.3	59.5
13	11°56.5	-18°56.9	321°22.8	11.6	-4°28.3	16.3	59.5
14	26°56.3	-18°56.3	335°53.5	11.7	-4°12.0	16.3	59.4
15	41°56.2	-18°55.6	350°24.2	11.7	-3°55.7	16.3	59.4
16	56°56.0	-18°55.0	4°55.0	11.8	-3°39.4	16.3	59.4
17	71°55.9	-18°54.4	19°25.8	11.9	-3°23.1	16.3	59.3
18	86°55.7	-18°53.8	33°56.7	11.9	-3°06.8	16.3	59.3
19	101°55.6	-18°53.2	48°27.7	12.0	-2°50.5	16.3	59.3
20	116°55.5	-18°52.5	62°58.7	12.1	-2°34.3	16.3	59.2
21	131°55.3	-18°51.9	77°29.8	12.1	-2°18.0	16.3	59.2
22	146°55.2	-18°51.3	92°00.9	12.2	-2°01.7	16.2	59.1
23	161°55.0	-18°50.7	106°32.1	12.2	-1°45.5	16.2	59.1
	SD.=16.2	d=0.6	S.D.=16.4				

Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	176°54.9	-18°50.0	121°03.3	12.3	-1°29.3	16.2	59.1
1	191°54.8	-18°49.4	135°34.6	12.3	-1°13.1	16.2	59.0
2	206°54.6	-18°48.8	150°06.0	12.4	-0°56.9	16.2	59.0
3	221°54.5	-18°48.2	164°37.4	12.4	-0°40.7	16.2	58.9
4	236°54.3	-18°47.5	179°08.8	12.5	-0°24.5	16.1	58.9
5	251°54.2	-18°46.9	193°40.3	12.5	-0°08.4	16.1	58.9
6	266°54.1	-18°46.3	208°11.9	12.6	0°07.7	16.1	58.8
7	281°53.9	-18°45.7	222°43.4	12.6	0°23.8	16.1	58.8
8	296°53.8	-18°45.0	237°15.1	12.6	0°39.9	16.1	58.7
9	311°53.7	-18°44.4	251°46.7	12.7	0°55.9	16.0	58.7
10	326°53.5	-18°43.8	266°18.4	12.7	1°11.9	16.0	58.7
11	341°53.4	-18°43.1	280°50.2	12.8	1°27.9	16.0	58.6
12	356°53.2	-18°42.5	295°21.9	12.8	1°43.9	15.9	58.6
13	11°53.1	-18°41.9	309°53.8	12.8	1°59.8	15.9	58.5
14	26°53.0	-18°41.3	324°25.6	12.9	2°15.7	15.9	58.5
15	41°52.8	-18°40.6	338°57.5	12.9	2°31.5	15.8	58.4
16	56°52.7	-18°40.0	353°29.4	12.9	2°47.4	15.8	58.4
17	71°52.6	-18°39.4	8°01.4	13.0	3°03.1	15.8	58.4
18	86°52.4	-18°38.7	22°33.3	13.0	3°18.9	15.7	58.3
19	101°52.3	-18°38.1	37°05.3	13.0	3°34.6	15.7	58.3
20	116°52.2	-18°37.4	51°37.4	13.0	3°50.3	15.7	58.2
21	131°52.0	-18°36.8	66°09.4	13.1	4°05.9	15.6	58.2
22	146°51.9	-18°36.2	80°41.5	13.1	4°21.5	15.6	58.2
23	161°51.8	-18°35.5	95°13.6	13.1	4°37.0	15.5	58.1
	SD.=16.2	d=0.6	S.D.=16.1				

Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°51.6	-18°34.9	109°45.7	13.1	4°52.5	15.5	58.1
1	191°51.5	-18°34.3	124°17.8	13.2	5°08.0	15.4	58.0
2	206°51.4	-18°33.6	138°50.0	13.2	5°23.4	15.4	58.0
3	221°51.3	-18°33.0	153°22.2	13.2	5°38.8	15.3	58.0
4	236°51.1	-18°32.3	167°54.4	13.2	5°54.1	15.3	57.9
5	251°51.0	-18°31.7	182°26.6	13.2	6°09.4	15.2	57.9
6	266°50.9	-18°31.1	196°58.8	13.2	6°24.6	15.2	57.8
7	281°50.7	-18°30.4	211°31.1	13.2	6°39.8	15.1	57.8
8	296°50.6	-18°29.8	226°03.3	13.3	6°54.9	15.1	57.8
9	311°50.5	-18°29.1	240°35.6	13.3	7°09.9	15.0	57.7
10	326°50.3	-18°28.5	255°07.8	13.3	7°25.0	15.0	57.7
11	341°50.2	-18°27.8	269°40.1	13.3	7°39.9	14.9	57.7
12	356°50.1	-18°27.2	284°12.4	13.3	7°54.8	14.9	57.6
13	11°50.0	-18°26.5	298°44.7	13.3	8°09.7	14.8	57.6
14	26°49.8	-18°25.9	313°17.0	13.3	8°24.4	14.8	57.5
15	41°49.7	-18°25.3	327°49.3	13.3	8°39.2	14.7	57.5
16	56°49.6	-18°24.6	342°21.6	13.3	8°53.8	14.6	57.5
17	71°49.5	-18°24.0	356°53.9	13.3	9°08.4	14.6	57.4
18	86°49.3	-18°23.3	11°26.2	13.3	9°23.0	14.5	57.4
19	101°49.2	-18°22.7	25°58.5	13.3	9°37.5	14.5	57.3
20	116°49.1	-18°22.0	40°30.8	13.3	9°51.9	14.4	57.3
21	131°49.0	-18°21.4	55°03.1	13.3	10°06.2	14.3	57.3
22	146°48.8	-18°20.7	69°35.4	13.3	10°20.5	14.3	57.2
23	161°48.7	-18°20.1	84°07.6	13.3	10°34.8	14.2	57.2
	SD.=16.2	d=0.6	S.D.=15.8				

Twilight				Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	07:31	09:06	11:45	12:41	15:20	16:56	
70	07:20	08:43	10:22	14:04	15:43	17:06	
68	07:11	08:25	09:44	14:42	16:01	17:15	
66	07:04	08:10	09:18	15:08	16:16	17:22	
64	06:58	07:58	08:58	15:28	16:28	17:28	
62	06:52	07:48	08:41	15:44	16:38	17:34	
60	06:47	07:39	08:28	15:58	16:47	17:39	
58	06:42	07:31	08:16	16:09	16:55	17:44	
56	06:38	07:24	08:06	16:20	17:02	17:48	
54	06:34	07:17	07:57	16:28	17:08	17:52	
52	06:30	07:12	07:49	16:36	17:14	17:55	
50	06:27	07:06	07:42	16:44	17:19	17:59	
45	06:19	06:55	07:27	16:59	17:31	18:06	
40	06:12	06:45	07:14	17:11	17:40	18:13	
35	06:06	06:36	07:03	17:22	17:49	18:20	
30	05:59	06:28	06:53	17:32	17:57	18:26	
20	05:47	06:14	06:37	17:48	18:11	18:38	
10	05:35	06:00	06:23	18:02	18:25	18:50	
0	05:22	05:47	06:09	18:16	18:38	19:03	
-10	05:07	05:33	05:55	18:30	18:52	19:18	
-20	04:49	05:17	05:40	18:44	19:08	19:36	
-30	04:25	04:57	05:23	19:02	19:28	19:59	
-35	04:11	04:45	05:13	19:12	19:40	20:14	
-40	03:53	04:31	05:01	19:23	19:54	20:31	
-45	03:30	04:13	04:48	19:37	20:11	20:54	
-50	02:59	03:51	04:31	19:53	20:32	21:24	
-52	02:43	03:41	04:23	20:01	20:43	21:40	
-54	02:23	03:28	04:14	20:10	20:55	21:60	
-56	01:57	03:14	04:04	20:20	21:09	22:25	
-58	01:17	02:57	03:52	20:31	21:26	23:01	
-60	--	02:36	03:39	20:44	21:46	--	

Moonrise				Moonset		
Lat.	Wed	Thu	Fri	Wed	Thu	Fri
72	10:36	10:02	09:28	21:22	23:38	--
70	10:29	10:03	09:38	21:25	23:31	--
68	10:23	10:04	09:46	21:28	23:26	--
66	10:18	10:05	09:53	21:30	23:21	--
64	10:14	10:06	09:59	21:32	23:17	--
62	10:10	10:07	10:04	21:34	23:14	--
60	10:07	10:08	10:08	21:35	23:11	--
58	10:04	10:08	10:12	21:36	23:08	--
56	10:01	10:09	10:16	21:38	23:06	--
54	09:59	10:09	10:19	21:39	23:04	--
52	09:57	10:10	10:22	21:39	23:02	--
50	09:55	10:10	10:25	21:40	23:00	--
45	09:51	10:11	10:31	21:42	22:57	--
40	09:47	10:12	10:36	21:44	22:54	--
35	09:44	10:12	10:40	21:45	22:51	23:55
30	09:41	10:13	10:44	21:46	22:49	23:50
20	09:36	10:14	10:50	21:48	22:45	23:40
10	09:32	10:15	10:56	21:50	22:41	23:32
0	09:28	10:16	11:02	21:51	22:38	23:24
-10	09:24	10:17	11:08	21:53	22:35	23:16
-20	09:20	10:18	11:14	21:54	22:31	23:08
-30	09:15	10:19	11:21	21:56	22:27	23:05
-35	09:12	10:20	11:25	21:57	22:25	22:53
-40	09:09	10:20	11:29	21:58	22:22	22:47
-45	09:05	10:21	11:35	21:59	22:19	22:39
-50	09:01	10:23	11:41	22:01	22:16	22:31
-52	08:59	10:23	11:44	22:01	22:14	22:27
-54	08:57	10:24	11:48	22:02	22:12	22:23
-56	08:54	10:24	11:51	22:03	22:10	22:18
-58	08:51	10:25	11:55	22:04	22:08	22:13
-60	08:48	10:26	11:60	22:05	22:06	22:07

Sun				Moon		
Day	Eqn. of Time	Mer.	Mer.	Mer.	Lower	Age
	00 ^h	12 ^h	Pass	Upper		
25	12:07	12:14	12:12	15:39	03:15	4(18%)
26	12:21	12:27	12:12	16:26	04:03	5(28%)
27	12:34	12:40	12:12	17:12	04:49	6(38%)

January 28, 29 ,30 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	127°00.1	153°17.1	-12°32.0	59°37.4	24°35.4	121°39.0	1°01.2	158°55.2	-14°14.0					Alpheratz	357°36.6	29°13.1	
1	142°02.6	168°16.6	-12°30.9	74°39.4	24°35.5	136°41.1	1°01.4	173°57.4	-14°13.9					Ankaa	353°08.9	-42°11.1	
2	157°05.0	183°16.1	-12°29.7	89°41.4	24°35.5	151°43.1	1°01.6	188°59.6	-14°13.8					Schedar	349°33.1	56°40.0	
3	172°07.5	198°15.6	-12°28.6	104°43.3	24°35.6	166°45.2	1°01.8	204°01.8	-14°13.7					Diphda	348°48.9	-17°51.8	
4	187°09.9	213°15.1	-12°27.5	119°45.3	24°35.6	181°47.2	1°02.0	219°03.9	-14°13.6					Achernar	335°21.5	-57°07.5	
5	202°12.4	228°14.5	-12°26.3	134°47.3	24°35.7	196°49.3	1°02.2	234°06.1	-14°13.5					Hamal	327°53.1	23°34.3	
6	217°14.9	243°14.0	-12°25.2	149°49.3	24°35.7	211°51.3	1°02.3	249°08.3	-14°13.4					Polaris	314°43.5	89°22.0	
7	232°17.3	258°13.5	-12°24.1	164°51.3	24°35.8	226°53.4	1°02.5	264°10.5	-14°13.3					Akamar	315°12.9	-40°13.0	
8	247°19.8	273°13.0	-12°22.9	179°53.2	24°35.8	241°55.4	1°02.7	279°12.6	-14°13.2					Menkar	314°07.8	4°10.7	
9	262°22.3	288°12.5	-12°21.8	194°55.2	24°35.8	256°57.5	1°02.9	294°14.8	-14°13.1					Mirfak	308°30.4	49°56.7	
10	277°24.7	303°12.0	-12°20.7	209°57.2	24°35.9	271°59.5	1°03.1	309°17.0	-14°13.0					Aldebaran	290°41.3	16°33.3	
11	292°27.2	318°11.5	-12°19.5	224°59.2	24°35.9	287°01.6	1°03.3	324°19.2	-14°12.9					Rigel	281°05.2	-8°10.6	
12	307°29.7	333°11.0	-12°18.4	240°01.1	24°36.0	302°03.6	1°03.5	339°21.4	-14°12.8					Capella	280°23.9	46°01.4	
13	322°32.1	348°10.5	-12°17.2	255°03.1	24°36.0	317°05.7	1°03.6	354°23.5	-14°12.7					Bellatrix	278°24.3	6°22.2	
14	337°34.6	3°10.0	-12°16.1	270°05.1	24°36.1	332°07.7	1°03.8	9°25.7	-14°12.6					Elnath	278°03.6	28°37.6	
15	352°37.0	18°09.6	-12°15.0	285°07.1	24°36.1	347°09.8	1°04.0	24°27.9	-14°12.5					Alnilam	275°39.1	-1°11.3	
16	7°39.5	33°09.1	-12°13.8	300°09.0	24°36.2	2°11.8	1°04.2	39°30.1	-14°12.4					Betelgeuse	270°53.6	7°24.6	
17	22°42.0	48°08.6	-12°12.7	315°11.0	24°36.2	17°13.9	1°04.4	54°32.3	-14°12.3					Canopus	263°52.6	-52°42.6	
18	37°44.4	63°08.1	-12°11.5	330°13.0	24°36.3	32°15.9	1°04.6	69°34.4	-14°12.2					Sirius	258°27.2	-16°44.8	
19	52°46.9	78°07.6	-12°10.4	345°14.9	24°36.3	47°18.0	1°04.8	84°36.6	-14°12.1					Adara	255°06.8	-29°00.3	
20	67°49.4	93°07.1	-12°09.3	0°16.9	24°36.4	62°20.0	1°05.0	99°38.8	-14°12.0					Procyon	244°52.1	5°10.1	
21	82°51.8	108°06.6	-12°08.1	15°18.9	24°36.4	77°22.0	1°05.1	114°41.0	-14°11.9					Pollux	243°18.8	27°58.2	
22	97°54.3	123°06.1	-12°07.0	30°20.8	24°36.5	92°24.1	1°05.3	129°43.2	-14°11.8					Avior	234°14.7	-59°35.0	
23	112°56.8	138°05.6	-12°05.8	45°22.8	24°36.5	107°26.1	1°05.5	144°45.3	-14°11.7					Suhail	222°47.0	-43°31.5	
Mer.pass.:15:29			v-0.5 d1.1 m-3.8			v2.0 d0.0 m-0.4			v2.1 d0.2 m-2.1			v2.2 d0.1 m0.8			Miaplacidus	221°37.7	-69°48.6
															Alphard	217°49.0	-8°45.5
															Regulus	207°35.8	11°51.2
															Dubhe	193°42.4	61°37.4
															Denebola	182°26.3	14°26.5
															Gienah	175°45.0	-17°40.1
															Acrux	173°01.5	-63°13.3
															Gacrux	171°53.2	-57°14.3
															Alioth	166°14.2	55°49.8
															Spica	158°23.9	-11°16.9
															Alcaid	152°53.2	49°11.6
															Hadar	148°38.2	-60°28.8
															Menkent	147°59.5	-36°28.8
															Arcturus	145°49.2	19°03.9
															Rigel Kent.	139°42.6	-60°55.5
															Zubenelg.	136°57.8	-16°08.2
															Kochab	137°19.9	74°03.3
															Alphecca	126°05.2	26°38.0
															Antares	112°18.0	-26°28.9
															Atria	107°14.0	-69°03.9
															Sabik	102°04.8	-15°45.2
															Shaula	96°12.9	-37°07.1
															Rasalhague	96°00.3	12°32.5
															Etamin	90°43.3	51°28.9
															Kaus Aust.	83°35.0	-34°22.4
															Vega	80°34.7	38°48.1
															Nunki	75°50.1	-26°16.1
															Altair	62°01.9	8°55.6
															Peacock	53°08.8	-56°39.7
															Deneb	49°27.4	45°21.7
															Enif	33°40.7	9°58.7
															Alnair	27°35.4	-46°51.1
															Fomalhaut	15°16.6	-29°30.2
															Scheat	13°47.1	28°12.4
															Markab	13°31.8	15°19.7
															2023/1/2	SHA	Mer.pass
															Venus	26°17.0	13:47
															Mars	292°37.3	19:59
															Jupiter	354°38.9	15:51
															Saturn	31°55.1	13:22
															2023/1/2	SHA	Mer.pass
															Venus	25°05.9	13:48
															Mars	292°25.5	19:56
															Jupiter	354°29.0	15:48
															Saturn	31°48.3	13:19
															2023/1/3	SHA	Mer.pass
															Venus	23°55.0	13:49
															Mars	292°13.1	19:53
															Jupiter	354°18.9	15:45
															Saturn	31°41.4	13:15
															Horizontal parallax		
															Venus:		0.1
															Mars:		0.2
Mer.pass.:15:21			v-0.5 d1.2 m-3.8			v1.9 d0.1 m-0.3			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Sun				Moon			
h	GHA	Dec	GHA	ν	Dec	d	HP
0	176°48.6	-18°19.4	98°39.9	13.3	10°48.9	14.1	57.2
1	191°48.5	-18°18.8	113°12.2	13.3	11°03.0	14.1	57.1
2	206°48.4	-18°18.1	127°44.5	13.3	11°20.6	14.0	57.1
3	221°48.2	-18°17.4	142°16.7	13.3	11°31.0	13.9	57.0
4	236°48.1	-18°16.8	156°49.0	13.2	11°44.9	13.8	57.0
5	251°48.0	-18°16.1	171°21.2	13.2	11°58.7	13.8	57.0
6	266°47.9	-18°15.5	185°53.4	13.2	12°12.4	13.7	56.9
7	281°47.7	-18°14.8	200°25.6	13.2	12°26.1	13.6	56.9
8	296°47.6	-18°14.2	214°57.8	13.2	12°39.7	13.6	56.9
9	311°47.5	-18°13.5	229°30.0	13.2	12°53.2	13.5	56.8
10	326°47.4	-18°12.9	244°02.2	13.2	13°06.6	13.4	56.8
11	341°47.3	-18°12.2	258°34.3	13.1	13°20.0	13.3	56.8
12	356°47.1	-18°11.5	273°06.5	13.1	13°33.3	13.3	56.7
13	11°47.0	-18°10.9	287°38.6	13.1	13°46.5	13.2	56.7
14	26°46.9	-18°10.2	302°10.7	13.1	13°59.7	13.1	56.6
15	41°46.8	-18°09.6	316°42.7	13.1	14°12.7	13.0	56.6
16	56°46.7	-18°08.9	331°14.8	13.0	14°25.7	12.9	56.6
17	71°46.6	-18°08.2	345°46.8	13.0	14°38.6	12.9	56.5
18	86°46.4	-18°07.6	0°18.8	13.0	14°51.4	12.8	56.5
19	101°46.3	-18°06.9	14°50.8	13.0	15°04.1	12.7	56.5
20	116°46.2	-18°06.2	29°22.8	12.9	15°16.8	12.6	56.4
21	131°46.1	-18°05.6	43°54.7	12.9	15°29.3	12.5	56.4
22	146°46.0	-18°04.9	58°26.6	12.9	15°41.8	12.4	56.4
23	161°45.9	-18°04.3	72°58.5	12.9	15°54.2	12.4	56.3
	SD.=16.2	d=0.7			S.D.=15.6		
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	176°45.8	-18°03.6	87°30.4	12.8	16°06.5	12.3	56.3
1	191°45.6	-18°02.9	102°02.2	12.8	16°18.7	12.2	56.3
2	206°45.5	-18°02.3	116°34.0	12.8	16°30.9	12.1	56.2
3	221°45.4	-18°01.6	131°05.8	12.8	16°42.9	12.0	56.2
4	236°45.3	-18°00.9	145°37.5	12.7	16°54.9	11.9	56.2
5	251°45.2	-18°00.3	160°09.2	12.7	17°06.7	11.8	56.1
6	266°45.1	-17°59.6	174°40.9	12.7	17°18.5	11.7	56.1
7	281°45.0	-17°58.9	189°12.6	12.6	17°30.2	11.6	56.1
8	296°44.9	-17°58.2	203°44.2	12.6	17°41.8	11.5	56.0
9	311°44.7	-17°57.6	218°15.8	12.6	17°53.3	11.5	56.0
10	326°44.6	-17°56.9	232°47.3	12.5	18°04.7	11.4	56.0
11	341°44.5	-17°56.2	247°18.8	12.5	18°16.0	11.3	56.0
12	356°44.4	-17°55.6	261°50.3	12.5	18°27.2	11.2	55.9
13	11°44.3	-17°54.9	276°21.8	12.4	18°38.3	11.1	55.9
14	26°44.2	-17°54.2	290°53.2	12.4	18°49.4	11.0	55.9
15	41°44.1	-17°53.5	305°24.6	12.4	19°00.3	10.9	55.8
16	56°44.0	-17°52.9	319°55.9	12.3	19°11.1	10.8	55.8
17	71°43.9	-17°52.2	334°27.2	12.3	19°21.8	10.7	55.8
18	86°43.8	-17°51.5	348°58.5	12.3	19°32.5	10.6	55.7
19	101°43.7	-17°50.8	3°29.7	12.2	19°43.0	10.5	55.7
20	116°43.5	-17°50.2	18°00.9	12.2	19°53.4	10.4	

January 31, 01 ,02 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	129°57.5	152°42.0	-11°09.1	61°57.6	24°39.0	124°06.3	1°14.8	161°32.0	-14°06.9	Alpheratz	357°36.7	29°13.1					
1	144°60.0	167°41.5	-11°07.9	76°59.5	24°39.0	139°08.3	1°15.0	176°34.2	-14°06.8	Ankaa	353°08.9	-42°11.1					
2	160°02.4	182°41.1	-11°06.8	92°01.4	24°39.1	154°10.4	1°15.2	191°36.4	-14°06.7	Schedar	349°33.1	56°40.0					
3	175°04.9	197°40.6	-11°05.6	107°03.3	24°39.1	169°12.4	1°15.4	206°38.6	-14°06.6	Diphda	348°48.9	-17°51.8					
4	190°07.4	212°40.1	-11°04.4	122°05.2	24°39.2	184°14.4	1°15.6	221°40.7	-14°06.5	Achernar	335°21.5	-57°07.5					
5	205°09.8	227°39.7	-11°03.3	137°07.1	24°39.3	199°16.5	1°15.8	236°42.9	-14°06.4	Hamal	327°53.1	23°34.3					
6	220°12.3	242°39.2	-11°02.1	152°09.0	24°39.3	214°18.5	1°16.0	251°45.1	-14°06.3	Polaris	314°44.7	89°22.0					
7	235°14.8	257°38.7	-11°00.9	167°10.9	24°39.4	229°20.5	1°16.2	266°47.3	-14°06.2	Akamar	315°12.9	-40°13.0					
8	250°17.2	272°38.3	-10°59.7	182°12.8	24°39.4	244°22.6	1°16.3	281°49.5	-14°06.1	Menkar	314°07.8	4°10.7					
9	265°19.7	287°37.8	-10°58.6	197°14.7	24°39.5	259°24.6	1°16.5	296°51.6	-14°06.0	Mirfak	308°30.4	49°56.7					
10	280°22.1	302°37.3	-10°57.4	212°16.6	24°39.5	274°26.7	1°16.7	311°53.8	-14°05.9	Aldebaran	290°41.3	16°33.3					
11	295°24.6	317°36.9	-10°56.2	227°18.5	24°39.6	289°28.7	1°16.9	326°56.0	-14°05.8	Rigel	281°05.2	-8°10.6					
12	310°27.1	332°36.4	-10°55.0	242°20.4	24°39.6	304°30.7	1°17.1	341°58.2	-14°05.7	Capella	280°23.9	46°01.4					
13	325°29.5	347°35.9	-10°53.9	257°22.3	24°39.7	319°32.8	1°17.3	357°00.3	-14°05.6	Bellatrix	278°24.4	6°22.2					
14	340°32.0	2°35.5	-10°52.7	272°24.2	24°39.7	334°34.8	1°17.5	12°02.5	-14°05.5	Elnath	278°03.6	28°37.6					
15	355°34.5	17°35.0	-10°51.5	287°26.1	24°39.8	349°36.8	1°17.7	27°04.7	-14°05.4	Alnilam	275°39.1	-1°11.3					
16	10°36.9	32°34.5	-10°50.3	302°27.9	24°39.8	4°38.9	1°17.9	42°06.9	-14°05.3	Betelgeuse	270°53.6	7°24.6					
17	25°39.4	47°34.1	-10°49.1	317°29.8	24°39.9	19°40.9	1°18.1	57°09.0	-14°05.2	Canopus	263°52.6	-52°42.6					
18	40°41.9	62°33.6	-10°48.0	332°31.7	24°40.0	34°43.0	1°18.3	72°11.2	-14°05.1	Sirius	258°27.2	-16°44.8					
19	55°44.3	77°33.2	-10°46.8	347°33.6	24°40.0	49°45.0	1°18.5	87°13.4	-14°05.0	Adara	255°06.8	-29°00.3					
20	70°46.8	92°32.7	-10°45.6	2°35.5	24°40.1	64°47.0	1°18.6	102°15.6	-14°04.9	Procyon	244°52.1	5°10.0					
21	85°49.3	107°32.2	-10°44.4	17°37.4	24°40.1	79°49.1	1°18.8	117°17.7	-14°04.8	Pollux	243°18.8	27°58.2					
22	100°51.7	122°31.8	-10°43.2	32°39.3	24°40.2	94°51.1	1°19.0	132°19.9	-14°04.7	Avior	234°14.7	-59°35.0					
23	115°54.2	137°31.3	-10°42.1	47°41.2	24°40.2	109°53.1	1°19.2	147°22.1	-14°04.6	Suhail	222°47.0	-43°31.5					
Mer.pass.:15:17			v-0.5 d1.2 m-3.8			v1.9 d0.1 m-0.3			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
0	130°56.6	152°30.9	-10°40.9	62°43.0	24°40.3	124°55.2	1°19.4	162°24.3	-14°04.5	Dubhe	193°42.4	61°37.4					
1	145°59.1	167°30.4	-10°39.7	77°44.9	24°40.3	139°57.2	1°19.6	177°26.5	-14°04.4	Denebola	182°26.3	14°26.5					
2	161°01.6	182°29.9	-10°38.5	92°46.8	24°40.4	154°59.2	1°19.8	192°28.6	-14°04.3	Gienah	175°45.0	-17°40.1					
3	176°04.0	197°29.5	-10°37.3	107°48.7	24°40.5	170°01.3	1°20.0	207°30.8	-14°04.2	Acrux	173°01.5	-63°13.3					
4	191°06.5	212°29.0	-10°36.1	122°50.6	24°40.5	185°03.3	1°20.2	222°33.0	-14°04.1	Gacrux	171°53.1	-57°14.3					
5	206°09.0	227°28.6	-10°35.0	137°52.4	24°40.6	200°05.3	1°20.4	237°35.2	-14°04.0	Alioth	166°14.2	55°49.8					
6	221°11.4	242°28.1	-10°33.8	152°54.3	24°40.6	215°07.4	1°20.6	252°37.3	-14°03.9	Spica	158°23.9	-11°16.9					
7	236°13.9	257°27.7	-10°32.6	167°56.2	24°40.7	230°09.4	1°20.8	267°39.5	-14°03.8	Alcaid	152°53.1	49°11.6					
8	251°16.4	272°27.2	-10°31.4	182°58.1	24°40.7	245°11.5	1°21.0	282°41.7	-14°03.7	Hadar	148°38.2	-60°28.8					
9	266°18.8	287°26.7	-10°30.2	197°59.9	24°40.8	260°13.5	1°21.2	297°43.9	-14°03.6	Menkent	147°59.5	-36°28.8					
10	281°21.3	302°26.3	-10°29.0	213°01.8	24°40.8	275°15.5	1°21.3	312°46.0	-14°03.5	Arcturus	145°49.2	19°03.9					
11	296°23.8	317°25.8	-10°27.9	228°03.7	24°40.9	290°17.6	1°21.5	327°48.2	-14°03.4	Rigel Kent.	139°42.5	-60°55.5					
12	311°26.2	332°25.4	-10°26.7	243°05.6	24°41.0	305°19.6	1°21.7	342°50.4	-14°03.3	Zubenelg.	136°57.8	-16°08.2					
13	326°28.7	347°24.9	-10°25.5	258°07.4	24°41.0	320°21.6	1°21.9	357°52.6	-14°03.2	Kochab	137°19.8	74°03.3					
14	341°31.1	2°24.5	-10°24.3	273°09.3	24°41.1	335°23.7	1°22.1	12°54.7	-14°03.1	Alphecca	126°05.2	26°38.0					
15	356°33.6	17°24.0	-10°23.1	288°11.2	24°41.1	350°25.7	1°22.3	27°56.9	-14°03.0	Antares	112°18.0	-26°28.9					
16	11°36.1	32°23.6	-10°21.9	303°13.0	24°41.2	5°27.7	1°22.5	42°59.1	-14°02.9	Atria	107°14.0	-69°03.9					
17	26°38.5	47°23.1	-10°20.7	318°14.9	24°41.2	20°29.8	1°22.7	58°01.3	-14°02.8	Sabik	102°04.8	-15°45.2					
18	41°41.0	62°22.7	-10°19.5	333°16.8	24°41.3	35°31.8	1°22.9	73°03.4	-14°02.7	Shaula	96°12.8	-37°07.1					
19	56°43.5	77°22.2	-10°18.3	348°18.6	24°41.4	50°33.8	1°23.1	88°05.6	-14°02.6	Rasalhague	96°00.3	12°32.5					
20	71°45.9	92°21.8	-10°17.1	3°20.5	24°41.4	65°35.9	1°23.3	103°07.8	-14°02.5	Etamin	90°43.3	51°28.9					
21	86°48.4	107°21.3	-10°16.0	18°22.3	24°41.5	80°37.9	1°23.5	118°10.0	-14°02.4	Kaus Aust.	83°34.9	-34°22.4					
22	101°50.9	122°20.9	-10°14.8	33°24.2	24°41.5	95°39.9	1°23.7	133°12.1	-14°02.3	Vega	80°34.7	38°48.0					
23	116°53.3	137°20.4	-10°13.6	48°26.1	24°41.6	110°41.9	1°23.9	148°14.3	-14°02.2	Nunki	75°50.1	-26°16.1					
Mer.pass.:15:13			v-0.5 d1.2 m-3.8			v1.9 d0.1 m-0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
0	131°55.8	152°20.0	-10°12.4	63°27.9	24°41.6	125°44.0	1°24.1	163°16.5	-14°02.1	Alnair	27°35.4	-46°51.1					
1	146°58.2	167°19.5	-10°11.2	78°29.8	24°41.7	140°46.0	1°24.3	178°18.7	-14°02.0	Fomalhaut	15°16.6	-29°30.2					
2	162°00.7	182°19.1	-10°10.0	93°31.6	24°41.8	155°48.0	1°24.4	193°20.8	-14°01.9	Scheat	13°47.1	28°12.4					
3	177°03.2	197°18.6	-10°08.8	108°33.5	24°41.8	170°50.1	1°24.6	208°23.0	-14°01.8	Markab	13°31.8	15°19.7					
4	192°05.6	212°18.2	-10°07.6	123°35.3	24°41.9	185°52.1	1°24.8	223°25.2	-14°01.7								
5	207°08.1	227°17.7	-10°06.4	138°37.2	24°41.9	200°54.1	1°25.0	238°27.4	-14°01.6	2023/1/3	SHA	Mer.pass					
6	222°10.6	242°17.3	-10°05.2	153°39.1	24°42.0	215°56.2	1°25.2	253°29.5	-14°01.5	Venus	22°44.5	13:50					
7	237°13.0	257°16.8	-10°04.0	168°40.9	24°42.0	230°58.2	1°25.4	268°31.7	-14°01.4	Mars	292°00.1	19:50					
8	252°15.5	272°16.4	-10°02.8	183°42.8	24°42.1	246°00.2	1°25.6	283°33.9	-14°01.3	Jupiter	354°08.8	15:41					
9	267°18.0	287°16.0	-10°01.6	198°44.6	24°42.2	261°02.3	1°25.8	298°36.1	-14°01.2	Saturn	31°34.5	13:12					
10	282°20.4	302°15.5	-10°00.4	213°46.5	24°42.2	276°04.3	1°26.0	313°38.3	-14°01.1	2023/2/1	SHA	Mer.pass					
11	297°22.9	317°15.1	-9°59.2	228°48													

h Sun Moon														
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	176°40.7	-17°31.0	64°18.4	11.1	24°01.9	7.3	55.0	72	07:10	08:40	10:29	13:59	15:49	17:18
1	191°40.6	-17°30.3	78°48.5	11.0	24°09.1	7.2	55.0	70	07:02	08:21	09:47	14:41	16:07	17:26
2	206°40.5	-17°29.6	93°18.5	11.0	24°16.2	7.0	54.9	68	06:56	08:06	09:18	15:10	16:22	17:33
3	221°40.4	-17°28.9	107°48.5	11.0	24°23.2	6.9	54.9	66	06:50	07:54	08:57	15:31	16:34	17:38
4	236°40.3	-17°28.2	122°18.4	10.9	24°30.1	6.8	54.9	64	06:45	07:44	08:40	15:48	16:44	17:43
5	251°40.2	-17°27.5	136°48.3	10.9	24°36.8	6.7	54.9	62	06:40	07:35	08:26	16:02	16:53	17:48
6	266°40.1	-17°26.8	151°18.2	10.8	24°43.5	6.6	54.9	60	06:36	07:27	08:14	16:13	17:01	17:52
7	281°40.0	-17°26.1	165°48.0	10.8	24°50.0	6.4	54.8	58	06:33	07:20	08:04	16:24	17:08	17:55
8	296°39.9	-17°25.4	180°17.8	10.8	24°56.4	6.3	54.8	56	06:29	07:14	07:55	16:32	17:14	17:59
9	311°39.8	-17°24.7	194°47.6	10.7	25°02.6	6.2	54.8	54	06:26	07:09	07:47	16:40	17:19	18:02
10	326°39.7	-17°24.0	209°17.3	10.7	25°08.7	6.1	54.8	52	06:23	07:04	07:40	16:47	17:24	18:05
11	341°39.7	-17°23.3	223°47.0	10.7	25°14.8	5.9	54.8	50	06:20	06:59	07:34	16:54	17:29	18:07
12	356°39.6	-17°22.6	238°16.7	10.6	25°20.6	5.8	54.7	45	06:14	06:49	07:20	17:07	17:39	18:14
13	11°39.5	-17°21.9	252°46.3	10.6	25°26.4	5.7	54.7	40	06:08	06:40	07:09	17:19	17:47	18:20
14	26°39.4	-17°21.2	267°15.9	10.6	25°32.0	5.6	54.7	35	06:02	06:32	06:59	17:28	17:55	18:25
15	41°39.3	-17°20.5	281°45.4	10.5	25°37.5	5.4	54.7	30	05:57	06:25	06:50	17:37	18:02	18:31
16	56°39.2	-17°19.8	296°15.0	10.5	25°42.9	5.3	54.7	20	05:46	06:13	06:36	17:52	18:15	18:41
17	71°39.1	-17°19.1	310°44.5	10.5	25°48.2	5.2	54.7	10	05:35	06:00	06:22	18:05	18:27	18:52
18	86°39.0	-17°18.4	325°13.9	10.5	25°53.3	5.1	54.6	0	05:23	05:48	06:10	18:17	18:39	19:04
19	101°38.9	-17°17.7	339°43.4	10.4	25°58.3	4.9	54.6	-10	05:10	05:35	05:57	18:29	18:52	19:17
20	116°38.8	-17°17.0	354°12.8	10.4	26°03.2	4.8	54.6	-20	04:53	05:21	05:44	18:43	19:06	19:34
21	131°38.7	-17°16.3	8°42.2	10.4	26°07.9	4.7	54.6	-30	04:32	05:02	05:28	18:58	19:24	19:55
22	146°38.7	-17°15.6	23°11.5	10.3	26°12.5	4.6	54.6	-35	04:18	04:52	05:19	19:07	19:35	20:08
23	161°38.6	-17°14.9	37°40.9	10.3	26°17.0	4.4	54.6	-40	04:02	04:39	05:09	19:18	19:48	20:24
SD.=16.2 d=0.7 S.D.=15.0								-45	03:41	04:23	04:56	19:30	20:03	20:45
								-50	03:13	04:03	04:41	19:45	20:23	21:12
								-52	02:59	03:53	04:34	19:52	20:32	21:26
								-54	02:42	03:43	04:26	19:60	20:43	21:42
								-56	02:21	03:30	04:17	20:08	20:55	22:03
								-58	01:53	03:15	04:07	20:18	21:10	22:29
								-60	01:08	02:57	03:55	20:30	21:27	23:11
Wed	GHA	Dec	GHA	ν	Dec	d	HP							
0	176°38.5	-17°14.2	52°10.2	10.3	26°21.4	4.3	54.5							
1	191°38.4	-17°13.5	66°39.4	10.3	26°25.6	4.2	54.5							
2	206°38.3	-17°12.8	81°08.7	10.2	26°29.7	4.0	54.5							
3	221°38.2	-17°12.1	95°37.9	10.2	26°33.7	3.9	54.5							
4	236°38.1	-17°11.4	110°07.1	10.2	26°37.5	3.8	54.5							
5	251°38.0	-17°10.7	124°36.3	10.2	26°41.2	3.6	54.5							
6	266°38.0	-17°10.0	139°05.5	10.2	26°44.8	3.5	54.5							
7	281°37.9	-17°09.3	153°34.7	10.1	26°48.2	3.4	54.4							
8	296°37.8	-17°08.6	168°03.8	10.1	26°51.5	3.2	54.4							
9	311°37.7	-17°07.9	182°32.9	10.1	26°54.7	3.1	54.4							
10	326°37.6	-17°07.1	197°02.0	10.1	26°57.8	3.0	54.4							
11	341°37.5	-17°06.4	211°31.1	10.1	27°00.7	2.8	54.4							
12	356°37.4	-17°05.7	226°00.1	10.1	27°03.5	2.7	54.4							
13	11°37.4	-17°05.0	240°29.2	10.0	27°06.1	2.6	54.4							
14	26°37.3	-17°04.3	254°58.2	10.0	27°08.6	2.4	54.3							
15	41°37.2	-17°03.6	269°27.2	10.0	27°11.0	2.3	54.3							
16	56°37.1	-17°02.9	283°56.3	10.0	27°13.3	2.2	54.3							
17	71°37.0	-17°02.2	298°25.3	10.0	27°15.4	2.0	54.3							
18	86°37.0	-17°01.4	312°54.3	10.0	27°17.4	1.9	54.3							
19	101°36.9	-17°00.7	327°23.2	10.0	27°19.2	1.8	54.3							
20	116°36.8	-17°00.0	341°52.2	10.0	27°20.9	1.6	54.3							
21	131°36.7	-16°59.3	356°21.2	10.0	27°22.5	1.5	54.3							
22	146°36.6	-16°58.6	10°50.2	10.0	27°23.9	1.4	54.2							
23	161°36.5	-16°57.9	25°19.1	10.0	27°25.3	1.2	54.2							
SD.=16.2 d=0.7 S.D.=14.9														
Thu	GHA	Dec	GHA	ν	Dec	d	HP							
0	176°36.5	-16°57.1	39°48.1	10.0	27°26.4	1.1	54.2							
1	191°36.4	-16°56.4	54°17.1	10.0	27°27.5	1.0	54.2							
2	206°36.3	-16°55.7	68°46.0	10.0	27°28.4	0.8	54.2							
3	221°36.2	-16°55.0	83°15.0	10.0	27°29.2	0.7	54.2							
4	236°36.2	-16°54.3	97°44.0	10.0	27°29.8	0.6	54.2							
5	251°36.1	-16°53.6	112°12.9	10.0	27°30.3	0.4	54.2							
6	266°36.0	-16°52.8	126°41.9	10.0	27°30.7	0.3	54.2							
7	281°35.9	-16°52.1	141°10.9	10.0	27°30.9	0.2	54.2							
8	296°35.8	-16°51.4	155°39.9	10.0	27°31.0	0.0	54.1							
9	311°35.8	-16°50.7	170°08.9	10.0	27°31.0	-0.1	54.1							
10	326°35.7	-16°49.9	184°37.9	10.0	27°30.8	-0.2	54.1							
11	341°35.6	-16°49.2	199°06.9	10.0	27°30.5	-0.4	54.1							
12	356°35.5	-16°48.5	213°35.9	10.0	27°30.1	-0.5	54.1							
13	11°35.5	-16°47.8	228°04.9	10.0	27°29.5	-0.6	54.1							
14	26°35.4	-16°47.1	242°34.0	10.1	27°28.8	-0.8	54.1							
15	41°35.3	-16°46.3	257°03.0	10.1	27°28.0	-0.9	54.1							
16	56°35.2	-16°45.6	271°32.1	10.1	27°27.0	-1.0	54.1							
17	71°35.2	-16°44.9	286°01.2	10.1	27°25.9	-1.2	54.1							
18	86°35.1	-16°44.2	300°30.3	10.1	27°24.7	-1.3	54.1							
19	101°35.0	-16°43.4	314°59.4	10.1	27°23.3	-1.4	54.1							
20	116°34.9	-16°42.7	329°28.6	10.2	27°21.9	-1.6	54.1							
21	131°34.9	-16°42.0	343°57.8	10.2	27°20.2	-1.7	54.1							

February 03, 04 ,05 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	132°54.9	152°09.3	-9°43.6	64°12.2	24°43.0	126°32.7	1°28.7	164°08.7	-13°59.7	Alpheratz	357°36.7	29°13.1					
1	147°57.4	167°08.9	-9°42.4	79°14.1	24°43.1	141°34.7	1°28.9	179°10.9	-13°59.6	Ankaa	353°08.9	-42°11.1					
2	162°59.9	182°08.5	-9°41.2	94°15.9	24°43.1	156°36.7	1°29.1	194°13.1	-13°59.5	Schedar	349°33.2	56°40.0					
3	178°02.3	197°08.0	-9°40.0	109°17.7	24°43.2	171°38.8	1°29.3	209°15.2	-13°59.4	Diphda	348°48.9	-17°51.8					
4	193°04.8	212°07.6	-9°38.8	124°19.6	24°43.3	186°40.8	1°29.5	224°17.4	-13°59.3	Achernar	335°21.6	-57°07.5					
5	208°07.2	227°07.2	-9°37.6	139°21.4	24°43.3	201°42.8	1°29.7	239°19.6	-13°59.2	Hamal	327°53.1	23°34.3					
6	223°09.7	242°06.7	-9°36.4	154°23.2	24°43.4	216°44.9	1°29.9	254°21.8	-13°59.1	Polaris	314°46.0	89°22.0					
7	238°12.2	257°06.3	-9°35.2	169°25.0	24°43.4	231°46.9	1°30.1	269°23.9	-13°59.0	Akamar	315°12.9	-40°13.0					
8	253°14.6	272°05.9	-9°34.0	184°26.9	24°43.5	246°48.9	1°30.3	284°26.1	-13°58.9	Menkar	314°07.8	4°10.7					
9	268°17.1	287°05.4	-9°32.8	199°28.7	24°43.6	261°50.9	1°30.5	299°28.3	-13°58.8	Mirfak	308°30.4	49°56.7					
10	283°19.6	302°05.0	-9°31.6	214°30.5	24°43.6	276°53.0	1°30.7	314°30.5	-13°58.7	Aldebaran	290°41.3	16°33.3					
11	298°22.0	317°04.6	-9°30.3	229°32.3	24°43.7	291°55.0	1°30.9	329°32.6	-13°58.6	Rigel	281°05.2	-8°10.6					
12	313°24.5	332°04.1	-9°29.1	244°34.2	24°43.7	306°57.0	1°31.1	344°34.8	-13°58.5	Capella	280°24.0	46°01.4					
13	328°27.0	347°03.7	-9°27.9	259°36.0	24°43.8	321°59.0	1°31.3	359°37.0	-13°58.4	Bellatrix	278°24.4	6°22.2					
14	343°29.4	2°03.3	-9°26.7	274°37.8	24°43.9	337°01.1	1°31.5	14°39.2	-13°58.3	Elnath	278°03.6	28°37.7					
15	358°31.9	17°02.8	-9°25.5	289°39.6	24°43.9	352°03.1	1°31.7	29°41.3	-13°58.2	Alnilam	275°39.1	-1°11.3					
16	13°34.4	32°02.4	-9°24.3	304°41.4	24°44.0	7°05.1	1°31.9	44°43.5	-13°58.1	Betelgeuse	270°53.6	7°24.6					
17	28°36.8	47°02.0	-9°23.1	319°43.3	24°44.0	22°07.1	1°32.1	59°45.7	-13°58.0	Canopus	263°52.7	-52°42.6					
18	43°39.3	62°01.5	-9°21.9	334°45.1	24°44.1	37°09.2	1°32.3	74°47.9	-13°57.9	Sirius	258°27.2	-16°44.8					
19	58°41.7	77°01.1	-9°20.7	349°46.9	24°44.2	52°11.2	1°32.5	89°50.0	-13°57.8	Adara	255°06.8	-29°00.3					
20	73°44.2	92°00.7	-9°19.4	4°48.7	24°44.2	67°13.2	1°32.7	104°52.2	-13°57.7	Procyon	244°52.1	5°10.0					
21	88°46.7	107°00.2	-9°18.2	19°50.5	24°44.3	82°15.2	1°32.9	119°54.4	-13°57.6	Pollux	243°18.8	27°58.2					
22	103°49.1	121°59.8	-9°17.0	34°52.3	24°44.3	97°17.3	1°33.1	134°56.5	-13°57.5	Avior	234°14.7	-59°35.0					
23	118°51.6	136°59.4	-9°15.8	49°54.1	24°44.4	112°19.3	1°33.3	149°58.7	-13°57.4	Suhail	222°47.0	-43°31.5					
Mer.pass.:15:05			v-0.4 d1.2 m-3.8			v1.8 d0.1 m-0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	133°54.1	151°59.0	-9°14.6	64°56.0	24°44.5	127°21.3	1°33.4	165°00.9	-13°57.3	Dubhe	193°42.3	61°37.4					
1	148°56.5	166°58.5	-9°13.4	79°57.8	24°44.5	142°23.3	1°33.6	180°03.1	-13°57.2	Denebola	182°26.3	14°26.5					
2	163°59.0	181°58.1	-9°12.2	94°59.6	24°44.6	157°25.4	1°33.8	195°05.2	-13°57.1	Gienah	175°45.0	-17°40.2					
3	179°01.5	196°57.7	-9°11.0	110°01.4	24°44.6	172°27.4	1°34.0	210°07.4	-13°57.0	Acrux	173°01.5	-63°13.4					
4	194°03.9	211°57.2	-9°09.7	125°03.2	24°44.7	187°29.4	1°34.2	225°09.6	-13°56.9	Gacrux	171°53.1	-57°14.3					
5	209°06.4	226°56.8	-9°08.5	140°05.0	24°44.8	202°31.4	1°34.4	240°11.8	-13°56.8	Alioth	166°14.1	55°49.8					
6	224°08.9	241°56.4	-9°07.3	155°06.8	24°44.8	217°33.5	1°34.6	255°13.9	-13°56.7	Spica	158°23.9	-11°16.9					
7	239°11.3	256°56.0	-9°06.1	170°08.6	24°44.9	232°35.5	1°34.8	270°16.1	-13°56.6	Alcaid	152°53.1	49°11.6					
8	254°13.8	271°55.5	-9°04.9	185°10.4	24°45.0	247°37.5	1°35.0	285°18.3	-13°56.5	Hadar	148°38.1	-60°28.8					
9	269°16.2	286°55.1	-9°03.7	200°12.2	24°45.0	262°39.5	1°35.2	300°20.5	-13°56.4	Menkent	147°59.4	-36°28.8					
10	284°18.7	301°54.7	-9°02.4	215°14.0	24°45.1	277°41.5	1°35.4	315°22.6	-13°56.3	Arcturus	145°49.2	19°03.9					
11	299°21.2	316°54.3	-9°01.2	230°15.8	24°45.1	292°43.6	1°35.6	330°24.8	-13°56.2	Rigel Kent.	139°42.5	-60°55.5					
12	314°23.6	331°53.8	-8°60.0	245°17.6	24°45.2	307°45.6	1°35.8	345°27.0	-13°56.1	Zubenelg.	136°57.8	-16°08.2					
13	329°26.1	346°53.4	-8°58.8	260°19.4	24°45.3	322°47.6	1°36.0	0°29.2	-13°56.0	Kochab	137°19.8	74°03.3					
14	344°28.6	1°53.0	-8°57.6	275°21.2	24°45.3	337°49.6	1°36.2	15°31.3	-13°55.9	Alphecca	126°05.2	26°38.0					
15	359°31.0	16°52.6	-8°56.3	290°23.0	24°45.4	352°51.7	1°36.4	30°33.5	-13°55.8	Antares	112°17.9	-26°28.9					
16	14°33.5	31°52.2	-8°55.1	305°24.8	24°45.4	7°53.7	1°36.6	45°35.7	-13°55.7	Atria	107°13.9	-69°03.9					
17	29°36.0	46°51.7	-8°53.9	320°26.6	24°45.5	22°55.7	1°36.8	60°37.9	-13°55.6	Sabik	102°04.8	-15°45.2					
18	44°38.4	61°51.3	-8°52.7	335°28.4	24°45.6	37°57.7	1°37.0	75°40.0	-13°55.5	Shaula	96°12.8	-37°07.1					
19	59°40.9	76°50.9	-8°51.5	350°30.2	24°45.6	52°59.7	1°37.2	90°42.2	-13°55.4	Rasalhague	96°00.3	12°32.5					
20	74°43.3	91°50.5	-8°50.2	5°32.0	24°45.7	68°01.8	1°37.4	105°44.4	-13°55.3	Etamin	90°43.3	51°28.9					
21	89°45.8	106°50.1	-8°49.0	20°33.8	24°45.8	83°03.8	1°37.6	120°46.6	-13°55.2	Kaus Aust.	83°34.9	-34°22.4					
22	104°48.3	121°49.6	-8°47.8	35°35.6	24°45.8	98°05.8	1°37.8	135°48.7	-13°55.1	Vega	80°34.7	38°48.0					
23	119°50.7	136°49.2	-8°46.6	50°37.3	24°45.9	113°07.8	1°38.0	150°50.9	-13°55.0	Nunki	75°50.0	-26°16.1					
Mer.pass.:15:01			v-0.4 d1.2 m-3.8			v1.8 d0.1 m-0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	134°53.2	151°48.8	-8°45.3	65°39.1	24°45.9	128°09.8	1°38.2	165°53.1	-13°54.9	Fomalhaut	15°16.6	-29°30.2					
1	149°55.7	166°48.4	-8°44.1	80°40.9	24°46.0	143°11.9	1°38.4	180°55.3	-13°54.8	Scheat	13°47.1	28°12.4					
2	164°58.1	181°48.0	-8°42.9	95°42.7	24°46.1	158°13.9	1°38.6	195°57.4	-13°54.7	Markab	13°31.8	15°19.7					
3	180°00.6	196°47.5	-8°41.7	110°44.5	24°46.1	173°15.9	1°38.8	210°59.6	-13°54.6								
4	195°03.1	211°47.1	-8°40.4	125°46.3	24°46.2	188°17.9	1°39.0	226°01.8	-13°54.5								
5	210°05.5	226°46.7	-8°39.2	140°48.1	24°46.3	203°19.9	1°39.2	241°03.9	-13°54.4								
6	225°08.0	241°46.3	-8°38.0	155°49.8	24°46.3	218°22.0	1°39.4	256°06.1	-13°54.3								
7	240°10.5	256°45.9	-8°36.8	170°51.6	24°46.4	233°24.0	1°39.6	271°08.3	-13°54.2								
8	255°12.9	271°45.5	-8°35.5	185°53.4	24°46.4	248°26.0	1°39.8	286°10.5	-13°54.1								
9	270°15.4	286°45.0	-8°34.3	200°55.2	24°46.5	263°28.0	1°40.0	301°12.6	-13°54.0								
10	285°17.8	301°44.6	-8°33.1	215°57.0	24°46.6	278°30.0	1°40.2	316°14.8	-13°53.9								
11	300°20.3	316°44.2	-8°31.9	230°58.7	24°46.6	293°32.1	1°40.4	331°17.0	-13°53.8								
12	315°22.8	331°43.8	-8°30.6	246°00.5	24°46.7	308°34.1	1°40.6	346°19.2	-13°53.7								
13	330°25.2	346°43.4	-8°29.4	261°02.3	24°46.8	323°36.1	1°40.8	1°21.3	-13°53.6								
14	345°27.7	1°43.0	-8°28.2	276°04.1	24°46.8	338°38.1	1°41.0	16°23.5	-13°53.5								
15	0°30.2	16°42.6	-8°26.9	291°05.8	24°46.9	353°40.1	1°41.2	31°25.7	-13°53.4								
16	15°32.6	31°42.2	-8°25.7	306°07.6	24°46.9	8°42.2	1°41.4	46°27.9</									

Sun				Moon												
Fri	GHA	Dec		GHA	ν	Dec	d	HP								
0	176°34.7	-16°39.8		27°25.4	10.3	27°14.6	-2.1	54.0	Lat.	Twilight		Twilight				
1	191°34.6	-16°39.1		41°54.7	10.3	27°12.4	-2.2	54.0	72	06:60	08:26	10:06	14:23	16:03	17:30	
2	206°34.5	-16°38.3		56°24.0	10.3	27°10.1	-2.3	54.0	70	06:53	08:09	09:30	14:58	16:20	17:36	
3	221°34.5	-16°37.6		70°53.3	10.3	27°07.7	-2.5	54.0	68	06:47	07:56	09:06	15:23	16:33	17:42	
4	236°34.4	-16°36.9		85°22.6	10.4	27°05.2	-2.6	54.0	66	06:42	07:45	08:46	15:42	16:44	17:47	
5	251°34.3	-16°36.1		99°52.0	10.4	27°02.5	-2.7	54.0	64	06:38	07:36	08:31	15:58	16:53	17:51	
6	266°34.2	-16°35.4		114°21.4	10.4	26°59.7	-2.9	54.0	62	06:34	07:28	08:18	16:10	17:01	17:55	
7	281°34.2	-16°34.7		128°50.8	10.5	26°56.8	-3.0	54.0	60	06:31	07:21	08:07	16:21	17:08	17:58	
8	296°34.1	-16°33.9		143°20.3	10.5	26°53.7	-3.1	54.0	58	06:27	07:15	07:58	16:31	17:14	18:01	
9	311°34.0	-16°33.2		157°49.8	10.5	26°50.5	-3.2	54.0	56	06:24	07:09	07:50	16:39	17:20	18:04	
10	326°34.0	-16°32.5		172°19.4	10.6	26°47.2	-3.4	54.0	54	06:22	07:04	07:42	16:46	17:25	18:07	
11	341°33.9	-16°31.7		186°48.9	10.6	26°43.8	-3.5	54.0	52	06:19	06:59	07:36	16:53	17:29	18:10	
12	356°33.8	-16°31.0		201°18.5	10.6	26°40.2	-3.6	54.0	50	06:16	06:55	07:30	16:59	17:33	18:12	
13	11°33.8	-16°30.3		215°48.2	10.7	26°36.5	-3.8	54.0	45	06:11	06:46	07:17	17:12	17:43	18:18	
14	26°33.7	-16°29.5		230°17.9	10.7	26°32.7	-3.9	54.0	40	06:05	06:37	07:06	17:22	17:51	18:23	
15	41°33.6	-16°28.8		244°47.6	10.7	26°28.8	-4.0	54.0	35	06:00	06:30	06:57	17:31	17:58	18:28	
16	56°33.6	-16°28.0		259°17.3	10.8	26°24.7	-4.1	54.0	30	05:55	06:24	06:49	17:39	18:04	18:33	
17	71°33.5	-16°27.3		273°47.1	10.8	26°20.5	-4.3	54.0	20	05:45	06:12	06:35	17:53	18:16	18:43	
18	86°33.4	-16°26.6		288°17.0	10.9	26°16.2	-4.4	54.0	10	05:35	06:00	06:22	18:06	18:27	18:53	
19	101°33.4	-16°25.8		302°46.9	10.9	26°11.8	-4.5	54.0	0	05:24	05:49	06:10	18:17	18:39	19:04	
20	116°33.3	-16°25.1		317°16.8	10.9	26°07.2	-4.6	54.0	-10	05:11	05:37	05:58	18:29	18:51	19:17	
21	131°33.3	-16°24.3		331°46.8	11.0	26°02.5	-4.7	54.0	-20	04:55	05:22	05:46	18:42	19:05	19:32	
22	146°33.2	-16°23.6		346°16.8	11.0	25°57.7	-4.9	54.0	-30	04:35	05:05	05:31	18:56	19:22	19:52	
23	161°33.1	-16°22.9		0°46.8	11.1	25°52.8	-5.0	54.0	-35	04:22	04:55	05:22	19:05	19:32	20:05	
		SD.=16.2	d=0.7	S.D.=14.7												
										-40	04:06	04:43	05:12	19:15	19:44	20:21
										-45	03:47	04:28	05:01	19:26	19:59	20:40
										-50	03:21	04:09	04:46	19:40	20:17	21:05
										-52	03:07	03:60	04:40	19:47	20:26	21:18
										-54	02:52	03:50	04:32	19:54	20:36	21:34
										-56	02:33	03:38	04:24	20:02	20:48	21:52
										-58	02:08	03:24	04:15	20:12	21:01	22:16
										-60	01:33	03:08	04:04	20:22	21:17	22:49
										Lat.	Moonrise			Moonset		
										72	—:—	—:—	—:—	—:—	—:—	—:—
										70	—:—	—:—	—:—	—:—	—:—	—:—
										68	—:—	—:—	13:13	—:—	—:—	11:18
										66	—:—	—:—	14:12	—:—	—:—	10:18
										64	—:—	12:49	14:45	—:—	10:03	09:44
										62	11:53	13:32	15:10	09:15	09:19	09:19
										60	12:36	14:00	15:29	08:31	08:50	08:59
										58	13:05	14:22	15:45	08:03	08:28	08:42
										56	13:27	14:40	15:58	07:40	08:09	08:28
										54	13:45	14:55	16:10	07:22	07:54	08:16
										52	14:01	15:08	16:20	07:06	07:41	08:06
										50	14:14	15:20	16:29	06:53	07:29	07:56
										45	14:41	15:43	16:49	06:25	07:04	07:36
										40	15:03	16:02	17:04	06:03	06:45	07:19
										35	15:20	16:18	17:17	05:45	06:28	07:05
										30	15:36	16:32	17:29	05:30	06:14	06:53
										20	16:02	16:55	17:48	05:03	05:50	06:32
										10	16:24	17:15	18:05	04:40	05:28	06:14
										0	16:45	17:34	18:20	04:19	05:09	05:57
										-10	17:05	17:52	18:36	03:57	04:49	05:39
										-20	17:28	18:12	18:53	03:34	04:28	05:21
										-30	17:53	18:35	19:12	03:07	04:03	04:59
										-35	18:08	18:48	19:23	02:52	03:48	04:47
										-40	18:26	19:04	19:35	02:33	03:31	04:32
										-45	18:47	19:22	19:50	02:11	03:11	04:15
										-50	19:14	19:45	20:08	01:42	02:45	03:53
										-52	19:26	19:56	20:17	01:28	02:32	03:42
										-54	19:41	20:08	20:26	01:12	02:18	03:31
										-56	19:58	20:22	20:37	00:52	02:01	03:17
										-58	20:19	20:38	20:49	00:28	01:40	03:01
										-60	20:45	20:58	21:03	—:—	01:14	02:42
										Day	Sun			Moon		
											Eqn.of Time	Mer.	Mer.Pass.		Age	
											00 ^h	12 ^h	Pass	Upper	Lower	
										3	13:41	13:45	12:13	22:56	10:31	13(95%)
										4	13:48	13:51	12:13	23:45	11:21	14(98%)
										5	13:53	13:56	12:13	00:31	12:08	15(100%)
		SD.=16.2	d=0.8	S.D.=14.7												

February 06, 07 ,08 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	135°52.3	151°38.9	-8°15.9	66°21.8	24°47.5	128°58.3	1°43.0	166°45.3	-13°52.5	Alpheratz	357°36.7	29°13.1					
1	150°54.8	166°38.5	-8°14.6	81°23.5	24°47.5	144°00.3	1°43.2	181°47.4	-13°52.4	Ankaa	353°09.0	-42°11.1					
2	165°57.3	181°38.0	-8°13.4	96°25.3	24°47.6	159°02.3	1°43.4	196°49.6	-13°52.3	Schedar	349°33.2	56°40.0					
3	180°59.7	196°37.6	-8°12.2	111°27.0	24°47.6	174°04.3	1°43.6	211°51.8	-13°52.2	Diphda	348°49.0	-17°51.8					
4	196°02.2	211°37.2	-8°10.9	126°28.8	24°47.7	189°06.4	1°43.8	226°53.9	-13°52.1	Achernar	335°21.6	-57°07.5					
5	211°04.7	226°36.8	-8°09.7	141°30.6	24°47.8	204°08.4	1°44.0	241°56.1	-13°52.0	Hamal	327°53.1	23°34.3					
6	226°07.1	241°36.4	-8°08.5	156°32.3	24°47.8	219°10.4	1°44.2	256°58.3	-13°51.9	Polaris	314°47.6	89°22.0					
7	241°09.6	256°36.0	-8°07.2	171°34.1	24°47.9	234°12.4	1°44.4	272°00.5	-13°51.8	Akamar	315°13.0	-40°13.0					
8	256°12.1	271°35.6	-8°06.0	186°35.8	24°48.0	249°14.4	1°44.6	287°02.6	-13°51.7	Menkar	314°07.8	4°10.7					
9	271°14.5	286°35.2	-8°04.8	201°37.6	24°48.0	264°16.4	1°44.8	302°04.8	-13°51.6	Mirfak	308°30.4	49°56.7					
10	286°17.0	301°34.8	-8°03.5	216°39.4	24°48.1	279°18.5	1°45.0	317°07.0	-13°51.5	Aldebaran	290°41.3	16°33.3					
11	301°19.4	316°34.4	-8°02.3	231°41.1	24°48.2	294°20.5	1°45.2	332°09.2	-13°51.4	Rigel	281°05.2	-8°10.6					
12	316°21.9	331°34.0	-8°01.0	246°42.9	24°48.2	309°22.5	1°45.4	347°11.3	-13°51.3	Capella	280°24.0	46°01.4					
13	331°24.4	346°33.6	-7°59.8	261°44.6	24°48.3	324°24.5	1°45.6	2°13.5	-13°51.2	Bellatrix	278°24.4	6°22.2					
14	346°26.8	1°33.2	-7°58.6	276°46.4	24°48.3	339°26.5	1°45.8	17°15.7	-13°51.1	Elnath	278°03.6	28°37.7					
15	1°29.3	16°32.8	-7°57.3	291°48.1	24°48.4	354°28.5	1°46.0	32°17.9	-13°51.0	Alnilam	275°39.1	-1°11.3					
16	16°31.8	31°32.4	-7°56.1	306°49.9	24°48.5	9°30.5	1°46.2	47°20.0	-13°50.9	Betelgeuse	270°53.6	7°24.6					
17	31°34.2	46°32.0	-7°54.9	321°51.6	24°48.5	24°32.6	1°46.4	62°22.2	-13°50.8	Canopus	263°52.7	-52°42.6					
18	46°36.7	61°31.6	-7°53.6	336°53.4	24°48.6	39°34.6	1°46.6	77°24.4	-13°50.7	Sirius	258°27.2	-16°44.8					
19	61°39.2	76°31.2	-7°52.4	351°55.1	24°48.7	54°36.6	1°46.8	92°26.5	-13°50.6	Adara	255°06.8	-29°00.3					
20	76°41.6	91°30.8	-7°51.1	6°56.9	24°48.7	69°38.6	1°47.0	107°28.7	-13°50.5	Procyon	244°52.1	5°10.0					
21	91°44.1	106°30.4	-7°49.9	21°58.6	24°48.8	84°40.6	1°47.2	122°30.9	-13°50.4	Pollux	243°18.8	27°58.2					
22	106°46.6	121°30.0	-7°48.7	37°00.4	24°48.9	99°42.6	1°47.4	137°33.1	-13°50.3	Avior	234°14.8	-59°35.0					
23	121°49.0	136°29.6	-7°47.4	52°02.1	24°48.9	114°44.6	1°47.6	152°35.2	-13°50.2	Suhail	222°47.0	-43°31.5					
Mer.pass.:14:54			v-0.4 d1.2 m-3.8			v1.8 d0.1 m-0.1			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec							
0	136°51.5	151°29.2	-7°46.2	67°03.9	24°49.0	129°46.7	1°47.8	167°37.4	-13°50.1	Miaplacidus	221°37.7	-69°48.6					
1	151°53.9	166°28.7	-7°44.9	82°05.6	24°49.1	144°48.7	1°48.0	182°39.6	-13°50.0	Alphard	217°49.0	-8°45.6					
2	166°56.4	181°28.3	-7°43.7	97°07.3	24°49.1	159°50.7	1°48.2	197°41.8	-13°49.9	Regulus	207°35.8	11°51.2					
3	181°58.9	196°28.0	-7°42.4	112°09.1	24°49.2	174°52.7	1°48.4	212°43.9	-13°49.8	Dubhe	193°42.3	61°37.4					
4	197°01.3	211°27.6	-7°41.2	127°10.8	24°49.3	189°54.7	1°48.6	227°46.1	-13°49.7	Denebola	182°26.2	14°26.5					
5	212°03.8	226°27.2	-7°40.0	142°12.6	24°49.3	204°56.7	1°48.8	242°48.3	-13°49.6	Gienah	175°45.0	-17°40.2					
6	227°06.3	241°26.8	-7°38.7	157°14.3	24°49.4	219°58.7	1°49.0	257°50.4	-13°49.5	Acrux	173°01.4	-63°13.4					
7	242°08.7	256°26.4	-7°37.5	172°16.0	24°49.4	235°00.7	1°49.2	272°52.6	-13°49.4	Gacrux	171°53.1	-57°14.3					
8	257°11.2	271°26.0	-7°36.2	187°17.8	24°49.5	250°02.8	1°49.4	287°54.8	-13°49.3	Alioth	166°14.1	55°49.8					
9	272°13.7	286°25.6	-7°35.0	202°19.5	24°49.6	265°04.8	1°49.6	302°57.0	-13°49.2	Spica	158°23.8	-11°16.9					
10	287°16.1	301°25.2	-7°33.7	217°21.2	24°49.6	280°06.8	1°49.8	317°59.1	-13°49.1	Alcaid	152°53.1	49°11.6					
11	302°18.6	316°24.8	-7°32.5	232°23.0	24°49.7	295°08.8	1°50.0	333°01.3	-13°49.0	Hadar	148°38.1	-60°28.8					
12	317°21.1	331°24.4	-7°31.2	247°24.7	24°49.8	310°10.8	1°50.2	348°03.5	-13°48.9	Menkent	147°59.4	-36°28.9					
13	332°23.5	346°24.0	-7°30.0	262°26.4	24°49.8	325°12.8	1°50.4	3°05.7	-13°48.8	Arcturus	145°49.1	19°03.9					
14	347°26.0	1°23.6	-7°28.8	277°28.2	24°49.9	340°14.8	1°50.6	18°07.8	-13°48.7	Rigel Kent.	139°42.4	-60°55.6					
15	2°28.4	16°23.2	-7°27.5	292°29.9	24°50.0	355°16.8	1°50.8	33°10.0	-13°48.6	Zubenelg.	136°57.8	-16°08.2					
16	17°30.9	31°22.8	-7°26.3	307°31.6	24°50.0	10°18.8	1°51.0	48°12.2	-13°48.5	Kochab	137°19.7	74°03.3					
17	32°33.4	46°22.4	-7°25.0	322°33.4	24°50.1	25°20.9	1°51.2	63°14.4	-13°48.4	Alphecca	126°05.2	26°38.0					
18	47°35.8	61°22.0	-7°23.8	337°35.1	24°50.2	40°22.9	1°51.4	78°16.5	-13°48.3	Antares	112°17.9	-26°28.9					
19	62°38.3	76°21.6	-7°22.5	352°36.8	24°50.2	55°24.9	1°51.6	93°18.7	-13°48.2	Atria	107°13.8	-69°03.9					
20	77°40.8	91°21.2	-7°21.3	7°38.5	24°50.3	70°26.9	1°51.8	108°20.9	-13°48.1	Sabik	102°04.8	-15°45.2					
21	92°43.2	106°20.8	-7°20.0	22°40.3	24°50.4	85°28.9	1°52.0	123°23.0	-13°48.0	Shaula	96°12.8	-37°07.1					
22	107°45.7	121°20.4	-7°18.8	37°42.0	24°50.4	100°30.9	1°52.2	138°25.2	-13°47.9	Rasalhague	96°00.2	12°32.5					
23	122°48.2	136°20.0	-7°17.5	52°43.7	24°50.5	115°32.9	1°52.4	153°27.4	-13°47.8	Etamin	90°43.3	51°28.9					
Mer.pass.:14:50			v-0.4 d1.2 m-3.8			v1.7 d0.1 m-0.1			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	137°50.6	151°19.6	-7°16.3	67°45.4	24°50.6	130°34.9	1°52.6	168°29.6	-13°47.7	Kaus Aust.	83°34.9	-34°22.4			
1	152°53.1	166°19.2	-7°15.0	82°47.2	24°50.6	145°36.9	1°52.8	183°31.7	-13°47.6	Vega	80°34.7	38°48.0			
2	167°55.5	181°18.9	-7°13.8	97°48.9	24°50.7	160°38.9	1°53.0	198°33.9	-13°47.5	Nunki	75°50.0	-26°16.1			
3	182°58.0	196°18.5	-7°12.5	112°50.6	24°50.8	175°41.0	1°53.2	213°36.1	-13°47.4	Altair	62°01.9	8°55.6			
4	198°00.5	211°18.1	-7°11.3	127°52.3	24°50.8	190°43.0	1°53.4	228°38.3	-13°47.3	Peacock	53°08.8	-56°39.7			
5	213°02.9	226°17.7	-7°10.0	142°54.0	24°50.9	205°45.0	1°53.6	243°40.4	-13°47.2	Deneb	49°27.3	45°21.6			
6	228°05.4	241°17.3	-7°08.8	157°55.7	24°51.0	220°47.0	1°53.8	258°42.6	-13°47.1	Enif	33°40.7	9°58.7			
7	243°07.9	256°16.9	-7°07.5	172°57.5	24°51.0	235°49.0	1°54.0	273°44.8	-13°47.0	Alnair	27°35.4	-46°51.1			
8	258°10.3	271°16.5	-7°06.3	187°59.2	24°51.1	250°51.0	1°54.2	288°46.9	-13°46.9	Fomalhaut	15°16.6	-29°30.2			
9	273°12.8	286°16.1	-7°05.0	203°00.9	24°51.2	265°53.0	1°54.4	303°49.1	-13°46.8	Scheat	13°47.1	28°12.4			
10	288°15.3	301°15.7	-7°03.8	218°02.6	24°51.2	280°55.0	1°54.6	318°51.3	-13°46.7	Markab	13°31.8	15°19.7			
11	303°17.7	316°15.3	-7°02.5	233°04.3	24°51.3	295°57.0	1°54.8	333°53.5	-13°46.6						
12	318°20.2	331°15.0	-7°01.3	248°06.0	24°51.4	310°59.0									

Sun			Moon											
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
								Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
0	176°30.5	-15°46.0	352°24.6	13.8	19°37.7	-10.0	54.1	72	06:48	08:13	09:45	14:45	16:17	17:42
1	191°30.4	-15°45.2	6°57.4	13.8	19°27.6	-10.1	54.1	70	06:43	07:58	09:15	15:15	16:32	17:47
2	206°30.4	-15°44.4	21°30.2	13.9	19°17.4	-10.2	54.1	68	06:38	07:46	08:53	15:36	16:43	17:51
3	221°30.3	-15°43.7	36°03.1	13.9	19°07.2	-10.3	54.1	66	06:34	07:36	08:36	15:54	16:53	17:55
4	236°30.3	-15°42.9	50°36.1	14.0	18°56.9	-10.4	54.1	64	06:31	07:28	08:22	16:08	17:01	17:59
5	251°30.3	-15°42.1	65°09.1	14.0	18°46.5	-10.4	54.1	62	06:27	07:21	08:10	16:19	17:09	18:02
6	266°30.2	-15°41.4	79°42.1	14.1	18°36.0	-10.5	54.1	60	06:24	07:14	07:60	16:29	17:15	18:05
7	281°30.2	-15°40.6	94°15.3	14.1	18°25.5	-10.6	54.1	58	06:22	07:08	07:51	16:38	17:21	18:07
8	296°30.1	-15°39.8	108°48.4	14.2	18°14.8	-10.7	54.1	56	06:19	07:03	07:43	16:45	17:26	18:10
9	311°30.1	-15°39.1	123°21.7	14.3	18°04.1	-10.7	54.1	54	06:17	06:59	07:37	16:52	17:30	18:12
10	326°30.0	-15°38.3	137°55.0	14.3	17°53.3	-10.8	54.1	52	06:14	06:55	07:30	16:58	17:34	18:14
11	341°30.0	-15°37.5	152°28.3	14.4	17°42.5	-10.9	54.1	50	06:12	06:51	07:25	17:04	17:38	18:17
12	356°30.0	-15°36.8	167°01.7	14.4	17°31.5	-11.0	54.1	45	06:07	06:42	07:13	17:16	17:47	18:22
13	11°29.9	-15°36.0	181°35.1	14.5	17°20.5	-11.0	54.1	40	06:02	06:35	07:03	17:26	17:54	18:26
14	26°29.9	-15°35.2	196°08.6	14.5	17°09.4	-11.1	54.2	35	05:58	06:28	06:54	17:34	18:01	18:31
15	41°29.8	-15°34.4	210°42.1	14.6	16°58.3	-11.2	54.2	30	05:53	06:22	06:47	17:42	18:07	18:35
16	56°29.8	-15°33.7	225°15.7	14.6	16°47.1	-11.3	54.2	20	05:44	06:11	06:33	17:55	18:18	18:44
17	71°29.8	-15°32.9	239°49.4	14.7	16°35.8	-11.3	54.2	10	05:35	05:56	06:22	18:07	18:28	18:53
18	86°29.7	-15°32.1	254°23.0	14.7	16°24.4	-11.4	54.2	0	05:24	05:49	06:11	18:18	18:39	19:04
19	101°29.7	-15°31.4	268°56.8	14.8	16°13.0	-11.5	54.2	-10	05:12	05:38	05:59	18:29	18:50	19:16
20	116°29.6	-15°30.6	283°30.6	14.8	16°01.5	-11.5	54.2	-20	04:57	05:24	05:47	18:41	19:04	19:31
21	131°29.6	-15°29.8	298°04.4	14.9	15°49.9	-11.6	54.2	-30	04:38	05:08	05:33	18:54	19:20	19:50
22	146°29.6	-15°29.0	312°38.3	14.9	15°38.3	-11.7	54.2	-35	04:26	04:58	05:25	19:02	19:29	20:02
23	161°29.5	-15°28.3	327°12.2	14.9	15°26.6	-11.7	54.2	-40	04:11	04:47	05:16	19:11	19:41	20:16
	SD.=16.2	d=0.8	S.D.=14.7					-45	03:52	04:33	05:05	19:22	19:55	20:35
								-50	03:28	04:15	04:52	19:35	20:12	20:59
								-52	03:15	04:06	04:45	19:42	20:20	21:11
								-54	03:01	03:57	04:39	19:48	20:30	21:25
								-56	02:44	03:46	04:31	19:56	20:40	21:42
								-58	02:22	03:33	04:22	20:04	20:53	22:03
								-60	01:52	03:18	04:12	20:14	21:08	22:31
								Lat.	Moonrise			Moonset		
								Mon	Tue	Wed	Mon	Tue	Wed	
0	176°29.5	-15°27.5	341°46.2	15.0	15°14.8	-11.8	54.2	72	14:14	17:05	19:12	11:54	10:33	09:52
1	191°29.4	-15°26.7	356°20.2	15.0	15°03.0	-11.9	54.2	70	15:12	17:26	19:21	10:53	10:09	09:41
2	206°29.4	-15°25.9	10°54.2	15.1	14°51.1	-11.9	54.3	68	15:46	17:42	19:28	10:18	09:51	09:32
3	221°29.4	-15°25.2	25°28.3	15.1	14°39.1	-12.0	54.3	66	16:10	17:55	19:34	09:53	09:37	09:24
4	236°29.3	-15°24.4	40°02.5	15.2	14°27.1	-12.0	54.3	64	16:29	18:06	19:39	09:33	09:25	09:17
5	251°29.3	-15°23.6	54°36.7	15.2	14°15.0	-12.1	54.3	62	16:44	18:15	19:43	09:17	09:14	09:11
6	266°29.3	-15°22.8	69°10.9	15.2	14°02.9	-12.2	54.3	60	16:57	18:23	19:47	09:03	09:05	09:06
7	281°29.2	-15°22.0	83°45.2	15.3	13°50.7	-12.2	54.3	58	17:08	18:30	19:50	08:52	08:58	09:02
8	296°29.2	-15°21.3	98°19.5	15.3	13°38.5	-12.3	54.3	56	17:17	18:36	19:53	08:41	08:51	08:58
9	311°29.2	-15°20.5	112°53.8	15.4	13°26.1	-12.3	54.3	54	17:26	18:41	19:56	08:32	08:44	08:54
10	326°29.1	-15°19.7	127°28.2	15.4	13°13.8	-12.4	54.3	52	17:33	18:46	19:58	08:24	08:39	08:51
11	341°29.1	-15°18.9	142°02.6	15.4	13°01.4	-12.4	54.3	50	17:40	18:50	19:60	08:17	08:34	08:48
12	356°29.1	-15°18.1	156°37.1	15.5	12°48.9	-12.5	54.4	45	17:54	18:60	20:05	08:01	08:23	08:41
13	11°29.0	-15°17.4	171°11.6	15.5	12°36.4	-12.6	54.4	40	18:06	19:07	20:08	07:48	08:13	08:36
14	26°29.0	-15°16.6	185°46.1	15.6	12°23.8	-12.6	54.4	35	18:16	19:14	20:12	07:37	08:05	08:31
15	41°29.0	-15°15.8	200°20.7	15.6	12°11.1	-12.7	54.4	30	18:25	19:20	20:15	07:28	07:58	08:27
16	56°28.9	-15°15.0	214°55.3	15.6	11°58.4	-12.7	54.4	20	18:40	19:30	20:20	07:11	07:46	08:20
17	71°28.9	-15°14.2	229°30.0	15.7	11°45.7	-12.8	54.4	10	18:53	19:39	20:24	06:56	07:35	08:13
18	86°28.9	-15°13.4	244°04.6	15.7	11°32.9	-12.8	54.4	0	19:05	19:47	20:28	06:42	07:25	08:07
19	101°28.8	-15°12.7	258°39.3	15.7	11°20.1	-12.9	54.4	-10	19:17	19:55	20:32	06:28	07:15	08:01
20	116°28.8	-15°11.9	273°14.1	15.8	11°07.2	-12.9	54.5	-20	19:30	20:04	20:37	06:13	07:04	07:54
21	131°28.8	-15°11.1	287°48.9	15.8	10°54.3	-13.0	54.5	-30	19:44	20:14	20:42	05:56	06:52	07:46
22	146°28.8	-15°10.3	302°23.7	15.8	10°41.3	-13.0	54.5	-35	19:53	20:20	20:44	05:46	06:44	07:42
23	161°28.7	-15°09.5	316°58.5	15.8	10°28.3	-13.0	54.5	-40	20:02	20:26	20:48	05:34	06:36	07:37
	SD.=16.2	d=0.8	S.D.=14.8					-45	20:13	20:33	20:51	05:20	06:26	07:31
								-50	20:27	20:42	20:56	05:03	06:14	07:24
								-52	20:33	20:46	20:58	04:55	06:08	07:21
								-54	20:40	20:51	20:60	04:46	06:02	07:17
								-56	20:48	20:56	21:02	04:36	05:55	07:13
								-58	20:56	21:01	21:05	04:25	05:47	07:08
								-60	21:06	21:08	21:08	04:11	05:39	07:03
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
0	176°28.7	-15°08.7	331°33.3	15.9	10°15.2	-13.1	54.5	6	13:58	14:00	12:14	00:31	12:53	16(99%)
1	191°28.7	-15°08.0	346°08.2	15.9	10°02.1	-13.1	54.5	7	14:02	14:04	12:14	01:15	13:36	17(97%)
2	206°28.6	-15°07.2	0°43.1	15.9	9°48.9	-13.2	54.5	8	14:05	14:07	12:14	01:57	14:17	18(93%)
3	221°28.6	-15°06.4	15°18.1	15.9	9°35.7	-13.2	54.5							
4	236°28.6	-15°05.6	29°53.0	16.0	9°22.5	-13.3	54.6							
5	251°28.6	-15°04.8	44°28.0	16.0	9°09.2	-13.3	54.6							
6	266°28.5	-15°04.0	59°03.0	16.0	8°55.9	-13.3	54.6							
7	281°28.5	-15°03.2	73°38.0	16.0	8°42.5	-13.4	54.6							
8	296°28.5	-15°02.4	88°13.1	16.1	8°29.1	-13.4	54.6							
9	311°28.4	-15°01.6	102°48.2	16.1	8°15.6	-13.5	54.6							
10	326°28.4	-15°00.9	117°23.2	16.1	8°02.2	-13.5	54.6							
11	341°28.4	-15°00.1	131°58.4	16.1	7°48.7	-13.5	54.6							
12	356°28.4	-14°59.3	146°33.5	16.1	7°35.1	-13.6	54.7							
13	11°28.3	-14°58.5	161°08.6	16.1	7°21.5	-13.6	54.7							
14	26°28.3	-14°57.7	175°43.8	16.2	7°07.9	-13.6	54.7							
15	41°28.3	-14°56.9	190°18.9	16.2	6°54.2	-13.7	54.7							
16	56°28.3	-14°56.1	204°54.1	16.2	6°40.6	-13.7	54.7							
17	71°28.3	-14°55.3	219°29.3	16.2	6°26.8	-13.7	54.7							
18	86°28.2	-14°54.5	234°04.5	16.2	6°13.1	-13.8	54.8							
19	101°28.2	-14°53.7	248°39.8	16.2	5°59.3	-13.8	54.8							
20	116°28.2	-14°52.9	263°15.0	16.2	5°45.5	-13.8	54.8							
21	131°28.2	-14°52.1	277°50.2	16.2	5°31.7	-13.9	54.8							
22	146°2													

February 09, 10 ,11 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	138°49.8	151°10.3	-6°46.2	68°26.5	24°52.2	131°23.1	1°57.5	169°21.7	-13°45.3				Alpheratz	357°36.7	29°13.1		
1	153°52.2	166°09.9	-6°44.9	83°28.2	24°52.2	146°25.1	1°57.7	184°23.9	-13°45.2				Ankaa	353°09.0	-42°11.1		
2	168°54.7	181°09.6	-6°43.7	98°29.9	24°52.3	161°27.1	1°57.9	199°26.0	-13°45.1				Schedar	349°33.2	56°40.0		
3	183°57.1	196°09.2	-6°42.4	113°31.6	24°52.4	176°29.1	1°58.1	214°28.2	-13°44.9				Diphda	348°49.0	-17°51.8		
4	198°59.6	211°08.8	-6°41.2	128°33.3	24°52.4	191°31.1	1°58.3	229°30.4	-13°44.8				Achernar	335°21.6	-57°07.5		
5	214°02.1	226°08.4	-6°39.9	143°35.0	24°52.5	206°33.1	1°58.5	244°32.6	-13°44.7				Hamal	327°53.1	23°34.3		
6	229°04.5	241°08.0	-6°38.7	158°36.7	24°52.6	221°35.2	1°58.7	259°34.7	-13°44.6				Polaris	314°49.2	89°22.0		
7	244°07.0	256°07.6	-6°37.4	173°38.4	24°52.6	236°37.2	1°58.9	274°36.9	-13°44.5				Akamar	315°13.0	-40°13.0		
8	259°09.5	271°07.3	-6°36.1	188°40.1	24°52.7	251°39.2	1°59.1	289°39.1	-13°44.4				Menkar	314°07.8	4°10.7		
9	274°11.9	286°06.9	-6°34.9	203°41.8	24°52.8	266°41.2	1°59.3	304°41.3	-13°44.3				Mirfak	308°30.5	49°56.7		
10	289°14.4	301°06.5	-6°33.6	218°43.5	24°52.8	281°43.2	1°59.5	319°43.4	-13°44.2				Aldebaran	290°41.3	16°33.3		
11	304°16.9	316°06.1	-6°32.4	233°45.2	24°52.9	296°45.2	1°59.7	334°45.6	-13°44.1				Rigel	281°05.2	-8°10.6		
12	319°19.3	331°05.7	-6°31.1	248°46.8	24°53.0	311°47.2	1°59.9	349°47.8	-13°44.0				Capella	280°24.0	46°01.4		
13	334°21.8	346°05.4	-6°29.8	263°48.5	24°53.0	326°49.2	2°00.1	4°49.9	-13°43.9				Bellatrix	278°24.4	6°22.2		
14	349°24.3	1°05.0	-6°28.6	278°50.2	24°53.1	341°51.2	2°00.3	19°52.1	-13°43.8				Elnath	278°03.7	28°37.7		
15	4°26.7	16°04.6	-6°27.3	293°51.9	24°53.2	356°53.2	2°00.5	34°54.3	-13°43.7				Alnilam	275°39.1	-1°11.3		
16	19°29.2	31°04.2	-6°26.1	308°53.6	24°53.2	11°55.2	2°00.8	49°56.5	-13°43.6				Betelgeuse	270°53.6	7°24.6		
17	34°31.6	46°03.8	-6°24.8	323°55.3	24°53.3	26°57.2	2°01.0	64°58.6	-13°43.5				Canopus	263°52.7	-52°42.7		
18	49°34.1	61°03.5	-6°23.5	338°57.0	24°53.4	41°59.2	2°01.2	80°00.8	-13°43.4				Sirius	258°27.3	-16°44.8		
19	64°36.6	76°03.1	-6°22.3	353°58.7	24°53.4	57°01.2	2°01.4	95°03.0	-13°43.3				Adara	255°06.8	-29°00.3		
20	79°39.0	91°02.7	-6°21.0	9°00.3	24°53.5	72°03.2	2°01.6	110°05.1	-13°43.2				Procyon	244°52.1	5°10.0		
21	94°41.5	106°02.3	-6°19.7	24°02.0	24°53.6	87°05.2	2°01.8	125°07.3	-13°43.1				Pollux	243°18.8	27°58.2		
22	109°44.0	121°02.0	-6°18.5	39°03.7	24°53.6	102°07.2	2°02.0	140°09.5	-13°43.0				Avior	234°14.8	-59°35.0		
23	124°46.4	136°01.6	-6°17.2	54°05.4	24°53.7	117°09.2	2°02.2	155°11.7	-13°42.9				Suhail	222°47.0	-43°31.6		
Mer.pass.:14:42			v-0.4 d1.3 m-3.8			v1.7 d0.1 m-0.0			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	139°48.9	151°01.2	-6°16.0	69°07.1	24°53.8	132°11.2	2°02.4	170°13.8	-13°42.8				Dubhe	193°42.3	61°37.5		
1	154°51.4	166°00.8	-6°14.7	84°08.8	24°53.8	147°13.2	2°02.6	185°16.0	-13°42.7				Denebola	182°26.2	14°26.5		
2	169°53.8	181°00.5	-6°13.4	99°10.4	24°53.9	162°15.2	2°02.8	200°18.2	-13°42.6				Gienah	175°44.9	-17°40.2		
3	184°56.3	196°00.1	-6°12.2	114°12.1	24°54.0	177°17.2	2°03.0	215°20.4	-13°42.5				Acrux	173°01.4	-63°13.4		
4	199°58.8	210°59.7	-6°10.9	129°13.8	24°54.0	192°19.2	2°03.2	230°22.5	-13°42.4				Gacrux	171°53.0	-57°14.3		
5	215°01.2	225°59.3	-6°09.6	144°15.5	24°54.1	207°21.2	2°03.4	245°24.7	-13°42.3				Alioth	166°14.1	55°49.8		
6	230°03.7	240°59.0	-6°08.4	159°17.1	24°54.2	222°23.2	2°03.6	260°26.9	-13°42.2				Spica	158°23.8	-11°16.9		
7	245°06.1	255°58.6	-6°07.1	174°18.8	24°54.2	237°25.2	2°03.8	275°29.0	-13°42.1				Alcaid	152°53.1	49°11.6		
8	260°08.6	270°58.2	-6°05.8	189°20.5	24°54.3	252°27.2	2°04.0	290°31.2	-13°42.0				Hadar	148°38.1	-60°28.8		
9	275°11.1	285°57.8	-6°04.6	204°22.2	24°54.4	267°29.2	2°04.2	305°33.4	-13°41.9				Menkent	147°59.4	-36°28.9		
10	290°13.5	300°57.5	-6°03.3	219°23.8	24°54.4	282°31.3	2°04.4	320°35.6	-13°41.8				Arcturus	145°49.1	19°03.8		
11	305°16.0	315°57.1	-6°02.0	234°25.5	24°54.5	297°33.3	2°04.6	335°37.7	-13°41.7				Rigil Kent.	139°42.4	-60°55.6		
12	320°18.5	330°56.7	-6°00.8	249°27.2	24°54.6	312°35.3	2°04.8	350°39.9	-13°41.6				Zubenelg.	136°57.7	-16°08.2		
13	335°20.9	345°56.3	-5°59.5	264°28.8	24°54.6	327°37.3	2°05.1	5°42.1	-13°41.5				Kochab	137°19.6	74°03.3		
14	350°23.4	0°56.0	-5°58.2	279°30.5	24°54.7	342°39.3	2°05.3	20°44.2	-13°41.4				Alphecca	126°05.1	26°38.0		
15	5°25.9	15°55.6	-5°57.0	294°32.2	24°54.8	357°41.3	2°05.5	35°46.4	-13°41.3				Antares	112°17.9	-26°28.9		
16	20°28.3	30°55.2	-5°55.7	309°33.9	24°54.8	12°43.3	2°05.7	50°48.6	-13°41.2				Atria	107°13.8	-69°03.9		
17	35°30.8	45°54.8	-5°54.4	324°35.5	24°54.9	27°45.3	2°05.9	65°50.8	-13°41.1				Sabik	102°04.8	-15°45.2		
18	50°33.2	60°54.5	-5°53.2	339°37.2	24°55.0	42°47.3	2°06.1	80°52.9	-13°41.0				Shaula	96°12.7	-37°07.1		
19	65°35.7	75°54.1	-5°51.9	354°38.8	24°55.0	57°49.3	2°06.3	95°55.1	-13°40.9				Rasalhague	96°00.2	12°32.4		
20	80°38.2	90°53.7	-5°50.6	9°40.5	24°55.1	72°51.3	2°06.5	110°57.3	-13°40.8				Etamin	90°43.2	51°28.8		
21	95°40.6	105°53.4	-5°49.3	24°42.2	24°55.2	87°53.3	2°06.7	125°59.5	-13°40.7				Kaus Aust.	83°34.9	-34°22.4		
22	110°43.1	120°53.0	-5°48.1	39°43.8	24°55.3	102°55.3	2°06.9	141°01.6	-13°40.6				Vega	80°34.6	38°48.0		
23	125°45.6	135°52.6	-5°46.8	54°45.5	24°55.3	117°57.3	2°07.1	156°03.8	-13°40.5				Nunki	75°50.0	-26°16.1		
Mer.pass.:14:38			v-0.4 d1.3 m-3.8			v1.7 d0.1 m-0.0			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	140°48.0	150°52.3	-5°45.5	69°47.2	24°55.4	132°59.3	2°07.3	171°06.0	-13°40.4				Enif	33°40.7	9°58.7		
1	155°50.5	165°51.9	-5°44.3	84°48.8	24°55.5	148°01.3	2°07.5	186°08.1	-13°40.3				Alnair	27°35.4	-46°51.1		
2	170°53.0	180°51.5	-5°43.0	99°50.5	24°55.5	163°03.3	2°07.7	201°10.3	-13°40.2				Fomalhaut	15°16.6	-29°30.2		
3	185°55.4	195°51.2	-5°41.7	114°52.1	24°55.6	178°05.3	2°07.9	216°12.5	-13°40.1				Scheat	13°47.1	28°12.4		
4	200°57.9	210°50.8	-5°40.5	129°53.8	24°55.7	193°07.3	2°08.1	231°14.7	-13°40.0				Markab	13°31.8	15°19.7		
5	216°00.4	225°50.4	-5°39.2	144°55.5	24°55.7	208°09.3	2°08.3	246°16.8	-13°39.9				2023/2/9			SHA	Mer.pass
6	231°02.8	240°50.0	-5°37.9	159°57.1	24°55.8	223°11.3	2°08.6	261°19.0	-13°39.8				Venus	12°20.6	13:56		
7	246°05.3	255°49.7	-5°36.6	174°58.8	24°55.9	238°13.3	2°08.8	276°21.2	-13°39.7				Mars	289°36.7	19:24		
8	261°07.7	270°49.3	-5°35.4	190°00.4	24°55.9	253°15.3	2°09.0	291°23.3	-13°39.6				Jupiter	352°33.4	15:12		
9	276°10.2	285°48.9	-5°34.1	205°02.1	24°56.0	268°17.2	2°09.2	306°25.5	-13°39.5				Saturn	30°31.9	12:41		
10	291°12.7	300°48.6	-5°32.8	220°03.7	24°56.1	283°19.2	2°09.4	321°27.7	-13°39.4				2023/2/1			SHA	Mer.pass
11	306°15.1	315°48.2	-5°31.5	235°05.4	24°56.1	298°21.2	2°09.6	336°29.9	-13°39.3				Venus	11°12.3	13:56		
12	321°17.6	330°47.8	-5°30.3	250°07.0	24°56.2	313°23.2	2°09.8	351°32.0	-13°39.2				Mars	289°18.2	19:21		
13	336°20.1	345°47.5	-5°29.0	265°08.7	24°56.3	328°25.2	2°10.0	6°34.2	-13°39.1				Jupiter	352°22.3	15:09		
14	351°22.5	0°47.1	-5°27.7	280°10.3	24°56.3	343°27.2	2°10.2	21°36.4	-13°39.0				Saturn	30°24.9	12:37		
15	6°25.0	15°46.8	-5°26.5	295°12.0	24°56.4	358°29.2											

Sun			Moon											
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	176°28.1	-14°49.7	321°36.0	16.3	4°50.0	-13.9	54.8	72	06:36	07:59	09:25	15:05	16:31	17:54
1	191°28.1	-14°48.9	336°11.3	16.3	4°36.0	-14.0	54.9	70	06:32	07:46	08:60	15:30	16:44	17:58
2	206°28.1	-14°48.1	350°46.5	16.3	4°22.1	-14.0	54.9	68	06:29	07:36	08:40	15:49	16:54	18:01
3	221°28.0	-14°47.3	5°21.8	16.3	4°08.1	-14.0	54.9	66	06:26	07:27	08:25	16:05	17:03	18:04
4	236°28.0	-14°46.5	19°57.1	16.3	3°54.1	-14.0	54.9	64	06:23	07:19	08:12	16:17	17:10	18:07
5	251°28.0	-14°45.7	34°32.3	16.3	3°40.0	-14.0	54.9	62	06:20	07:13	08:01	16:28	17:17	18:09
6	266°28.0	-14°44.9	49°07.6	16.3	3°26.0	-14.1	55.0	60	06:18	07:07	07:52	16:37	17:22	18:12
7	281°28.0	-14°44.1	63°42.9	16.3	3°11.9	-14.1	55.0	58	06:16	07:02	07:44	16:45	17:27	18:14
8	296°27.9	-14°43.3	78°18.2	16.3	2°57.8	-14.1	55.0	56	06:14	06:58	07:37	16:52	17:32	18:16
9	311°27.9	-14°42.5	92°53.4	16.3	2°43.7	-14.1	55.0	54	06:12	06:53	07:31	16:58	17:36	18:18
10	326°27.9	-14°41.7	107°28.7	16.3	2°29.5	-14.1	55.0	52	06:10	06:50	07:25	17:04	17:40	18:19
11	341°27.9	-14°40.9	122°03.9	16.3	2°15.4	-14.2	55.0	50	06:08	06:46	07:20	17:09	17:43	18:21
12	356°27.9	-14°40.1	136°39.2	16.2	2°01.2	-14.2	55.1	45	06:04	06:38	07:09	17:20	17:51	18:25
13	11°27.9	-14°39.3	151°14.4	16.2	1°47.0	-14.2	55.1	40	05:59	06:31	06:59	17:29	17:58	18:29
14	26°27.8	-14°38.5	165°49.7	16.2	1°32.8	-14.2	55.1	35	05:55	06:25	06:51	17:37	18:04	18:33
15	41°27.8	-14°37.7	180°24.9	16.2	1°18.6	-14.2	55.1	30	05:51	06:20	06:44	17:44	18:09	18:37
16	56°27.8	-14°36.9	195°00.1	16.2	1°04.3	-14.2	55.1	20	05:43	06:09	06:32	17:57	18:19	18:45
17	71°27.8	-14°36.1	209°35.3	16.2	0°50.1	-14.3	55.2	10	05:34	05:59	06:21	18:07	18:29	18:54
18	86°27.8	-14°35.3	224°10.5	16.2	0°35.8	-14.3	55.2	0	05:25	05:49	06:11	18:18	18:39	19:04
19	101°27.8	-14°34.5	238°45.7	16.2	0°21.6	-14.3	55.2	-10	05:13	05:39	06:00	18:28	18:50	19:15
20	116°27.7	-14°33.7	253°20.8	16.2	0°07.3	-14.3	55.2	-20	04:59	05:26	05:49	18:39	19:02	19:29
21	131°27.7	-14°32.9	267°56.0	16.1	-0°07.0	-14.3	55.2	-30	04:41	05:11	05:36	18:52	19:17	19:47
22	146°27.7	-14°32.1	282°31.1	16.1	-0°21.3	-14.3	55.2	-35	04:29	05:01	05:28	18:59	19:26	19:58
23	161°27.7	-14°31.3	297°06.2	16.1	-0°35.6	-14.3	55.3	-40	04:15	04:51	05:20	19:08	19:37	20:12
								-45	03:58	04:37	05:09	19:18	19:50	20:30
								-50	03:35	04:21	04:57	19:30	20:06	20:52
								-52	03:23	04:13	04:51	19:36	20:14	21:03
								-54	03:10	04:04	04:45	19:42	20:23	21:16
								-56	02:54	03:54	04:38	19:49	20:33	21:32
								-58	02:35	03:42	04:30	19:57	20:44	21:51
								-60	02:09	03:28	04:20	20:06	20:58	22:15
								Lat.	Moonrise			Moonset		
								72	21:12	23:14	--	09:20	08:50	08:17
								70	21:12	23:05	--	09:17	08:54	08:29
								68	21:11	22:57	--	09:14	08:58	08:40
								66	21:11	22:50	--	09:12	09:00	08:48
								64	21:11	22:45	--	09:10	09:03	08:55
								62	21:11	22:40	--	09:08	09:05	09:02
								60	21:10	22:36	--	09:07	09:07	09:07
								58	21:10	22:32	23:57	09:05	09:08	09:12
								56	21:10	22:29	23:51	09:04	09:10	09:16
								54	21:10	22:26	23:45	09:03	09:11	09:20
								52	21:10	22:24	23:40	09:02	09:12	09:24
								50	21:10	22:21	23:35	09:01	09:14	09:27
								45	21:10	22:16	23:25	08:59	09:16	09:34
								40	21:10	22:12	23:16	08:57	09:18	09:40
								35	21:09	22:08	23:09	08:56	09:20	09:45
								30	21:09	22:05	23:03	08:54	09:21	09:50
								20	21:09	21:60	22:52	08:52	09:24	09:57
								10	21:09	21:55	22:43	08:50	09:26	10:04
								0	21:09	21:50	22:34	08:48	09:29	10:11
								-10	21:09	21:46	22:25	08:46	09:31	10:17
								-20	21:09	21:41	22:16	08:43	09:33	10:25
								-30	21:09	21:36	22:06	08:41	09:36	10:33
								-35	21:09	21:33	21:60	08:40	09:38	10:37
								-40	21:09	21:30	21:53	08:38	09:39	10:43
								-45	21:08	21:26	21:45	08:36	09:41	10:49
								-50	21:08	21:21	21:36	08:34	09:44	10:56
								-52	21:08	21:19	21:32	08:33	09:45	10:60
								-54	21:08	21:17	21:27	08:31	09:46	11:03
								-56	21:08	21:14	21:22	08:30	09:48	11:08
								-58	21:08	21:12	21:16	08:29	09:49	11:12
								-60	21:08	21:09	21:09	08:27	09:51	11:18
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								9	14:08	14:09	12:14	02:37	14:58	19(88%)
								10	14:09	14:10	12:14	03:18	15:39	20(81%)
								11	14:10	14:10	12:14	04:00	16:22	21(72%)
								</						

February 12, 13 ,14 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	141°47.2	150°43.5	-5°15.0	70°26.8	24°57.0	133°47.2	2°12.3	171°58.1	-13°37.9	Alpheratz	357°36.7	29°13.1					
1	156°49.6	165°43.1	-5°13.7	85°28.4	24°57.1	148°49.2	2°12.5	187°00.3	-13°37.8	Ankaa	353°09.0	-42°11.1					
2	171°52.1	180°42.8	-5°12.4	100°30.1	24°57.2	163°51.2	2°12.7	202°02.4	-13°37.7	Schedar	349°33.2	56°39.9					
3	186°54.6	195°42.4	-5°11.1	115°31.7	24°57.2	178°53.2	2°12.9	217°04.6	-13°37.6	Diphda	348°49.0	-17°51.8					
4	201°57.0	210°42.0	-5°09.9	130°33.3	24°57.3	193°55.2	2°13.1	232°06.8	-13°37.5	Achernar	335°21.6	-57°07.5					
5	216°59.5	225°41.7	-5°08.6	145°35.0	24°57.4	208°57.2	2°13.3	247°09.0	-13°37.4	Hamal	327°53.1	23°34.3					
6	232°02.0	240°41.3	-5°07.3	160°36.6	24°57.4	223°59.2	2°13.5	262°11.1	-13°37.3	Polaris	314°50.6	89°22.0					
7	247°04.4	255°40.9	-5°06.0	175°38.2	24°57.5	239°01.2	2°13.7	277°13.3	-13°37.2	Akamar	315°13.0	-40°13.0					
8	262°06.9	270°40.6	-5°04.8	190°39.9	24°57.6	254°03.2	2°13.9	292°15.5	-13°37.1	Menkar	314°07.8	4°10.7					
9	277°09.3	285°40.2	-5°03.5	205°41.5	24°57.6	269°05.2	2°14.1	307°17.6	-13°37.0	Mirfak	308°30.5	49°56.7					
10	292°11.8	300°39.9	-5°02.2	220°43.1	24°57.7	284°07.2	2°14.4	322°19.8	-13°36.9	Aldebaran	290°41.3	16°33.3					
11	307°14.3	315°39.5	-5°00.9	235°44.8	24°57.8	299°09.2	2°14.6	337°22.0	-13°36.8	Rigel	281°05.2	-8°10.6					
12	322°16.7	330°39.1	-4°59.6	250°46.4	24°57.9	314°11.2	2°14.8	352°24.2	-13°36.7	Capella	280°24.0	46°01.4					
13	337°19.2	345°38.8	-4°58.4	265°48.0	24°57.9	329°13.1	2°15.0	7°26.3	-13°36.6	Bellatrix	278°24.4	6°22.2					
14	352°21.7	0°38.4	-4°57.1	280°49.7	24°58.0	344°15.1	2°15.2	22°28.5	-13°36.5	Elnath	278°03.7	28°37.7					
15	7°24.1	15°38.1	-4°55.8	295°51.3	24°58.1	359°17.1	2°15.4	37°30.7	-13°36.4	Alnilam	275°39.1	-1°11.3					
16	22°26.6	30°37.7	-4°54.5	310°52.9	24°58.1	14°19.1	2°15.6	52°32.8	-13°36.3	Betelgeuse	270°53.6	7°24.6					
17	37°29.1	45°37.4	-4°53.2	325°54.5	24°58.2	29°21.1	2°15.8	67°35.0	-13°36.2	Canopus	263°52.7	-52°42.7					
18	52°31.5	60°37.0	-4°52.0	340°56.2	24°58.3	44°23.1	2°16.0	82°37.2	-13°36.1	Sirius	258°27.3	-16°44.8					
19	67°34.0	75°36.6	-4°50.7	355°57.8	24°58.3	59°25.1	2°16.2	97°39.4	-13°36.0	Adara	255°06.8	-29°00.4					
20	82°36.5	90°36.3	-4°49.4	10°59.4	24°58.4	74°27.1	2°16.4	112°41.5	-13°35.9	Procyon	244°52.1	5°10.0					
21	97°38.9	105°35.9	-4°48.1	26°01.0	24°58.5	89°29.1	2°16.6	127°43.7	-13°35.8	Pollux	243°18.8	27°58.2					
22	112°41.4	120°35.6	-4°46.8	41°02.7	24°58.5	104°31.1	2°16.8	142°45.9	-13°35.7	Avior	234°14.8	-59°35.1					
23	127°43.8	135°35.2	-4°45.6	56°04.3	24°58.6	119°33.1	2°17.1	157°48.0	-13°35.6	Suhail	222°47.0	-43°31.6					
Mer.pass.:14:30			v-0.4 d1.3 m-3.8			v1.6 d0.1 m0.0			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	142°46.3	150°34.9	-4°44.3	71°05.9	24°58.7	134°35.1	2°17.3	172°50.2	-13°35.5	Miaplacidus	221°37.7	-69°48.7					
1	157°48.8	165°34.5	-4°43.0	86°07.5	24°58.7	149°37.1	2°17.5	187°52.4	-13°35.4	Alphard	217°49.0	-8°45.6					
2	172°51.2	180°34.1	-4°41.7	101°09.2	24°58.8	164°39.1	2°17.7	202°54.6	-13°35.3	Regulus	207°35.7	11°51.2					
3	187°53.7	195°33.8	-4°40.4	116°10.8	24°58.9	179°41.1	2°17.9	217°56.7	-13°35.2	Dubhe	193°42.3	61°37.5					
4	202°56.2	210°33.4	-4°39.1	131°12.4	24°59.0	194°43.1	2°18.1	232°58.9	-13°35.1	Denebola	182°26.2	14°26.5					
5	217°58.6	225°33.1	-4°37.9	146°14.0	24°59.0	209°45.0	2°18.3	248°01.1	-13°35.0	Gienah	175°44.9	-17°40.2					
6	233°01.1	240°32.7	-4°36.6	161°15.6	24°59.1	224°47.0	2°18.5	263°03.2	-13°34.9	Acrux	173°01.4	-63°13.4					
7	248°03.6	255°32.4	-4°35.3	176°17.2	24°59.2	239°49.0	2°18.7	278°05.4	-13°34.8	Gacrux	171°53.0	-57°14.4					
8	263°06.0	270°32.0	-4°34.0	191°18.9	24°59.2	254°51.0	2°18.9	293°07.6	-13°34.7	Alioth	166°14.0	55°49.8					
9	278°08.5	285°31.7	-4°32.7	206°20.5	24°59.3	269°53.0	2°19.1	308°09.8	-13°34.6	Spica	158°23.8	-11°16.9					
10	293°10.9	300°31.3	-4°31.4	221°22.1	24°59.4	284°55.0	2°19.3	323°11.9	-13°34.5	Alcaid	152°53.0	49°11.6					
11	308°13.4	315°31.0	-4°30.2	236°23.7	24°59.4	299°57.0	2°19.6	338°14.1	-13°34.4	Hadar	148°38.0	-60°28.8					
12	323°15.9	330°30.6	-4°28.9	251°25.3	24°59.5	314°59.0	2°19.8	353°16.3	-13°34.3	Menkent	147°59.4	-36°28.9					
13	338°18.3	345°30.2	-4°27.6	266°26.9	24°59.6	330°01.0	2°20.0	8°18.4	-13°34.2	Arcturus	145°49.1	19°03.8					
14	353°20.8	0°29.9	-4°26.3	281°28.5	24°59.6	345°03.0	2°20.2	23°20.6	-13°34.1	Rigel Kent.	139°42.4	-60°55.6					
15	8°23.3	15°29.5	-4°25.0	296°30.2	24°59.7	0°05.0	2°20.4	38°22.8	-13°34.0	Zubenelg.	136°57.7	-16°08.2					
16	23°25.7	30°29.2	-4°23.7	311°31.8	24°59.8	15°07.0	2°20.6	53°25.0	-13°33.9	Kochab	137°19.6	74°03.3					
17	38°28.2	45°28.8	-4°22.4	326°33.4	24°59.8	30°08.9	2°20.8	68°27.1	-13°33.8	Alphecca	126°05.1	26°38.0					
18	53°30.7	60°28.5	-4°21.2	341°35.0	24°59.9	45°10.9	2°21.0	83°29.3	-13°33.7	Antares	112°17.9	-26°28.9					
19	68°33.1	75°28.1	-4°19.9	356°36.6	24°60.0	60°12.9	2°21.2	98°31.5	-13°33.6	Atria	107°13.7	-69°03.9					
20	83°35.6	90°27.8	-4°18.6	11°38.2	25°00.1	75°14.9	2°21.4	113°33.6	-13°33.5	Sabik	102°04.7	-15°45.2					
21	98°38.1	105°27.4	-4°17.3	26°39.8	25°00.1	90°16.9	2°21.6	128°35.8	-13°33.4	Shaula	96°12.7	-37°07.1					
22	113°40.5	120°27.1	-4°16.0	41°41.4	25°00.2	105°18.9	2°21.9	143°38.0	-13°33.3	Rasalhague	96°00.2	12°32.4					
23	128°43.0	135°26.7	-4°14.7	56°43.0	25°00.3	120°20.9	2°22.1	158°40.2	-13°33.2	Etamin	90°43.2	51°28.8					
Mer.pass.:14:26			v-0.4 d1.3 m-3.8			v1.6 d0.1 m0.1			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	143°45.4	150°26.4	-4°13.4	71°44.6	25°00.3	135°22.9	2°22.3	173°42.3	-13°33.1	2023/2/1	SHA	Mer.pass					
1	158°47.9	165°26.0	-4°12.2	86°46.2	25°00.4	150°24.9	2°22.5	188°44.5	-13°33.0	Venus	8°56.3	13:57					
2	173°50.4	180°25.7	-4°10.9	101°47.8	25°00.5	165°26.9	2°22.7	203°46.7	-13°32.9	Mars	288°39.6	19:16					
3	188°52.8	195°25.3	-4°09.6	116°49.4	25°00.5	180°28.8	2°22.9	218°48.8	-13°32.7	Jupiter	352°00.0	15:03					
4	203°55.3	210°25.0	-4°08.3	131°51.0	25°00.6	195°30.8	2°23.1	233°51.0	-13°32.6	Saturn	30°10.9	12:30					
5	218°57.8	225°24.6	-4°07.0	146°52.6	25°00.7	210°32.8	2°23.3	248°53.2	-13°32.5								
6	234°00.2	240°24.3	-4°05.7	161°54.2	25°00.7	225°34.8	2°23.5	263°55.4	-13°32.4								
7	249°02.7	255°23.9	-4°04.4	176°55.8	25°00.8	240°36.8	2°23.7	278°57.5	-13°32.3								
8	264°05.2	270°23.6	-4°03.1	191°57.4	25°00.9	255°38.8	2°24.0	293°59.7	-13°32.2	2023/2/1	SHA	Mer.pass					
9	279°07.6	285°23.2	-4°01.9	206°59.0	25°01.0	270°40.8	2°24.2	309°01.9	-13°32.1	Venus	7°48.5	13:58					
10	294°10.1	300°22.9	-4°00.6	222°00.6	25°01.0	285°42.8	2°24.4	324°04.0	-13°32.0	Mars	288°19.6	19:14					
11	309°12.6	315°22.5	-3°59.3	237°02.2	25°01.1	300°44.8	2°24.6	33									

Sun				Moon												
Sun	GHA	Dec		GHA	ν	Dec	d	HP		Twilight				Twilight		
0	176°27.5	-13°51.2		290°59.0	13.7	-12°08.3	-13.6	56.5	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	191°27.5	-13°50.4		305°31.7	13.6	-12°21.8	-13.5	56.5	72	06:24	07:45	09:07	15:23	16:45	18:06	
2	206°27.5	-13°49.6		320°04.3	13.5	-12°35.4	-13.5	56.5	70	06:21	07:34	08:45	15:45	16:56	18:09	
3	221°27.5	-13°48.8		334°36.8	13.5	-12°48.8	-13.5	56.6	68	06:19	07:25	08:28	16:02	17:05	18:11	
4	236°27.5	-13°47.9		349°09.2	13.4	-13°02.3	-13.4	56.6	66	06:17	07:17	08:14	16:16	17:12	18:13	
5	251°27.5	-13°47.1		3°41.5	13.3	-13°15.7	-13.4	56.6	64	06:15	07:11	08:02	16:27	17:19	18:15	
6	266°27.5	-13°46.3		18°13.7	13.2	-13°29.0	-13.3	56.6	62	06:13	07:05	07:53	16:37	17:24	18:17	
7	281°27.5	-13°45.4		32°45.9	13.1	-13°42.3	-13.3	56.7	60	06:11	06:60	07:44	16:45	17:29	18:18	
8	296°27.5	-13°44.6		47°18.0	13.0	-13°55.5	-13.2	56.7	58	06:09	06:55	07:37	16:52	17:34	18:20	
9	311°27.5	-13°43.8		61°49.9	12.9	-14°08.7	-13.2	56.7	56	06:08	06:51	07:30	16:59	17:38	18:22	
10	326°27.5	-13°43.0		76°21.8	12.8	-14°21.9	-13.1	56.8	54	06:06	06:48	07:25	17:04	17:41	18:23	
11	341°27.5	-13°42.1		90°53.6	12.8	-14°35.0	-13.1	56.8	52	06:05	06:44	07:19	17:10	17:45	18:25	
12	356°27.5	-13°41.3		105°25.3	12.7	-14°48.0	-13.0	56.8	50	06:03	06:41	07:15	17:14	17:48	18:26	
13	11°27.5	-13°40.5		119°57.0	12.6	-15°01.0	-13.0	56.9	45	05:60	06:34	07:04	17:25	17:55	18:29	
14	26°27.5	-13°39.6		134°28.5	12.5	-15°13.9	-12.9	56.9	40	05:56	06:28	06:56	17:33	18:01	18:33	
15	41°27.5	-13°38.8		148°59.9	12.4	-15°26.8	-12.8	56.9	35	05:53	06:22	06:48	17:40	18:06	18:36	
16	56°27.5	-13°38.0		163°31.2	12.3	-15°39.6	-12.8	56.9	30	05:49	06:17	06:42	17:47	18:11	18:40	
17	71°27.6	-13°37.1		178°02.5	12.2	-15°52.4	-12.7	57.0	20	05:42	06:08	06:30	17:58	18:21	18:47	
18	86°27.6	-13°36.3		192°33.6	12.1	-16°05.1	-12.7	57.0	10	05:34	05:59	06:20	18:08	18:30	18:55	
19	101°27.6	-13°35.5		207°04.6	12.0	-16°17.7	-12.6	57.0	0	05:25	05:49	06:11	18:18	18:39	19:03	
20	116°27.6	-13°34.6		221°35.5	11.9	-16°30.3	-12.5	57.1	-10	05:14	05:39	06:01	18:27	18:49	19:14	
21	131°27.6	-13°33.8		236°06.4	11.8	-16°42.8	-12.5	57.1	-20	05:01	05:28	05:51	18:37	19:00	19:27	
22	146°27.6	-13°33.0		250°37.1	11.7	-16°55.2	-12.4	57.1	-30	04:44	05:13	05:38	18:49	19:14	19:44	
23	161°27.6	-13°32.1		265°07.7	11.6	-17°07.6	-12.3	57.2	-35	04:33	05:05	05:31	18:56	19:23	19:55	
	SD.=16.2	d=0.8		S.D.=15.4					-40	04:19	04:54	05:23	19:04	19:33	20:08	
									-45	04:03	04:42	05:14	19:14	19:45	20:24	
									-50	03:41	04:27	05:02	19:25	20:00	20:45	
									-52	03:31	04:19	04:57	19:30	20:08	20:56	
									-54	03:19	04:11	04:51	19:36	20:16	21:08	
									-56	03:04	04:01	04:44	19:42	20:25	21:22	
									-58	02:47	03:51	04:37	19:50	20:36	21:39	
									-60	02:24	03:38	04:29	19:58	20:48	22:00	
								</								

February 15, 16 ,17 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	144°44.6	150°18.0	-3°42.5	72°22.8	25°02.0	136°10.6	2°27.3	174°34.4	-13°30.6	Alpheratz	357°36.7	29°13.1					
1	159°47.1	165°17.7	-3°41.2	87°24.4	25°02.1	151°12.6	2°27.5	189°36.6	-13°30.5	Ankaa	353°09.0	-42°11.1					
2	174°49.5	180°17.3	-3°39.9	102°26.0	25°02.1	166°14.6	2°27.7	204°38.8	-13°30.4	Schedar	349°33.2	56°39.9					
3	189°52.0	195°17.0	-3°38.6	117°27.6	25°02.2	181°16.6	2°28.0	219°41.0	-13°30.3	Diphda	348°49.0	-17°51.8					
4	204°54.4	210°16.7	-3°37.3	132°29.2	25°02.3	196°18.5	2°28.2	234°43.1	-13°30.2	Achernar	335°21.6	-57°07.5					
5	219°56.9	225°16.3	-3°36.0	147°30.8	25°02.3	211°20.5	2°28.4	249°45.3	-13°30.1	Hamal	327°53.1	23°34.3					
6	234°59.4	240°16.0	-3°34.8	162°32.3	25°02.4	226°22.5	2°28.6	264°47.5	-13°30.0	Polaris	314°51.8	89°22.0					
7	250°01.8	255°15.6	-3°33.5	177°33.9	25°02.5	241°24.5	2°28.8	279°49.6	-13°29.9	Akamar	315°13.0	-40°13.0					
8	265°04.3	270°15.3	-3°32.2	192°35.5	25°02.5	256°26.5	2°29.0	294°51.8	-13°29.8	Menkar	314°07.8	4°10.7					
9	280°06.8	285°14.9	-3°30.9	207°37.1	25°02.6	271°28.5	2°29.2	309°54.0	-13°29.7	Mirfak	308°30.5	49°56.7					
10	295°09.2	300°14.6	-3°29.6	222°38.7	25°02.7	286°30.5	2°29.4	324°56.2	-13°29.6	Aldebaran	290°41.3	16°33.3					
11	310°11.7	315°14.3	-3°28.3	237°40.2	25°02.7	301°32.4	2°29.6	339°58.3	-13°29.5	Rigel	281°05.2	-8°10.6					
12	325°14.2	330°13.9	-3°27.0	252°41.8	25°02.8	316°34.4	2°29.8	355°00.5	-13°29.4	Capella	280°24.0	46°01.4					
13	340°16.6	345°13.6	-3°25.7	267°43.4	25°02.9	331°36.4	2°30.1	10°02.7	-13°29.3	Bellatrix	278°24.4	6°22.2					
14	355°19.1	0°13.2	-3°24.4	282°45.0	25°03.0	346°38.4	2°30.3	25°04.8	-13°29.2	Elnath	278°03.7	28°37.7					
15	10°21.5	15°12.9	-3°23.1	297°46.5	25°03.0	1°40.4	2°30.5	40°07.0	-13°29.1	Alnilam	275°39.2	-1°11.3					
16	25°24.0	30°12.5	-3°21.8	312°48.1	25°03.1	16°42.4	2°30.7	55°09.2	-13°29.0	Betelgeuse	270°53.6	7°24.6					
17	40°26.5	45°12.2	-3°20.5	327°49.7	25°03.2	31°44.4	2°30.9	70°11.4	-13°28.9	Canopus	263°52.7	-52°42.7					
18	55°28.9	60°11.9	-3°19.2	342°51.2	25°03.2	46°46.3	2°31.1	85°13.5	-13°28.8	Sirius	258°27.3	-16°44.8					
19	70°31.4	75°11.5	-3°17.9	357°52.8	25°03.3	61°48.3	2°31.3	100°15.7	-13°28.7	Adara	255°06.8	-29°00.4					
20	85°33.9	90°11.2	-3°16.6	12°54.4	25°03.4	76°50.3	2°31.5	115°17.9	-13°28.6	Procyon	244°52.1	5°10.0					
21	100°36.3	105°10.8	-3°15.3	27°55.9	25°03.4	91°52.3	2°31.8	130°20.0	-13°28.5	Pollux	243°18.8	27°58.2					
22	115°38.8	120°10.5	-3°14.1	42°57.5	25°03.5	106°54.3	2°32.0	145°22.2	-13°28.4	Avior	234°14.8	-59°35.1					
23	130°41.3	135°10.2	-3°12.8	57°59.1	25°03.6	121°56.3	2°32.2	160°24.4	-13°28.3	Suhail	222°47.0	-43°31.6					
Mer.pass.:14:18			v-0.3 d1.3 m-3.8			v1.6 d0.1 m0.1			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	145°43.7	150°09.8	-3°11.5	73°00.7	25°03.6	136°58.2	2°32.4	175°26.6	-13°28.2	Dubhe	193°42.3	61°37.5						
1	160°46.2	165°09.5	-3°10.2	88°02.2	25°03.7	152°00.2	2°32.6	190°28.7	-13°28.0	Denebola	182°26.2	14°26.5						
2	175°48.7	180°09.1	-3°08.9	103°03.8	25°03.8	167°02.2	2°32.8	205°30.9	-13°27.9	Gienah	175°44.9	-17°40.2						
3	190°51.1	195°08.8	-3°07.6	118°05.3	25°03.9	182°04.2	2°33.0	220°33.1	-13°27.8	Acrux	173°01.3	-63°13.4						
4	205°53.6	210°08.5	-3°06.3	133°06.9	25°03.9	197°06.2	2°33.2	235°35.2	-13°27.7	Gacrux	171°53.0	-57°14.4						
5	220°56.0	225°08.1	-3°05.0	148°08.5	25°04.0	212°08.2	2°33.4	250°37.4	-13°27.6	Alioth	166°14.0	55°49.8						
6	235°58.5	240°07.8	-3°03.7	163°10.0	25°04.1	227°10.1	2°33.7	265°39.6	-13°27.5	Spica	158°23.8	-11°16.9						
7	251°01.0	255°07.4	-3°02.4	178°11.6	25°04.1	242°12.1	2°33.9	280°41.8	-13°27.4	Alcaid	152°53.0	49°11.6						
8	266°03.4	270°07.1	-3°01.1	193°13.2	25°04.2	257°14.1	2°34.1	295°43.9	-13°27.3	Hadar	148°38.0	-60°28.8						
9	281°05.9	285°06.8	-2°59.8	208°14.7	25°04.3	272°16.1	2°34.3	310°46.1	-13°27.2	Menkent	147°59.3	-36°28.9						
10	296°08.4	300°06.4	-2°58.5	223°16.3	25°04.3	287°18.1	2°34.5	325°48.3	-13°27.1	Arcturus	145°49.1	19°03.8						
11	311°10.8	315°06.1	-2°57.2	238°17.8	25°04.4	302°20.1	2°34.7	340°50.4	-13°27.0	Rigel Kent.	139°42.3	-60°55.6						
12	326°13.3	330°05.8	-2°55.9	253°19.4	25°04.5	317°22.0	2°34.9	355°52.6	-13°26.9	Zubenelg.	136°57.7	-16°08.3						
13	341°15.8	345°05.4	-2°54.6	268°20.9	25°04.5	332°24.0	2°35.1	10°54.8	-13°26.8	Kochab	137°19.5	74°03.3						
14	356°18.2	0°05.1	-2°53.3	283°22.5	25°04.6	347°26.0	2°35.4	25°57.0	-13°26.7	Alphecca	126°05.1	26°38.0						
15	11°20.7	15°04.7	-2°52.0	298°24.1	25°04.7	2°28.0	2°35.6	40°59.1	-13°26.6	Antares	112°17.8	-26°28.9						
16	26°23.2	30°04.4	-2°50.7	313°25.6	25°04.7	17°30.0	2°35.8	56°01.3	-13°26.5	Atria	107°13.7	-69°03.9						
17	41°25.6	45°04.1	-2°49.4	328°27.2	25°04.8	32°31.9	2°36.0	71°03.5	-13°26.4	Sabik	102°04.7	-15°45.2						
18	56°28.1	60°03.7	-2°48.1	343°28.7	25°04.9	47°33.9	2°36.2	86°05.6	-13°26.3	Shaula	96°12.7	-37°07.1						
19	71°30.5	75°03.4	-2°46.8	358°30.3	25°05.0	62°35.9	2°36.4	101°07.8	-13°26.2	Rasalhague	96°00.2	12°32.4						
20	86°33.0	90°03.1	-2°45.5	13°31.8	25°05.0	77°37.9	2°36.6	116°10.0	-13°26.1	Etamin	90°43.2	51°28.8						
21	101°35.5	105°02.7	-2°44.2	28°33.4	25°05.1	92°39.9	2°36.8	131°12.2	-13°26.0	Kaus Aust.	83°34.8	-34°22.4						
22	116°37.9	120°02.4	-2°42.9	43°34.9	25°05.2	107°41.9	2°37.1	146°14.3	-13°25.9	Vega	80°34.6	38°48.0						
23	131°40.4	135°02.1	-2°41.6	58°36.5	25°05.2	122°43.8	2°37.3	161°16.5	-13°25.8	Nunki	75°50.0	-26°16.1						
Mer.pass.:14:14			v-0.3 d1.3 m-3.8			v1.6 d0.1 m0.1			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8						

Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	146°42.9	150°01.7	-2°40.3	73°38.0	25°05.3	137°45.8	2°37.5	176°18.7	-13°25.7									
1	161°45.3	165°01.4	-2°39.0	88°39.6	25°05.4	152°47.8	2°37.7	191°20.8	-13°25.6									
2	176°47.8	180°01.0	-2°37.7	103°41.1	25°05.4	167°49.8	2°37.9	206°23.0	-13°25.5									
3	191°50.3	195°00.7	-2°36.4	118°42.7	25°05.5	182°51.8	2°38.1	221°25.2	-13°25.4									
4	206°52.7	210°00.4	-2°35.1	133°44.2	25°05.6	197°53.7	2°38.3	236°27.4	-13°25.3									
5	221°55.2	225°00.0	-2°33.8	148°45.8	25°05.6	212°55.7	2°38.5	251°29.5	-13°25.2									
6	236°57.7	239°59.7	-2°32.5	163°47.3	25°05.7	227°57.7	2°38.8	266°31.7	-13°25.1									
7	252°00.1	254°59.4	-2°31.2	178°48.8	25°05.8	242°59.7	2°39.0	281°33.9	-13°25.0									
8	267°02.6	269°59.0	-2°29.9	193°50.4	25°05.8	258°01.7	2°39.2	296°36.0	-13									

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	176°28.5	-12°50.7	253°44.5	5.7	-25°17.2	-7.0	58.8
1	191°28.5	-12°49.8	268°09.1	5.6	-25°24.1	-6.8	58.9
2	206°28.5	-12°49.0	282°33.7	5.5	-25°30.8	-6.7	58.9
3	221°28.6	-12°48.1	296°58.1	5.3	-25°37.4	-6.5	58.9
4	236°28.6	-12°47.3	311°22.3	5.2	-25°43.8	-6.4	59.0
5	251°28.6	-12°46.4	325°46.5	5.1	-25°50.1	-6.2	59.0
6	266°28.6	-12°45.6	340°10.6	5.0	-25°56.2	-6.0	59.1
7	281°28.7	-12°44.7	354°34.5	4.9	-26°02.2	-5.9	59.1
8	296°28.7	-12°43.8	8°58.3	4.8	-26°08.0	-5.7	59.1
9	311°28.7	-12°43.0	23°22.0	4.7	-26°13.6	-5.5	59.2
10	326°28.8	-12°42.1	37°45.6	4.6	-26°19.0	-5.4	59.2
11	341°28.8	-12°41.3	52°09.1	4.4	-26°24.3	-5.2	59.2
12	356°28.8	-12°40.4	66°32.5	4.3	-26°29.4	-5.0	59.3
13	11°28.8	-12°39.5	80°55.8	4.2	-26°34.4	-4.9	59.3
14	26°28.9	-12°38.7	95°19.0	4.1	-26°39.1	-4.7	59.3
15	41°28.9	-12°37.8	109°42.1	4.0	-26°43.7	-4.5	59.4
16	56°28.9	-12°37.0	124°05.1	3.9	-26°48.1	-4.3	59.4
17	71°29.0	-12°36.1	138°28.0	3.8	-26°52.4	-4.2	59.4
18	86°29.0	-12°35.2	152°50.8	3.7	-26°56.4	-4.0	59.5
19	101°29.0	-12°34.4	167°13.5	3.7	-27°00.3	-3.8	59.5
20	116°29.1	-12°33.5	181°36.1	3.6	-27°04.0	-3.6	59.5
21	131°29.1	-12°32.7	195°58.6	3.5	-27°07.5	-3.4	59.6
22	146°29.1	-12°31.8	210°21.0	3.4	-27°10.9	-3.2	59.6
23	161°29.2	-12°30.9	224°43.4	3.3	-27°14.0	-3.0	59.6
SD.=16.2		d=0.9	S.D.=16.1				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	176°29.2	-12°30.1	239°05.6	3.2	-27°17.0	-2.9	59.7
1	191°29.2	-12°29.2	253°27.8	3.1	-27°19.7	-2.7	59.7
2	206°29.3	-12°28.3	267°49.9	3.1	-27°22.3	-2.5	59.7
3	221°29.3	-12°27.5	282°11.9	3.0	-27°24.7	-2.3	59.8
4	236°29.3	-12°26.6	296°33.9	2.9	-27°26.9	-2.1	59.8
5	251°29.4	-12°25.7	310°55.8	2.8	-27°28.9	-1.9	59.8
6	266°29.4	-12°24.9	325°17.6	2.8	-27°30.7	-1.7	59.9
7	281°29.4	-12°24.0	339°39.3	2.7	-27°32.3	-1.5	59.9
8	296°29.5	-12°23.2	354°01.0	2.6	-27°33.7	-1.3	59.9
9	311°29.5	-12°22.3	8°22.6	2.6	-27°34.9	-1.1	59.9
10	326°29.5	-12°21.4	22°44.2	2.5	-27°35.9	-0.9	60.0
11	341°29.6	-12°20.6	37°05.7	2.5	-27°36.8	-0.7	60.0
12	356°29.6	-12°19.7	51°27.1	2.4	-27°37.4	-0.5	60.0
13	11°29.6	-12°18.8	65°48.5	2.4	-27°37.8	-0.3	60.1
14	26°29.7	-12°18.0	80°09.9	2.3	-27°38.0	-0.1	60.1
15	41°29.7	-12°17.1	94°31.2	2.3	-27°38.0	0.1	60.1
16	56°29.8	-12°16.2	108°52.5	2.2	-27°37.8	0.3	60.2
17	71°29.8	-12°15.3	123°13.7	2.2	-27°37.4	0.5	60.2
18	86°29.8	-12°14.5	137°34.9	2.2	-27°36.8	0.7	60.2
19	101°29.9	-12°13.6	151°56.0	2.1	-27°36.0	0.9	60.2
20	116°29.9	-12°12.7	166°17.2	2.1	-27°35.0	1.1	60.3
21	131°30.0	-12°11.9	180°38.3	2.1	-27°33.8	1.3	60.3
22	146°30.0	-12°11.0	194°59.3	2.1	-27°32.4	1.5	60.3
23	161°30.0	-12°10.1	209°20.4	2.0	-27°30.7	1.7	60.3
SD.=16.2		d=0.9	S.D.=16.3				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°30.1	-12°09.3	223°41.4	2.0	-27°28.9	1.9	60.4
1	191°30.1	-12°08.4	238°02.5	2.0	-27°26.9	2.1	60.4
2	206°30.2	-12°07.5	252°23.5	2.0	-27°24.6	2.4	60.4
3	221°30.2	-12°06.6	266°44.5	2.0	-27°22.2	2.6	60.5
4	236°30.2	-12°05.8	281°05.5	2.0	-27°19.5	2.8	60.5
5	251°30.3	-12°04.9	295°26.4	2.0	-27°16.6	3.0	60.5
6	266°30.3	-12°04.0	309°47.4	2.0	-27°13.6	3.2	60.5
7	281°30.4	-12°03.1	324°08.4	2.0	-27°10.3	3.4	60.6
8	296°30.4	-12°02.3	338°29.4	2.0	-27°06.8	3.6	60.6
9	311°30.4	-12°01.4	352°50.4	2.0	-27°03.1	3.8	60.6
10	326°30.5	-12°00.5	7°11.5	2.0	-26°59.2	4.0	60.6
11	341°30.5	-11°59.6	21°32.5	2.0	-26°55.1	4.2	60.6
12	356°30.6	-11°58.8	35°53.5	2.1	-26°50.8	4.4	60.7
13	11°30.6	-11°57.9	50°14.6	2.1	-26°46.3	4.6	60.7
14	26°30.7	-11°57.0	64°35.7	2.1	-26°41.6	4.8	60.7
15	41°30.7	-11°56.1	78°56.8	2.1	-26°36.6	5.0	60.7
16	56°30.8	-11°55.3	93°18.0	2.2	-26°31.5	5.2	60.8
17	71°30.8	-11°54.4	107°39.2	2.2	-26°26.2	5.4	60.8
18	86°30.8	-11°53.5	122°00.4	2.2	-26°20.6	5.6	60.8
19	101°30.9	-11°52.6	136°21.6	2.3	-26°14.9	5.8	60.8
20	116°30.9	-11°51.8	150°42.9	2.3	-26°09.0	6.0	60.8
21	131°31.0	-11°50.9	165°04.3	2.4	-26°02.8	6.2	60.9
22	146°31.0	-11°50.0	179°25.6	2.4	-25°56.5	6.4	60.9
23	161°31.1	-11°49.1	193°47.1	2.5	-25°50.0	6.6	60.9
SD.=16.2		d=0.9	S.D.=16.5				
Twilight		Twilight		Twilight		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	06:11	07:31	08:49	15:40	16:59	18:19	
70	06:10	07:22	08:30	15:59	17:08	18:20	
68	06:09	07:14	08:15	16:14	17:16	18:21	
66	06:07	07:07	08:03	16:27	17:22	18:22	
64	06:06	07:02	07:52	16:37	17:28	18:23	
62	06:05	06:57	07:44	16:45	17:32	18:24	
60	06:04	06:52	07:36	16:53	17:37	18:25	
58	06:03	06:49	07:30	16:59	17:41	18:26	
56	06:02	06:45	07:24	17:05	17:44	18:28	
54	06:00	06:42	07:18	17:11	17:47	18:29	
52	05:59	06:39	07:14	17:15	17:50	18:30	
50	05:58	06:36	07:09	17:20	17:53	18:31	
45	05:55	06:30	06:50	17:29	17:59	18:33	
40	05:53	06:24	06:52	17:37	18:04	18:36	
35	05:50	06:19	06:45	17:43	18:09	18:39	
30	05:47	06:15	06:39	17:49	18:14	18:42	
20	05:40	06:06	06:29	17:60	18:22	18:48	
10	05:33	05:58	06:19	18:09	18:30	18:55	
0	05:25	05:49	06:11	18:17	18:39	19:03	
-10	05:15	05:40	06:02	18:26	18:48	19:13	
-20	05:03	05:29	05:52	18:36	18:58	19:25	
-30	04:46	05:16	05:41	18:47	19:12	19:41	
-35	04:36	05:08	05:34	18:53	19:20	19:51	
-40	04:24	04:58	05:27	19:00	19:29	20:03	
-45	04:08	04:47	05:18	19:09	19:40	20:19	
-50	03:48	04:32	05:08	19:19	19:54	20:38	
-52	03:38	04:26	05:03	19:24	20:01	20:48	
-54	03:27	04:18	04:57	19:29	20:09	20:59	
-56	03:14	04:09	04:51	19:35	20:17	21:12	
-58	02:58	03:59	04:44	19:42	20:27	21:27	
-60	02:38	03:48	04:37	19:50	20:38	21:46	
Moonrise		Moonset		Moonset		Moonset	
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	—:—	—:—	—:—	—:—	
64	—:—	—:—	—:—	—:—	—:—	—:—	
62	05:46	07:48	08:30	08:51	09:00	10:35	
60	05:08	06:42	07:39	09:30	10:06	11:26	
58	04:41	06:07	07:07	09:58	10:41	11:57	
56	04:20	05:42	06:43	10:19	11:06	12:21	
54	04:02	05:22	06:24	10:37	11:27	12:40	
52	03:48	05:05	06:07	10:52	11:44	12:56	
50	03:35	04:50	05:53	11:05	11:58	13:10	
45	03:08	04:21	05:25	11:32	12:28	13:39	
40	02:47	03:58	05:02	11:54	12:51	14:01	
35	02:30	03:39	04:43	12:12	13:10	14:19	
30	02:15	03:23	04:27	12:27	13:27	14:35	
20	01:50	02:55	03:60	12:53	13:54	15:01	
10	01:28	02:32	03:36	13:16	14:18	15:24	
0	01:08	02:10	03:14	13:37	14:40	15:45	
-10	00:48	01:48	02:53	13:58	15:02	16:06	
-20	00:27	01:25	02:29	14:21	15:26	16:29	
-30	00:03	00:57	02:02	14:47	15:54	16:55	
-35	—:—	00:41	01:46	15:03	16:10	17:10	
-40	—:—	00:23	01:27	15:21	16:29	17:28	
-45	—:—	00:01	01:04	15:43	16:52	17:49	
-50	23:32	—:—	00:35	16:11	17:21	18:16	
-52	23:18	—:—	00:21	16:25	17:35	18:29	
-54	23:02	—:—	00:04	16:40	17:52	18:43	
-56	22:44	23:45	—:—	16:59	18:12	19:01	
-58	22:20	23:20	—:—	17:22	18:36	19:21	
-60	21:50	22:48	—:—	17:52	19:09	19:47	
Sun		Moon		Moon		Moon	
Day	Eqn.of Time	Mer.	Mer.	Mer.	Mer.	Age	
	00 ^h	12 ^h	Pass	Upper	Lower		
15	14:06	14:05	12:14	07:22	19:53	25(30%)	
16	14:03	14:02	12:14	08:25	20:57	26(20%)	
17	14:00	13:58	12:13	09:29	22:02	27(12%)	

February 18, 19 ,20 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	147°42.0	149°53.7	-2°09.1	74°15.0	25°06.9	138°33.3	2°42.6	177°10.8	-13°23.2	Alpheratz	357°36.7	29°13.0					
1	162°44.5	164°53.4	-2°07.8	89°16.5	25°07.0	153°35.3	2°42.8	192°13.0	-13°23.1	Ankaa	353°09.0	-42°11.1					
2	177°46.9	179°53.1	-2°06.5	104°18.0	25°07.1	168°37.3	2°43.0	207°15.1	-13°23.0	Schedar	349°33.2	56°39.9					
3	192°49.4	194°52.7	-2°05.2	119°19.6	25°07.2	183°39.3	2°43.2	222°17.3	-13°22.9	Diphda	348°49.0	-17°51.8					
4	207°51.9	209°52.4	-2°03.9	134°21.1	25°07.2	198°41.2	2°43.5	237°19.5	-13°22.8	Achernar	335°21.7	-57°07.5					
5	222°54.3	224°52.1	-2°02.6	149°22.6	25°07.3	213°43.2	2°43.7	252°21.6	-13°22.7	Hamal	327°53.1	23°34.3					
6	237°56.8	239°51.7	-2°01.3	164°24.2	25°07.4	228°45.2	2°43.9	267°23.8	-13°22.6	Polaris	314°53.1	89°22.0					
7	252°59.3	254°51.4	-2°00.0	179°25.7	25°07.4	243°47.2	2°44.1	282°26.0	-13°22.5	Akamar	315°13.0	-40°13.0					
8	268°01.7	269°51.1	-1°58.7	194°27.2	25°07.5	258°49.1	2°44.3	297°28.2	-13°22.4	Menkar	314°07.8	4°10.7					
9	283°04.2	284°50.7	-1°57.4	209°28.7	25°07.6	273°51.1	2°44.5	312°30.3	-13°22.3	Mirfak	308°30.5	49°56.7					
10	298°06.7	299°50.4	-1°56.1	224°30.3	25°07.6	288°53.1	2°44.7	327°32.5	-13°22.2	Aldebaran	290°41.3	16°33.3					
11	313°09.1	314°50.1	-1°54.8	239°31.8	25°07.7	303°55.1	2°44.9	342°34.7	-13°22.1	Rigel	281°05.2	-8°10.6					
12	328°11.6	329°49.8	-1°53.5	254°33.3	25°07.8	318°57.0	2°45.2	357°36.8	-13°22.0	Capella	280°24.0	46°01.5					
13	343°14.0	344°49.4	-1°52.2	269°34.8	25°07.8	333°59.0	2°45.4	12°39.0	-13°21.9	Bellatrix	278°24.4	6°22.2					
14	358°16.5	359°49.1	-1°50.9	284°36.3	25°07.9	349°01.0	2°45.6	27°41.2	-13°21.8	Elnath	278°03.7	28°37.7					
15	13°19.0	14°48.8	-1°49.6	299°37.9	25°08.0	4°03.0	2°45.8	42°43.4	-13°21.7	Alnilam	275°39.2	-1°11.3					
16	28°21.4	29°48.4	-1°48.3	314°39.4	25°08.0	19°05.0	2°46.0	57°45.5	-13°21.6	Betelgeuse	270°53.6	7°24.6					
17	43°23.9	44°48.1	-1°47.0	329°40.9	25°08.1	34°06.9	2°46.2	72°47.7	-13°21.5	Canopus	263°52.8	-52°42.7					
18	58°26.4	59°47.8	-1°45.7	344°42.4	25°08.2	49°08.9	2°46.4	87°49.9	-13°21.4	Sirius	258°27.3	-16°44.8					
19	73°28.8	74°47.5	-1°44.4	359°43.9	25°08.2	64°10.9	2°46.7	102°52.0	-13°21.3	Adara	255°06.8	-29°00.4					
20	88°31.3	89°47.1	-1°43.1	14°45.5	25°08.3	79°12.9	2°46.9	117°54.2	-13°21.2	Procyon	244°52.1	5°10.0					
21	103°33.8	104°46.8	-1°41.8	29°47.0	25°08.4	94°14.8	2°47.1	132°56.4	-13°21.1	Pollux	243°18.8	27°58.2					
22	118°36.2	119°46.5	-1°40.5	44°48.5	25°08.4	109°16.8	2°47.3	147°58.6	-13°21.0	Avior	234°14.8	-59°35.1					
23	133°38.7	134°46.2	-1°39.2	59°50.0	25°08.5	124°18.8	2°47.5	163°00.7	-13°20.9	Suhail	222°47.0	-43°31.6					
Mer.pass.:14:06			v-0.3 d1.3 m-3.8			v1.5 d0.1 m0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	148°41.1	149°45.8	-1°37.9	74°51.5	25°08.6	139°20.8	2°47.7	178°02.9	-13°20.8								
1	163°43.6	164°45.5	-1°36.6	89°53.0	25°08.6	154°22.7	2°48.0	193°05.1	-13°20.7								
2	178°46.1	179°45.2	-1°35.3	104°54.5	25°08.7	169°24.7	2°48.2	208°07.2	-13°20.6								
3	193°48.5	194°44.8	-1°34.0	119°56.1	25°08.8	184°26.7	2°48.4	223°09.4	-13°20.5								
4	208°51.0	209°44.5	-1°32.6	134°57.6	25°08.9	199°28.7	2°48.6	238°11.6	-13°20.4								
5	223°53.5	224°44.2	-1°31.3	149°59.1	25°08.9	214°30.6	2°48.8	253°13.8	-13°20.3								
6	238°55.9	239°43.9	-1°30.0	165°00.6	25°09.0	229°32.6	2°49.0	268°15.9	-13°20.2								
7	253°58.4	254°43.5	-1°28.7	180°02.1	25°09.1	244°34.6	2°49.2	283°18.1	-13°20.1								
8	269°00.9	269°43.2	-1°27.4	195°03.6	25°09.1	259°36.5	2°49.5	298°20.3	-13°20.0								
9	284°03.3	284°42.9	-1°26.1	210°05.1	25°09.2	274°38.5	2°49.7	313°22.4	-13°19.9								
10	299°05.8	299°42.6	-1°24.8	225°06.6	25°09.3	289°40.5	2°49.9	328°24.6	-13°19.8								
11	314°08.3	314°42.2	-1°23.5	240°08.1	25°09.3	304°42.5	2°50.1	343°26.8	-13°19.7								
12	329°10.7	329°41.9	-1°22.2	255°09.6	25°09.4	319°44.4	2°50.3	358°29.0	-13°19.6								
13	344°13.2	344°41.6	-1°20.9	270°11.1	25°09.5	334°46.4	2°50.5	13°31.1	-13°19.5								
14	359°15.6	359°41.3	-1°19.6	285°12.6	25°09.5	349°48.4	2°50.7	28°33.3	-13°19.4								
15	14°18.1	14°40.9	-1°18.3	300°14.1	25°09.6	4°50.4	2°51.0	43°35.5	-13°19.3								
16	29°20.6	29°40.6	-1°17.0	315°15.7	25°09.7	19°52.3	2°51.2	58°37.6	-13°19.1								
17	44°23.0	44°40.3	-1°15.7	330°17.2	25°09.7	34°54.3	2°51.4	73°39.8	-13°19.0								
18	59°25.5	59°40.0	-1°14.4	345°18.7	25°09.8	49°56.3	2°51.6	88°42.0	-13°18.9								
19	74°28.0	74°39.6	-1°13.1	0°20.2	25°09.9	64°58.3	2°51.8	103°44.2	-13°18.8								
20	89°30.4	89°39.3	-1°11.8	15°21.7	25°09.9	80°00.2	2°52.0	118°46.3	-13°18.7								
21	104°32.9	104°39.0	-1°10.5	30°23.2	25°10.0	95°02.2	2°52.3	133°48.5	-13°18.6								
22	119°35.4	119°38.7	-1°09.2	45°24.7	25°10.1	110°04.2	2°52.5	148°50.7	-13°18.5								
23	134°37.8	134°38.3	-1°07.9	60°26.2	25°10.1	125°06.1	2°52.7	163°52.9	-13°18.4								
Mer.pass.:14:02			v-0.3 d1.3 m-3.8			v1.5 d0.1 m0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	149°40.3	149°38.0	-1°06.5	75°27.7	25°10.2	140°08.1	2°52.9	178°55.0	-13°18.3								
1	164°42.8	164°37.7	-1°05.2	90°29.1	25°10.3	155°10.1	2°53.1	193°57.2	-13°18.2								
2	179°45.2	179°37.4	-1°03.9	105°30.6	25°10.3	170°12.1	2°53.3	208°59.4	-13°18.1								
3	194°47.7	194°37.0	-1°02.6	120°32.1	25°10.4	185°14.0	2°53.5	224°01.5	-13°18.0								
4	209°50.1	209°36.7	-1°01.3	135°33.6	25°10.5	200°16.0	2°53.8	239°03.7	-13°17.9								
5	224°52.6	224°36.4	-1°00.0	150°35.1	25°10.5	215°18.0	2°54.0	254°05.9	-13°17.8								
6	239°55.1	239°36.1	-0°58.7	165°36.6	25°10.6	230°19.9	2°54.2	269°08.1	-13°17.7								
7	254°57.5	254°35.7	-0°57.4	180°38.1	25°10.7	245°21.9	2°54.4	284°10.2	-13°17.6								
8	270°00.0	269°35.4	-0°56.1	195°39.6	25°10.7	260°23.9	2°54.6	299°12.4	-13°17.5								
9	285°02.5	284°35.1	-0°54.8	210°41.1	25°10.8	275°25.9	2°54.8	314°14.6	-13°17.4								
10	300°04.9	299°34.8	-0°53.5	225°42.6	25°10.9	290°27.8	2°55.1	329°16.7	-13°17.3								
11	315°07.4	314°34.5	-0°52.2	240°44.1	25°10.9	305°29.8	2°55.3	344°18.9	-13°17.2								
12	330°09.9	329°34.1	-0°50.9	255°45.6	25°11.0	320°31.8	2°55.5	359°21.1	-13°17.1								
13	345°12.3	344°33.8	-0°49.6	270°47.1	25°11.1	335°33.7	2°55.7	14°23.3	-13°17.0								
14	0°14.8	335°33.5	-0°48.3	285°48.5	25°11.1	350°35.7	2°55.9	29°25.4	-13°16.9								
15	15°17.2	14°33.2	-0°47.0	300°50.0	25°11.2	5°37.7	2°56.1	44°27.6	-13°16.8								
16	30°19.7	29°32.8	-0°45.6	315°51.5	25°11.3	20°39.7	2°56.4	59°29.8	-13°16.7								
17	45°22.2	44°32.5	-0°44.3	330°53.0	25°11.3	35°41.6	2°56.6	74°31.9	-13°16.6								
18	60°24.6	59°32.2	-0°43.0	345°54.5	25°11.4	50°43.6	2°56.8	89°34.1	-13°16.5								
19	75°27.1	74°31.9	-0°41.7	0°56.0	25°11.5	65°45.6	2°57.0	104°36.3	-13°16.4								
20	90°29.6	89°31.6	-0°40.4	15°57.5	25°11.5	80°47.5	2°57.2	119°38.5	-13°16.3								
21	105°32.0	104°31.2	-0°39.1	30°58.9	25°11.6	95°49.5	2°57.4	134°40.6	-13°16.2								
22	120°34.5	119°30.9	-0°37.8	46°00.4	25°11.7	110°51.5	2°57.7	149°42.8	-13°16.1								
23	135°37.0	134°30.6	-0°36.5	61°01.9	25°11.7	125°53.4	2°57.9	164°45.0	-13°16.0								
Mer.pass.:13:59			v-0.3 d1.3 m-3.8			v1.5 d0.1 m0.2			v2.0 d0.2 m-2.0			v2.2 d0.1 m0.8					

2023/2/1	SHA	Mer.pass
Venus	2°11.7	14:01
Mars	286°33.0	19:01
Jupiter	350°51.3	14:44
Saturn	29°28.8	12:10
2023/2/1	SHA	Mer.pass
Venus	1°04.7	14:01
Mars	286°10.4	18:59
Jupiter	350°39.6	14:41
Saturn	29°21.8	12:06
2023/2/2	SHA	Mer.pass
Venus	359°57.7	14:02
Mars	285°47.4	18:56
Jupiter	350°27.8	14:38
Saturn	29°14.7	12:03
Horizontal paralax		
Venus:		0.1
Mars:		0.1

Sun				Moon											
Sat	GHA	Dec		GHA	ν	Dec	d	HP							
0	176°31.1	-11°48.2		208°08.5	2.5	-25°43.3	6.8	60.9	Lat.	Twilight			Twilight		
1	191°31.2	-11°47.4		222°30.1	2.6	-25°36.3	7.0	60.9	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
2	206°31.2	-11°46.5		236°51.7	2.6	-25°29.2	7.2	60.9	70	05:58	07:09	08:16	16:13	17:20	18:31
3	221°31.3	-11°45.6		251°13.3	2.7	-25°21.9	7.4	61.0	68	05:58	07:03	08:02	16:27	17:26	18:31
4	236°31.3	-11°44.7		265°35.0	2.7	-25°14.4	7.6	61.0	66	05:58	06:57	07:52	16:37	17:32	18:31
5	251°31.4	-11°43.8		279°56.8	2.8	-25°06.7	7.8	61.0	64	05:57	06:53	07:42	16:46	17:36	18:32
6	266°31.4	-11°43.0		294°18.6	2.9	-24°58.8	8.0	61.0	62	05:57	06:48	07:35	16:54	17:40	18:32
7	281°31.5	-11°42.1		308°40.5	2.9	-24°50.8	8.2	61.0	60	05:56	06:45	07:28	17:01	17:44	18:32
8	296°31.5	-11°41.2		323°02.5	3.0	-24°42.5	8.3	61.0	58	05:56	06:41	07:22	17:07	17:47	18:33
9	311°31.6	-11°40.3		337°24.5	3.1	-24°34.1	8.5	61.0	56	05:55	06:38	07:17	17:12	17:50	18:34
10	326°31.6	-11°39.4		351°46.6	3.1	-24°25.5	8.7	61.1	54	05:55	06:36	07:12	17:17	17:53	18:34
11	341°31.7	-11°38.5		6°08.8	3.2	-24°16.7	8.9	61.1	52	05:54	06:33	07:08	17:21	17:55	18:35
12	356°31.7	-11°37.7		20°31.0	3.3	-24°07.7	9.1	61.1	50	05:53	06:31	07:04	17:25	17:58	18:35
13	11°31.8	-11°36.8		34°53.4	3.4	-23°58.5	9.3	61.1	45	05:51	06:25	06:55	17:33	18:03	18:37
14	26°31.8	-11°35.9		49°15.8	3.5	-23°49.2	9.4	61.1	40	05:49	06:21	06:48	17:40	18:08	18:39
15	41°31.9	-11°35.0		63°38.3	3.5	-23°39.6	9.6	61.1	35	05:47	06:16	06:42	17:46	18:12	18:41
16	56°31.9	-11°34.1		78°00.8	3.6	-23°29.9	9.8	61.1	30	05:44	06:12	06:36	17:52	18:16	18:44
17	71°32.0	-11°33.2		92°23.5	3.7	-23°20.1	10.0	61.1	20	05:39	06:05	06:27	18:01	18:23	18:49
18	86°32.0	-11°32.4		106°46.3	3.8	-23°10.0	10.1	61.1	10	05:32	05:57	06:18	18:09	18:31	18:55
19	101°32.1	-11°31.5		121°09.1	3.9	-22°59.8	10.3	61.1	0	05:25	05:49	06:10	18:17	18:38	19:03
20	116°32.1	-11°30.6		135°32.0	4.0	-22°49.4	10.5	61.2	-10	05:16	05:41	06:02	18:25	18:47	19:12
21	131°32.2	-11°29.7		149°55.0	4.1	-22°38.9	10.6	61.2	-20	05:04	05:31	05:53	18:34	18:56	19:23
22	146°32.2	-11°28.8		164°18.1	4.2	-22°28.2	10.8	61.2	-30	04:49	05:18	05:43	18:44	19:09	19:38
23	161°32.3	-11°27.9		178°41.3	4.2	-22°17.3	10.9	61.2	-35	04:40	05:11	05:37	18:50	19:16	19:47
	SD.=16.2	d=0.9		S.D.=16.6					-40	04:28	05:02	05:30	18:56	19:25	19:59
									-45	04:13	04:51	05:22	19:04	19:35	20:13
									-50	03:55	04:38	05:13	19:14	19:48	20:31
									-52	03:46	04:32	05:08	19:18	19:54	20:40
									-54	03:35	04:25	05:03	19:23	20:01	20:50
									-56	03:23	04:17	04:58	19:28	20:09	21:02
									-58	03:09	04:08	04:52	19:34	20:18	21:16
									-60	02:51	03:57	04:45	19:41	20:28	21:33
Sun	GHA	Dec		GHA	ν	Dec	d	HP							
0	176°32.3	-11°27.0		193°04.6	4.3	-22°06.3	11.1	61.2	Lat.	Sat	Moonrise		Moonset		
1	191°32.4	-11°26.1		207°28.0	4.4	-21°55.1	11.3	61.2	72	--	--	10:02	--	--	15:33
2	206°32.4	-11°25.3		221°51.5	4.5	-21°43.8	11.4	61.2	70	--	11:28	09:32	--	12:05	16:00
3	221°32.5	-11°24.4		236°15.1	4.6	-21°32.3	11.6	61.2	68	--	09:57	09:10	--	13:34	16:21
4	236°32.6	-11°23.5		250°38.7	4.7	-21°20.6	11.7	61.2	66	--	09:18	08:52	--	14:13	16:37
5	251°32.6	-11°22.6		265°02.5	4.8	-21°08.8	11.9	61.2	64	09:13	08:50	08:38	12:08	14:39	16:49
6	266°32.7	-11°21.7		279°26.4	4.9	-20°56.9	12.0	61.2	62	08:31	08:28	08:25	12:50	14:60	17:00
7	281°32.7	-11°20.8		293°50.4	5.0	-20°44.8	12.2	61.2	60	08:02	08:11	08:15	13:18	15:16	17:09
8	296°32.8	-11°19.9		308°14.4	5.1	-20°32.6	12.3	61.2	58	07:39	07:56	08:06	13:40	15:30	17:17
9	311°32.8	-11°19.0		322°38.6	5.2	-20°20.2	12.4	61.2	56	07:21	07:43	07:58	13:57	15:42	17:24
10	326°32.9	-11°18.1		337°02.9	5.3	-20°07.7	12.6	61.2	54	07:05	07:32	07:50	14:12	15:52	17:31
11	341°33.0	-11°17.3		351°27.3	5.4	-19°55.0	12.7	61.2	52	06:52	07:22	07:44	14:25	16:01	17:36
12	356°33.0	-11°16.4		5°51.7	5.5	-19°42.2	12.9	61.2	50	06:40	07:14	07:38	14:37	16:09	17:41
13	11°33.1	-11°15.5		20°16.3	5.6	-19°29.3	13.0	61.2	45	06:16	06:55	07:25	15:00	16:27	17:52
14	26°33.1	-11°14.6		34°41.0	5.7	-19°16.3	13.1	61.2	40	05:56	06:39	07:15	15:19	16:41	18:01
15	41°33.2	-11°13.7		49°05.8	5.8	-19°03.1	13.2	61.2	35	05:39	06:26	07:05	15:35	16:52	18:08
16	56°33.2	-11°12.8		63°30.7	5.9	-18°49.8	13.4	61.2	30	05:25	06:15	06:57	15:48	17:03	18:15
17	71°33.3	-11°11.9		77°55.7	6.0	-18°36.3	13.5	61.2	20	05:00	05:55	06:43	16:11	17:20	18:26
18	86°33.4	-11°11.0		92°20.8	6.2	-18°22.8	13.6	61.2	10	04:39	05:38	06:31	16:31	17:35	18:36
19	101°33.4	-11°10.1		106°46.0	6.3	-18°09.1	13.7	61.2	0	04:19	05:21	06:19	16:49	17:49	18:45
20	116°33.5	-11°09.2		121°11.3	6.4	-17°55.3	13.8	61.2	-10	03:59	05:05	06:08	17:07	18:03	18:54
21	131°33.5	-11°08.3		135°36.7	6.5	-17°41.4	14.0	61.2	-20	03:38	04:48	05:55	17:27	18:18	19:04
22	146°33.6	-11°07.4		150°02.2	6.6	-17°27.4	14.1	61.2	-30	03:13	04:28	05:41	17:49	18:35	19:15
23	161°33.7	-11°06.5		164°27.8	6.7	-17°13.3	14.2	61.1	-35	02:58	04:16	05:33	18:02	18:45	19:21
	SD.=16.2	d=0.9		S.D.=16.7					-40	02:41	04:02	05:23	18:17	18:56	19:28
									-45	02:21	03:46	05:12	18:34	19:09	19:36
									-50	01:55	03:26	04:58	18:55	19:24	19:46
									-52	01:43	03:16	04:52	19:06	19:31	19:50
									-54	01:28	03:05	04:45	19:17	19:39	19:55
									-56	01:12	02:53	04:37	19:30	19:48	20:00
									-58	00:51	02:39	04:28	19:45	19:58	20:06
									-60	00:26	02:22	04:17	20:03	20:10	20:13
Mon	GHA	Dec		GHA	ν	Dec	d	HP							
0	176°33.7	-11°05.6		178°53.6	6.8	-16°59.0	14.3	61.1	Day	Sun		Mer.	Moon		Age
1	191°33.8	-11°04.8		193°19.4	6.9	-16°44.7	14.4	61.1	00 ^h	Eqn. of Time	12 ^h	Pass	Mer.Pass.	Lower	
2	206°33.8	-11°03.9		207°45.3	7.0	-16°30.3	14.5	61.1	18	13:55	13:53	12:13	10:34	23:05	28(5%)
3	221°33.9	-11°03.0		222°11.3	7.1	-16°15.7	14.6	61.1	19	13:51	13:48	12:13	11:35	00:04	29(1%)
4	236°34.0	-11°02.1		236°37.5	7.2	-16°01.1	14.7	61.1	20	13:45	13:42	12:13	12:32	00:04	0(0%)
5	251°34.0	-11°01.2		251°03.7	7.3	-15°46.3	14.8	61.1							
6	266°34.1	-11°00.3		265°30.0	7.4	-15°31.5	14.9	61.1							
7	281°34.2	-10°59.4		279°56.5	7.5	-15°16.5	15.0	61.1							
8	296°34.2	-10°58.5		294°23.0	7.6	-15°01.5	15.1	61.1							
9	311°34.3	-10°57.6		308°49.6	7.7	-14°46.4	15.2	61.0							
10	326°34.4	-10°56.7		323°16.4	7.8	-14°31.2	15.2	61.0							
11	341°34.4	-10°55.8		337°43.2	7.9	-14°15.9	15.3	61.0							
12	356°34.5	-10°54.9		352°10.1	8.0	-14°00.6	15.4	61.0							
13	11°34.5	-10°54.0		6°37.2	8.1	-13°45.1	15.5	61.0							
14	26°34.6	-10°53.1		21°04.3	8.2	-13°29.6	15.6	61.0							
15	41°34.7	-10°52.2		35°31.5	8.3	-13°14.0	15.6	61.0							
16	56°34.7	-10°51.3		49°58.8	8.4	-12°58.4	15.7	60.9							
17	71°34.8	-10°50.4		64°26.2	8.5	-12°42.7	15.8	60.9							
18	86°34.9	-10°49.5		78°53.7	8.5	-12°26.9	15.8	60.9							
19	101°34.9	-10°48.6		93°21.3	8.6	-12°11.0	15.9	60.9							
20	116°35.0	-10°47.7		107°49.0	8.7	-11°55.1	16.0	60.9							
21	131°35.1	-10°46.8		122°16.8	8.8	-11°39.1	16.0	60.8							
22	146°35.1	-10°45.9		136°44.6	8.9	-11°23.0	16.1	60.8							
23	161°35.2	-10°45.0		151°12.6	9.0	-11°06.9	16.1	60.8							
	SD.=16.2	d=0.9		S.D.=16.7											

February 21, 22 ,23 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	150°39.4	149°30.3	-0°35.2	76°03.4	25°11.8	140°55.4	2°58.1	179°47.2	-13°15.9	Alpheratz	357°36.7	29°13.0
1	165°41.9	164°30.0	-0°33.9	91°04.9	25°11.9	155°57.4	2°58.3	194°49.3	-13°15.8	Ankaa	353°09.0	-42°11.1
2	180°44.4	179°29.6	-0°32.6	106°06.4	25°11.9	170°59.4	2°58.5	209°51.5	-13°15.7	Schedar	349°33.3	56°39.9
3	195°46.8	194°29.3	-0°31.3	121°07.8	25°12.0	186°01.3	2°58.7	224°53.7	-13°15.6	Diphda	348°49.0	-17°51.8
4	210°49.3	209°29.0	-0°30.0	136°09.3	25°12.1	201°03.3	2°58.9	239°55.8	-13°15.5	Achernar	335°21.7	-57°07.5
5	225°51.7	224°28.7	-0°28.7	151°10.8	25°12.1	216°05.3	2°59.2	254°58.0	-13°15.4	Hamal	327°53.1	23°34.3
6	240°54.2	239°28.3	-0°27.3	166°12.3	25°12.2	231°07.2	2°59.4	270°00.2	-13°15.3	Polaris	314°54.7	89°22.0
7	255°56.7	254°28.0	-0°26.0	181°13.7	25°12.3	246°09.2	2°59.6	285°02.4	-13°15.2	Akamar	315°13.0	-40°13.0
8	270°59.1	269°27.7	-0°24.7	196°15.2	25°12.3	261°11.2	2°59.8	300°04.5	-13°15.1	Menkar	314°07.8	4°10.7
9	286°01.6	284°27.4	-0°23.4	211°16.7	25°12.4	276°13.1	3°00.0	315°06.7	-13°15.0	Mirfak	308°30.5	49°56.7
10	301°04.1	299°27.1	-0°22.1	226°18.2	25°12.5	291°15.1	3°00.2	330°08.9	-13°14.9	Aldebaran	290°41.3	16°33.3
11	316°06.5	314°26.7	-0°20.8	241°19.6	25°12.5	306°17.1	3°00.5	345°11.0	-13°14.8	Rigel	281°05.2	-8°10.6
12	331°09.0	329°26.4	-0°19.5	256°21.1	25°12.6	321°19.0	3°00.7	0°13.2	-13°14.6	Capella	280°24.0	46°01.5
13	346°11.5	344°26.1	-0°18.2	271°22.6	25°12.7	336°21.0	3°00.9	15°15.4	-13°14.5	Bellatrix	278°24.4	6°22.2
14	1°13.9	359°25.8	-0°16.9	286°24.1	25°12.7	351°23.0	3°01.1	30°17.6	-13°14.4	Elnath	278°03.7	28°37.7
15	16°16.4	14°25.5	-0°15.6	301°25.5	25°12.8	6°24.9	3°01.3	45°19.7	-13°14.3	Alnilam	275°39.2	-1°11.3
16	31°18.9	29°25.2	-0°14.3	316°27.0	25°12.9	21°26.9	3°01.6	60°21.9	-13°14.2	Betelgeuse	270°53.6	7°24.6
17	46°21.3	44°24.8	-0°13.0	331°28.5	25°12.9	36°28.9	3°01.8	75°24.1	-13°14.1	Canopus	263°52.8	-52°42.7
18	61°23.8	59°24.5	-0°11.7	346°29.9	25°13.0	51°30.8	3°02.0	90°26.2	-13°14.0	Sirius	258°27.3	-16°44.8
19	76°26.2	74°24.2	-0°10.3	1°31.4	25°13.1	66°32.8	3°02.2	105°28.4	-13°13.9	Adara	255°06.8	-29°00.4
20	91°28.7	89°23.9	-0°09.0	16°32.9	25°13.1	81°34.8	3°02.4	120°30.6	-13°13.8	Procyon	244°52.1	5°10.0
21	106°31.2	104°23.6	-0°07.7	31°34.3	25°13.2	96°36.8	3°02.6	135°32.8	-13°13.7	Pollux	243°18.8	27°58.2
22	121°33.6	119°23.2	-0°06.4	46°35.8	25°13.3	111°38.7	3°02.9	150°34.9	-13°13.6	Avior	234°14.8	-59°35.1
23	136°36.1	134°22.9	-0°05.1	61°37.3	25°13.3	126°40.7	3°03.1	165°37.1	-13°13.5	Suhail	222°47.0	-43°31.6
Mer.pass.:13:55		v-0.3 d1.3 m-3.8		v1.5 d0.1 m0.3		v2.0 d0.2 m-2.0		v2.2 d0.1 m0.8		Miaplacidus 221°37.7 -69°48.8		

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	151°38.6	149°22.6	-0°03.8	76°38.7	25°13.4	141°42.7	3°03.3	180°39.3	-13°13.4
1	166°41.0	164°22.3	-0°02.5	91°40.2	25°13.5	156°44.6	3°03.5	195°41.5	-13°13.3
2	181°43.5	179°22.0	-0°01.2	106°41.7	25°13.5	171°46.6	3°03.7	210°43.6	-13°13.2
3	196°46.0	194°21.6	0°00.1	121°43.1	25°13.6	186°48.6	3°03.9	225°45.8	-13°13.1
4	211°48.4	209°21.3	0°01.4	136°44.6	25°13.6	201°50.5	3°04.2	240°48.0	-13°13.0
5	226°50.9	224°21.0	0°02.7	151°46.1	25°13.7	216°52.5	3°04.4	255°50.1	-13°12.9
6	241°53.3	239°20.7	0°04.0	166°47.5	25°13.8	231°54.4	3°04.6	270°52.3	-13°12.8
7	256°55.8	254°20.4	0°05.3	181°49.0	25°13.8	246°56.4	3°04.8	285°54.5	-13°12.7
8	271°58.3	269°20.1	0°06.7	196°50.4	25°13.9	261°58.4	3°05.0	300°56.7	-13°12.6
9	287°00.7	284°19.7	0°08.0	211°51.9	25°14.0	277°00.3	3°05.2	315°58.8	-13°12.5
10	302°03.2	299°19.4	0°09.3	226°53.4	25°14.0	292°02.3	3°05.5	331°01.0	-13°12.4
11	317°05.7	314°19.1	0°10.6	241°54.8	25°14.1	307°04.3	3°05.7	346°03.2	-13°12.3
12	332°08.1	329°18.8	0°11.9	256°56.3	25°14.2	322°06.2	3°05.9	1°05.4	-13°12.2
13	347°10.6	344°18.5	0°13.2	271°57.7	25°14.2	337°08.2	3°06.1	16°07.5	-13°12.1
14	2°13.1	359°18.2	0°14.5	286°59.2	25°14.3	352°10.2	3°06.3	31°09.7	-13°12.0
15	17°15.5	14°17.8	0°15.8	302°00.6	25°14.4	7°12.1	3°06.6	46°11.9	-13°11.9
16	32°18.0	29°17.5	0°17.1	317°02.1	25°14.4	22°14.1	3°06.8	61°14.0	-13°11.8
17	47°20.5	44°17.2	0°18.4	332°03.6	25°14.5	37°16.1	3°07.0	76°16.2	-13°11.7
18	62°22.9	59°16.9	0°19.7	347°05.0	25°14.6	52°18.0	3°07.2	91°18.4	-13°11.6
19	77°25.4	74°16.6	0°21.0	2°06.5	25°14.6	67°20.0	3°07.4	106°20.6	-13°11.5
20	92°27.8	89°16.3	0°22.4	17°07.9	25°14.7	82°22.0	3°07.6	121°22.7	-13°11.4
21	107°30.3	104°15.9	0°23.7	32°09.4	25°14.8	97°23.9	3°07.9	136°24.9	-13°11.3
22	122°32.8	119°15.6	0°25.0	47°10.8	25°14.8	112°25.9	3°08.1	151°27.1	-13°11.2
23	137°35.2	134°15.3	0°26.3	62°12.3	25°14.9	127°27.9	3°08.3	166°29.3	-13°11.1
Mer.pass.:13:51		v-0.3 d1.3 m-3.8		v1.5 d0.1 m0.3		v2.0 d0.2 m-2.0		v2.2 d0.1 m0.8	

Th	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	152°37.7	149°15.0	0°27.6	77°13.7	25°14.9	142°29.8	3°08.5	181°31.4	-13°11.0
1	167°40.2	164°14.7	0°28.9	92°15.2	25°15.0	157°31.8	3°08.7	196°33.6	-13°10.9
2	182°42.6	179°14.4	0°30.2	107°16.6	25°15.1	172°33.7	3°09.0	211°35.8	-13°10.8
3	197°45.1	194°14.0	0°31.5	122°18.1	25°15.1	187°35.7	3°09.2	226°37.9	-13°10.7
4	212°47.6	209°13.7	0°32.8	137°19.5	25°15.2	202°37.7	3°09.4	241°40.1	-13°10.6
5	227°50.0	224°13.4	0°34.1	152°21.0	25°15.3	217°39.6	3°09.6	256°42.3	-13°10.5
6	242°52.5	239°13.1	0°35.4	167°22.4	25°15.3	232°41.6	3°09.8	271°44.5	-13°10.4
7	257°54.9	254°12.8	0°36.7	182°23.9	25°15.4	247°43.6	3°10.0	286°46.6	-13°10.3
8	272°57.4	269°12.5	0°38.1	197°25.3	25°15.5	262°45.5	3°10.3	301°48.8	-13°10.1
9	287°59.9	284°12.1	0°39.4	212°26.7	25°15.5	277°47.5	3°10.5	316°51.0	-13°10.0
10	303°02.3	299°11.8	0°40.7	227°28.2	25°15.6	292°49.5	3°10.7	331°53.2	-13°09.9
11	318°04.8	314°11.5	0°42.0	242°29.6	25°15.6	307°51.4	3°10.9	346°55.3	-13°09.8
12	333°07.3	329°11.2	0°43.3	257°31.1	25°15.7	322°53.4	3°11.1	1°57.5	-13°09.7
13	348°09.7	344°10.9	0°44.6	272°32.5	25°15.8	337°55.3	3°11.4	16°59.7	-13°09.6
14	3°12.2	359°10.6	0°45.9	287°34.0	25°15.8	352°57.3	3°11.6	32°01.8	-13°09.5
15	18°14.7	14°10.3	0°47.2	302°35.4	25°15.9	7°59.3	3°11.8	47°04.0	-13°09.4
16	33°17.1	29°09.9	0°48.5	317°36.8	25°16.0	23°01.2	3°12.0	62°06.2	-13°09.3
17	48°19.6	44°09.6	0°49.8	332°38.3	25°16.0	38°03.2	3°12.2	77°08.4	-13°09.2
18	63°22.1	59°09.3	0°51.1	347°39.7	25°16.1	53°05.2	3°12.4	92°10.5	-13°09.1
19	78°24.5	74°09.0	0°52.4	2°41.1	25°16.2	68°07.1	3°12.7	107°12.7	-13°09.0
20	93°27.0	89°08.7	0°53.7	17°42.6	25°16.2	83°09.1	3°12.9	122°14.9	-13°08.9
21	108°29.4	104°08.4	0°55.1	32°44.0	25°16.3	98°11.0	3°13.1	137°17.1	-13°08.8
22	123°31.9	119°08.1	0°56.4	47°45.5	25°16.3	113°13.0	3°13.3	152°19.2	-13°08.7
23	138°34.4	134°07.7	0°57.7	62°46.9	25°16.4	128°15.0	3°13.5	167°21.4	-13°08.6
	Mer.pass.:13:47	v-0.3 d1.3 m-3.8		v1.4 d0.1 m0.3		v2.0 d0.2 m-2.0		v2.2 d0.1 m0.8	

Stars		
	SHA	Dec
Alpheratz	357° 36.7	29° 13.0
Ankaa	353° 09.0	-42° 11.1
Schedar	349° 33.3	56° 39.9
Diphda	348° 49.0	-17° 51.8
Achernar	335° 21.7	-57° 07.5
Hamal	327° 53.1	23° 34.3
Polaris	314° 54.7	89° 22.0
Akamar	315° 13.0	-40° 13.0
Menkar	314° 07.8	4° 10.7
Mirfak	308° 30.5	49° 56.7
Aldebaran	290° 41.3	16° 33.3
Rigel	281° 05.2	-8° 10.0
Capella	280° 24.0	46° 01.5
Bellatrix	278° 24.4	6° 22.2
El Nath	278° 03.7	28° 37.7
Anilam	275° 39.2	-1° 11.3
Betelgeuse	270° 53.6	7° 24.6
Canopus	263° 52.8	-52° 42.7
Sirius	258° 27.3	-16° 44.8
Adara	255° 06.8	-29° 00.4
Procyon	244° 52.1	5° 10.0
Pollux	243° 18.8	27° 58.2
Avior	234° 14.8	-59° 35.1
Suhail	222° 47.0	-43° 31.6
Miaplacidus	221° 37.7	-69° 48.7
Alphard	217° 48.9	-8° 45.6
Regulus	207° 35.7	11° 51.2
Dubhe	193° 42.2	61° 37.5
Denebola	182° 26.2	14° 26.5
Genah	175° 44.9	-17° 40.2
Acrux	173° 01.3	-63° 13.5
Gacrux	171° 52.9	-57° 14.4
Alioth	166° 13.9	55° 49.8
Spica	158° 23.7	-11° 16.9
Alcaid	152° 52.9	49° 11.6
Hadar	148° 37.9	-60° 28.8
Menkent	147° 59.3	-36° 28.9
Arcturus	145° 49.0	19° 03.8
Rigel Kent.	139° 42.2	-60° 55.6
Zubenelg.	136° 57.6	-16° 08.3
Kochab	137° 19.4	74° 03.3
Alphecca	126° 05.0	26° 38.0
Antares	112° 17.8	-26° 28.9
Atria	107° 13.6	-69° 03.9
Sabik	102° 04.7	-15° 45.2
Shaula	96° 12.6	-37° 07.1
Rasalhague	96° 00.1	12° 32.4
Etamin	90° 43.1	51° 28.8
Kaus Aust.	83° 34.8	-34° 22.4
Vega	80° 34.6	38° 48.0
Nunki	75° 49.9	-26° 16.1
Altair	62° 01.8	8° 55.5
Peacock	53° 08.7	-56° 39.6
Deneb	49° 27.3	45° 21.5
Enif	33° 40.6	9° 58.7
Alnair	27° 35.3	-46° 51.1
Fomalhaut	15° 16.6	-29° 30.2
Scheat	13° 47.1	28° 12.4
Markab	13° 31.8	15° 19.6
2023/2/2	SHA	Mer.pass
Venus	358° 50.8	14:02
Mars	285° 24.0	18:54
Jupiter	350° 16.0	14:34
Saturn	29° 07.7	11:59
2023/2/2	SHA	Mer.pass
Venus	357° 44.0	14:03
Mars	285° 00.2	18:52
Jupiter	350° 04.1	14:31
Saturn	29° 00.7	11:56
2023/2/2	SHA	Mer.pass
Venus	356° 37.3	14:03
Mars	284° 36.0	18:49
Jupiter	349° 52.1	14:28
Saturn	28° 53.7	11:52
Horizontal paralax		
	Venus:	0.1
	Mars:	0.1

Sun				Moon													
Tue	GHA	Dec		GHA	ν	Dec	d	HP		Twilight				Twilight			
0	176°35.3	-10°44.1		165°40.6	9.1	-10°50.8	16.2	60.8	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.		
1	191°35.3	-10°43.2		180°08.8	9.2	-10°34.6	16.2	60.8	72	05:45	07:03	08:16	16:13	17:26	18:45		
2	206°35.4	-10°42.3		194°37.0	9.3	-10°18.3	16.3	60.7	70	05:46	06:57	08:01	16:27	17:32	18:43		
3	221°35.5	-10°41.4		209°05.3	9.3	-10°02.0	16.3	60.7	68	05:47	06:51	07:50	16:39	17:37	18:42		
4	236°35.6	-10°40.5		223°33.7	9.4	-9°45.6	16.4	60.7	66	05:48	06:47	07:40	16:48	17:41	18:41		
5	251°35.6	-10°39.6		238°02.1	9.5	-9°29.2	16.4	60.7	64	05:48	06:43	07:32	16:56	17:45	18:40		
6	266°35.7	-10°38.7		252°30.7	9.6	-9°12.8	16.5	60.6	62	05:49	06:40	07:25	17:03	17:48	18:40		
7	281°35.8	-10°37.8		266°59.3	9.7	-8°56.3	16.5	60.6	60	05:49	06:37	07:19	17:09	17:51	18:40		
8	296°35.8	-10°36.9		281°28.0	9.7	-8°39.8	16.5	60.6	58	05:49	06:34	07:14	17:14	17:54	18:40		
9	311°35.9	-10°36.0		295°56.8	9.8	-8°23.3	16.6	60.6	56	05:49	06:32	07:10	17:18	17:56	18:40		
10	326°36.0	-10°35.1		310°25.7	9.9	-8°06.7	16.6	60.5	54	05:48	06:29	07:05	17:23	17:59	18:40		
11	341°36.0	-10°34.2		324°54.6	10.0	-7°50.1	16.6	60.5	52	05:48	06:27	07:01	17:26	18:01	18:40		
12	356°36.1	-10°33.3		339°23.6	10.1	-7°33.4	16.7	60.5	50	05:48	06:25	06:58	17:30	18:03	18:40		
13	11°36.2	-10°32.3		353°52.7	10.1	-7°16.7	16.7	60.5	45	05:47	06:21	06:50	17:37	18:07	18:41		
14	26°36.3	-10°31.4		8°21.9	10.2	-7°00.0	16.7	60.4	40	05:45	06:17	06:44	17:44	18:11	18:42		
15	41°36.3	-10°30.5		22°51.1	10.3	-6°43.3	16.7	60.4	35	05:43	06:13	06:38	17:49	18:15	18:44		
16	56°36.4	-10°29.6		37°20.4	10.3	-6°26.6	16.8	60.4	30	05:42	06:09	06:34	17:54	18:18	18:46		
17	71°36.5	-10°28.7		51°49.8	10.4	-6°09.8	16.8	60.4	20	05:37	06:03	06:25	18:02	18:24	18:50		
18	86°36.6	-10°27.8		66°19.2	10.5	-5°53.0	16.8	60.3	10	05:31	05:56	06:17	18:10	18:31	18:56		
19	101°36.6	-10°26.9		80°48.7	10.5	-5°36.2	16.8	60.3	0	05:25	05:49	06:10	18:17	18:38	19:02		
20	116°36.7	-10°26.0		95°18.3	10.6	-5°19.4	16.8	60.3	-10	05:16	05:41	06:03	18:24	18:45	19:10		
21	131°36.8	-10°25.1		109°47.9	10.7	-5°02.6	16.8	60.2	-20	05:06	05:32	05:55	18:32	18:54	19:21		
22	146°36.8	-10°24.2		124°17.6	10.7	-4°45.8	16.8	60.2	-30	04:52	05:21	05:46	18:41	19:05	19:34		
23	161°36.9	-10°23.3		138°47.4	10.8	-4°28.9	16.8	60.2	-35	04:43	05:14	05:40	18:46	19:12	19:43		
	SD.=16.2	d=0.9		S.D.=16.6					-40	04:32	05:06	05:34	18:52	19:20	19:54		
									-45	04:19	04:56	05:27	18:59	19:30	20:07		
									-50	04:01	04:44	05:18	19:08	19:42	20:24		
									-52	03:53	04:38	05:14	19:12	19:48	20:32		
									-54	03:43	04:31	05:10	19:16	19:54	20:42		
									-56	03:32	04:24	05:05	19:21	20:01	20:53		
									-58	03:19	04:16	04:59	19:26	20:09	21:05		
									-60	03:03	04:06	04:53	19:32	20:19	21:21		
										Moonrise		Moonset					
									Lat.	Tue	Wed	Thu	Tue	Wed	Thu		
									72	09:06	08:28	07:53	18:20	20:46	23:08		
									70	08:54	08:26	07:59	18:30	20:44	22:54		
									68	08:44	08:24	08:04	18:37	20:42	22:44		
									66	08:36	08:22	08:09	18:43	20:40	22:35		
									64	08:28	08:20	08:12	18:48	20:39	22:27		
									62	08:22	08:19	08:15	18:52	20:38	22:21		
									60	08:17	08:18	08:18	18:56	20:37	22:15		
									58	08:12	08:17	08:21	18:59	20:36	22:10		
									56	08:08	08:16	08:23	19:02	20:36	22:06		
									54	08:04	08:15	08:25	19:05	20:35	22:02		
									52	08:00	08:14	08:27	19:07	20:34	21:59		
									50	07:57	08:13	08:28	19:09	20:34	21:56		
									45	07:50	08:12	08:32	19:14	20:33	21:49		
									40	07:44	08:10	08:35	19:18	20:32	21:43		
									35	07:39	08:09	08:38	19:21	20:31	21:38		
									30	07:34	08:08	08:40	19:24	20:30	21:34		
									20	07:27	08:07	08:45	19:29	20:29	21:27		
									10	07:20	08:05	08:48	19:33	20:28	21:20		
									0	07:13	08:04	08:52	19:37	20:27	21:14		
									-10	07:07	08:02	08:55	19:41	20:26	21:08		
									-20	06:60	08:01	08:59	19:45	20:24	21:02		
									-30	06:52	07:59	09:04	19:50	20:23	20:55		
									-35	06:47	07:58	09:06	19:53	20:22	20:51		
									-40	06:42	07:57	09:09	19:56	20:21	20:46		
									-45	06:35	07:56	09:13	19:59	20:20	20:41		
									-50	06:28	07:54	09:17	20:03	20:19	20:34		
									-52	06:25	07:53	09:19	20:05	20:18	20:31		
									-54	06:21	07:53	09:21	20:07	20:18	20:28		
									-56	06:17	07:52	09:23	20:09	20:17	20:25		
									-58	06:12	07:51	09:26	20:12	20:16	20:21		
									-60	06:07	07:50	09:29	20:15	20:16	20:16		
									Day	Sun		Mer.	Moon		Age		
										Eqn.of Time	12 ^h	Pass	Upper	Lower			
									21	13:39	13:35	12:13	13:25	00:59	1(2%)		
									22	13:32	13:28	12:13	14:15	01:50	2(7%)		
									23	13:24	13:20	12:13	15:03	02:39	3(14%)		
										SD.=16.2	d=0.9		S.D.=16.2				

February 24, 25 ,26 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	153°36.8	149°07.4	0°59.0	77°48.3	25°16.5	143°16.9	3°13.8	182°23.6	-13°08.5	Alpheratz	357°36.7	29°13.0					
1	168°39.3	164°07.1	1°00.3	92°49.8	25°16.5	158°18.9	3°14.0	197°25.7	-13°08.4	Ankaa	353°09.0	-42°11.1					
2	183°41.8	179°06.8	1°01.6	107°51.2	25°16.6	173°20.9	3°14.2	212°27.9	-13°08.3	Schedar	349°33.3	56°39.9					
3	198°44.2	194°06.5	1°02.9	122°52.6	25°16.7	188°22.8	3°14.4	227°30.1	-13°08.2	Diphda	348°49.0	-17°51.8					
4	213°46.7	209°06.2	1°04.2	137°54.1	25°16.7	203°24.8	3°14.6	242°32.3	-13°08.1	Achernar	335°21.7	-57°07.5					
5	228°49.2	224°05.9	1°05.5	152°55.5	25°16.8	218°26.7	3°14.9	257°34.4	-13°08.0	Hamal	327°53.1	23°34.3					
6	243°51.6	239°05.5	1°06.8	167°56.9	25°16.8	233°28.7	3°15.1	272°36.6	-13°07.9	Polaris	314°56.2	89°22.0					
7	258°54.1	254°05.2	1°08.1	182°58.4	25°16.9	248°30.7	3°15.3	287°38.8	-13°07.8	Akamar	315°13.1	-40°13.0					
8	273°56.5	269°04.9	1°09.4	197°59.8	25°17.0	263°32.6	3°15.5	302°41.0	-13°07.7	Menkar	314°07.9	4°10.7					
9	288°59.0	284°04.6	1°10.7	213°01.2	25°17.0	278°34.6	3°15.7	317°43.1	-13°07.6	Mirfak	308°30.6	49°56.7					
10	304°01.5	299°04.3	1°12.1	228°02.6	25°17.1	293°36.5	3°16.0	332°45.3	-13°07.5	Aldebaran	290°41.4	16°33.3					
11	319°03.9	314°04.0	1°13.4	243°04.1	25°17.2	308°38.5	3°16.2	347°47.5	-13°07.4	Rigel	281°05.3	-8°10.6					
12	334°06.4	329°03.7	1°14.7	258°05.5	25°17.2	323°40.5	3°16.4	2°49.7	-13°07.3	Capella	280°24.1	46°01.5					
13	349°08.9	344°03.3	1°16.0	273°06.9	25°17.3	338°42.4	3°16.6	17°51.8	-13°07.2	Bellatrix	278°24.4	6°22.2					
14	4°11.3	359°03.0	1°17.3	288°08.4	25°17.3	353°44.4	3°16.8	32°54.0	-13°07.1	Elnath	278°03.7	28°37.7					
15	19°13.8	14°02.7	1°18.6	303°09.8	25°17.4	8°46.3	3°17.0	47°56.2	-13°07.0	Alnilam	275°39.2	-1°11.3					
16	34°16.3	29°02.4	1°19.9	318°11.2	25°17.5	23°48.3	3°17.3	62°58.3	-13°06.9	Betelgeuse	270°53.6	7°24.6					
17	49°18.7	44°02.1	1°21.2	333°12.6	25°17.5	38°50.3	3°17.5	78°00.5	-13°06.8	Canopus	263°52.8	-52°42.7					
18	64°21.2	59°01.8	1°22.5	348°14.0	25°17.6	53°52.2	3°17.7	93°02.7	-13°06.7	Sirius	258°27.3	-16°44.8					
19	79°23.7	74°01.5	1°23.8	3°15.5	25°17.7	68°54.2	3°17.9	108°04.9	-13°06.6	Adara	255°06.8	-29°00.4					
20	94°26.1	89°01.1	1°25.1	18°16.9	25°17.7	83°56.1	3°18.1	123°07.0	-13°06.5	Procyon	244°52.1	5°10.0					
21	109°28.6	104°00.8	1°26.4	33°18.3	25°17.8	98°58.1	3°18.4	138°09.2	-13°06.4	Pollux	243°18.8	27°58.2					
22	124°31.0	119°00.5	1°27.7	48°19.7	25°17.8	114°00.1	3°18.6	153°11.4	-13°06.3	Avior	234°14.8	-59°35.1					
23	139°33.5	134°00.2	1°29.1	63°21.2	25°17.9	129°02.0	3°18.8	168°13.6	-13°06.2	Suhail	222°47.0	-43°31.6					
Mer.pass.:13:43			v-0.3 d1.3 m-3.8			v1.4 d0.1 m0.3			v2.0 d0.2 m-1.9			v2.2 d0.1 m0.8					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Alphard	217°48.9	-8°45.6					
0	154°36.0	148°59.9	1°30.4	78°22.6	25°18.0	144°04.0	3°19.0	183°15.7	-13°06.1	Regulus	207°35.7	11°51.2					
1	169°38.4	163°59.6	1°31.7	93°24.0	25°18.0	159°05.9	3°19.2	198°17.9	-13°06.0	Dubhe	193°42.2	61°37.5					
2	184°40.9	178°59.3	1°33.0	108°25.4	25°18.1	174°07.9	3°19.5	213°20.1	-13°05.9	Denebola	182°26.1	14°26.5					
3	199°43.4	193°59.0	1°34.3	123°26.8	25°18.2	189°09.9	3°19.7	228°22.3	-13°05.8	Gienah	175°44.9	-17°40.2					
4	214°45.8	208°58.6	1°35.6	138°28.3	25°18.2	204°11.8	3°19.9	243°24.4	-13°05.7	Acrux	173°01.3	-63°13.5					
5	229°48.3	223°58.3	1°36.9	153°29.7	25°18.3	219°13.8	3°20.1	258°26.6	-13°05.6	Gacrux	171°52.9	-57°14.4					
6	244°50.8	238°58.0	1°38.2	168°31.1	25°18.3	234°15.7	3°20.3	273°28.8	-13°05.4	Alioth	166°13.9	55°49.9					
7	259°53.2	253°57.7	1°39.5	183°32.5	25°18.4	249°17.7	3°20.6	288°30.9	-13°05.3	Spica	158°23.7	-11°16.9					
8	274°55.7	268°57.4	1°40.8	198°33.9	25°18.5	264°19.6	3°20.8	303°33.1	-13°05.2	Alcaid	152°52.9	49°11.6					
9	289°58.2	283°57.1	1°42.1	213°35.3	25°18.5	279°21.6	3°21.0	318°35.3	-13°05.1	Hadar	148°37.9	-60°28.8					
10	305°00.6	298°56.8	1°43.4	228°36.7	25°18.6	294°23.6	3°21.2	333°37.5	-13°05.0	Menkent	147°59.3	-36°28.9					
11	320°03.1	313°56.5	1°44.7	243°38.2	25°18.6	309°25.5	3°21.4	348°39.6	-13°04.9	Arcturus	145°49.0	19°03.8					
12	335°05.5	328°56.1	1°46.0	258°39.6	25°18.7	324°27.5	3°21.7	3°41.8	-13°04.8	Rigel Kent.	139°42.2	-60°55.6					
13	350°08.0	343°55.8	1°47.3	273°41.0	25°18.8	339°29.4	3°21.9	18°44.0	-13°04.7	Zubenelg.	136°57.6	-16°08.3					
14	5°10.5	358°55.5	1°48.7	288°42.4	25°18.8	354°31.4	3°22.1	33°46.2	-13°04.6	Kochab	137°19.3	74°03.3					
15	20°12.9	13°55.2	1°50.0	303°43.8	25°18.9	9°33.4	3°22.3	48°48.3	-13°04.5	Alphecca	126°05.0	26°38.0					
16	35°15.4	28°54.9	1°51.3	318°45.2	25°18.9	24°35.3	3°22.5	63°50.5	-13°04.4	Antares	112°17.8	-26°28.9					
17	50°17.9	43°54.6	1°52.6	333°46.6	25°19.0	39°37.3	3°22.8	78°52.7	-13°04.3	Atria	107°13.5	-69°03.9					
18	65°20.3	58°54.3	1°53.9	348°48.0	25°19.1	54°39.2	3°23.0	93°54.9	-13°04.2	Sabik	102°04.6	-15°45.2					
19	80°22.8	73°54.0	1°55.2	3°49.4	25°19.1	69°41.2	3°23.2	108°57.0	-13°04.1	Shaula	96°12.6	-37°07.1					
20	95°25.3	88°53.6	1°56.5	18°50.8	25°19.2	84°43.1	3°23.4	123°59.2	-13°04.0	Rasalhague	96°00.1	12°32.4					
21	110°27.7	103°53.3	1°57.8	33°52.3	25°19.2	99°45.1	3°23.6	139°01.4	-13°03.9	Etamin	90°43.1	51°28.8					
22	125°30.2	118°53.0	1°59.1	48°53.7	25°19.3	114°47.1	3°23.9	154°03.6	-13°03.8	Kaus Aust.	83°34.7	-34°22.4					
23	140°32.6	133°52.7	2°00.4	63°55.1	25°19.4	129°49.0	3°24.1	169°05.7	-13°03.7	Vega	80°34.5	38°48.0					
Mer.pass.:13:39			v-0.3 d1.3 m-3.8			v1.4 d0.1 m0.3			v2.0 d0.2 m-1.9			v2.2 d0.1 m0.8					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec <td>Nunki</td> <td>75°49.9</td> <td>-26°16.1</td>	Nunki	75°49.9	-26°16.1					
0	155°35.1	148°52.4	2°01.7	78°56.5	25°19.4	144°51.0	3°24.3	184°07.9	-13°03.6	Altair	62°01.8	8°55.5					
1	170°37.6	163°52.1	2°03.0	93°57.9	25°19.5	159°52.9	3°24.5	199°10.1	-13°03.5	Peacock	53°08.6	-56°39.6					
2	185°40.0	178°51.8	2°04.3	108°59.3	25°19.5	174°54.9	3°24.7	214°12.3	-13°03.4	Deneb	49°27.3	45°21.5					
3	200°42.5	193°51.5	2°05.6	124°00.7	25°19.6	189°56.8	3°25.0	229°14.4	-13°03.3	Enif	33°40.6	9°58.7					
4	215°45.0	208°51.2	2°06.9	139°02.1	25°19.7	204°58.8	3°25.2	244°16.6	-13°03.2	Alnair	27°35.3	-46°51.0					
5	230°47.4	223°50.8	2°08.2	154°03.5	25°19.7	220°00.8	3°25.4	259°18.8	-13°03.1	Fomalhaut	15°16.6	-29°30.2					
6	245°49.9	238°50.5	2°09.6	169°04.9	25°19.8	235°02.7	3°25.6	274°20.9	-13°03.0	Scheat	13°47.1	28°12.3					
7	260°52.4	253°50.2	2°10.9	184°06.3	25°19.8	250°04.7	3°25.9	289°23.1	-13°02.9	Markab	13°31.8	15°19.6					
8	275°54.8	268°49.9	2°12.2	199°07.7	25°19.9	265°06.6	3°26.1	304°25.3	-13°02.8	2023/2/2 SHA Mer.pass							
9	290°57.3	283°49.6	2°13.5	214°09.1	25°20.0	280°08.6	3°26.3	319°27.5	-13°02.7	Venus	355°30.6	14:04					
10	305°59.8	298°49.3	2°14.8	229°10.5	25°20.0	295°10.5	3°26.5	334°29.6	-13°02.6	Mars	284°11.5	18:47					
11	321°02.2	313°49.0	2°16.1	244°11.9	25°20.1	310°12.5	3°26.7	349°31.8	-13°02.5	Jupiter	349°40.1	14:25					
12	336°04.7	328°48.7	2°17.4	259°13.3	25°20.1	325°14.4	3°27.0	4°34.0	-13°02.4	Saturn	28°46.7	11:49					
13	351°07.1	343°48.3	2°18.7	274°14.7	25°20.2	340°16.4	3°27.2	19°36.2	-13°02.3	2023/2/2 SHA Mer.pass							
14	6°09.6	358°48.0	2°20.0	289°16.1	25°20.3	355°18.4	3°27.4	34°38.3	-13°02.2	Venus	354°23.9	14:04					
15	21°12.1	13°47.7	2°21.3	304°17.5	25°20.3	10°20.3	3°27.6	49°40.5	-13°02.1	Mars	283°46.6	18:45					
16	36°14.5	28°47.4	2°22.6	319°18.9	25°20.4	25°22.3	3°27.8	64°42.7	-13°02.0	Jupiter	349°28.0	14:22					
17	51°17.0	43°47.1	2°23.9	334°20.3	25°20.4	4											

h Sun Moon

Fri	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight		
0	176°40.9	-9°38.4	129°55.5	12.3	8°52.0	15.3	58.4	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	191°41.0	-9°37.5	144°26.8	12.3	9°07.3	15.2	58.3	72	05:31	06:49	07:60	16:28	17:40	18:58
2	206°41.1	-9°36.6	158°58.1	12.3	9°22.4	15.1	58.3	70	05:34	06:44	07:47	16:41	17:44	18:55
3	221°41.2	-9°35.7	173°29.4	12.3	9°37.5	15.1	58.3	68	05:36	06:40	07:37	16:50	17:48	18:52
4	236°41.3	-9°34.8	188°00.7	12.3	9°52.5	15.0	58.2	66	05:38	06:37	07:29	16:58	17:51	18:50
5	251°41.4	-9°33.8	202°32.0	12.3	10°07.5	14.9	58.2	64	05:39	06:34	07:22	17:05	17:54	18:49
6	266°41.4	-9°32.9	217°03.2	12.3	10°22.4	14.9	58.1	62	05:40	06:31	07:16	17:11	17:56	18:48
7	281°41.5	-9°32.0	231°34.5	12.3	10°37.2	14.8	58.1	60	05:41	06:29	07:11	17:16	17:59	18:47
8	296°41.6	-9°31.1	246°05.8	12.3	10°52.0	14.7	58.0	58	05:41	06:27	07:06	17:21	18:01	18:46
9	311°41.7	-9°30.1	260°37.1	12.3	11°06.6	14.6	58.0	56	05:42	06:25	07:02	17:25	18:03	18:46
10	326°41.8	-9°29.2	275°08.3	12.3	11°21.2	14.6	58.0	54	05:42	06:23	06:59	17:29	18:04	18:45
11	341°41.9	-9°28.3	289°39.6	12.3	11°35.7	14.5	57.9	52	05:42	06:21	06:55	17:32	18:06	18:45
12	356°42.0	-9°27.4	304°10.8	12.2	11°50.2	14.4	57.9	50	05:42	06:19	06:52	17:35	18:08	18:45
13	11°42.1	-9°26.5	318°42.1	12.2	12°04.6	14.3	57.8	45	05:42	06:16	06:45	17:41	18:11	18:45
14	26°42.2	-9°25.5	333°13.3	12.2	12°18.8	14.2	57.8	40	05:41	06:12	06:40	17:47	18:14	18:46
15	41°42.3	-9°24.6	347°44.5	12.2	12°33.1	14.2	57.8	35	05:40	06:09	06:35	17:52	18:17	18:47
16	56°42.4	-9°23.7	2°15.7	12.2	12°47.2	14.1	57.7	30	05:39	06:06	06:31	17:56	18:20	18:48
17	71°42.4	-9°22.8	16°46.9	12.2	13°01.2	14.0	57.7	20	05:35	06:01	06:23	18:03	18:26	18:51
18	86°42.5	-9°21.8	31°18.1	12.2	13°15.2	13.9	57.6	10	05:30	05:55	06:16	18:10	18:31	18:56
19	101°42.6	-9°20.9	45°49.3	12.2	13°29.1	13.8	57.6	0	05:24	05:49	06:10	18:16	18:37	19:02
20	116°42.7	-9°20.0	60°20.4	12.1	13°42.9	13.8	57.6	-10	05:17	05:42	06:03	18:23	18:44	19:09
21	131°42.8	-9°19.0	74°51.6	12.1	13°56.6	13.7	57.5	-20	05:07	05:34	05:56	18:30	18:52	19:18
22	146°42.9	-9°18.1	89°22.7	12.1	14°10.2	13.6	57.5	-30	04:54	05:23	05:48	18:38	19:02	19:31
23	161°43.0	-9°17.2	103°53.8	12.1	14°23.7	13.5	57.4	-35	04:46	05:17	05:43	18:43	19:08	19:39
	SD.=16.2	d=0.9	S.D.=15.9					-40	04:36	05:09	05:37	18:48	19:16	19:49
								-45	04:24	05:00	05:31	18:54	19:25	20:01
								-50	04:08	04:49	05:23	19:02	19:36	20:17
								-52	03:60	04:44	05:20	19:05	19:41	20:25

February 27, 28 ,01 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	156°34.3	148°44.9	2°33.0	79°30.0	25°20.8	145°37.9	3°29.6	185°00.1	-13°01.2	Alpheratz	357°36.7	29°13.0					
1	171°36.7	163°44.6	2°34.3	94°31.4	25°20.9	160°39.9	3°29.8	200°02.3	-13°01.1	Ankaa	353°09.0	-42°11.1					
2	186°39.2	178°44.3	2°35.6	109°32.8	25°21.0	175°41.8	3°30.0	215°04.4	-13°01.0	Schedar	349°33.3	56°39.9					
3	201°41.6	193°44.0	2°36.9	124°34.2	25°21.0	190°43.8	3°30.3	230°06.6	-13°00.9	Diphda	348°49.0	-17°51.8					
4	216°44.1	208°43.7	2°38.3	139°35.6	25°21.1	205°45.7	3°30.5	245°08.8	-13°00.8	Achernar	335°21.7	-57°07.4					
5	231°46.6	223°43.4	2°39.6	154°37.0	25°21.1	220°47.7	3°30.7	260°11.0	-13°00.7	Hamal	327°53.2	23°34.3					
6	246°49.0	238°43.1	2°40.9	169°38.4	25°21.2	235°49.6	3°30.9	275°13.1	-13°00.6	Polaris	314°57.3	89°22.0					
7	261°51.5	253°42.7	2°42.2	184°39.8	25°21.3	250°51.6	3°31.2	290°15.3	-13°00.5	Akamar	315°13.1	-40°13.0					
8	276°54.0	268°42.4	2°43.5	199°41.1	25°21.3	265°53.5	3°31.4	305°17.5	-13°00.4	Menkar	314°07.9	4°10.7					
9	291°56.4	283°42.1	2°44.8	214°42.5	25°21.4	280°55.5	3°31.6	320°19.7	-13°00.2	Mirfak	308°30.6	49°56.7					
10	306°58.9	298°41.8	2°46.1	229°43.9	25°21.4	295°57.4	3°31.8	335°21.8	-13°00.1	Aldebaran	290°41.4	16°33.3					
11	322°01.4	313°41.5	2°47.4	244°45.3	25°21.5	310°59.4	3°32.0	350°24.0	-13°00.0	Rigel	281°05.3	-8°10.6					
12	337°03.8	328°41.2	2°48.7	259°46.7	25°21.5	326°01.3	3°32.3	5°26.2	-12°59.9	Capella	280°24.1	46°01.5					
13	352°06.3	343°40.9	2°50.0	274°48.1	25°21.6	341°03.3	3°32.5	20°28.4	-12°59.8	Bellatrix	278°24.4	6°22.2					
14	7°08.8	358°40.6	2°51.3	289°49.5	25°21.7	356°05.3	3°32.7	35°30.5	-12°59.7	Elnath	278°03.7	28°37.7					
15	22°11.2	13°40.3	2°52.6	304°50.8	25°21.7	11°07.2	3°32.9	50°32.7	-12°59.6	Alnilam	275°39.2	-1°11.3					
16	37°13.7	28°39.9	2°53.9	319°52.2	25°21.8	26°09.2	3°33.1	65°34.9	-12°59.5	Betelgeuse	270°53.6	7°24.6					
17	52°16.1	43°39.6	2°55.2	334°53.6	25°21.8	41°11.1	3°33.4	80°37.1	-12°59.4	Canopus	263°52.8	-52°42.7					
18	67°18.6	58°39.3	2°56.5	349°55.0	25°21.9	56°13.1	3°33.6	95°39.2	-12°59.3	Sirius	258°27.3	-16°44.8					
19	82°21.1	73°39.0	2°57.8	4°56.4	25°21.9	71°15.0	3°33.8	110°41.4	-12°59.2	Adara	255°06.8	-29°00.4					
20	97°23.5	88°38.7	2°59.1	19°57.7	25°22.0	86°17.0	3°34.0	125°43.6	-12°59.1	Procyon	244°52.1	5°10.0					
21	112°26.0	103°38.4	3°00.4	34°59.1	25°22.1	101°18.9	3°34.3	140°45.8	-12°59.0	Pollux	243°18.8	27°58.2					
22	127°28.5	118°38.1	3°01.7	50°00.5	25°22.1	116°20.9	3°34.5	155°47.9	-12°58.9	Avior	234°14.8	-59°35.1					
23	142°30.9	133°37.8	3°03.0	65°01.9	25°22.2	131°22.8	3°34.7	170°50.1	-12°58.8	Suhail	222°47.0	-43°31.6					
Mer.pass.:13:31			v-0.3 d1.3 m-3.8			v1.4 d0.1 m0.4			v2.0 d0.2 m-1.9			v2.2 d0.1 m0.9					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	157°33.4	148°37.5	3°04.3	80°03.3	25°22.2	146°24.8	3°34.9	185°52.3	-12°58.7	Dubhe	193°42.2	61°37.5					
1	172°35.9	163°37.1	3°05.6	95°04.6	25°22.3	161°26.7	3°35.1	200°54.5	-12°58.6	Denebola	182°26.1	14°26.5					
2	187°38.3	178°36.8	3°06.9	110°06.0	25°22.3	176°28.7	3°35.4	215°56.6	-12°58.5	Gienah	175°44.8	-17°40.2					
3	202°40.8	193°36.5	3°08.2	125°07.4	25°22.4	191°30.6	3°35.6	230°58.8	-12°58.4	Acrux	173°01.2	-63°13.5					
4	217°43.2	208°36.2	3°09.5	140°08.8	25°22.5	206°32.6	3°35.8	246°01.0	-12°58.3	Gacrux	171°52.9	-57°14.4					
5	232°45.7	223°35.9	3°10.8	155°10.1	25°22.5	221°34.5	3°36.0	261°03.2	-12°58.2	Alioth	166°13.9	55°49.9					
6	247°48.2	238°35.6	3°12.1	170°11.5	25°22.6	236°36.5	3°36.3	276°05.3	-12°58.1	Spica	158°23.7	-11°16.9					
7	262°50.6	253°35.3	3°13.4	185°12.9	25°22.6	251°38.4	3°36.5	291°07.5	-12°58.0	Alcaid	152°52.9	49°11.6					
8	277°53.1	268°35.0	3°14.7	200°14.3	25°22.7	266°40.4	3°36.7	306°09.7	-12°57.9	Hadar	148°37.8	-60°28.9					
9	292°55.6	283°34.6	3°16.0	215°15.6	25°22.7	281°42.3	3°36.9	321°11.9	-12°57.8	Menkent	147°59.2	-36°28.9					
10	307°58.0	298°34.3	3°17.3	230°17.0	25°22.8	296°44.3	3°37.1	336°14.0	-12°57.7	Arcturus	145°49.0	19°03.8					
11	323°00.5	313°34.0	3°18.6	245°18.4	25°22.8	311°46.2	3°37.4	351°16.2	-12°57.6	Rigel Kent.	139°42.1	-60°55.6					
12	338°03.0	328°33.7	3°19.9	260°19.8	25°22.9	326°48.2	3°37.6	6°18.4	-12°57.5	Zubenelg.	136°57.6	-16°08.3					
13	353°05.4	343°33.4	3°21.2	275°21.1	25°23.0	341°50.1	3°37.8	21°20.6	-12°57.4	Kochab	137°19.3	74°03.3					
14	8°07.9	358°33.1	3°22.5	290°22.5	25°23.0	356°52.1	3°38.0	36°22.7	-12°57.3	Alphecca	126°05.0	26°38.0					
15	23°10.4	13°32.8	3°23.8	305°23.9	25°23.1	11°54.0	3°38.3	51°24.9	-12°57.2	Antares	112°17.7	-26°28.9					
16	38°12.8	28°32.5	3°25.1	320°25.2	25°23.1	26°56.0	3°38.5	66°27.1	-12°57.1	Atria	107°13.4	-69°03.9					
17	53°15.3	43°32.2	3°26.4	335°26.6	25°23.2	41°57.9	3°38.7	81°29.3	-12°57.0	Sabik	102°04.6	-15°45.2					
18	68°17.7	58°31.8	3°27.7	350°28.0	25°23.2	56°59.9	3°38.9	96°31.4	-12°56.9	Shaula	96°12.6	-37°07.1					
19	83°20.2	73°31.5	3°29.0	5°29.3	25°23.3	72°01.9	3°39.1	111°33.6	-12°56.8	Rasalhague	96°00.1	12°32.4					
20	98°22.7	88°31.2	3°30.3	20°30.7	25°23.3	87°03.8	3°39.4	126°35.8	-12°56.7	Etamin	90°43.1	51°28.8					
21	113°25.1	103°30.9	3°31.6	35°32.1	25°23.4	102°05.8	3°39.6	141°38.0	-12°56.6	Kaus Aust.	83°34.7	-34°22.4					
22	128°27.6	118°30.6	3°32.9	50°33.4	25°23.5	117°07.7	3°39.8	156°40.1	-12°56.5	Vega	80°34.5	38°47.9					
23	143°30.1	133°30.3	3°34.2	65°34.8	25°23.5	132°09.7	3°40.0	171°42.3	-12°56.4	Nunki	75°49.9	-26°16.1					
Mer.pass.:13:27			v-0.3 d1.3 m-3.9			v1.4 d0.1 m0.4			v2.0 d0.2 m-1.9			v2.2 d0.1 m0.9					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	158°32.5	148°30.0	3°35.5	80°36.2	25°23.6	147°11.6	3°40.3	186°44.5	-12°56.3	2023/2/2	SHA	Mer.pass					
1	173°35.0	163°29.7	3°36.8	95°37.5	25°23.6	162°13.6	3°40.5	201°46.7	-12°56.2	Venus	352°10.7	14:05					
2	188°37.5	178°29.4	3°38.1	110°38.9	25°23.7	177°15.5	3°40.7	216°48.8	-12°56.1	Mars	282°55.8	18:40					
3	203°39.9	193°29.0	3°39.4	125°40.3	25°23.7	192°17.4	3°40.9	231°51.0	-12°56.0	Jupiter	349°03.6	14:16					
4	218°42.4	208°28.7	3°40.7	140°41.6	25°23.8	207°19.4	3°41.1	246°53.2	-12°55.9	Saturn	28°25.8	11:38					
5	233°44.9	223°28.4	3°42.0	155°43.0	25°23.8	222°21.3	3°41.4	261°55.4	-12°55.8	2023/2/2	SHA	Mer.pass					
6	248°47.3	238°28.1	3°43.3	170°44.3	25°23.9	237°23.3	3°41.6	276°57.5	-12°55.7	Venus	351°04.1	14:06					
7	263°49.8	253°27.8	3°44.6	185°45.7	25°23.9	252°25.2	3°41.8	291°59.7	-12°55.6	Mars	282°29.9	18:38					
8	278°52.2	268°27.5	3°45.9	200°47.1	25°24.0	267°27.2	3°42.0	307°01.9	-12°55.5	Jupiter	348°51.4	14:12					
9	293°54.7	283°27.2	3°47.2	215°48.4	25°24.1	282°29.1	3°42.3	322°04.1	-12°55.4	Saturn	28°18.9	11:35					
10	308°57.2	298°26.9	3°48.5	230°49.8	25°24.1	297°31.1	3°42.5	337°06.3	-12°55.3	2023/2/2	SHA	Mer.pass					
11	323°59.6	313°26.6	3°49.8	245°51.1	25°24.2	312°33.0	3°42.7	352°08.4	-12°55.2	Venus	351°04.1	14:06					
12	339°02.1	328°26.2	3°51.1	260°52.5	25°24.2	327°35.0	3°42.9	7°10.6	-12°55.1	Mars	282°29.9	18:38					
13	354°04.6	343°25.9	3°52.4	275°53.9	25°24.3	342°36.											

Sun				Moon											
Mon	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	176°47.9	-8°31.5		94°45.9	10.7	23°23.2	8.2	55.7	72	05:16	06:34	07:44	16:43	17:53	19:12
1	191°48.0	-8°30.6		109°15.5	10.7	23°31.4	8.1	55.7	70	05:21	06:31	07:33	16:54	17:56	19:07
2	206°48.1	-8°29.6		123°45.2	10.6	23°39.5	8.0	55.6	68	05:24	06:28	07:25	17:02	17:59	19:03
3	221°48.2	-8°28.7		138°14.8	10.6	23°47.4	7.9	55.6	66	05:27	06:26	07:18	17:09	18:01	19:00
4	236°48.4	-8°27.7		152°44.4	10.6	23°55.2	7.7	55.6	64	05:29	06:24	07:12	17:15	18:03	18:58
5	251°48.5	-8°26.8		167°13.9	10.5	24°02.9	7.6	55.6	62	05:31	06:22	07:07	17:20	18:04	18:56
6	266°48.6	-8°25.9		181°43.4	10.5	24°10.4	7.5	55.5	60	05:32	06:20	07:02	17:24	18:06	18:54
7	281°48.7	-8°24.9		196°12.9	10.5	24°17.9	7.4	55.5	58	05:34	06:19	06:58	17:28	18:07	18:53
8	296°48.8	-8°24.0		210°42.4	10.4	24°25.2	7.2	55.5	56	05:34	06:17	06:55	17:31	18:09	18:52
9	311°48.9	-8°23.0		225°11.8	10.4	24°32.4	7.1	55.4	54	05:35	06:16	06:52	17:34	18:10	18:51
10	326°49.0	-8°22.1		239°41.2	10.4	24°39.4	7.0	55.4	52	05:36	06:15	06:49	17:37	18:11	18:50
11	341°49.1	-8°21.2		254°10.6	10.4	24°46.4	6.9	55.4	50	05:36	06:14	06:46	17:40	18:12	18:50
12	356°49.2	-8°20.2		268°39.9	10.3	24°53.2	6.7	55.4	45	05:37	06:11	06:40	17:46	18:15	18:49
13	11°49.3	-8°19.3		283°09.2	10.3	24°59.8	6.6	55.3	40	05:37	06:08	06:35	17:50	18:17	18:49
14	26°49.4	-8°18.3		297°38.5	10.3	25°06.4	6.5	55.3	35	05:36	06:06	06:31	17:54	18:20	18:49
15	41°49.6	-8°17.4		312°07.8	10.2	25°12.8	6.3	55.3	30	05:36	06:03	06:27	17:58	18:22	18:50
16	56°49.7	-8°16.5		326°37.0	10.2	25°19.1	6.2	55.3	20	05:33	05:59	06:21	18:05	18:27	18:52
17	71°49.8	-8°15.5		341°06.2	10.2	25°25.2	6.1	55.2	10	05:29	05:54	06:15	18:10	18:31	18:56
18	86°49.9	-8°14.6		355°35.4	10.2	25°31.2	6.0	55.2	0	05:24	05:48	06:09	18:16	18:37	19:01
19	101°50.0	-8°13.6		10°04.5	10.1	25°37.1	5.8	55.2	-10	05:17	05:42	06:03	18:21	18:43	19:07
20	116°50.1	-8°12.7		24°33.7	10.1	25°42.9	5.7	55.2	-20	05:09	05:35	05:57	18:28	18:50	19:16
21	131°50.2	-8°11.8		39°02.8	10.1	25°48.5	5.6	55.1	-30	04:57	05:26	05:50	18:35	18:59	19:28
22	146°50.3	-8°10.8		53°31.9	10.1	25°54.0	5.4	55.1	-35	04:49	05:20	05:46	18:39	19:05	19:35
23	161°50.4	-8°09.9		68°00.9	10.1	25°59.4	5.3	55.1	-40	04:40	05:13	05:41	18:44	19:11	19:44
	SD.=16.2	d=0.9		S.D.=15.2					-45	04:28	05:05	05:35	18:49	19:19	19:55
									-50	04:14	04:55	05:28	18:56	19:29	20:10
									-52	04:07	04:50	05:25	18:59	19:34	20:17
									-54	03:58	04:45	05:22	19:02	19:39	20:25
									-56	03:49	04:39	05:18	19:06	19:45	20:34
									-58	03:38	04:32	05:14	19:10	19:52	20:45
									-60	03:25	04:24	05:09	19:15	19:59	20:57

March 02, 03 ,04 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	159°31.7	148°22.5	4°06.7	81°08.8	25°24.9	147°58.4	3°45.6	187°36.7	-12°53.8	Alpheratz	357°36.7	29°13.0						
1	174°34.1	163°22.2	4°07.9	96°10.1	25°24.9	163°00.3	3°45.8	202°08.9	-12°53.7	Ankaa	353°09.0	-42°11.0						
2	189°36.6	178°21.9	4°09.2	111°11.5	25°25.0	178°02.3	3°46.0	217°41.1	-12°53.6	Schedar	349°33.3	56°39.9						
3	204°39.1	193°21.6	4°10.5	126°12.8	25°25.0	193°04.2	3°46.3	232°43.2	-12°53.5	Diphda	348°49.0	-17°51.8						
4	219°41.5	208°21.3	4°11.8	141°14.2	25°25.1	208°06.2	3°46.5	247°45.4	-12°53.4	Achernar	335°21.7	-57°07.4						
5	234°44.0	223°20.9	4°13.1	156°15.5	25°25.1	223°08.1	3°46.7	262°47.6	-12°53.3	Hamal	327°53.2	23°34.3						
6	249°46.5	238°20.6	4°14.4	171°16.9	25°25.2	238°10.1	3°46.9	277°49.8	-12°53.2	Polaris	314°58.5	89°22.0						
7	264°48.9	253°20.3	4°15.7	186°18.2	25°25.2	253°12.0	3°47.2	292°52.0	-12°53.1	Akamar	315°13.1	-40°13.0						
8	279°51.4	268°20.0	4°17.0	201°19.6	25°25.3	268°13.9	3°47.4	307°54.1	-12°53.0	Menkar	314°07.9	4°10.7						
9	294°53.8	283°19.7	4°18.3	216°20.9	25°25.3	283°15.9	3°47.6	322°56.3	-12°52.9	Mirfak	308°30.6	49°56.7						
10	309°56.3	298°19.4	4°19.6	231°22.2	25°25.4	298°17.8	3°47.8	337°58.5	-12°52.8	Aldebaran	290°41.4	16°33.3						
11	324°58.8	313°19.1	4°20.9	246°23.6	25°25.4	313°19.8	3°48.1	353°00.7	-12°52.7	Rigel	281°05.3	-8°10.7						
12	340°01.2	328°18.8	4°22.2	261°24.9	25°25.5	328°21.7	3°48.3	8°02.8	-12°52.6	Capella	280°24.1	46°01.5						
13	355°03.7	343°18.4	4°23.5	276°26.3	25°25.5	343°23.7	3°48.5	23°05.0	-12°52.5	Bellatrix	278°24.4	6°22.2						
14	10°06.2	358°18.1	4°24.8	291°27.6	25°25.6	358°25.6	3°48.7	38°07.2	-12°52.4	Elnath	278°03.7	28°37.7						
15	25°08.6	13°17.8	4°26.1	306°29.0	25°25.6	13°27.6	3°49.0	53°09.4	-12°52.3	Alnilam	275°39.2	-1°11.3						
16	40°11.1	28°17.5	4°27.4	321°30.3	25°25.7	28°29.5	3°49.2	68°11.5	-12°52.2	Betelgeuse	270°53.6	7°24.6						
17	55°13.6	43°17.2	4°28.7	336°31.7	25°25.7	43°31.5	3°49.4	83°13.7	-12°52.1	Canopus	263°52.8	-52°42.7						
18	70°16.0	58°16.9	4°29.9	351°33.0	25°25.8	58°33.4	3°49.6	98°15.9	-12°52.0	Sirius	258°27.3	-16°44.8						
19	85°18.5	73°16.6	4°31.2	6°34.3	25°25.8	73°35.4	3°49.8	113°18.1	-12°51.9	Adara	255°06.8	-29°00.4						
20	100°21.0	88°16.3	4°32.5	21°35.7	25°25.9	88°37.3	3°50.1	128°20.2	-12°51.8	Procyon	244°52.1	5°10.0						
21	115°23.4	103°15.9	4°33.8	36°37.0	25°25.9	103°39.3	3°50.3	143°22.4	-12°51.7	Pollux	243°18.8	27°58.2						
22	130°25.9	118°15.6	4°35.1	51°38.4	25°26.0	118°41.2	3°50.5	158°24.6	-12°51.6	Avior	234°14.9	-59°35.1						
23	145°28.3	133°15.3	4°36.4	66°39.7	25°26.0	133°43.1	3°50.7	173°26.8	-12°51.5	Suhail	222°47.0	-43°31.7						
Mer.pass.:13:19			v-0.3 d1.3 m-3.9			v1.4 d0.1 m0.5			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9			Miaplacidus		221°37.8	-69°48.8

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	160°30.8	148°15.0	4°37.7	81°41.0	25°26.1	148°45.1	3°51.0	188°29.0	-12°51.4
1	175°33.3	163°14.7	4°39.0	96°42.4	25°26.1	163°47.0	3°51.2	203°31.1	-12°51.3
2	190°35.7	178°14.4	4°40.3	111°43.7	25°26.2	178°49.0	3°51.4	218°33.3	-12°51.2
3	205°38.2	193°14.1	4°41.6	126°45.1	25°26.2	193°50.9	3°51.6	233°35.5	-12°51.1
4	220°40.7	208°13.7	4°42.9	141°46.4	25°26.3	208°52.9	3°51.9	248°37.7	-12°51.0
5	235°43.1	223°13.4	4°44.2	156°47.7	25°26.3	223°54.8	3°52.1	263°39.8	-12°50.9
6	250°45.6	238°13.1	4°45.4	171°49.1	25°26.4	238°56.8	3°52.3	278°42.0	-12°50.8
7	265°48.1	253°12.8	4°46.7	186°50.4	25°26.4	253°58.7	3°52.5	293°44.2	-12°50.7
8	280°50.5	268°12.5	4°48.0	201°51.7	25°26.5	269°00.6	3°52.8	308°46.4	-12°50.6
9	295°53.0	283°12.2	4°49.3	216°53.1	25°26.5	284°02.6	3°53.0	323°48.6	-12°50.5
10	310°55.5	298°11.9	4°50.6	231°54.4	25°26.6	299°04.5	3°53.2	338°50.7	-12°50.4
11	325°57.9	313°11.6	4°51.9	246°55.7	25°26.6	314°06.5	3°53.4	353°52.9	-12°50.3
12	341°00.4	328°11.2	4°53.2	261°57.1	25°26.7	329°08.4	3°53.6	8°55.1	-12°50.2
13	356°02.8	343°10.9	4°54.5	276°58.4	25°26.7	344°10.4	3°53.9	23°57.3	-12°50.1
14	11°05.3	358°10.6	4°55.8	291°59.7	25°26.8	359°12.3	3°54.1	38°59.4	-12°50.0
15	26°07.8	13°10.3	4°57.1	307°01.1	25°26.8	14°14.3	3°54.3	54°01.6	-12°49.9
16	41°10.2	28°10.0	4°58.3	322°02.4	25°26.9	29°16.2	3°54.5	69°03.8	-12°49.8
17	56°12.7	43°09.7	4°59.6	337°03.7	25°26.9	44°18.1	3°54.8	84°06.0	-12°49.7
18	71°15.2	58°09.4	5°00.9	352°05.1	25°27.0	59°20.1	3°55.0	99°08.1	-12°49.6
19	86°17.6	73°09.0	5°02.2	7°06.4	25°27.0	74°22.0	3°55.2	114°10.3	-12°49.5
20	101°20.1	88°08.7	5°03.5	22°07.7	25°27.1	89°24.0	3°55.4	129°12.5	-12°49.4
21	116°22.6	103°08.4	5°04.8	37°09.0	25°27.1	104°25.9	3°55.7	144°14.7	-12°49.3
22	131°25.0	118°08.1	5°06.1	52°10.4	25°27.2	119°27.9	3°55.9	159°16.9	-12°49.2
23	146°27.5	133°07.8	5°07.4	67°11.7	25°27.2	134°29.8	3°56.1	174°19.0	-12°49.1
	Mer.pass.:13:15	v-0.3 d1.3 m-3.9		v1.3 d0.1 m0.5		v1.9 d0.2 m-1.9		v2.2 d0.1 m0.9	

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	161°30.0	148°07.5	5°08.7	82°13.0	25°27.3	149°31.8	3°56.3	189°21.2	-12°49.0
1	176°32.4	163°07.2	5°09.9	97°14.4	25°27.3	164°33.7	3°56.6	204°23.4	-12°48.9
2	191°34.9	178°06.8	5°11.2	112°15.7	25°27.4	179°35.6	3°56.8	219°25.6	-12°48.8
3	206°37.3	193°06.5	5°12.5	127°17.0	25°27.4	194°37.6	3°57.0	234°27.7	-12°48.7
4	221°39.8	208°06.2	5°13.8	142°18.3	25°27.5	209°39.5	3°57.2	249°29.9	-12°48.6
5	236°42.3	223°05.9	5°15.1	157°19.7	25°27.5	224°41.5	3°57.5	264°32.1	-12°48.5
6	251°44.7	238°05.6	5°16.4	172°21.0	25°27.6	239°43.4	3°57.7	279°34.3	-12°48.4
7	266°47.2	253°05.3	5°17.7	187°22.3	25°27.6	254°45.4	3°57.9	294°36.5	-12°48.3
8	281°49.7	268°05.0	5°18.9	202°23.6	25°27.6	269°47.3	3°58.1	309°38.6	-12°48.2
9	296°52.1	283°04.6	5°20.2	217°24.9	25°27.7	284°49.2	3°58.4	324°40.8	-12°48.1
10	311°54.6	298°04.3	5°21.5	232°26.3	25°27.7	299°51.2	3°58.6	339°43.0	-12°48.0
11	326°57.1	313°04.0	5°22.8	247°27.6	25°27.8	314°53.1	3°58.8	354°45.2	-12°47.9
12	341°59.5	328°03.7	5°24.1	262°28.9	25°27.8	329°55.1	3°59.0	9°47.4	-12°47.8
13	357°02.0	343°03.4	5°25.4	277°30.2	25°27.9	344°57.0	3°59.3	24°49.5	-12°47.7
14	12°04.4	358°03.1	5°26.7	292°31.6	25°27.9	359°59.0	3°59.5	39°51.7	-12°47.6
15	27°06.9	13°02.7	5°27.9	307°32.9	25°28.0	15°00.9	3°59.7	54°53.9	-12°47.5
16	42°09.4	28°02.4	5°29.2	322°34.2	25°28.0	30°02.8	3°59.9	69°56.1	-12°47.4
17	57°11.8	43°02.1	5°30.5	337°35.5	25°28.1	45°04.8	4°00.2	84°58.2	-12°47.3
18	72°14.3	58°01.8	5°31.8	352°36.8	25°28.1	60°06.7	4°00.4	100°00.4	-12°47.2
19	87°16.8	73°01.5	5°33.1	7°38.1	25°28.2	75°08.7	4°00.6	115°02.6	-12°47.1
20	102°19.2	88°01.2	5°34.4	22°39.5	25°28.2	90°10.6	4°00.8	130°04.8	-12°47.0
21	117°21.7	103°00.8	5°35.6	37°40.8	25°28.3	105°12.5	4°01.1	145°07.0	-12°46.9
22	132°24.2	118°00.5	5°36.9	52°42.1	25°28.3	120°14.5	4°01.3	160°09.1	-12°46.8
23	147°26.6	133°00.2	5°38.2	67°43.4	25°28.3	135°16.4	4°01.5	175°11.3	-12°46.7
Mer.pass.:13:11		v-0.3 d1.3 m-3.9		v7.3 d0.0 m0.5		v1.9 d0.2 m-1.9		v2.2 d0.1 m0.9	

	SHA	Dec
Alpheratz	357° 36.7	29° 13.0
Ankaa	353° 09.0	-42° 11.0
Schedar	349° 33.3	56° 39.9
Diphda	348° 49.0	-17° 51.8
Achernar	335° 21.7	-57° 07.4
Hamal	327° 53.2	23° 34.3
Polaris	314° 58.5	89° 22.0
Akamar	315° 13.1	-40° 13.0
Menkar	314° 07.9	4° 10.7
Mirfak	308° 30.6	49° 56.7
Aldebaran	290° 41.4	16° 33.3
Rigel	281° 05.3	-8° 10.7
Capella	280° 24.1	46° 01.5
Bellatrix	278° 24.4	6° 22.2
Elnath	278° 03.7	28° 37.7
Anilnil	275° 39.2	-1° 11.3
Betelgeuse	270° 53.6	7° 24.6
Canopus	263° 52.8	-52° 42.7
Sirius	258° 27.3	-16° 44.8
Adara	255° 06.8	-29° 00.4
Procyon	244° 52.1	5° 10.0
Pollux	243° 18.8	27° 58.2
Avior	234° 14.9	-59° 35.1
Suhail	222° 47.0	-43° 31.7
Alphard	217° 48.9	-8° 45.6
Regulus	207° 35.7	11° 51.2
Dubhe	193° 42.2	61° 37.5
Denebola	182° 26.1	14° 26.5
Gienah	175° 44.8	-17° 40.3
Acrux	173° 01.2	-63° 13.5
Gacrux	171° 52.9	-57° 14.5
Alioth	166° 13.9	55° 49.9
Spica	158° 23.7	-11° 17.0
Alcaid	152° 52.9	49° 11.6
Hadar	148° 37.8	-60° 28.9
Menkent	147° 59.2	-36° 28.9
Arcturus	145° 49.0	19° 03.8
Rigel Kent.	139° 42.1	-60° 55.6
Zubenelg.	136° 57.6	-16° 08.3
Kochab	137° 19.2	74° 03.3
Alphecca	126° 05.0	26° 38.0
Antares	112° 17.7	-26° 29.0
Atria	107° 13.4	-69° 03.9
Sabik	102° 04.6	-15° 45.2
Shaula	96° 12.5	-37° 07.1
Rasalhague	96° 00.1	12° 32.4
Etamin	90° 43.1	51° 28.8
Kaus Aust.	83° 34.7	-34° 22.4
Vega	80° 34.5	38° 47.9
Nunki	75° 49.9	-26° 16.1
Altair	62° 01.8	8° 55.5
Peacock	53° 08.6	-56° 39.6
Deneb	49° 27.2	45° 21.5
Enif	33° 40.6	9° 58.7
Alnair	27° 35.3	-46° 51.0
Fomalhaut	15° 16.6	-29° 30.1
Scheat	13° 47.1	28° 12.3
Markab	13° 31.8	15° 19.1

2023/3/2	SHA	Mer.pass
Venus	348° 50.8	14:07
Mars	281° 37.1	18:34
Jupiter	348° 26.7	14:06
Saturn	28° 05.0	11:28

2023/3/3	SHA	Mer.pass
Venus	347° 44.2	14:07
Mars	281° 10.2	18:32
Jupiter	348° 14.3	14:03
Saturn	27° 58.1	11:24

2023/3/4	SHA	Mer.pass
Venus	346° 37.5	14:08
Mars	280° 43.1	18:30
Jupiter	348° 01.8	14:00
Saturn	27° 51.3	11:21

Horizontal parallax	
Venus:	0.1
Mars:	0.1

h		Sun		Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	176°56.2	-7°23.4	57°34.9	10.0	27°36.7	-1.3	54.2
1	191°56.3	-7°22.5	72°04.0	10.1	27°35.3	-1.5	54.2
2	206°56.5	-7°21.5	86°33.1	10.1	27°33.8	-1.6	54.2
3	221°56.6	-7°20.6	101°02.2	10.1	27°32.2	-1.7	54.2
4	236°56.7	-7°19.6	115°31.3	10.1	27°30.4	-1.9	54.2
5	251°56.8	-7°18.7	130°00.5	10.2	27°28.4	-2.0	54.2
6	266°57.0	-7°17.7	144°29.7	10.2	27°26.4	-2.1	54.2
7	281°57.1	-7°16.8	158°58.9	10.2	27°24.2	-2.3	54.2
8	296°57.2	-7°15.8	173°28.1	10.3	27°21.9	-2.4	54.2
9	311°57.3	-7°14.9	187°57.4	10.3	27°19.4	-2.5	54.1
10	326°57.5	-7°13.9	202°26.7	10.3	27°16.8	-2.6	54.1
11	341°57.6	-7°12.9	216°56.0	10.4	27°14.1	-2.8	54.1
12	356°57.7	-7°12.0	231°25.4	10.4	27°11.3	-2.9	54.1
13	11°57.8	-7°11.0	245°54.8	10.4	27°08.3	-3.0	54.1
14	26°58.0	-7°10.1	260°24.3	10.5	27°05.2	-3.2	54.1
15	41°58.1	-7°09.1	274°53.8	10.5	27°02.0	-3.3	54.1
16	56°58.2	-7°08.2	289°23.3	10.5	26°58.6	-3.4	54.1
17	71°58.4	-7°07.2	303°52.9	10.6	26°55.1	-3.5	54.1
18	86°58.5	-7°06.3	318°22.5	10.6	26°51.5	-3.7	54.1
19	101°58.6	-7°05.3	332°52.1	10.7	26°47.8	-3.8	54.1
20	116°58.7	-7°04.3	347°21.8	10.7	26°43.9	-3.9	54.1
21	131°58.9	-7°03.4	1°51.5	10.7	26°39.9	-4.0	54.1
22	146°59.0	-7°02.4	16°21.3	10.8	26°35.8	-4.2	54.1
23	161°59.1	-7°01.5	30°51.1	10.8	26°31.6	-4.3	54.1
SD.=16.1		d=1.0	S.D.=14.8				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°59.2	-7°00.5	45°20.9	10.9	26°27.2	-4.4	54.1
1	191°59.4	-6°59.6	59°50.8	10.9	26°22.8	-4.5	54.1
2	206°59.5	-6°58.6	74°20.7	11.0	26°18.1	-4.7	54.1
3	221°59.6	-6°57.7	88°50.7	11.0	26°13.4	-4.8	54.0
4	236°59.8	-6°56.7	103°20.7	11.0	26°08.6	-4.9	54.0
5	251°59.9	-6°55.7	117°50.8	11.1	26°03.6	-5.0	54.0
6	267°00.0	-6°54.8	132°20.9	11.1	25°58.5	-5.2	54.0
7	282°00.2	-6°53.8	146°51.1	11.2	25°53.3	-5.3	54.0
8	297°00.3	-6°52.9	161°21.3	11.2	25°48.0	-5.4	54.0
9	312°00.4	-6°51.9	175°51.6	11.3	25°42.5	-5.5	54.0
10	327°00.5	-6°51.0	190°21.9	11.3	25°37.0	-5.6	54.0
11	342°00.7	-6°50.0	204°52.3	11.4	25°31.3	-5.7	54.0
12	357°00.8	-6°49.0	219°22.7	11.4	25°25.5	-5.9	54.0
13	12°00.9	-6°48.1	233°53.1	11.5	25°19.6	-6.0	54.0
14	27°01.1	-6°47.1	248°23.6	11.5	25°13.5	-6.1	54.0
15	42°01.2	-6°46.2	262°54.2	11.6	25°07.4	-6.2	54.0
16	57°01.3	-6°45.2	277°24.8	11.6	25°01.1	-6.3	54.0
17	72°01.5	-6°44.2	291°55.5	11.7	24°54.7	-6.4	54.0
18	87°01.6	-6°43.3	306°26.2	11.7	24°48.3	-6.5	54.0
19	102°01.7	-6°42.3	320°57.0	11.8	24°41.7	-6.7	54.0
20	117°01.9	-6°41.4	335°27.8	11.9	24°34.9	-6.8	54.0
21	132°02.0	-6°40.4	349°58.7	11.9	24°28.1	-6.9	54.0
22	147°02.1	-6°39.4	4°29.7	12.0	24°21.2	-7.0	54.0
23	162°02.3	-6°38.5	19°00.6	12.0	24°14.1	-7.1	54.0
SD.=16.1		d=1.0	S.D.=14.7				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	177°02.4	-6°37.5	33°31.7	12.1	24°07.0	-7.2	54.0
1	192°02.5	-6°36.6	48°02.8	12.1	23°59.7	-7.3	54.0
2	207°02.7	-6°35.6	62°33.9	12.2	23°52.4	-7.4	54.0
3	222°02.8	-6°34.6	77°05.2	12.2	23°44.9	-7.5	54.0
4	237°02.9	-6°33.7	91°36.4	12.3	23°37.3	-7.6	54.0
5	252°03.1	-6°32.7	106°07.7	12.3	23°29.6	-7.7	54.0
6	267°03.2	-6°31.8	120°39.1	12.4	23°21.8	-7.8	54.0
7	282°03.3	-6°30.8	135°10.6	12.5	23°13.9	-7.9	54.0
8	297°03.5	-6°29.8	149°42.0	12.5	23°05.9	-8.0	54.0
9	312°03.6	-6°28.9	164°13.6	12.6	22°57.8	-8.1	54.0
10	327°03.7	-6°27.9	178°45.2	12.6	22°49.6	-8.3	54.0
11	342°03.9	-6°26.9	193°16.8	12.7	22°41.3	-8.4	54.1
12	357°04.0	-6°26.0	207°48.6	12.7	22°32.9	-8.5	54.1
13	12°04.2	-6°25.0	222°20.3	12.8	22°24.4	-8.6	54.1
14	27°04.3	-6°24.1	236°52.1	12.9	22°15.8	-8.6	54.1
15	42°04.4	-6°23.1	251°24.0	12.9	22°07.1	-8.7	54.1
16	57°04.6	-6°22.1	265°56.0	13.0	21°58.4	-8.8	54.1
17	72°04.7	-6°21.2	280°28.0	13.0	21°49.5	-8.9	54.1
18	87°04.8	-6°20.2	294°00.0	13.1	21°40.5	-9.0	54.1
19	102°05.0	-6°19.2	309°32.1	13.1	21°31.4	-9.1	54.1
20	117°05.1	-6°18.3	324°04.3	13.2	21°22.2	-9.2	54.1
21	132°05.2	-6°17.3	338°36.5	13.2	21°12.9	-9.3	54.1
22	147°05.4	-6°16.4	353°08.7	13.3	21°03.6	-9.4	54.1
23	162°05.5	-6°15.4	7°41.1	13.4	20°54.1	-9.5	54.1
SD.=16.1		d=1.0	S.D.=14.7				
		Twilight				Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	05:01	06:19	07:28	16:58	18:07	19:26	
70	05:07	06:18	07:19	17:06	18:08	19:19	
68	05:12	06:16	07:12	17:13	18:09	19:14	
66	05:16	06:15	07:06	17:19	18:11	19:10	
64	05:19	06:14	07:02	17:24	18:12	19:07	
62	05:22	06:13	06:57	17:28	18:12	19:04	
60	05:24	06:12	06:54	17:32	18:13	19:02	
58	05:26	06:11	06:50	17:35	18:14	18:60	
56	05:27	06:10	06:47	17:38	18:15	18:58	
54	05:28	06:09	06:45	17:40	18:16	18:57	
52	05:29	06:08	06:42	17:43	18:17	18:56	
50	05:30	06:08	06:40	17:45	18:17	18:55	
45	05:32	06:06	06:35	17:50	18:19	18:53	
40	05:33	06:04	06:31	17:54	18:21	18:52	
35	05:33	06:02	06:27	17:57	18:22	18:52	
30	05:32	06:00	06:24	18:00	18:24	18:52	
27	05:31	05:56	06:19	18:06	18:28	18:53	
20	05:28	05:52	06:13	18:11	18:32	18:56	
0	05:24	05:48	06:09	18:15	18:36	19:00	
-10	05:18	05:43	06:04	18:20	18:41	19:06	
-20	05:10	05:36	05:58	18:25	18:48	19:13	
-30	04:59	05:28	05:52	18:31	18:56	19:24	
-35	04:52	05:23	05:48	18:35	19:01	19:31	
-40	04:44	05:17	05:44	18:39	19:06	19:39	
-45	04:33	05:09	05:39	18:44	19:14	19:50	
-50	04:20	05:00	05:33	18:49	19:23	20:03	
-52	04:13	04:56	05:31	18:52	19:27	20:09	
-54	04:06	04:51	05:28	18:55	19:32	20:17	
-56	03:57	04:46	05:24	18:58	19:37	20:25	
-58	03:47	04:39	05:21	19:02	19:43	20:34	
-60	03:36	04:32	05:17	19:06	19:50	20:46	
		Moonrise		Moonset			
Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	11:33	—:—	—:—	08:49	
64	—:—	10:06	12:18	—:—	08:36	08:03	
62	09:28	11:07	12:48	07:29	07:34	07:33	
60	10:20	11:41	13:10	06:37	07:00	07:10	
58	10:51	12:06	13:28	06:06	06:35	06:52	
56	11:15	12:25	13:43	05:42	06:15	06:36	
54	11:34	12:42	13:56	05:22	05:58	06:23	
52	11:50	12:56	14:07	05:06	05:44	06:11	
50	12:04	13:08	14:17	04:52	05:31	06:01	
45	12:33	13:33	14:38	04:24	05:05	05:39	
40	12:55	13:54	14:55	04:01	04:45	05:21	
35	13:13	14:10	15:09	03:42	04:27	05:06	
30	13:29	14:25	15:21	03:26	04:12	04:53	
20	13:56	14:49	15:42	02:59	03:47	04:31	
10	14:19	15:10	16:00	02:36	03:25	04:11	
0	14:40	15:30	16:17	02:14	03:04	03:53	
-10	15:02	15:49	16:34	01:52	02:44	03:35	
-20	15:24	16:10	16:52	01:28	02:22	03:15	
-30	15:51	16:34	17:12	01:01	01:56	02:52	
-35	16:07	16:48	17:24	00:45	01:40	02:39	
-40	16:25	17:05	17:38	00:26	01:23	02:23	
-45	16:47	17:24	17:54	00:03	01:01	02:04	
-50	17:15	17:48	18:14	—:—	00:34	01:41	
-52	17:28	18:00	18:23	—:—	00:20	01:30	
-54	17:44	18:13	18:34	—:—	00:05	01:17	
-56	18:02	18:29	18:46	23:47	—:—	01:02	
-58	18:25	18:47	18:59	23:25	—:—	00:44	
-60	18:54	19:09	19:15	22:55	—:—	00:23	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Mer.	Mer.Pass.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
2	12:15	12:09	12:12	20:52	08:27	10(79%)	
3	12:03	11:57	12:11	21:41	09:17	11(86%)	
4	11:50	11:44	12:11	22:28	10:05	12(92%)	

March 05, 06 ,07 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	162°29.1	147°59.9	5°39.5	82°44.7	25°28.4	150°18.4	4°01.7	190°13.5	-12°46.6				Alpheratz	357°36.7	29°13.0		
1	177°31.6	162°59.6	5°40.8	97°46.0	25°28.4	165°20.3	4°02.0	205°15.7	-12°46.5				Ankaa	353°09.0	-42°11.0		
2	192°34.0	177°59.3	5°42.1	112°47.4	25°28.5	180°22.3	4°02.2	220°17.8	-12°46.4				Schedar	349°33.3	56°39.9		
3	207°36.5	192°59.0	5°43.3	127°48.7	25°28.5	195°24.2	4°02.4	235°20.0	-12°46.3				Diphda	348°49.0	-17°51.8		
4	222°38.9	207°58.6	5°44.6	142°50.0	25°28.6	210°26.1	4°02.6	250°22.2	-12°46.2				Achernar	335°21.7	-57°07.4		
5	237°41.4	222°58.3	5°45.9	157°51.3	25°28.6	225°28.1	4°02.8	265°24.4	-12°46.1				Hamal	327°53.2	23°34.3		
6	252°43.9	237°58.0	5°47.2	172°52.6	25°28.7	240°30.0	4°03.1	280°26.6	-12°46.0				Polaris	314°60.0	89°22.0		
7	267°46.3	252°57.7	5°48.5	187°53.9	25°28.7	255°32.0	4°03.3	295°28.7	-12°45.9				Akamars	315°13.1	-40°13.0		
8	282°48.8	267°57.4	5°49.7	202°55.2	25°28.8	270°33.9	4°03.5	310°30.9	-12°45.8				Menkar	314°07.9	4°10.7		
9	297°51.3	282°57.0	5°51.0	217°56.5	25°28.8	285°35.8	4°03.7	325°33.1	-12°45.7				Mirfak	308°30.6	49°56.7		
10	312°53.7	297°56.7	5°52.3	232°57.9	25°28.8	300°37.8	4°04.0	340°35.3	-12°45.6				Aldebaran	290°41.4	16°33.3		
11	327°56.2	312°56.4	5°53.6	247°59.2	25°28.9	315°39.7	4°04.2	355°37.5	-12°45.5				Rigel	281°05.3	-8°10.6		
12	342°58.7	327°56.1	5°54.9	263°00.5	25°28.9	330°41.7	4°04.4	10°39.6	-12°45.4				Capella	280°24.1	46°01.5		
13	358°01.1	342°55.8	5°56.1	278°01.8	25°29.0	345°43.6	4°04.6	25°41.8	-12°45.3				Bellatrix	278°24.5	6°22.2		
14	13°03.6	357°55.5	5°57.4	293°03.1	25°29.0	0°45.5	4°04.9	40°44.0	-12°45.2				Elnath	278°03.7	28°37.7		
15	28°06.1	12°55.1	5°58.7	308°04.4	25°29.1	15°47.5	4°05.1	55°46.2	-12°45.1				Alnilam	275°39.2	-1°11.3		
16	43°08.5	27°54.8	5°60.0	323°05.7	25°29.1	30°49.4	4°05.3	70°48.4	-12°45.0				Betelgeuse	270°53.6	7°24.6		
17	58°11.0	42°54.5	6°01.3	338°07.0	25°29.1	45°51.4	4°05.5	85°50.5	-12°44.9				Canopus	263°52.9	-52°42.7		
18	73°13.4	57°54.2	6°02.5	353°08.3	25°29.2	60°53.3	4°05.8	100°52.7	-12°44.8				Sirius	258°27.3	-16°44.9		
19	88°15.9	72°53.9	6°03.8	8°09.6	25°29.2	75°55.2	4°06.0	115°54.9	-12°44.7				Adara	255°06.9	-29°00.4		
20	103°18.4	87°53.6	6°05.1	23°10.9	25°29.3	90°57.2	4°06.2	130°57.1	-12°44.6				Procyon	244°52.1	5°10.0		
21	118°20.8	102°53.2	6°06.4	38°12.2	25°29.3	105°59.1	4°06.4	145°59.2	-12°44.5				Pollux	243°18.8	27°58.2		
22	133°23.3	117°52.9	6°07.7	53°13.5	25°29.4	121°01.1	4°06.7	161°01.4	-12°44.4				Avior	234°14.9	-59°35.2		
23	148°25.8	132°52.6	6°08.9	68°14.8	25°29.4	136°03.0	4°06.9	176°03.6	-12°44.3				Suhail	222°47.0	-43°31.7		
Mer.pass.:13:07			v-0.3 d1.3 m-3.9			v1.3 d0.0 m0.5			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					

Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	163°28.2	147°52.3	6°10.2	83°16.1	25°29.5	151°04.9	4°07.1	191°05.8	-12°44.2					
1	178°30.7	162°52.0	6°11.5	98°17.4	25°29.5	166°06.9	4°07.4	206°08.0	-12°44.1					
2	193°33.2	177°51.6	6°12.8	113°18.7	25°29.5	181°08.8	4°07.6	221°10.1	-12°44.0					
3	208°35.6	192°51.3	6°14.0	128°20.1	25°29.6	196°10.8	4°07.8	236°12.3	-12°43.9					
4	223°38.1	207°51.0	6°15.3	143°21.4	25°29.6	211°12.7	4°08.0	251°14.5	-12°43.8					
5	238°40.5	222°50.7	6°16.6	158°22.7	25°29.7	226°14.6	4°08.3	266°16.7	-12°43.6					
6	253°43.0	237°50.4	6°17.9	173°24.0	25°29.7	241°16.6	4°08.5	281°18.9	-12°43.5					
7	268°45.5	252°50.0	6°19.1	188°25.3	25°29.8	256°18.5	4°08.7	296°21.0	-12°43.4					
8	283°47.9	267°49.7	6°20.4	203°26.6	25°29.8	271°20.5	4°08.9	311°23.2	-12°43.3					
9	298°50.4	282°49.4	6°21.7	218°27.9	25°29.8	286°22.4	4°09.2	326°25.4	-12°43.2					
10	313°52.9	297°49.1	6°23.0	233°29.2	25°29.9	301°24.3	4°09.4	341°27.6	-12°43.1					
11	328°55.3	312°48.8	6°24.2	248°30.5	25°29.9	316°26.3	4°09.6	356°29.8	-12°43.0					
12	343°57.8	327°48.5	6°25.5	263°31.7	25°30.0	331°28.2	4°09.8	11°31.9	-12°42.9					
13	359°00.3	342°48.1	6°26.8	278°33.0	25°30.0	346°30.2	4°10.1	26°34.1	-12°42.8					
14	14°02.7	357°47.8	6°28.1	293°34.3	25°30.0	1°32.1	4°10.3	41°36.3	-12°42.7					
15	29°05.2	12°47.5	6°29.3	308°35.6	25°30.1	16°34.0	4°10.5	56°38.5	-12°42.6					
16	44°07.7	27°47.2	6°30.6	323°36.9	25°30.1	31°36.0	4°10.7	71°40.7	-12°42.5					
17	59°10.1	42°46.9	6°31.9	338°38.2	25°30.2	46°37.9	4°11.0	86°42.8	-12°42.4					
18	74°12.6	57°46.5	6°33.2	353°39.5	25°30.2	61°39.8	4°11.2	101°45.0	-12°42.3					
19	89°15.0	72°46.2	6°34.4	8°40.8	25°30.2	76°41.8	4°11.4	116°47.2	-12°42.2					
20	104°17.5	87°45.9	6°35.7	23°42.1	25°30.3	91°43.7	4°11.6	131°49.4	-12°42.1					
21	119°20.0	102°45.6	6°37.0	38°43.4	25°30.3	106°45.7	4°11.9	146°51.6	-12°42.0					
22	134°22.4	117°45.2	6°38.2	53°44.7	25°30.4	121°47.6	4°12.1	161°53.7	-12°41.9					
23	149°24.9	132°44.9	6°39.5	68°46.0	25°30.4	136°49.5	4°12.3	176°55.9	-12°41.8					
Mer.pass.:13:03			v-0.3 d1.3 m-3.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					

Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	
0	164°27.4	147°44.6	6°40.8	83°47.3	25°30.5	151°51.5	4°12.5	191°58.1	-12°41.7
1	179°29.8	162°44.3	6°42.1	98°48.6	25°30.5	166°53.4	4°12.8	207°00.3	-12°41.6
2	194°32.3	177°44.0	6°43.3	113°49.9	25°30.5	181°55.3	4°13.0	222°02.5	-12°41.5
3	209°34.8	192°43.6	6°44.6	128°51.2	25°30.6	196°57.3	4°13.2	237°04.6	-12°41.4
4	224°37.2	207°43.3	6°45.9	143°52.4	25°30.6	211°59.2	4°13.4	252°06.8	-12°41.3
5	239°39.7	222°43.0	6°47.1	158°53.7	25°30.7	227°01.2	4°13.7	267°09.0	-12°41.2
6	254°42.1	237°42.7	6°48.4	173°55.0	25°30.7	242°03.1	4°13.9	282°11.2	-12°41.1
7	269°44.6	252°42.4	6°49.7	188°56.3	25°30.7	257°05.0	4°14.1	297°13.4	-12°41.0
8	284°47.1	267°42.0	6°51.0	203°57.6	25°30.8	272°07.0	4°14.3	312°15.5	-12°40.9
9	299°49.5	282°41.7	6°52.2	218°58.9	25°30.8	287°08.9	4°14.6	327°17.7	-12°40.8
10	314°52.0	297°41.4	6°53.5	234°00.2	25°30.8	302°10.8	4°14.8	342°19.9	-12°40.7
11	329°54.5	312°41.1	6°54.8	249°01.5	25°30.9	317°12.8	4°15.0	357°22.1	-12°40.6
12	344°56.9	327°40.7	6°56.0	264°02.8	25°30.9	332°14.7	4°15.2	12°24.3	-12°40.5
13	359°59.4	342°40.4	6°57.3	279°04.0	25°31.0	347°16.7	4°15.5	27°26.4	-12°40.4
14	15°01.9	357°40.1	6°58.6	294°05.3	25°31.0	2°18.6	4°15.7	42°28.6	-12°40.3
15	30°04.3	12°39.8	6°59.8	309°06.6	25°31.0	17°20.5	4°15.9	57°30.8	-12°40.2
16	45°06.8	27°39.4	7°01.1	324°07.9	25°31.1	32°22.5	4°16.1	72°33.0	-12°40.1
17	60°09.3	42°39.1	7°02.4	339°09.2	25°31.1	47°24.4	4°16.4	87°35.2	-12°40.0
18	75°11.7	57°38.8	7°03.6	354°10.5	25°31.2	62°26.3	4°16.6	102°37.4	-12°39.9
19	90°14.2	72°38.5	7°04.9	9°11.7	25°31.2	77°28.3	4°16.8	117°39.5	-12°39.8
20	105°16.6	87°38.2	7°06.2	24°13.0	25°31.2	92°30.2	4°17.1	132°41.7	-12°39.7
21	120°19.1	102°37.8	7°07.4	39°14.3	25°31.3	107°32.1	4°17.3	147°43.9	-12°39.6
22	135°21.6	117°37.5	7°08.7	54°15.6	25°31.3	122°34.1	4°17.5	162°46.1	-12°39.5
23	150°24.0	132°37.2	7°10.0	69°16.9	25°31.3	137°36.0</			

h		Sun		Moon					
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	177°05.7	-6°14.4	22°13.4	13.4	20°44.6	-9.6	54.1	72	04:46 06:05 07:12 17:13 18:20 19:40
1	192°05.8	-6°13.5	36°45.9	13.5	20°35.0	-9.7	54.1	70	04:54 06:04 07:05 17:19 18:20 19:32
2	207°05.9	-6°12.5	51°18.4	13.5	20°25.2	-9.8	54.1	68	04:54 06:04 07:05 17:19 18:20 19:32
3	222°06.1	-6°11.5	65°50.9	13.6	20°15.4	-9.9	54.1	66	05:05 06:04 06:55 17:29 18:20 19:20
4	237°06.2	-6°10.6	80°23.5	13.6	20°05.5	-9.9	54.1	64	05:09 06:04 06:51 17:33 18:20 19:16
5	252°06.4	-6°09.6	94°56.2	13.7	19°55.5	-10.0	54.1	62	05:12 06:04 06:48 17:36 18:21 19:12
6	267°06.5	-6°08.6	109°28.9	13.7	19°45.4	-10.1	54.2	60	05:15 06:03 06:45 17:39 18:21 19:09
7	282°06.6	-6°07.7	124°01.6	13.8	19°35.3	-10.2	54.2	58	05:18 06:03 06:42 17:42 18:21 19:06
8	297°06.8	-6°06.7	138°34.4	13.8	19°25.0	-10.3	54.2	56	05:20 06:03 06:40 17:44 18:21 19:04
9	312°06.9	-6°05.7	153°07.3	13.9	19°14.7	-10.4	54.2	54	05:21 06:02 06:37 17:46 18:21 19:02
10	327°07.1	-6°04.8	167°40.2	13.9	19°04.3	-10.5	54.2	52	05:23 06:02 06:35 17:48 18:22 19:01
11	342°07.2	-6°03.8	182°13.2	14.0	18°53.8	-10.5	54.2	50	05:24 06:01 06:34 17:50 18:22 18:60
12	357°07.3	-6°02.8	196°46.2	14.0	18°43.2	-10.6	54.2	45	05:26 06:00 06:30 17:54 18:23 18:57
13	12°07.5	-6°01.9	211°19.3	14.1	18°32.6	-10.7	54.2	40	05:28 05:59 06:26 17:57 18:24 18:55
14	27°07.6	-6°00.9	225°52.4	14.1	18°21.8	-10.8	54.2	35	05:29 05:58 06:23 17:50 18:25 18:54
15	42°07.8	-5°59.9	240°25.5	14.2	18°11.0	-10.9	54.2	30	05:29 05:57 06:21 18:02 18:26 18:54
16	57°07.9	-5°59.0	254°58.8	14.2	18°00.1	-10.9	54.2	20	05:29 05:54 06:16 18:07 18:29 18:54
17	72°08.0	-5°58.0	269°32.0	14.3	17°49.2	-11.0	54.2	10	05:27 05:51 06:12 18:11 18:32 18:56
18	87°08.2	-5°57.0	284°05.4	14.3	17°38.1	-11.1	54.3	0	05:23 05:47 06:08 18:15 18:35 18:59
19	102°08.3	-5°56.1	298°38.7	14.4	17°27.0	-11.2	54.3	-10	05:18 05:43 06:04 18:19 18:40 19:04
20	117°08.5	-5°55.1	313°12.1	14.4	17°15.8	-11.2	54.3	-20	05:11 05:37 05:59 18:23 18:45 19:11
21	132°08.6	-5°54.1	327°45.6	14.5	17°04.5	-11.3	54.3	-30	05:02 05:30 05:54 18:28 18:52 19:20
22	147°08.8	-5°53.2	342°19.1	14.5	16°53.2	-11.4	54.3	-35	04:55 05:25 05:51 18:31 18:56 19:27
23	162°08.9	-5°52.2	356°52.7	14.6	16°41.8	-11.5	54.3	-40	04:48 05:20 05:48 18:34 19:02 19:34
SD.=16.1		d=1.0			S.D.=14.8				-45 04:38 05:14 05:43 18:38 19:08 19:44
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	177°09.0	-5°51.2	11°26.3	14.6	16°30.3	-11.5	54.3	-50	04:25 05:05 05:38 18:43 19:16 19:56
1	192°09.2	-5°50.3	25°59.9	14.7	16°18.7	-11.6	54.3	-52	04:19 05:02 05:36 18:45 19:20 20:02
2	207°09.3	-5°49.3	40°33.6	14.7	16°07.1	-11.7	54.3	-54	04:13 04:57 05:34 18:48 19:24 20:08
3	222°09.5	-5°48.3	55°07.3	14.8	15°55.4	-11.7	54.3	-56	04:05 04:52 05:31 18:50 19:29 20:16
4	237°09.6	-5°47.4	69°41.1	14.8	15°43.6	-11.8	54.3	-58	03:56 04:47 05:28 18:53 19:34 20:24
5	252°09.8	-5°46.4	84°14.9	14.8	15°31.8	-11.9	54.4	-60	03:46 04:41 05:24 18:57 19:40 20:34
6	267°09.9	-5°45.4	98°48.8	14.9	15°19.9	-11.9	54.4		
7	282°10.0	-5°44.5	113°22.7	14.9	15°07.9	-12.0	54.4	Moonrise	
8	297°10.2	-5°43.5	127°56.7	15.0	14°55.9	-12.1	54.4	Lat.	Sun
9	312°10.3	-5°42.5	142°30.7	15.0	14°43.8	-12.1	54.4	72	--
10	327°10.5	-5°41.6	157°04.7	15.1	14°31.6	-12.2	54.4	70	12:24 14:56 16:57 09:35 08:34 08:02
11	342°10.6	-5°40.6	171°38.8	15.1	14°19.4	-12.3	54.4	68	13:13 15:17 17:07 08:45 08:12 07:50
12	357°10.8	-5°39.6	186°12.9	15.1	14°07.1	-12.3	54.4	66	13:44 15:33 17:15 08:13 07:54 07:40
13	12°10.9	-5°38.7	200°47.0	15.2	13°54.7	-12.4	54.4	64	14:07 15:46 17:21 07:50 07:40 07:32
14	27°11.1	-5°37.7	215°21.2	15.2	13°42.3	-12.4	54.5	62	14:24 15:57 17:27 07:31 07:28 07:24
15	42°11.2	-5°36.7	229°55.4	15.2	13°29.9	-12.5	54.5	60	14:39 16:07 17:32 07:15 07:17 07:18
16	57°11.4	-5°35.7	244°29.7	15.3	13°17.3	-12.6	54.5	58	14:52 16:15 17:36 07:02 07:08 07:13
17	72°11.5	-5°34.8	259°04.0	15.3	13°04.7	-12.6	54.5	56	15:03 16:22 17:40 06:50 07:00 07:08
18	87°11.6	-5°33.8	273°38.3	15.3	12°52.1	-12.7	54.5	54	15:12 16:28 17:44 06:40 06:53 07:03
19	102°11.8	-5°32.8	288°12.7	15.4	12°39.4	-12.7	54.5	52	15:21 16:34 17:47 06:31 06:47 06:59
20	117°11.9	-5°31.9	302°47.1	15.4	12°26.6	-12.8	54.5	50	15:28 16:39 17:50 06:23 06:41 06:56
21	132°12.1	-5°30.9	317°21.5	15.4	12°13.8	-12.8	54.5	45	15:44 16:50 17:56 06:06 06:28 06:48
22	147°12.2	-5°29.9	331°55.9	15.5	12°01.0	-12.9	54.6	40	15:57 16:59 18:01 05:52 06:18 06:41
23	162°12.4	-5°29.0	346°30.4	15.5	11°48.1	-12.9	54.6	35	16:08 17:07 18:05 05:39 06:09 06:35
SD.=16.1		d=1.0			S.D.=14.8				30 16:18 17:14 18:09 05:29 06:01 06:30
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	177°12.5	-5°28.0	1°05.0	15.5	11°35.1	-13.0	54.6	20	16:35 17:26 18:16 05:10 05:47 06:21
1	192°12.7	-5°27.0	15°39.5	15.6	11°22.1	-13.0	54.6	10	16:49 17:36 18:22 04:54 05:35 06:13
2	207°12.8	-5°26.0	30°14.1	15.6	11°09.0	-13.1	54.6	0	17:02 17:45 18:27 04:39 05:23 06:06
3	222°13.0	-5°25.1	44°48.7	15.6	10°55.9	-13.1	54.6	-10	17:16 17:55 18:33 04:24 05:12 05:58
4	237°13.1	-5°24.1	59°23.3	15.6	10°42.7	-13.2	54.6	-20	17:30 18:05 18:38 04:08 04:59 05:50
5	252°13.3	-5°23.1	73°58.0	15.7	10°29.5	-13.2	54.6	-30	17:46 18:17 18:45 03:49 04:45 05:41
6	267°13.4	-5°22.2	88°32.7	15.7	10°16.2	-13.3	54.7	-35	17:55 18:23 18:49 03:38 04:37 05:35
7	282°13.6	-5°21.2	103°07.4	15.7	10°02.9	-13.3	54.7	-40	18:06 18:31 18:53 03:25 04:27 05:29
8	297°13.7	-5°20.2	117°42.1	15.7	9°49.5	-13.4	54.7	-45	18:19 18:39 18:58 03:10 04:16 05:22
9	312°13.9	-5°19.2	132°16.9	15.8	9°36.1	-13.4	54.7	-50	18:34 18:50 19:04 02:51 04:02 05:13
10	327°14.0	-5°18.3	146°51.7	15.8	9°22.7	-13.5	54.7	-52	18:41 18:55 19:06 02:42 03:56 05:09
11	342°14.2	-5°17.3	161°26.5	15.8	9°09.2	-13.5	54.7	-54	18:49 18:60 19:09 02:32 03:49 05:05
12	357°14.3	-5°16.3	176°01.3	15.8	8°55.7	-13.6	54.7	-56	18:57 19:06 19:12 02:21 03:41 04:60
13	12°14.5	-5°15.4	190°36.1	15.9	8°42.1	-13.6	54.8	-58	19:07 19:12 19:16 02:08 03:32 04:54
14	27°14.6	-5°14.4	205°11.0	15.9	8°28.5	-13.6	54.8	-60	19:18 19:20 19:20 01:53 03:21 04:48
15	42°14.8	-5°13.4	219°45.9	15.9	8°14.8	-13.7	54.8		
16	57°14.9	-5°12.4	234°20.8	15.9	8°01.1	-13.7	54.8	Sun	
17	72°15.1	-5°11.5	248°55.7	15.9	7°47.4	-13.7	54.8	Day	Eqn.of Time
18	87°15.2	-5°10.5	263°30.6	15.9	7°33.6	-13.8	54.8	5	11:37 11:31 12:11 23:12 10:50 13(96%)
19	102°15.4	-5°09.5	278°05.6	16.0	7°19.8	-13.8	54.9	6	11:24 11:17 12:11 23:55 11:34 14(99%)
20	117°15.5	-5°08.6	292°40.5	16.0	7°06.0	-13.9	54.9	7	11:10 11:03 12:11 00:37 12:16 15(100%)
21	132°15.7	-5°07.6	307°15.5	16.0	6°52.1	-13.9	54.9		
22	147°15.8	-5°06.6	321°50.5	16.0	6°38.2	-13.9	54.9	Moon	
23	162°16.0	-5°05.6	336°25.5	16.0	6°24.3	-14.0	54.9	Mer.Pass.	Age
SD.=16.1		d=1.0			S.D.=14.9				

March 08, 09 ,10 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	165°26.5	147°36.9	7°11.2	84°18.2	25°31.4	152°37.9	4°18.0	192°50.4	-12°39.3				Alpheratz	357°36.7	29°13.0		
1	180°29.0	162°36.5	7°12.5	99°19.4	25°31.4	167°39.9	4°18.2	207°52.6	-12°39.2				Ankaa	353°09.0	-42°11.0		
2	195°31.4	177°36.2	7°13.8	114°20.7	25°31.5	182°41.8	4°18.4	222°54.8	-12°39.1				Schedar	349°33.3	56°39.9		
3	210°33.9	192°35.9	7°15.0	129°22.0	25°31.5	197°43.8	4°18.6	237°57.0	-12°39.0				Diphda	348°49.0	-17°51.8		
4	225°36.4	207°35.6	7°16.3	144°23.3	25°31.5	212°45.7	4°18.9	252°59.2	-12°38.9				Achernar	335°21.8	-57°07.4		
5	240°38.8	222°35.2	7°17.5	159°24.6	25°31.6	227°47.6	4°19.1	268°01.3	-12°38.8				Hamal	327°53.2	23°34.3		
6	255°41.3	237°34.9	7°18.8	174°25.8	25°31.6	242°49.6	4°19.3	283°03.5	-12°38.7				Polaris	315°01.4	89°22.0		
7	270°43.7	252°34.6	7°20.1	189°27.1	25°31.6	257°51.5	4°19.5	298°05.7	-12°38.6				Akamar	315°13.1	-40°13.0		
8	285°46.2	267°34.3	7°21.3	204°28.4	25°31.7	272°53.4	4°19.8	313°07.9	-12°38.5				Menkar	314°07.9	4°10.7		
9	300°48.7	282°33.9	7°22.6	219°29.7	25°31.7	287°55.4	4°20.0	328°10.1	-12°38.4				Mirfak	308°30.6	49°56.7		
10	315°51.1	297°33.6	7°23.9	234°30.9	25°31.8	302°57.3	4°20.2	343°12.3	-12°38.3				Aldebaran	290°41.4	16°33.3		
11	330°53.6	312°33.3	7°25.1	249°32.2	25°31.8	317°59.2	4°20.4	358°14.4	-12°38.2				Rigel	281°05.3	-8°10.6		
12	345°56.1	327°33.0	7°26.4	264°33.5	25°31.8	333°01.2	4°20.7	13°16.6	-12°38.1				Capella	280°24.1	46°01.5		
13	0°58.5	342°32.6	7°27.6	279°34.8	25°31.9	348°03.1	4°20.9	28°18.8	-12°38.0				Bellatrix	278°24.5	6°22.2		
14	16°01.0	357°32.3	7°28.9	294°36.0	25°31.9	3°05.0	4°21.1	43°21.0	-12°37.9				Elnath	278°03.8	28°37.7		
15	31°03.5	12°32.0	7°30.2	309°37.3	25°31.9	18°07.0	4°21.4	58°23.2	-12°37.8				Alnilam	275°39.2	-1°11.3		
16	46°05.9	27°31.7	7°31.4	324°38.6	25°32.0	33°08.9	4°21.6	73°25.3	-12°37.7				Betelgeuse	270°53.7	7°24.6		
17	61°08.4	42°31.3	7°32.7	339°39.9	25°32.0	48°10.8	4°21.8	88°27.5	-12°37.6				Canopus	263°52.9	-52°42.7		
18	76°10.9	57°31.0	7°33.9	354°41.1	25°32.0	63°12.8	4°22.0	103°29.7	-12°37.5				Sirius	258°27.3	-16°44.9		
19	91°13.3	72°30.7	7°35.2	9°42.4	25°32.1	78°14.7	4°22.3	118°31.9	-12°37.4				Adara	255°06.9	-29°00.4		
20	106°15.8	87°30.3	7°36.5	24°43.7	25°32.1	93°16.6	4°22.5	133°34.1	-12°37.3				Procyon	244°52.1	5°10.0		
21	121°18.2	102°30.0	7°37.7	39°45.0	25°32.1	108°18.6	4°22.7	148°36.3	-12°37.2				Pollux	243°18.8	27°58.3		
22	136°20.7	117°29.7	7°39.0	54°46.2	25°32.2	123°20.5	4°22.9	163°38.4	-12°37.1				Avior	234°14.9	-59°35.2		
23	151°23.2	132°29.4	7°40.2	69°47.5	25°32.2	138°22.4	4°23.2	178°40.6	-12°37.0				Suhail	222°47.1	-43°31.7		
Mer.pass.:12:56			v-0.3 d1.3 m-3.9			v1.3 d0.0 m0.6			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					

Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	166°25.6	147°29.0	7°41.5	84°48.8	25°32.3	153°24.4	4°23.4	193°42.8						
1	181°28.1	162°28.7	7°42.8	99°50.0	25°32.3	168°26.3	4°23.6	208°45.0						
2	196°30.6	177°28.4	7°44.0	114°51.3	25°32.3	183°28.2	4°23.8	223°47.2						
3	211°33.0	192°28.1	7°45.3	129°52.6	25°32.4	198°30.2	4°24.1	238°49.3						
4	226°35.5	207°27.7	7°46.5	144°53.9	25°32.4	213°32.1	4°24.3	253°51.5						
5	241°38.0	222°27.4	7°47.8	159°55.1	25°32.4	228°34.0	4°24.5	268°53.7						
6	256°40.4	237°27.1	7°49.0	174°56.4	25°32.5	243°36.0	4°24.7	283°55.9						
7	271°42.9	252°26.7	7°50.3	189°57.7	25°32.5	258°37.9	4°25.0	298°58.1						
8	286°45.3	267°26.4	7°51.6	204°58.9	25°32.5	273°39.8	4°25.2	314°00.3						
9	301°47.8	282°26.1	7°52.8	220°00.2	25°32.6	288°41.8	4°25.4	329°02.4						
10	316°50.3	297°25.8	7°54.1	235°01.5	25°32.6	303°43.7	4°25.7	344°04.6						
11	331°52.7	312°25.4	7°55.3	250°02.7	25°32.6	318°45.6	4°25.9	359°06.8						
12	346°55.2	327°25.1	7°56.6	265°04.0	25°32.7	333°47.6	4°26.1	14°09.0						
13	1°57.7	342°24.8	7°57.8	280°05.2	25°32.7	348°49.5	4°26.3	29°11.2						
14	17°00.1	357°24.4	7°59.1	295°06.5	25°32.7	3°51.4	4°26.6	44°13.3						
15	32°02.6	12°24.1	8°00.3	310°07.8	25°32.8	18°53.4	4°26.8	59°15.5						
16	47°05.1	27°23.8	8°01.6	325°09.0	25°32.8	33°55.3	4°27.0	74°17.7						
17	62°07.5	42°23.4	8°02.8	340°10.3	25°32.8	48°57.2	4°27.2	89°19.9						
18	77°10.0	57°23.1	8°04.1	355°11.6	25°32.9	63°59.2	4°27.5	104°22.1						
19	92°12.5	72°22.8	8°05.4	10°12.8	25°32.9	79°01.1	4°27.7	119°24.3						
20	107°14.9	87°22.5	8°06.6	25°14.1	25°32.9	94°03.0	4°27.9	134°26.4						
21	122°17.4	102°22.1	8°07.9	40°15.4	25°32.9	109°05.0	4°28.1	149°28.6						
22	137°19.8	117°21.8	8°09.1	55°16.6	25°33.0	124°06.9	4°28.4	164°30.8						
23	152°22.3	132°21.5	8°10.4	70°17.9	25°33.0	139°08.8	4°28.6	179°33.0						
Mer.pass.:12:52			v-0.3 d1.3 m-3.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					

Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	167°24.8	147°21.1	8°11.6	85°19.1	25°33.0	154°10.8	4°28.8	194°35.2						
1	182°27.2	162°20.8	8°12.9	100°20.4	25°33.1	169°12.7	4°29.1	209°37.4						
2	197°29.7	177°20.5	8°14.1	115°21.7	25°33.1	184°14.6	4°29.3	224°39.5						
3	212°32.2	192°20.1	8°15.4	130°22.9	25°33.1	199°16.6	4°29.5	239°41.7						
4	227°34.6	207°19.8	8°16.6	145°24.2	25°33.2	214°18.5	4°29.7	254°43.9						
5	242°37.1	222°19.5	8°17.9	160°25.4	25°33.2	229°20.4	4°30.0	269°46.1						
6	257°39.6	237°19.1	8°19.1	175°26.7	25°33.2	244°22.4	4°30.2	284°48.3						
7	272°42.0	252°18.8	8°20.4	190°27.9	25°33.3	259°24.3	4°30.4	299°50.5						
8	287°44.5	267°18.5	8°21.6	205°29.2	25°33.3	274°26.2	4°30.6	314°52.6						
9	302°47.0	282°18.1	8°22.9	220°30.5	25°33.3	289°28.2	4°30.9	329°54.8						
10	317°49.4	297°17.8	8°24.1	235°31.7	25°33.4	304°30.1	4°31.1	344°57.0						
11	332°51.9	312°17.5	8°25.4	250°33.0	25°33.4	319°32.0	4°31.3	359°59.2						
12	347°54.3	327°17.1	8°26.6	265°34.2	25°33.4	334°33.9	4°31.6	15°01.4						
13	2°56.8	342°16.8	8°27.8	280°35.5	25°33.4	349°35.9	4°31.8	30°03.6						
14	17°59.3	357°16.5	8°29.1	295°36.7	25°33.5	4°37.8	4°32.0	45°05.7						
15	33°01.7	12°16.1	8°30.3	310°38.0	25°33.5	19°39.7	4°32.2	60°07.9						
16	48°04.2	27°15.8	8°31.6	325°39.2	25°33.5	34°41.7	4°32.5	75°10.1						
17	63°06.7	42°15.5	8°32.8	340°40.5	25°33.6	49°43.6	4°32.7	90°12.3						
18	78°09.1	57°15.1	8°34.1	355°41.7	25°33.6	64°45.5	4°32.9	105°14.5						
19	93°11.6	72°14.8	8°35.3	10°43.0	25°33.6	79°47.5	4°33.1	120°16.7						
20	108°14.1	87°14.5	8°36.6	25°44.2	25°33.6	94°49.4	4°33.4	135°18.8						
21	123°16.5	102°14.1	8°37.8	40°45.5	25°33.7	109°51.3	4°33.6	150°21.0						
22	138°19.0	117°13.8	8°39.1	55°46.7	25°33.7	124°53.3	4°33.8	165°23.2						
23	153°21.4	132°13.5	8°40.3	70°48.0	25°33.7	139°55.2	4°34.1	180°25.4						
Mer.pass.:12:48			v-0.3 d1.3 m-3.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					

2023/3/8	SHA	Mer.pass
Venus	342°10.4	14:10
Mars	278°51.7	18:21
Jupiter	347°11.4	13:48
Saturn	27°23.9	11:07
2023/3/9	SHA	Mer.pass
Venus	341°03.4	14:10
Mars	278°23.1	18:19
Jupiter	346°58.7	13:45
Saturn	27°17.2	11:04
2023/3/1	SHA	Mer.pass
Venus	339°56.4	14:11
Mars	277°54.4	18:17
Jupiter	346°46.0	13:42
Saturn	27°10.4	11:00
Horizontal paralax		
Venus:		0.1
Mars:		0.1

Sun								Moon							
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	177° 16.1	-5° 04.7	351° 00.5	16.0	6° 10.3	-14.0	54.9	72	04:30	05:50	06:57	17:27	18:34	19:55	
1	192° 16.3	-5° 03.7	5° 35.5	16.0	5° 56.3	-14.0	54.9	70	04:39	05:51	06:51	17:32	18:32	19:45	
2	207° 16.4	-5° 02.7	20° 10.5	16.0	5° 42.3	-14.1	55.0	68	04:47	05:52	06:47	17:36	18:31	19:37	
3	222° 16.6	-5° 01.7	34° 45.5	16.0	5° 28.2	-14.1	55.0	66	04:53	05:53	06:44	17:39	18:30	19:30	
4	237° 16.7	-5° 00.8	49° 20.6	16.0	5° 14.1	-14.1	55.0	64	04:58	05:54	06:41	17:42	18:29	19:25	
5	252° 16.9	-4° 59.8	63° 55.6	16.0	4° 60.0	-14.1	55.0	62	05:03	05:54	06:38	17:44	18:29	19:20	
6	267° 17.0	-4° 58.8	78° 30.7	16.0	4° 45.8	-14.2	55.0	60	05:06	05:54	06:36	17:47	18:28	19:17	
7	282° 17.2	-4° 57.8	93° 05.7	16.1	4° 31.6	-14.2	55.0	58	05:09	05:55	06:34	17:49	18:28	19:13	
8	297° 17.3	-4° 56.9	107° 40.8	16.1	4° 17.4	-14.2	55.1	56	05:12	05:55	06:32	17:50	18:27	19:11	
9	312° 17.5	-4° 55.9	122° 15.8	16.1	4° 03.2	-14.2	55.1	54	05:14	05:55	06:30	17:52	18:27	19:08	
10	327° 17.6	-4° 54.9	136° 50.9	16.1	3° 49.0	-14.3	55.1	52	05:16	05:55	06:29	17:53	18:27	19:06	
11	342° 17.8	-4° 53.9	151° 25.9	16.1	3° 34.7	-14.3	55.1	50	05:18	05:55	06:27	17:55	18:27	19:04	
12	357° 17.9	-4° 53.0	166° 01.0	16.1	3° 20.4	-14.3	55.1	45	05:21	05:55	06:24	17:58	18:27	19:01	
13	12° 18.1	-4° 52.0	180° 36.0	16.0	3° 06.1	-14.3	55.1	40	05:23	05:55	06:22	18:00	18:27	18:58	
14	27° 18.3	-4° 51.0	195° 11.1	16.0	2° 51.7	-14.3	55.2	35	05:25	05:54	06:19	18:02	18:28	18:57	
15	42° 18.4	-4° 50.0	209° 46.1	16.0	2° 37.4	-14.4	55.2	30	05:26	05:53	06:17	18:04	18:28	18:56	
16	57° 18.6	-4° 49.1	224° 21.2	16.0	2° 23.0	-14.4	55.2	20	05:26	05:52	06:14	18:08	18:30	18:55	
17	72° 18.7	-4° 48.1	238° 56.2	16.0	2° 08.6	-14.4	55.2	10	05:25	05:49	06:10	18:11	18:32	18:56	
18	87° 18.9	-4° 47.1	253° 31.2	16.0	1° 54.2	-14.4	55.2	0	05:22	05:47	06:07	18:14	18:35	18:59	
19	102° 19.0	-4° 46.1	268° 06.2	16.0	1° 39.8	-14.4	55.2	-10	05:18	05:43	06:04	18:17	18:38	19:03	
20	117° 19.2	-4° 45.2	282° 41.2	16.0	1° 25.3	-14.4	55.3	-20	05:12	05:38	06:00	18:20	18:43	19:08	
21	132° 19.3	-4° 44.2	297° 16.2	16.0	1° 10.9	-14.5	55.3	-30	05:04	05:32	05:56	18:25	18:49	19:17	
22	147° 19.5	-4° 43.2	311° 51.2	16.0	0° 56.4	-14.5	55.3	-35	04:58	05:28	05:54	18:27	18:52	19:22	
23	162° 19.6	-4° 42.2	326° 26.2	16.0	0° 41.9	-14.5	55.3	-40	04:51	05:23	05:51	18:30	18:57	19:29	
SD.=16.1 d=1.0								S.D.=15.0							
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
0	177° 19.8	-4° 41.3	341° 01.2	16.0	0° 27.4	-14.5	55.3	72	18:47	20:50	23:03	07:42	07:11	06:38	
1	192° 20.0	-4° 40.3	355° 36.1	15.9	0° 12.9	-14.5	55.3	70	18:50	20:43	22:44	07:36	07:13	06:48	
2	207° 20.1	-4° 39.3	10° 11.0	15.9	-0° 01.6	-14.5	55.4	68	18:52	20:37	22:29	07:31	07:14	06:56	
3	222° 20.3	-4° 38.3	24° 46.0	15.9	-0° 16.1	-14.5	55.4	66	18:53	20:33	22:17	07:27	07:15	07:03	
4	237° 20.4	-4° 37.4	39° 20.9	15.9	-0° 30.6	-14.5	55.4	64	18:55	20:29	22:07	07:24	07:16	07:09	
5	252° 20.6	-4° 36.4	53° 55.7	15.9	-0° 45.2	-14.5	55.4	62	18:56	20:25	21:58	07:21	07:17	07:14	
6	267° 20.7	-4° 35.4	68° 30.6	15.9	-0° 59.7	-14.5	55.4	60	18:57	20:22	21:51	07:18	07:18	07:18	
7	282° 20.9	-4° 34.4	83° 05.4	15.8	-1° 14.3	-14.5	55.5	58	18:58	20:20	21:45	07:16	07:19	07:22	
8	297° 21.0	-4° 33.4	97° 40.3	15.8	-1° 28.8	-14.6	55.5	56	18:58	20:17	21:39	07:14	07:20	07:26	
9	312° 21.2	-4° 32.5	112° 15.1	15.8	-1° 43.4	-14.6	55.5	54	18:59	20:15	21:34	07:12	07:20	07:29	
10	327° 21.4	-4° 31.5	126° 49.8	15.8	-1° 57.9	-14.6	55.5	52	18:60	20:14	21:29	07:10	07:21	07:32	
11	342° 21.5	-4° 30.5	141° 24.6	15.7	-2° 12.5	-14.6	55.5	50	19:00	20:12	21:25	07:09	07:21	07:34	
12	357° 21.7	-4° 29.5	155° 59.3	15.7	-2° 27.0	-14.6	55.5	45	19:02	20:08	21:17	07:05	07:22	07:40	
13	12° 21.8	-4° 28.6	170° 34.0	15.7	-2° 41.6	-14.6	55.6	40	19:03	20:05	21:09	07:02	07:23	07:45	
14	27° 22.0	-4° 27.6	185° 08.7	15.7	-2° 56.2	-14.6	55.6	35	19:04	20:03	21:03	06:60	07:24	07:49	
15	42° 22.1	-4° 26.6	199° 43.3	15.6	-3° 10.7	-14.6	55.6	30	19:04	20:00	20:58	06:58	07:25	07:53	
16	57° 22.3	-4° 25.6	214° 17.9	15.6	-3° 25.3	-14.6	55.6	20	19:06	19:56	20:48	06:54	07:26	07:59	
17	72° 22.5	-4° 24.7	228° 52.5	15.6	-3° 39.8	-14.5	55.6	10	19:07	19:53	20:40	06:50	07:27	08:05	
18	87° 22.6	-4° 23.7	243° 27.0	15.5	-3° 54.3	-14.5	55.7	0	19:08	19:50	20:33	06:47	07:28	08:10	
19	102° 22.8	-4° 22.7	258° 01.5	15.5	-4° 08.9	-14.5	55.7	-10	19:09	19:47	20:25	06:44	07:29	08:15	
20	117° 22.9	-4° 21.7	272° 36.0	15.5	-4° 23.4	-14.5	55.7	-20	19:11	19:43	20:17	06:40	07:30	08:21	
21	132° 23.1	-4° 20.7	287° 10.4	15.4	-4° 37.9	-14.5	55.7	-30	19:12	19:40	20:08	06:36	07:31	08:28	
22	147° 23.2	-4° 19.8	301° 44.9	15.4	-4° 52.5	-14.5	55.7	-35	19:13	19:37	20:03	06:33	07:32	08:31	
23	162° 23.4	-4° 18.8	316° 19.2	15.3	-5° 07.0	-14.5	55.8	-40	19:14	19:35	19:57	06:31	07:33	08:36	
SD.=16.1 d=1.0								S.D.=15.1							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon			
0	177° 23.6	-4° 17.8	330° 53.5	15.3	-5° 21.4	-14.5	55.8	8	10:55	10:48	12:10	00:37	12:57	16(99%)	
1	192° 23.7	-4° 16.8	345° 27.8	15.3	-5° 35.9	-14.5	55.8	9	10:41	10:33	12:10	01:18	13:38	17(96%)	
2	207° 23.9	-4° 15.8	0° 02.1	15.2	-5° 50.4	-14.5	55.8	10	10:26	10:18	12:10	01:59	14:21	18(92%)	
3	222° 24.0	-4° 14.9	14° 36.3	15.2	-6° 04.8	-14.4	55.8								
4	237° 24.2	-4° 13.9	29° 10.5	15.1	-6° 19.3	-14.4	55.9								
5	252° 24.4	-4° 12.9	43° 44.6	15.1	-6° 33.7	-14.4	55.9								
6	267° 24.5	-4° 11.9	58° 18.6	15.0	-6° 48.1	-14.4	55.9								
7	282° 24.7	-4° 11.0	72° 52.7	15.0	-7° 02.5	-14.4	55.9								
8	297° 24.8	-4° 10.0	87° 26.6	15.0	-7° 16.9	-14.4	55.9								
9	312° 25.0	-4° 09.0	102° 00.6	14.9	-7° 31.2	-14.3	56.0								
10	327° 25.2	-4° 08.0	116° 34.5	14.9	-7° 45.5	-14.3	56.0								
11	342° 25.3	-4° 07.0	131° 08.3	14.8	-7° 59.8	-14.3	56.0								
12	357° 25.5	-4° 06.1	145° 42.1	14.8	-8° 14.1	-14.3	56.0								
13	12° 25.6	-4° 05.1	160° 15.8	14.7	-8° 28.4	-14.2	56.0								
14	27° 25.8	-4° 04.1	174° 49.5	14.6	-8° 42.6	-14.2	56.1								
15	42° 26.0	-4° 03.1	189° 23.1	14.6	-8° 56.8	-14.2	56.1								
16	57° 26.1	-4° 02.1	203° 56.6	14.5	-9° 11.0	-14.2	56.1								
17	72° 26.3	-4° 01.2	218° 30.1	14.5	-9° 25.1	-14.1	56.1								
18	87° 26.5	-4° 00.2	233° 03.6	14.4	-9° 39.2	-14.1	56.1								
19	102° 26.6	-3° 59.2	247° 37.0	14.4	-9° 53.3	-14.1	56.2								
20	117° 26.8	-3° 58.2	262° 10.3	14.3	-10° 07.4	-14.0	56.2								
21	132° 26.9	-3° 57.2	276° 43.5	14.2	-10° 21.4	-14.0	56.2								
22	147° 27.1	-3° 56.3	291° 16.7	14.2	-10° 35.4	-14.0	56.2								
23	162° 27.3	-3° 55.3	305° 49.9	14.1	-10° 49.3	-13.9	56.2								
SD.=16.1 d=1.0								S.D.=15.2							

March 11, 12 ,13 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	168°23.9	147°13.1	8°41.5	85°49.2	25°33.8	154°57.1	4°34.3	195°27.6	-12°32.2	Alpheratz	357°36.7	29°13.0					
1	183°26.4	162°12.8	8°42.8	100°50.5	25°33.8	169°59.0	4°34.5	210°29.8	-12°32.1	Ankaa	353°09.0	-42°11.0					
2	198°28.8	177°12.5	8°44.0	115°51.7	25°33.8	185°01.0	4°34.7	225°32.0	-12°32.0	Schedar	349°33.3	56°39.8					
3	213°31.3	192°12.1	8°45.3	130°53.0	25°33.8	200°02.9	4°35.0	240°34.1	-12°31.9	Diphda	348°49.0	-17°51.8					
4	228°33.8	207°11.8	8°46.5	145°54.2	25°33.9	215°04.8	4°35.2	255°36.3	-12°31.8	Achernar	335°21.8	-57°07.4					
5	243°36.2	222°11.4	8°47.7	160°55.5	25°33.9	230°06.8	4°35.4	270°38.5	-12°31.7	Hamal	327°53.2	23°34.3					
6	258°38.7	237°11.1	8°49.0	175°56.7	25°33.9	245°08.7	4°35.6	285°40.7	-12°31.6	Polaris	315°02.6	89°22.0					
7	273°41.2	252°10.8	8°50.2	190°58.0	25°34.0	260°10.6	4°35.9	300°42.9	-12°31.5	Akamar	315°13.1	-40°13.0					
8	288°43.6	267°10.4	8°51.5	205°59.2	25°34.0	275°12.6	4°36.1	315°45.1	-12°31.4	Menkar	314°07.9	4°10.7					
9	303°46.1	282°10.1	8°52.7	221°00.5	25°34.0	290°14.5	4°36.3	330°47.2	-12°31.3	Mirfak	308°30.7	49°56.7					
10	318°48.6	297°09.8	8°54.0	236°01.7	25°34.0	305°16.4	4°36.6	345°49.4	-12°31.2	Aldebaran	290°41.4	16°33.3					
11	333°51.0	312°09.4	8°55.2	251°03.0	25°34.1	320°18.3	4°36.8	0°51.6	-12°31.1	Rigel	281°05.3	-8°10.7					
12	348°53.5	327°09.1	8°56.4	266°04.2	25°34.1	335°20.3	4°37.0	15°53.8	-12°31.0	Capella	280°24.1	46°01.5					
13	3°55.9	342°08.7	8°57.7	281°05.4	25°34.1	350°22.2	4°37.2	30°56.0	-12°30.9	Bellatrix	278°24.5	6°22.2					
14	18°58.4	357°08.4	8°58.9	296°06.7	25°34.1	5°24.1	4°37.5	45°58.2	-12°30.8	Elnath	278°03.8	28°37.7					
15	34°00.9	12°08.1	9°00.1	311°07.9	25°34.2	20°26.1	4°37.7	61°00.3	-12°30.7	Alnilam	275°39.2	-1°11.3					
16	49°03.3	27°07.7	9°01.4	326°09.2	25°34.2	35°28.0	4°37.9	76°02.5	-12°30.6	Betelgeuse	270°53.7	7°24.6					
17	64°05.8	42°07.4	9°02.6	341°10.4	25°34.2	50°29.9	4°38.1	91°04.7	-12°30.5	Canopus	263°52.9	-52°42.7					
18	79°08.3	57°07.1	9°03.9	356°11.7	25°34.3	65°31.9	4°38.4	106°06.9	-12°30.4	Sirius	258°27.4	-16°44.9					
19	94°10.7	72°06.7	9°05.1	11°12.9	25°34.3	80°33.8	4°38.6	121°09.1	-12°30.3	Adara	255°06.9	-29°00.4					
20	109°13.2	87°06.4	9°06.3	26°14.1	25°34.3	95°35.7	4°38.8	136°11.3	-12°30.2	Procyon	244°52.1	5°10.0					
21	124°15.7	102°06.0	9°07.6	41°15.4	25°34.3	110°37.6	4°39.1	151°13.5	-12°30.1	Pollux	243°18.8	27°58.3					
22	139°18.1	117°05.7	9°08.8	56°16.6	25°34.4	125°39.6	4°39.3	166°15.6	-12°30.0	Avior	234°14.9	-59°35.2					
23	154°20.6	132°05.4	9°10.0	71°17.9	25°34.4	140°41.5	4°39.5	181°17.8	-12°29.9	Suhail	222°47.1	-43°31.7					
Mer.pass.:12:44			v-0.3 d1.2 m-3.9			v1.2 d0.0 m0.6			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	169°23.0	147°05.0	9°11.3	86°19.1	25°34.4	155°43.4	4°39.7	196°20.0	-12°29.8	Dubhe	193°42.2	61°37.6					
1	184°25.5	162°04.7	9°12.5	101°20.3	25°34.4	170°45.4	4°40.0	211°22.2	-12°29.7	Denebola	182°26.1	14°26.5					
2	199°28.0	177°04.3	9°13.7	116°21.6	25°34.5	185°47.3	4°40.2	226°24.4	-12°29.6	Gienah	175°44.8	-17°40.3					
3	214°30.4	192°04.0	9°15.0	131°22.8	25°34.5	200°49.2	4°40.4	241°26.6	-12°29.5	Acrux	173°01.2	-63°13.6					
4	229°32.9	207°03.7	9°16.2	146°24.1	25°34.5	215°51.1	4°40.7	256°28.8	-12°29.4	Gacrux	171°52.8	-57°14.5					
5	244°35.4	222°03.3	9°17.4	161°25.3	25°34.5	230°53.1	4°40.9	271°30.9	-12°29.3	Alioth	166°13.8	55°49.9					
6	259°37.8	237°03.0	9°18.7	176°26.5	25°34.6	245°55.0	4°41.1	286°33.1	-12°29.2	Spica	158°23.6	-11°17.0					
7	274°40.3	252°02.6	9°19.9	191°27.8	25°34.6	260°56.9	4°41.3	301°35.3	-12°29.1	Alcaid	152°52.8	49°11.7					
8	289°42.8	267°02.3	9°21.1	206°29.0	25°34.6	275°58.9	4°41.6	316°37.5	-12°29.0	Hadar	148°37.7	-60°28.9					
9	304°45.2	282°01.9	9°22.4	221°30.2	25°34.6	291°00.8	4°41.8	331°39.7	-12°28.9	Menkent	147°59.2	-36°29.0					
10	319°47.7	297°01.6	9°23.6	236°31.5	25°34.7	306°02.7	4°42.0	346°41.9	-12°28.8	Arcturus	145°48.9	19°03.8					
11	334°50.2	312°01.3	9°24.8	251°32.7	25°34.7	321°04.6	4°42.2	1°44.1	-12°28.7	Rigel Kent.	139°42.0	-60°55.7					
12	349°52.6	327°00.9	9°26.1	266°34.0	25°34.7	336°06.6	4°42.5	16°46.2	-12°28.6	Zubenelg.	136°57.5	-16°08.3					
13	4°55.1	342°00.6	9°27.3	281°35.2	25°34.7	351°08.5	4°42.7	31°48.4	-12°28.5	Kochab	137°19.0	74°03.3					
14	19°57.5	357°00.2	9°28.5	296°36.4	25°34.7	6°10.4	4°42.9	46°50.6	-12°28.4	Alphecca	126°04.9	26°38.0					
15	35°00.0	11°59.9	9°29.8	311°37.7	25°34.8	21°12.3	4°43.2	61°52.8	-12°28.3	Antares	112°17.6	-26°29.0					
16	50°02.5	26°59.5	9°31.0	326°38.9	25°34.8	36°14.3	4°43.4	76°55.0	-12°28.2	Atria	107°13.2	-69°03.9					
17	65°04.9	41°59.2	9°32.2	341°40.1	25°34.8	51°16.2	4°43.6	91°57.2	-12°28.1	Sabik	102°04.5	-15°45.3					
18	80°07.4	56°58.9	9°33.4	356°41.4	25°34.8	66°18.1	4°43.8	106°59.4	-12°28.0	Shaula	96°12.5	-37°07.1					
19	95°09.9	71°58.5	9°34.7	11°42.6	25°34.9	81°20.1	4°44.1	122°01.5	-12°27.9	Rasalhague	96°00.0	12°32.4					
20	110°12.3	86°58.2	9°35.9	26°43.8	25°34.9	96°22.0	4°44.3	137°03.7	-12°27.8	Etamin	90°43.0	51°28.8					
21	125°14.8	101°57.8	9°37.1	41°45.0	25°34.9	111°23.9	4°44.5	152°05.9	-12°27.7	Kaus Aust.	83°34.6	-34°22.4					
22	140°17.3	116°57.5	9°38.3	56°46.3	25°34.9	126°25.8	4°44.8	167°08.1	-12°27.6	Vega	80°34.4	38°47.9					
23	155°19.7	131°57.1	9°39.6	71°47.5	25°35.0	141°27.8	4°45.0	182°10.3	-12°27.5	Nunki	75°49.8	-26°16.1					
Mer.pass.:12:40			v-0.3 d1.2 m-3.9			v1.2 d0.0 m0.6			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	170°22.2	146°56.8	9°40.8	86°48.7	25°35.0	156°29.7	4°45.2	197°12.5	-12°27.4	Alnair	27°35.3	-46°51.0					
1	185°24.7	161°56.4	9°42.0	101°50.0	25°35.0	171°31.6	4°45.4	212°14.7	-12°27.3	Fomalhaut	15°16.6	-29°30.1					
2	200°27.1	176°56.1	9°43.3	116°51.2	25°35.0	186°33.5	4°45.7	227°16.8	-12°27.2	Scheat	13°47.1	28°12.3					
3	215°29.6	191°55.8	9°44.5	131°52.4	25°35.0	201°35.5	4°45.9	242°19.0	-12°27.1	Markab	13°31.8	15°19.6					
4	230°32.0	206°55.4	9°45.7	146°53.7	25°35.1	216°37.4	4°46.1	257°21.2	-12°27.0	2023/3/1 SHA Mer.pass							
5	245°34.5	221°55.1	9°46.9	161°54.9	25°35.1	231°39.3	4°46.3	272°23.4	-12°26.9	Venus	338°49.2	14:11					
6	260°37.0	236°54.7	9°48.1	176°56.1	25°35.1	246°41.3	4°46.6	287°25.6	-12°26.8	Mars	277°25.3	18:15					
7	275°39.4	251°54.4	9°49.4	191°57.3	25°35.1	261°43.2	4°46.8	302°27.8	-12°26.7	Jupiter	346°33.2	13:38					
8	290°41.9	266°54.0	9°50.6	206°58.6	25°35.1	276°45.1	4°47.0	317°30.0	-12°26.6	Saturn	27°03.7	10:57					
9	305°44.4	281°53.7	9°51.8	221°59.8	25°35.2	291°47.0	4°47.3	332°32.1	-12°26.5	2023/3/1 SHA Mer.pass							
10	320°46.8	296°53.3	9°53.0	237°01.0	25°35.2	306°49.0	4°47.5	347°34.3	-12°26.4	Venus	337°42.0	14:12			</		

h		Sun		Moon			
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	177°27.4	-3°54.3	320°22.9	14.0	-11°03.2	-13.9	56.3
1	192°27.6	-3°53.3	334°55.9	14.0	-11°17.1	-13.9	56.3
2	207°27.7	-3°52.3	349°28.9	13.9	-11°31.0	-13.8	56.3
3	222°27.9	-3°51.3	4°01.7	13.8	-11°44.8	-13.8	56.3
4	237°28.1	-3°50.4	18°34.5	13.8	-11°58.5	-13.7	56.3
5	252°28.2	-3°49.4	33°07.3	13.7	-12°12.2	-13.7	56.4
6	267°28.4	-3°48.4	47°39.9	13.6	-12°25.9	-13.6	56.4
7	282°28.6	-3°47.4	62°12.5	13.5	-12°39.5	-13.6	56.4
8	297°28.7	-3°46.4	76°45.0	13.5	-12°53.1	-13.6	56.4
9	312°28.9	-3°45.5	91°17.5	13.4	-13°06.6	-13.5	56.5
10	327°29.1	-3°44.5	105°49.8	13.3	-13°20.1	-13.5	56.5
11	342°29.2	-3°43.5	120°22.1	13.2	-13°33.5	-13.4	56.5
12	357°29.4	-3°42.5	134°54.3	13.2	-13°46.9	-13.4	56.5
13	12°29.5	-3°41.5	149°26.4	13.1	-14°00.2	-13.3	56.5
14	27°29.7	-3°40.6	163°58.5	13.0	-14°13.5	-13.2	56.6
15	42°29.9	-3°39.6	178°30.4	12.9	-14°26.7	-13.2	56.6
16	57°30.0	-3°38.6	193°02.3	12.8	-14°39.9	-13.1	56.6
17	72°30.2	-3°37.6	207°34.1	12.8	-14°53.0	-13.1	56.6
18	87°30.4	-3°36.6	222°05.8	12.7	-15°06.1	-13.0	56.7
19	102°30.5	-3°35.6	236°37.5	12.6	-15°19.1	-13.0	56.7
20	117°30.7	-3°34.7	251°09.0	12.5	-15°32.0	-12.9	56.7
21	132°30.9	-3°33.7	265°40.5	12.4	-15°44.9	-12.8	56.7
22	147°31.0	-3°32.7	280°11.8	12.3	-15°57.7	-12.8	56.7
23	162°31.2	-3°31.7	294°43.1	12.2	-16°10.4	-12.7	56.8
SD.=16.1		d=1.0	S.D.=15.3				
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	177°31.4	-3°30.7	309°14.3	12.1	-16°23.1	-12.6	56.8
1	192°31.5	-3°29.7	323°45.4	12.1	-16°35.7	-12.6	56.8
2	207°31.7	-3°28.8	338°16.4	12.0	-16°48.2	-12.5	56.8
3	222°31.9	-3°27.8	352°47.3	11.9	-17°00.7	-12.4	56.9
4	237°32.0	-3°26.8	7°18.1	11.8	-17°13.1	-12.4	56.9
5	252°32.2	-3°25.8	21°48.9	11.7	-17°25.4	-12.3	56.9
6	267°32.4	-3°24.8	36°19.5	11.6	-17°37.6	-12.2	56.9
7	282°32.5	-3°23.8	50°50.1	11.5	-17°49.8	-12.1	57.0
8	297°32.7	-3°22.9	65°20.5	11.4	-18°01.9	-12.1	57.0
9	312°32.8	-3°21.9	79°50.8	11.3	-18°13.9	-12.0	57.0
10	327°33.0	-3°20.9	94°21.1	11.2	-18°25.8	-11.9	57.0
11	342°33.2	-3°19.9	108°51.2	11.1	-18°37.7	-11.8	57.1
12	357°33.3	-3°18.9	123°21.3	11.0	-18°49.4	-11.7	57.1
13	12°33.5	-3°17.9	137°51.2	10.9	-19°01.1	-11.6	57.1
14	27°33.7	-3°17.0	152°21.1	10.8	-19°12.7	-11.6	57.1
15	42°33.9	-3°16.0	166°50.8	10.7	-19°24.2	-11.5	57.1
16	57°34.0	-3°15.0	181°20.5	10.6	-19°35.6	-11.4	57.2
17	72°34.2	-3°14.0	195°50.0	10.5	-19°47.0	-11.3	57.2
18	87°34.4	-3°13.0	210°19.5	10.4	-19°58.2	-11.2	57.2
19	102°34.5	-3°12.0	224°48.8	10.3	-20°09.3	-11.1	57.2
20	117°34.7	-3°11.1	239°18.0	10.2	-20°20.4	-11.0	57.3
21	132°34.9	-3°10.1	253°47.2	10.1	-20°31.3	-10.9	57.3
22	147°35.0	-3°09.1	268°16.2	10.0	-20°42.2	-10.8	57.3
23	162°35.2	-3°08.1	282°45.1	9.9	-20°53.0	-10.7	57.3
SD.=16.1		d=1.0	S.D.=15.5				
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	177°35.4	-3°07.1	297°13.9	9.8	-21°03.6	-10.6	57.4
1	192°35.5	-3°06.1	311°42.6	9.6	-21°14.2	-10.5	57.4
2	207°35.7	-3°05.2	326°11.2	9.5	-21°24.6	-10.4	57.4
3	222°35.9	-3°04.2	340°39.7	9.4	-21°35.0	-10.3	57.4
4	237°36.0	-3°03.2	355°08.1	9.3	-21°45.2	-10.2	57.5
5	252°36.2	-3°02.2	9°36.3	9.2	-21°55.3	-10.1	57.5
6	267°36.4	-3°01.2	24°04.5	9.1	-22°05.3	-10.0	57.5
7	282°36.5	-3°00.2	38°32.6	9.0	-22°15.2	-9.9	57.5
8	297°36.7	-2°59.2	53°00.5	8.9	-22°25.0	-9.7	57.6
9	312°36.9	-2°58.3	67°28.3	8.8	-22°34.7	-9.6	57.6
10	327°37.1	-2°57.3	81°56.1	8.7	-22°44.3	-9.5	57.6
11	342°37.2	-2°56.3	96°23.7	8.6	-22°53.7	-9.4	57.6
12	357°37.4	-2°55.3	110°51.2	8.5	-23°03.1	-9.3	57.7
13	12°37.6	-2°54.3	125°18.6	8.3	-23°12.3	-9.1	57.7
14	27°37.7	-2°53.3	139°45.9	8.2	-23°21.3	-9.0	57.7
15	42°37.9	-2°52.3	154°13.1	8.1	-23°30.3	-8.9	57.7
16	57°38.1	-2°51.4	168°40.2	8.0	-23°39.1	-8.8	57.8
17	72°38.2	-2°50.4	183°07.1	7.9	-23°47.8	-8.6	57.8
18	87°38.4	-2°49.4	197°34.0	7.8	-23°56.4	-8.5	57.8
19	102°38.6	-2°48.4	212°00.7	7.7	-24°04.9	-8.4	57.8
20	117°38.8	-2°47.4	226°27.4	7.6	-24°13.2	-8.3	57.9
21	132°38.9	-2°46.4	240°53.9	7.5	-24°21.4	-8.1	57.9
22	147°39.1	-2°45.4	255°20.3	7.4	-24°29.4	-8.0	57.9
23	162°39.3	-2°44.5	269°46.7	7.3	-24°37.3	-7.8	57.9
SD.=16.1		d=1.0	S.D.=15.6				
		Twilight		Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	04:13	05:34	06:41	17:41	18:48	20:10	
70	04:24	05:37	06:38	17:44	18:45	19:58	
68	04:34	05:40	06:35	17:47	18:42	19:49	
66	04:41	05:42	06:32	17:49	18:40	19:41	
64	04:47	05:43	06:30	17:51	18:38	19:34	
62	04:53	05:44	06:28	17:53	18:37	19:29	
60	04:57	05:46	06:27	17:54	18:35	19:24	
58	05:01	05:46	06:25	17:55	18:34	19:20	
56	05:04	05:47	06:24	17:57	18:34	19:17	
54	05:07	05:48	06:23	17:58	18:33	19:14	
52	05:09	05:48	06:22	17:59	18:32	19:12	
50	05:11	05:49	06:21	17:60	18:32	19:09	
45	05:16	05:50	06:19	18:02	18:31	19:05	
40	05:19	05:50	06:17	18:03	18:30	19:02	
35	05:21	05:50	06:15	18:05	18:30	18:59	
30	05:22	05:50	06:14	18:06	18:30	18:58	
20	05:24	05:49	06:11	18:09	18:31	18:56	
10	05:23	05:48	06:09	18:11	18:32	18:56	
0	05:22	05:46	06:07	18:13	18:34	18:58	
-10	05:19	05:43	06:04	18:15	18:36	19:01	
-20	05:14	05:39	06:01	18:18	18:40	19:06	
-30	05:06	05:34	05:58	18:21	18:45	19:13	
-35	05:01	05:31	05:56	18:23	18:48	19:18	
-40	04:55	05:27	05:54	18:25	18:52	19:24	
-45	04:47	05:22	05:51	18:27	18:57	19:32	
-50	04:37	05:16	05:48	18:30	19:03	19:42	
-52	04:32	05:13	05:47	18:32	19:06	19:46	
-54	04:26	05:09	05:45	18:33	19:09	19:52	
-56	04:20	05:06	05:44	18:35	19:12	19:58	
-58	04:13	05:02	05:42	18:37	19:16	20:05	
-60	04:04	04:57	05:39	18:39	19:21	20:13	
		Moonrise		Moonset			
Lat.	Sat	Sun	Mon	Sat	Sun	Mon	
72	--	02:06	--	05:57	04:31	--	
70	--	01:08	--	06:18	05:30	--	
68	--	00:35	03:52	06:35	06:05	04:33	
66	--	00:11	02:28	06:49	06:30	05:58	
64	23:52	--	01:51	07:00	06:50	06:36	
62	23:37	--	01:24	07:10	07:06	07:03	
60	23:24	--	01:04	07:19	07:20	07:24	
58	23:14	--	00:48	07:26	07:32	07:41	
56	23:04	--	00:33	07:33	07:42	07:56	
54	22:56	--	00:21	07:39	07:51	08:09	
52	22:49	--	00:11	07:44	07:59	08:20	
50	22:42	--	00:01	07:49	08:07	08:30	
45	22:28	23:42	--	07:59	08:22	08:51	
40	22:16	23:26	--	08:08	08:35	09:08	
35	22:06	23:12	--	08:16	08:46	09:22	
30	21:58	23:01	--	08:23	08:56	09:35	
20	21:43	22:41	23:42	08:34	09:13	09:56	
10	21:30	22:24	23:21	08:45	09:28	10:15	
0	21:18	22:08	23:02	08:54	09:41	10:33	
-10	21:07	21:52	22:42	09:04	09:55	10:51	
-20	20:54	21:35	22:22	09:14	10:10	11:10	
-30	20:40	21:16	21:58	09:26	10:27	11:32	
-35	20:32	21:05	21:45	09:33	10:38	11:44	
-40	20:23	20:52	21:29	09:41	10:49	11:59	
-45	20:12	20:37	21:10	09:50	11:03	12:17	
-50	19:59	20:19	20:47	10:02	11:19	12:40	
-52	19:53	20:11	20:35	10:07	11:27	12:50	
-54	19:46	20:01	20:23	10:13	11:36	13:02	
-56	19:39	19:50	20:08	10:19	11:46	13:16	
-58	19:31	19:38	19:51	10:26	11:58	13:33	
-60	19:21	19:24	19:31	10:35	12:11	13:52	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Mer.	Mer.Pass.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
11	10:10	10:02	12:10	02:43	15:06	19(85%)	
12	09:54	09:46	12:09	03:29	15:54	20(77%)	
13	09:38	09:30	12:09	04:20	16:47	21(67%)	

March 14, 15 ,16 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	171°21.3	146°48.4	10°10.1	87°18.1	25°35.5	157°15.9	4°50.7	198°05.0	-12°25.1	Alpheratz	357°36.7	29°13.0
1	186°23.8	161°48.1	10°11.3	102°19.4	25°35.5	172°17.8	4°50.9	213°07.1	-12°25.0	Ankaa	353°09.0	-42°11.0
2	201°26.3	176°47.7	10°12.5	117°20.6	25°35.5	187°19.8	4°51.1	228°09.3	-12°24.9	Schedar	349°33.3	56°39.8
3	216°28.7	191°47.4	10°13.8	132°21.8	25°35.5	202°21.7	4°51.4	243°11.5	-12°24.8	Diphda	348°49.0	-17°51.8
4	231°31.2	206°47.0	10°15.0	147°23.0	25°35.5	217°23.6	4°51.6	258°13.7	-12°24.7	Achernar	335°21.8	-57°07.4
5	246°33.6	221°46.7	10°16.2	162°24.2	25°35.5	232°25.5	4°51.8	273°15.9	-12°24.6	Hamal	327°53.2	23°34.3
6	261°36.1	236°46.3	10°17.4	177°25.5	25°35.6	247°27.5	4°52.1	288°18.1	-12°24.5	Polaris	315°03.6	89°21.9
7	276°38.6	251°46.0	10°18.6	192°26.7	25°35.6	262°29.4	4°52.3	303°20.3	-12°24.4	Akamar	315°13.2	-40°13.0
8	291°41.0	266°45.6	10°19.8	207°27.9	25°35.6	277°31.3	4°52.5	318°22.5	-12°24.3	Menkar	314°07.9	4°10.7
9	306°43.5	281°45.3	10°21.0	222°29.1	25°35.6	292°33.2	4°52.7	333°24.6	-12°24.2	Mirfak	308°30.7	49°56.7
10	321°46.0	296°44.9	10°22.3	237°30.3	25°35.6	307°35.2	4°53.0	348°26.8	-12°24.1	Aldebaran	290°41.4	16°33.3
11	336°48.4	311°44.6	10°23.5	252°31.5	25°35.7	322°37.1	4°53.2	3°29.0	-12°24.0	Rigel	281°05.3	-8°10.7
12	351°50.9	326°44.2	10°24.7	267°32.8	25°35.7	337°39.0	4°53.4	18°31.2	-12°23.9	Capella	280°24.2	46°01.5
13	6°53.4	341°43.9	10°25.9	282°34.0	25°35.7	352°40.9	4°53.7	33°33.4	-12°23.8	Bellatrix	278°24.5	6°22.2
14	21°55.8	356°43.5	10°27.1	297°35.2	25°35.7	7°42.9	4°53.9	48°35.6	-12°23.7	Elnath	278°03.8	28°37.7
15	36°58.3	11°43.2	10°28.3	312°36.4	25°35.7	22°44.8	4°54.1	63°37.8	-12°23.6	Alnilam	275°39.3	-1°11.4
16	52°00.8	26°42.8	10°29.5	327°37.6	25°35.7	37°46.7	4°54.3	78°40.0	-12°23.5	Betelgeuse	270°53.7	7°24.6
17	67°03.2	41°42.5	10°30.7	342°38.8	25°35.8	52°48.6	4°54.6	93°42.1	-12°23.4	Canopus	263°52.9	-52°42.7
18	82°05.7	56°42.1	10°31.9	357°40.0	25°35.8	67°50.6	4°54.8	108°44.3	-12°23.3	Sirius	258°27.4	-16°44.9
19	97°08.1	71°41.7	10°33.2	12°41.2	25°35.8	82°52.5	4°55.0	123°46.5	-12°23.2	Adara	255°06.9	-29°00.4
20	112°10.6	86°41.4	10°34.4	27°42.5	25°35.8	97°54.4	4°55.3	138°48.7	-12°23.1	Procyon	244°52.2	5°10.0
21	127°13.1	101°41.0	10°35.6	42°43.7	25°35.8	112°56.3	4°55.5	153°50.9	-12°23.0	Pollux	243°18.8	27°58.3
22	142°15.5	116°40.7	10°36.8	57°44.9	25°35.8	127°58.3	4°55.7	168°53.1	-12°22.9	Avior	234°14.9	-59°35.2
23	157°18.0	131°40.3	10°38.0	72°46.1	25°35.8	143°00.2	4°55.9	183°55.3	-12°22.8	Suhail	222°47.1	-43°31.7
Mer.pass.:12:32		v-0.4 d1.2 m-3.9		v1.2 d0.0 m0.7		v1.9 d0.2 m-1.9		v2.2 d0.1 m0.9		Miaplacidus	221°37.9	-69°48.9
										Alphard	217°49.0	-8°45.6
										Regulus	207°35.7	11°51.2
										Dubhe	193°42.2	61°37.6
										Denebola	182°26.1	14°26.5
										Gienah	175°44.8	-17°40.3
										Acrux	173°01.2	-63°13.6
										Gacrux	171°52.8	-57°14.5
										Alioth	166°13.8	55°49.9
										Spica	158°23.6	-11°17.0
										Alcaid	152°52.8	49°11.7
										Hadar	148°37.7	-60°28.9
										Menkent	147°59.1	-36°29.0
										Arcturus	145°48.9	19°03.8
										Rigel Kent.	139°42.0	-60°55.7
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°19.0	74°03.3
										Alphecca	126°04.9	26°38.0
										Antares	112°17.6	-26°29.0
										Atria	107°13.1	-69°03.9
										Sabik	102°04.5	-15°45.3
										Shaula	96°12.4	-37°07.1
										Rasalhague	95°60.0	12°32.4
										Etamin	90°42.9	51°28.8
										Kaus Aust.	83°34.6	-34°22.3
										Vega	80°34.4	38°47.9
										Nunki	75°49.8	-26°16.1
										Altair	62°01.7	8°55.5
										Peacock	53°08.5	-56°39.5
										Deneb	49°27.2	45°21.5
										Enif	33°40.6	9°58.7
										Alnair	27°35.2	-46°51.0
										Fomalhaut	15°16.6	-29°30.1
										Scheat	13°47.1	28°12.3
										Markab	13°31.7	15°19.6
										2023/3/1	SHA	Mer.pass
										Venus	335°27.1	14:13
										Mars	275°56.8	18:09
										Jupiter	345°54.6	13:29
										Saturn	26°43.6	10:46
										2023/3/1	SHA	Mer.pass
										Venus	334°19.5	14:14
										Mars	275°26.8	18:07
										Jupiter	345°41.6	13:26
										Saturn	26°37.0	10:43
										2023/3/1	SHA	Mer.pass
										Venus	333°11.7	14:14
										Mars	274°56.6	18:05
										Jupiter	345°28.6	13:23
										Saturn	26°30.4	10:39
										Horizontal paralax		
										Venus:		0.1
										Mars:		0.1

h		Sun		Moon			
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	177°39.4	-2°43.5	284°12.9	7.2	-24°45.1	-7.7	58.0
1	192°39.6	-2°42.5	298°39.0	7.1	-24°52.7	-7.6	58.0
2	207°39.8	-2°41.5	313°05.0	7.0	-25°00.2	-7.4	58.0
3	222°39.9	-2°40.5	327°30.9	6.8	-25°07.6	-7.3	58.0
4	237°40.1	-2°39.5	341°56.7	6.7	-25°14.8	-7.1	58.1
5	252°40.3	-2°38.5	356°22.4	6.6	-25°21.9	-7.0	58.1
6	267°40.5	-2°37.6	10°48.0	6.5	-25°28.8	-6.8	58.1
7	282°40.6	-2°36.6	25°13.5	6.4	-25°35.6	-6.7	58.1
8	297°40.8	-2°35.6	39°38.9	6.3	-25°42.2	-6.5	58.2
9	312°41.0	-2°34.6	54°04.1	6.2	-25°48.6	-6.4	58.2
10	327°41.1	-2°33.6	68°29.3	6.1	-25°55.0	-6.2	58.2
11	342°41.3	-2°32.6	82°54.4	6.0	-26°01.1	-6.1	58.2
12	357°41.5	-2°31.6	97°19.4	5.9	-26°07.1	-5.9	58.3
13	12°41.7	-2°30.7	111°44.3	5.9	-26°13.0	-5.8	58.3
14	27°41.8	-2°29.7	126°09.1	5.8	-26°18.7	-5.6	58.3
15	42°42.0	-2°28.7	140°33.8	5.7	-26°24.2	-5.5	58.4
16	57°42.2	-2°27.7	154°58.4	5.6	-26°29.6	-5.3	58.4
17	72°42.4	-2°26.7	169°23.0	5.5	-26°34.8	-5.1	58.4
18	87°42.5	-2°25.7	183°47.4	5.4	-26°39.8	-5.0	58.4
19	102°42.7	-2°24.7	198°11.8	5.3	-26°44.7	-4.8	58.5
20	117°42.9	-2°23.8	212°36.0	5.2	-26°49.4	-4.6	58.5
21	132°43.0	-2°22.8	227°00.2	5.1	-26°54.0	-4.5	58.5
22	147°43.2	-2°21.8	241°24.3	5.1	-26°58.4	-4.3	58.5
23	162°43.4	-2°20.8	255°48.3	5.0	-27°02.6	-4.1	58.6
SD.=16.1		d=1.0	S.D.=15.8				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	177°43.6	-2°19.8	270°12.2	4.9	-27°06.6	-4.0	58.6
1	192°43.7	-2°18.8	284°36.1	4.8	-27°10.5	-3.8	58.6
2	207°43.9	-2°17.8	298°59.8	4.7	-27°14.2	-3.6	58.6
3	222°44.1	-2°16.8	313°23.5	4.7	-27°17.7	-3.4	58.7
4	237°44.3	-2°15.9	327°47.2	4.6	-27°21.1	-3.3	58.7
5	252°44.4	-2°14.9	342°10.7	4.5	-27°24.2	-3.1	58.7
6	267°44.6	-2°13.9	356°34.2	4.4	-27°27.2	-2.9	58.7
7	282°44.8	-2°12.9	10°57.6	4.4	-27°30.0	-2.7	58.8
8	297°45.0	-2°11.9	25°21.0	4.3	-27°32.7	-2.5	58.8
9	312°45.1	-2°10.9	39°44.2	4.3	-27°35.1	-2.4	58.8
10	327°45.3	-2°09.9	54°07.5	4.2	-27°37.4	-2.2	58.8
11	342°45.5	-2°08.9	68°30.6	4.1	-27°39.5	-2.0	58.9
12	357°45.7	-2°08.0	82°53.7	4.1	-27°41.4	-1.8	58.9
13	12°45.8	-2°07.0	97°16.8	4.0	-27°43.1	-1.6	58.9
14	27°46.0	-2°06.0	111°39.8	4.0	-27°44.6	-1.4	58.9
15	42°46.2	-2°05.0	126°02.7	3.9	-27°46.0	-1.3	59.0
16	57°46.4	-2°04.0	140°25.6	3.9	-27°47.1	-1.1	59.0
17	72°46.5	-2°03.0	154°48.4	3.8	-27°48.1	-0.9	59.0
18	87°46.7	-2°02.0	169°11.2	3.8	-27°48.9	-0.7	59.0
19	102°46.9	-2°01.0	183°34.0	3.7	-27°49.5	-0.5	59.1
20	117°47.1	-2°00.1	197°56.7	3.7	-27°49.9	-0.3	59.1
21	132°47.2	-1°59.1	212°19.4	3.7	-27°50.1	-0.1	59.1
22	147°47.4	-1°58.1	226°42.0	3.6	-27°50.2	0.1	59.1
23	162°47.6	-1°57.1	241°04.6	3.6	-27°50.0	0.3	59.2
SD.=16.1		d=1.0	S.D.=16.0				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	177°47.8	-1°56.1	255°27.2	3.6	-27°49.6	0.4	59.2
1	192°47.9	-1°55.1	269°49.8	3.5	-27°49.1	0.6	59.2
2	207°48.1	-1°54.1	284°12.3	3.5	-27°48.4	0.8	59.2
3	222°48.3	-1°53.1	298°34.8	3.5	-27°47.4	1.0	59.3
4	237°48.5	-1°52.1	312°57.3	3.5	-27°46.3	1.2	59.3
5	252°48.6	-1°51.2	327°19.7	3.5	-27°45.0	1.4	59.3
6	267°48.8	-1°50.2	341°42.2	3.4	-27°43.5	1.6	59.3
7	282°49.0	-1°49.2	356°04.6	3.4	-27°41.8	1.8	59.4
8	297°49.2	-1°48.2	10°27.0	3.4	-27°39.9	2.0	59.4
9	312°49.3	-1°47.2	24°49.5	3.4	-27°37.8	2.2	59.4
10	327°49.5	-1°46.2	39°11.9	3.4	-27°35.5	2.4	59.4
11	342°49.7	-1°45.2	53°34.3	3.4	-27°33.1	2.6	59.4
12	357°49.9	-1°44.2	67°56.7	3.4	-27°30.4	2.8	59.5
13	12°50.0	-1°43.3	82°19.1	3.4	-27°27.5	3.0	59.5
14	27°50.2	-1°42.3	96°41.5	3.4	-27°24.5	3.2	59.5
15	42°50.4	-1°41.3	111°03.9	3.4	-27°21.2	3.3	59.5
16	57°50.6	-1°40.3	125°26.3	3.4	-27°17.8	3.5	59.6
17	72°50.8	-1°39.3	139°48.7	3.4	-27°14.2	3.7	59.6
18	87°50.9	-1°38.3	154°11.2	3.5	-27°10.3	3.9	59.6
19	102°51.1	-1°37.3	168°33.6	3.5	-27°06.3	4.1	59.6
20	117°51.3	-1°36.3	182°56.1	3.5	-27°02.1	4.3	59.6
21	132°51.5	-1°35.3	197°18.6	3.5	-26°57.7	4.5	59.7
22	147°51.6	-1°34.4	211°41.1	3.5	-26°53.1	4.7	59.7
23	162°51.8	-1°33.4	226°03.7	3.6	-26°48.3	4.9	59.7
SD.=16.1		d=1.0	S.D.=16.1				
		Twilight		Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	03:55	05:19	06:26	17:55	19:02	20:27	
70	04:09	05:23	06:24	17:56	18:57	20:12	
68	04:20	05:27	06:22	17:58	18:53	20:01	
66	04:29	05:30	06:21	17:59	18:50	19:51	
64	04:36	05:33	06:20	17:60	18:47	19:44	
62	04:42	05:35	06:19	18:01	18:45	19:37	
60	04:48	05:37	06:18	18:01	18:43	19:32	
58	04:52	05:38	06:17	18:02	18:41	19:27	
56	04:56	05:39	06:16	18:03	18:40	19:23	
54	04:59	05:41	06:16	18:03	18:39	19:20	
52	05:02	05:41	06:15	18:04	18:38	19:17	
50	05:05	05:42	06:14	18:04	18:37	19:14	
45	05:10	05:44	06:13	18:05	18:35	19:09	
40	05:14	05:45	06:12	18:06	18:33	19:05	
35	05:17	05:46	06:11	18:07	18:32	19:02	
30	05:19	05:46	06:10	18:08	18:32	18:60	
20	05:21	05:47	06:09	18:09	18:31	18:57	
10	05:22	05:46	06:07	18:11	18:32	18:56	
0	05:21	05:45	06:06	18:12	18:33	18:57	
-10	05:19	05:43	06:04	18:14	18:35	18:59	
-20	05:15	05:40	06:02	18:15	18:37	19:03	
-30	05:08	05:36	06:00	18:17	18:41	19:09	
-35	05:04	05:33	05:59	18:19	18:44	19:14	
-40	04:58	05:30	05:57	18:20	18:47	19:19	
-45	04:51	05:26	05:55	18:22	18:51	19:26	
-50	04:42	05:21	05:53	18:24	18:56	19:35	
-52	04:38	05:18	05:52	18:25	18:59	19:39	
-54	04:33	05:15	05:51	18:26	19:01	19:44	
-56	04:27	05:12	05:50	18:27	19:04	19:49	
-58	04:21	05:09	05:48	18:28	19:08	19:55	
-60	04:13	05:05	05:47	18:30	19:12	20:03	
		Moonrise		Moonset			
Lat.	Tue	Wed	Thu	Tue	Wed	Thu	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	—:—	—:—	—:—	—:—	
64	04:21	—:—	—:—	05:59	—:—	—:—	
62	03:22	05:29	06:50	06:59	06:56	07:46	
60	02:49	04:28	05:38	07:33	07:57	08:57	
58	02:24	03:54	05:03	07:58	08:31	09:32	
56	02:04	03:29	04:37	08:18	08:56	09:58	
54	01:48	03:09	04:16	08:35	09:16	10:18	
52	01:34	02:53	03:59	08:49	09:33	10:35	
50	01:22	02:38	03:44	09:02	09:47	10:50	
45	00:57	02:09	03:15	09:28	10:17	11:20	
40	00:37	01:47	02:51	09:49	10:40	11:43	
35	00:20	01:28	02:32	10:06	10:59	12:02	
30	00:06	01:12	02:16	10:21	11:15	12:18	
20	—:—	00:45	01:48	10:46	11:43	12:46	
10	—:—	00:21	01:24	11:08	12:07	13:09	
0	23:60	—:—	01:01	11:29	12:29	13:31	
-10	23:38	—:—	00:39	11:49	12:51	13:53	
-20	23:15	—:—	00:15	12:12	13:15	14:17	
-30	22:49	23:48	—:—	12:37	13:43	14:44	
-35	22:33	23:31	—:—	12:53	13:59	14:60	
-40	22:15	23:12	—:—	13:10	14:18	15:18	
-45	21:53	22:49	23:58	13:32	14:41	15:41	
-50	21:25	22:19	23:31	13:59	15:10	16:09	
-52	21:12	22:05	23:17	14:12	15:25	16:23	
-54	20:56	21:48	23:01	14:27	15:42	16:39	
-56	20:38	21:28	22:43	14:45	16:02	16:58	
-58	20:16	21:02	22:20	15:07	16:27	17:21	
-60	19:47	20:28	21:50	15:35	17:01	17:51	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Mer.	Mer.Pass.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
14	09:22	09:14	12:09	05:15	17:44	22(57%)	
15	09:06	08:57	12:08	06:14	18:45	23(46%)	
16	08:49	08:40	12:08	07:16	19:47	24(34%)	

March 17, 18 ,19 (Fri., Sat., Sun.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	174°18.7	146°22.6	11°36.6	88°45.0	25°36.4	159°34.4	5°07.2	200°42.6	-12°18.1	Alpheratz	357°36.7	29°13.0
1	189°21.2	161°22.2	11°37.8	103°46.2	25°36.4	174°36.3	5°07.4	215°44.8	-12°18.0	Ankaa	353°09.0	-42°11.0
2	204°23.7	176°21.9	11°39.0	118°47.4	25°36.4	189°38.2	5°07.6	230°46.9	-12°17.9	Schedar	349°33.3	56°39.8
3	219°26.1	191°21.5	11°40.2	133°48.6	25°36.4	204°40.1	5°07.8	245°49.1	-12°17.8	Diphda	348°49.0	-17°51.8
4	234°28.6	206°21.1	11°41.4	148°49.8	25°36.4	219°42.1	5°08.1	260°51.3	-12°17.7	Achernar	335°21.8	-57°07.4
5	249°31.1	221°20.7	11°42.6	163°50.9	25°36.4	234°44.0	5°08.3	275°53.5	-12°17.6	Hamal	327°53.2	23°34.3
6	264°33.5	236°20.4	11°43.7	178°52.1	25°36.5	249°45.9	5°08.5	290°55.7	-12°17.5	Polaris	315°04.6	89°21.9
7	279°36.0	251°20.0	11°44.9	193°53.3	25°36.5	264°47.8	5°08.8	305°57.9	-12°17.4	Akamar	315°13.2	-40°13.0
8	294°38.5	266°19.6	11°46.1	208°54.5	25°36.5	279°49.7	5°09.0	321°00.1	-12°17.3	Menkar	314°07.9	4°10.7
9	309°40.9	281°19.3	11°47.3	223°55.7	25°36.5	294°51.7	5°09.2	336°02.3	-12°17.2	Mirfak	308°30.7	49°56.7
10	324°43.4	296°18.9	11°48.5	238°56.9	25°36.5	309°53.6	5°09.4	351°04.5	-12°17.1	Aldebaran	290°41.4	16°33.3
11	339°45.9	311°18.5	11°49.6	253°58.1	25°36.5	324°55.5	5°09.7	6°06.7	-12°17.0	Rigel	281°05.3	-8°10.7
12	354°48.3	326°18.2	11°50.8	268°59.3	25°36.5	339°57.4	5°09.9	21°08.9	-12°16.9	Capella	280°24.2	46°01.5
13	9°50.8	341°17.8	11°52.0	284°00.5	25°36.5	354°59.3	5°10.1	36°11.1	-12°16.8	Bellatrix	278°24.5	6°22.2
14	24°53.2	356°17.4	11°53.2	299°01.6	25°36.5	10°01.3	5°10.4	51°13.2	-12°16.7	Elnath	278°03.8	28°37.7
15	39°55.7	11°17.0	11°54.4	314°02.8	25°36.5	25°03.2	5°10.6	66°15.4	-12°16.6	Alnilam	275°39.3	-1°11.4
16	54°58.2	26°16.7	11°55.5	329°04.0	25°36.5	40°05.1	5°10.8	81°17.6	-12°16.5	Betelgeuse	270°53.7	7°24.6
17	70°00.6	41°16.3	11°56.7	344°05.2	25°36.5	55°07.0	5°11.0	96°19.8	-12°16.4	Canopus	263°53.0	-52°42.7
18	85°03.1	56°15.9	11°57.9	359°06.4	25°36.5	70°08.9	5°11.3	111°22.0	-12°16.3	Sirius	258°27.4	-16°44.9
19	100°05.6	71°15.5	11°59.1	14°07.6	25°36.5	85°10.9	5°11.5	126°24.2	-12°16.2	Adara	255°06.9	-29°00.4
20	115°08.0	86°15.2	12°00.3	29°08.8	25°36.5	100°12.8	5°11.7	141°26.4	-12°16.1	Procyon	244°52.2	5°10.0
21	130°10.5	101°14.8	12°01.4	44°10.0	25°36.5	115°14.7	5°12.0	156°28.6	-12°16.0	Pollux	243°18.8	27°58.3
22	145°13.0	116°14.4	12°02.6	59°11.1	25°36.5	130°16.6	5°12.2	171°30.8	-12°15.9	Avior	234°15.0	-59°35.2
23	160°15.4	131°14.0	12°03.8	74°12.3	25°36.5	145°18.5	5°12.4	186°33.0	-12°15.8	Suhail	222°47.1	-43°31.7
Mer.pass.:12:20		v-0.4 d1.2 m-3.9		v1.2 d0.0 m0.7		v1.9 d0.2 m-1.9		v2.2 d0.1 m0.9		Miaplacidus	221°37.9	-69°48.9
										Alphard	217°49.0	-8°45.6
										Regulus	207°35.7	11°51.2
										Dubhe	193°42.1	61°37.6
										Denebola	182°26.1	14°26.5
										Gienah	175°44.8	-17°40.3
										Acrux	173°01.1	-63°13.6
										Gacrux	171°52.8	-57°14.5
										Alioth	166°13.8	55°49.9
										Spica	158°23.6	-11°17.0
										Alcaid	152°52.8	49°11.7
										Hadar	148°37.7	-60°28.9
										Menkent	147°59.1	-36°29.0
										Arcturus	145°48.9	19°03.8
										Rigel Kent.	139°41.9	-60°55.7
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°18.9	74°03.3
										Alphecca	126°04.8	26°38.0
										Antares	112°17.6	-26°29.0
										Atria	107°13.1	-69°03.9
										Sabik	102°04.5	-15°45.3
										Shaula	96°12.4	-37°07.1
										Rasalhague	95°60.0	12°32.4
										Etamin	90°42.9	51°28.8
										Kaus Aust.	83°34.6	-34°22.3
										Vega	80°34.4	38°47.9
										Nunki	75°49.7	-26°16.1
										Altair	62°01.7	8°55.5
										Peacock	53°08.4	-56°39.5
										Deneb	49°27.1	45°21.5
										Enif	33°40.6	9°58.7
										Alnair	27°35.2	-46°51.0
										Fomalhaut	15°16.6	-29°30.1
										Scheat	13°47.1	28°12.3
										Markab	13°31.7	15°19.6
										2023/3/1	SHA	Mer.pass
										Venus	332°03.8	14:15
										Mars	274°26.2	18:04
										Jupiter	345°15.6	13:20
										Saturn	26°23.8	10:36
										2023/3/1	SHA	Mer.pass
										Venus	330°55.8	14:15
										Mars	273°55.6	18:02
										Jupiter	345°02.6	13:17
										Saturn	26°17.3	10:32
										2023/3/1	SHA	Mer.pass
										Venus	329°47.6	14:16
										Mars	273°24.8	17:60
										Jupiter	344°49.5	13:14
										Saturn	26°10.8	10:29
										Horizontal parallax		
										Venus:		0.1
										Mars:		0.1

Sun							Moon							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	177°52.0	-1°32.4	240°26.3	3.6	-26°43.4	5.1	59.7	72	03:37	05:03	06:10	18:08	19:16	20:44
1	192°52.2	-1°31.4	254°48.9	3.6	-26°38.2	5.3	59.7	70	03:53	05:09	06:10	18:08	19:10	20:27
2	207°52.4	-1°30.4	269°11.5	3.7	-26°32.8	5.4	59.8	68	04:06	05:14	06:10	18:09	19:04	20:13
3	222°52.5	-1°29.4	283°34.2	3.7	-26°27.3	5.6	59.8	66	04:16	05:18	06:09	18:09	18:60	20:03
4	237°52.7	-1°28.4	297°56.9	3.7	-26°21.6	5.8	59.8	64	04:25	05:22	06:09	18:09	18:56	19:54
5	252°52.9	-1°27.4	312°19.6	3.8	-26°15.6	6.0	59.8	62	04:32	05:25	06:09	18:09	18:53	19:46
6	267°53.1	-1°26.5	326°42.4	3.8	-26°09.5	6.2	59.8	60	04:38	05:27	06:09	18:09	18:50	19:40
7	282°53.2	-1°25.5	341°05.2	3.8	-26°03.3	6.4	59.9	58	04:43	05:30	06:09	18:09	18:48	19:35
8	297°53.4	-1°24.5	355°28.1	3.9	-25°56.8	6.6	59.9	56	04:48	05:31	06:08	18:09	18:46	19:30
9	312°53.6	-1°23.5	9°51.0	3.9	-25°50.1	6.7	59.9	54	04:52	05:33	06:08	18:09	18:44	19:26
10	327°53.8	-1°22.5	24°14.0	4.0	-25°43.3	6.9	59.9	52	04:55	05:35	06:08	18:09	18:43	19:22
11	342°54.0	-1°21.5	38°37.0	4.0	-25°36.3	7.1	59.9	50	04:58	05:36	06:08	18:09	18:41	19:19
12	357°54.1	-1°20.5	53°00.1	4.1	-25°29.1	7.3	60.0	45	05:04	05:38	06:08	18:09	18:39	19:13
13	12°54.3	-1°19.5	67°23.2	4.1	-25°21.7	7.5	60.0	40	05:09	05:40	06:07	18:10	18:37	19:08
14	27°54.5	-1°18.5	81°46.4	4.2	-25°14.1	7.7	60.0	35	05:12	05:42	06:07	18:10	18:35	19:04
15	42°54.7	-1°17.6	96°09.6	4.3	-25°06.4	7.8	60.0	30	05:15	05:43	06:07	18:10	18:34	19:02
16	57°54.9	-1°16.6	110°32.9	4.3	-24°58.4	8.0	60.0	20	05:19	05:44	06:06	18:10	18:32	18:58
17	72°55.0	-1°15.6	124°56.2	4.4	-24°50.4	8.2	60.0	10	05:20	05:45	06:06	18:11	18:32	18:56
18	87°55.2	-1°14.6	139°19.7	4.4	-24°42.1	8.4	60.1	0	05:20	05:44	06:05	18:11	18:32	18:56
19	102°55.4	-1°13.6	153°43.1	4.5	-24°33.6	8.5	60.1	-10	05:19	05:43	06:04	18:12	18:33	18:57
20	117°55.6	-1°12.6	168°06.7	4.6	-24°25.0	8.7	60.1	-20	05:15	05:41	06:03	18:13	18:35	19:00
21	132°55.7	-1°11.6	182°30.3	4.6	-24°16.2	8.9	60.1	-30	05:10	05:38	06:02	18:14	18:38	19:06
22	147°55.9	-1°10.6	196°54.0	4.7	-24°07.3	9.0	60.1	-35	05:06	05:36	06:01	18:14	18:40	19:09
23	162°56.1	-1°09.6	211°17.7	4.8	-23°58.2	9.2	60.1	-40	05:01	05:33	06:00	18:15	18:42	19:14
SD.=16.1 d=1.0							S.D.=16.3	-45	04:55	05:30	05:59	18:16	18:45	19:20
								-50	04:47	05:26	05:58	18:17	18:49	19:28
								-52	04:43	05:24	05:57	18:18	18:51	19:31
								-54	04:39	05:21	05:57	18:18	18:54	19:36
								-56	04:34	05:19	05:56	18:19	18:56	19:41
								-58	04:28	05:16	05:55	18:20	18:59	19:46
								-60	04:22	05:12	05:54	18:21	19:02	19:53
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	177°56.3	-1°08.6	225°41.5	4.9	-23°48.9	9.4	60.2	72	--	--	09:14	--	--	11:46
1	192°56.5	-1°07.7	240°05.4	4.9	-23°39.4	9.5	60.2	70	--	--	08:16	--	--	12:42
2	207°56.6	-1°06.7	254°29.4	5.0	-23°29.8	9.7	60.2	68	--	--	07:41	--	--	13:15
3	222°56.8	-1°05.7	268°53.4	5.1	-23°20.0	9.9	60.2	66	--	07:55	07:16	--	11:00	13:39
4	237°57.0	-1°04.7	283°17.5	5.1	-23°10.1	10.0	60.2	64	--	07:12	06:56	--	11:42	13:57
5	252°57.2	-1°03.7	297°41.7	5.2	-22°60.0	10.2	60.2	62	06:47	06:43	06:40	09:60	12:10	14:12
6	267°57.4	-1°02.7	312°05.9	5.3	-22°49.7	10.3	60.2	60	06:09	06:21	06:26	10:37	12:31	14:25
7	282°57.5	-1°01.7	326°30.3	5.4	-22°39.3	10.5	60.2	58	05:42	06:03	06:14	11:03	12:49	14:36
8	297°57.7	-1°00.7	340°54.7	5.5	-22°28.7	10.7	60.3	56	05:21	05:47	06:04	11:24	13:03	14:45
9	312°57.9	-0°59.7	355°19.2	5.5	-22°18.0	10.8	60.3	54	05:03	05:34	05:55	11:41	13:16	14:53
10	327°58.1	-0°58.8	9°43.8	5.6	-22°07.1	11.0	60.3	52	04:48	05:23	05:47	11:56	13:27	15:00
11	342°58.3	-0°57.8	24°08.4	5.7	-21°56.1	11.1	60.3	50	04:35	05:12	05:39	12:09	13:37	15:07
12	357°58.4	-0°56.8	38°33.2	5.8	-21°44.9	11.3	60.3	45	04:08	04:51	05:23	12:35	13:57	15:21
13	12°58.6	-0°55.8	52°58.0	5.9	-21°33.6	11.4	60.3	40	03:47	04:33	05:10	12:55	14:14	15:33
14	27°58.8	-0°54.8	67°22.9	5.9	-21°22.1	11.5	60.3	35	03:29	04:18	04:59	13:13	14:27	15:42
15	42°59.0	-0°53.8	81°47.9	6.0	-21°10.5	11.7	60.3	30	03:14	04:05	04:49	13:27	14:39	15:51
16	57°59.2	-0°52.8	96°13.0	6.1	-20°58.7	11.8	60.3	20	02:48	03:43	04:32	13:52	14:60	16:05
17	72°59.3	-0°51.8	110°38.1	6.2	-20°46.8	12.0	60.4	10	02:25	03:23	04:17	14:14	15:17	16:18
18	87°59.5	-0°50.8	125°03.4	6.3	-20°34.8	12.1	60.4	0	02:04	03:05	04:03	14:34	15:33	16:30
19	102°59.7	-0°49.9	139°28.7	6.4	-20°22.6	12.2	60.4	-10	01:43	02:47	03:49	14:53	15:50	16:41
20	117°59.9	-0°48.9	153°54.1	6.5	-20°10.3	12.4	60.4	-20	01:20	02:28	03:34	15:14	16:07	16:54
21	133°00.1	-0°47.9	168°19.6	6.5	-19°57.9	12.5	60.4	-30	00:54	02:05	03:17	15:39	16:26	17:07
22	148°00.3	-0°46.9	182°45.2	6.6	-19°45.3	12.6	60.4	-35	00:38	01:52	03:07	15:53	16:38	17:15
23	163°00.4	-0°45.9	197°10.9	6.7	-19°32.6	12.8	60.4	-40	00:20	01:36	02:55	16:09	16:51	17:25
SD.=16.1 d=1.0							S.D.=16.4	-45	--	01:18	02:41	16:29	17:06	17:35
								-50	--	00:55	02:24	16:53	17:24	17:48
								-52	--	00:44	02:16	17:04	17:33	17:54
								-54	--	00:31	02:07	17:17	17:43	17:60
								-56	--	00:16	01:57	17:32	17:54	18:07
								-58	23:59	--	01:46	17:50	18:06	18:15
								-60	23:38	--	01:32	18:12	18:20	18:24
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		
0	178°00.6	-0°44.9	211°36.6	6.8	-19°19.8	12.9	60.4		Eqn.of Time	Mer.	Mer.Pass.	Age		
1	193°00.8	-0°43.9	226°02.5	6.9	-19°06.8	13.0	60.4		00 ^h	12 ^h	Pass	Upper	Lower	
2	208°01.0	-0°42.9	240°28.4	7.0	-18°53.7	13.1	60.4	17	08:32	08:23	12:08	08:18	20:49	
3	223°01.2	-0°41.9	254°54.4	7.1	-18°40.5	13.3	60.4	18	08:15	08:06	12:08	09:19	21:48	
4	238°01.3	-0°41.0	269°20.5	7.1	-18°27.2	13.4	60.4	19	07:57	07:49	12:07	10:16	22:43	
5	253°01.5	-0°40.0	283°46.7	7.2	-18°13.8	13.5	60.4							
6	268°01.7	-0°39.0	298°13.0	7.3	-18°00.2	13.6	60.4							
7	283°01.9	-0°38.0	312°39.4	7.4	-17°46.6	13.7	60.4							
8	298°02.1	-0°37.0	327°05.8	7.5	-17°32.8	13.8	60.4							
9	313°02.2	-0°36.0	341°32.3	7.6	-17°18.9	13.9	60.4							
10	328°02.4	-0°35.0	355°59.0	7.7	-17°04.9	14.1	60.4							
11	343°02.6	-0°34.0	10°25.7	7.7	-16°50.8	14.2	60.5							
12	358°02.8	-0°33.0	24°52.5	7.8	-16°36.5	14.3	60.5							
13	13°03.0	-0°32.1	39°19.3	7.9	-16°22.2	14.4	60.5							
14	28°03.2	-0°31.1	53°46.3	8.0	-16°07.8	14.5	60.5							
15	43°03.3	-0°30.1	68°13.3	8.1	-15°53.3	14.6	60.5							
16	58°03.5	-0°29.1	82°40.5	8.2	-15°38.7	14.7	60.5							
17	73°03.7	-0°28.1	97°07.7	8.2	-15°24.0	14.8	60.5							
18	88°03.9	-0°27.1	111°35.0	8.3	-15°09.2	14.8	60.5							
19	103°04.1	-0°26.1	126°02.3	8.4	-14°54.3	14.9	60.5							
20	118°04.3	-0°25.1	140°29.8	8.5	-14°39.3	15.0	60.4							
21	133°04.4	-0°24.1	154°57.3	8.6	-14°24.2	15.1	60.4							
22	148°04.6	-0°23.2	169°24.9	8.7	-14°09.1	15.2	60.4							
23	163°04.8	-0°22.2	183°52.6	8.7	-13°53.8	15.3	60.4							
SD.=16.1 d=1.0							S.D.=16.5							

March 20, 21 ,22 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	177°16.2	145°55.4	13°00.8	90°09.9	25°36.6	161°52.5	5°23.7	203°20.5	-12°11.1				Alpheratz	357°36.7	29°13.0		
1	192°18.6	160°55.0	13°01.9	105°11.1	25°36.6	176°54.4	5°23.9	218°22.7	-12°11.0				Ankaa	353°09.0	-42°11.0		
2	207°21.1	175°54.6	13°03.1	120°12.3	25°36.5	191°56.3	5°24.1	233°24.9	-12°10.9				Schedar	349°33.3	56°39.8		
3	222°23.6	190°54.2	13°04.2	135°13.4	25°36.5	206°58.3	5°24.4	248°27.0	-12°10.9				Diphda	348°49.0	-17°51.8		
4	237°26.0	205°53.8	13°05.4	150°14.6	25°36.5	222°00.2	5°24.6	263°29.2	-12°10.8				Achernar	335°21.8	-57°07.4		
5	252°28.5	220°53.4	13°06.5	165°15.7	25°36.5	237°02.1	5°24.8	278°31.4	-12°10.7				Hamal	327°53.2	23°34.3		
6	267°30.9	235°53.0	13°07.7	180°16.9	25°36.5	252°04.0	5°25.0	293°33.6	-12°10.6				Polaris	315°05.9	89°21.9		
7	282°33.4	250°52.6	13°08.8	195°18.1	25°36.5	267°05.9	5°25.3	308°35.8	-12°10.5				Akamar	315°13.2	-40°13.0		
8	297°35.9	265°52.2	13°10.0	210°19.2	25°36.5	282°07.8	5°25.5	323°38.0	-12°10.4				Menkar	314°07.9	4°10.7		
9	312°38.3	280°51.8	13°11.1	225°20.4	25°36.5	297°09.8	5°25.7	338°40.2	-12°10.3				Mirfak	308°30.7	49°56.7		
10	327°40.8	295°51.5	13°12.3	240°21.6	25°36.5	312°11.7	5°26.0	353°42.4	-12°10.2				Aldebaran	290°41.5	16°33.3		
11	342°43.3	310°51.1	13°13.4	255°22.7	25°36.5	327°13.6	5°26.2	8°44.6	-12°10.1				Rigel	281°05.4	-8°10.6		
12	357°45.7	325°50.7	13°14.5	270°23.9	25°36.5	342°15.5	5°26.4	23°46.8	-12°10.0				Capella	280°24.2	46°01.5		
13	12°48.2	340°50.3	13°15.7	285°25.1	25°36.5	357°17.4	5°26.6	38°49.0	-12°09.9				Bellatrix	278°24.5	6°22.2		
14	27°50.7	355°49.9	13°16.8	300°26.2	25°36.5	12°19.3	5°26.9	53°51.2	-12°09.8				Elnath	278°03.8	28°37.7		
15	42°53.1	10°49.5	13°18.0	315°27.4	25°36.5	27°21.3	5°27.1	68°53.4	-12°09.7				Alnilam	275°39.3	-1°11.3		
16	57°55.6	25°49.1	13°19.1	330°28.5	25°36.5	42°23.2	5°27.3	83°55.6	-12°09.6				Betelgeuse	270°53.7	7°24.6		
17	72°58.1	40°48.7	13°20.3	345°29.7	25°36.5	57°25.1	5°27.6	98°57.8	-12°09.5				Canopus	263°53.0	-52°42.7		
18	88°00.5	55°48.3	13°21.4	0°30.9	25°36.5	72°27.0	5°27.8	113°60.0	-12°09.4				Sirius	258°27.4	-16°44.9		
19	103°03.0	70°47.9	13°22.5	15°32.0	25°36.5	87°28.9	5°28.0	129°02.2	-12°09.3				Adara	255°06.9	-29°00.4		
20	118°05.4	85°47.5	13°23.7	30°33.2	25°36.4	102°30.8	5°28.3	144°04.4	-12°09.2				Procyon	244°52.2	5°10.0		
21	133°07.9	100°47.1	13°24.8	45°34.3	25°36.4	117°32.7	5°28.5	159°06.6	-12°09.1				Pollux	243°18.9	27°58.3		
22	148°10.4	115°46.7	13°26.0	60°35.5	25°36.4	132°34.7	5°28.7	174°08.8	-12°09.0				Avior	234°15.0	-59°35.2		
23	163°12.8	130°46.3	13°27.1	75°36.7	25°36.4	147°36.6	5°28.9	189°11.0	-12°08.9				Suhail	222°47.1	-43°31.7		
Mer.pass.:12:08			v-0.4 d1.2 m-3.9			v1.2 d-0.0 m0.8			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	178°15.3	145°45.9	13°28.2	90°37.8	25°36.4	162°38.5	5°29.2	204°13.2	-12°08.9								
1	193°17.8	160°45.5	13°29.4	105°39.0	25°36.4	177°40.4	5°29.4	219°15.4	-12°08.8				Dubhe	193°42.1	61°37.6		
2	208°20.2	175°45.1	13°30.5	120°40.1	25°36.4	192°42.3	5°29.6	234°17.6	-12°08.7				Denebola	182°26.1	14°26.5		
3	223°22.7	190°44.7	13°31.6	135°41.3	25°36.4	207°44.2	5°29.9	249°19.8	-12°08.6				Gienah	175°44.8	-17°40.3		
4	238°25.2	205°44.4	13°32.8	150°42.5	25°36.4	222°46.2	5°30.1	264°21.9	-12°08.5				Acrux	173°01.1	-63°13.6		
5	253°27.6	220°44.0	13°33.9	165°43.6	25°36.4	237°48.1	5°30.3	279°24.1	-12°08.4				Gacrux	171°52.8	-57°14.6		
6	268°30.1	235°43.6	13°35.1	180°44.8	25°36.4	252°50.0	5°30.6	294°26.3	-12°08.3				Alioth	166°13.8	55°49.9		
7	283°32.5	250°43.2	13°36.2	195°45.9	25°36.4	267°51.9	5°30.8	309°28.5	-12°08.2				Spica	158°23.6	-11°17.0		
8	298°35.0	265°42.8	13°37.3	210°47.1	25°36.4	282°53.8	5°31.0	324°30.7	-12°08.1				Alcaid	152°52.7	49°11.7		
9	313°37.5	280°42.4	13°38.5	225°48.2	25°36.3	297°55.7	5°31.2	339°32.9	-12°08.0				Hadar	148°37.6	-60°29.0		
10	328°39.9	295°42.0	13°39.6	240°49.4	25°36.3	312°57.6	5°31.5	354°35.1	-12°07.9				Menkent	147°59.1	-36°29.0		
11	343°42.4	310°41.6	13°40.7	255°50.6	25°36.3	327°59.6	5°31.7	9°37.3	-12°07.8				Arcturus	145°48.9	19°03.8		
12	358°44.9	325°41.2	13°41.9	270°51.7	25°36.3	343°01.5	5°31.9	24°39.5	-12°07.7				Rigel Kent.	139°41.9	-60°55.7		
13	13°47.3	340°40.8	13°43.0	285°52.9	25°36.3	358°03.4	5°32.2	39°41.7	-12°07.6				Zubenelg.	136°57.5	-16°08.3		
14	28°49.8	355°40.4	13°44.1	300°54.0	25°36.3	13°05.3	5°32.4	54°43.9	-12°07.5				Kochab	137°18.9	74°03.3		
15	43°52.3	10°40.0	13°45.2	315°55.2	25°36.3	28°07.2	5°32.6	69°46.1	-12°07.4				Alphecca	126°04.8	26°38.0		
16	58°54.7	25°39.6	13°46.4	330°56.3	25°36.3	43°09.1	5°32.8	84°48.3	-12°07.3				Antares	112°17.5	-26°29.0		
17	73°57.2	40°39.2	13°47.5	345°57.5	25°36.3	58°11.0	5°33.1	99°50.5	-12°07.2				Atria	107°13.0	-69°03.9		
18	88°59.7	55°38.8	13°48.6	0°58.6	25°36.3	73°13.0	5°33.3	114°52.7	-12°07.2				Sabik	102°04.4	-15°45.3		
19	104°02.1	70°38.4	13°49.8	15°59.8	25°36.2	88°14.9	5°33.5	129°54.9	-12°07.1				Shaula	96°12.4	-37°07.1		
20	119°04.6	85°38.0	13°50.9	31°00.9	25°36.2	103°16.8	5°33.8	144°57.1	-12°07.0				Rasalhague	95°59.9	12°32.4		
21	134°07.0	100°37.6	13°52.0	46°02.1	25°36.2	118°18.7	5°34.0	159°59.3	-12°06.9				Etamin	90°42.9	51°28.8		
22	149°09.5	115°37.1	13°53.1	61°03.2	25°36.2	133°20.6	5°34.2	175°01.5	-12°06.8				Kaus Aust.	83°34.5	-34°22.4		
23	164°12.0	130°36.7	13°54.3	76°04.4	25°36.2	148°22.5	5°34.5	190°03.7	-12°06.7				Vega	80°34.3	38°47.9		
Mer.pass.:12:04			v-0.4 d1.1 m-3.9			v1.2 d-0.0 m0.8			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	179°14.4	145°36.3	13°55.4	91°05.5	25°36.2	163°24.4	5°34.7	205°05.9	-12°06.6								
1	194°16.9	160°35.9	13°56.5	106°06.7	25°36.2	178°26.4	5°34.9	220°08.1	-12°06.5								
2	209°19.4	175°35.5	13°57.6	121°07.8	25°36.2	193°28.3	5°35.1	235°10.3	-12°06.4								
3	224°21.8	190°35.1	13°58.8	136°09.0	25°36.1	208°30.2	5°35.4	250°12.5	-12°06.3								
4	239°24.3	205°34.7	13°59.9	151°10.1	25°36.1	223°32.1	5°35.6	265°14.7	-12°06.2								
5	254°26.8	220°34.3	14°01.0	166°11.3	25°36.1	238°34.0	5°35.8	280°16.9	-12°06.1								
6	269°29.2	235°33.9	14°02.1	181°12.4	25°36.1	253°35.9	5°36.1	295°19.1	-12°06.0								
7	284°31.7	250°33.5	14°03.2	196°13.6	25°36.1	268°37.8	5°36.3	310°21.3	-12°05.9								
8	299°34.2	265°33.1	14°04.4	211°14.7	25°36.1	283°39.8	5°36.5	325°23.5	-12°05.8								
9	314°36.6	280°32.7	14°05.5	226°15.9	25°36.1	298°41.7	5°36.8	340°25.7	-12°05.7								
10	329°39.1	295°32.3	14°06.6	241°17.0	25°36.1	313°43.6	5°37.0	355°27.9	-12°05.6								
11	344°41.5	310°31.9	14°07.7	256°18.2	25°36.0	328°45.5	5°37.2	10°30.1	-12°05.5								
12	359°44.0	325°31.5	14°08.8	271°19.3	25°36.0	343°47.4	5°37.4	25°32.3	-12°05.5								
13	14°46.5	340°31.1	14°10.0	286°20.5	25°36.0	358°49.3	5°37.7	40°34.5	-12°05.4								
14	29°48.9	355°30.7	14°11.1	301°21.6	25°36.0	13°51.2	5°37.9	55°36.7									

h		Sun		Moon			
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	178°05.0	-0°21.2	198°20.4	8.8	-13°38.5	15.4	60.4
1	193°05.2	-0°20.2	212°48.2	8.9	-13°23.1	15.4	60.4
2	208°05.3	-0°19.2	227°16.2	9.0	-13°07.6	15.5	60.4
3	223°05.5	-0°18.2	241°44.2	9.0	-12°52.1	15.6	60.4
4	238°05.7	-0°17.2	256°12.2	9.1	-12°36.4	15.7	60.4
5	253°05.9	-0°16.2	270°40.4	9.2	-12°20.7	15.7	60.4
6	268°06.1	-0°15.2	285°08.6	9.3	-12°05.0	15.8	60.4
7	283°06.3	-0°14.3	299°36.9	9.3	-11°49.1	15.9	60.4
8	298°06.4	-0°13.3	314°05.3	9.4	-11°33.2	15.9	60.4
9	313°06.6	-0°12.3	328°33.7	9.5	-11°17.3	16.0	60.4
10	328°06.8	-0°11.3	343°02.2	9.5	-11°01.3	16.1	60.4
11	343°07.0	-0°10.3	357°30.8	9.6	-10°45.2	16.1	60.4
12	358°07.2	-0°09.3	11°59.5	9.7	-10°29.0	16.2	60.4
13	13°07.4	-0°08.3	26°28.2	9.8	-10°12.8	16.2	60.4
14	28°07.5	-0°07.3	40°57.0	9.8	-9°56.6	16.3	60.3
15	43°07.7	-0°06.3	55°25.8	9.9	-9°40.3	16.3	60.3
16	58°07.9	-0°05.4	69°54.7	9.9	-9°23.9	16.4	60.3
17	73°08.1	-0°04.4	84°23.7	10.0	-9°07.5	16.4	60.3
18	88°08.3	-0°03.4	98°52.8	10.1	-8°51.1	16.5	60.3
19	103°08.5	-0°02.4	113°21.9	10.1	-8°34.6	16.5	60.3
20	118°08.6	-0°01.4	127°51.0	10.2	-8°18.1	16.5	60.3
21	133°08.8	-0°00.4	142°20.2	10.3	-8°01.5	16.6	60.3
22	148°09.0	0°00.6	156°49.5	10.3	-7°44.9	16.6	60.2
23	163°09.2	0°01.6	171°18.9	10.4	-7°28.3	16.7	60.2
SD.=16.1		d=1.0	S.D.=16.5				
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	178°09.4	0°02.6	185°48.3	10.4	-7°11.6	16.7	60.2
1	193°09.6	0°03.5	200°17.7	10.5	-6°54.9	16.7	60.2
2	208°09.7	0°04.5	214°47.2	10.5	-6°38.1	16.8	60.2
3	223°09.9	0°05.5	229°16.8	10.6	-6°21.4	16.8	60.2
4	238°10.1	0°06.5	243°46.4	10.6	-6°04.6	16.8	60.2
5	253°10.3	0°07.5	258°16.1	10.7	-5°47.8	16.8	60.1
6	268°10.5	0°08.5	272°45.8	10.7	-5°30.9	16.9	60.1
7	283°10.7	0°09.5	287°15.5	10.8	-5°14.1	16.9	60.1
8	298°10.9	0°10.5	301°45.3	10.8	-4°57.2	16.9	60.1
9	313°11.0	0°11.5	316°15.2	10.9	-4°40.3	16.9	60.1
10	328°11.2	0°12.4	330°45.1	10.9	-4°23.4	16.9	60.1
11	343°11.4	0°13.4	345°15.0	11.0	-4°06.4	16.9	60.0
12	358°11.6	0°14.4	359°45.0	11.0	-3°49.5	16.9	60.0
13	13°11.8	0°15.4	14°15.1	11.1	-3°32.5	17.0	60.0
14	28°12.0	0°16.4	28°45.1	11.1	-3°15.6	17.0	60.0
15	43°12.1	0°17.4	43°15.2	11.1	-2°58.6	17.0	60.0
16	58°12.3	0°18.4	57°45.4	11.2	-2°41.7	17.0	59.9
17	73°12.5	0°19.4	72°15.6	11.2	-2°24.7	17.0	59.9
18	88°12.7	0°20.3	86°45.8	11.2	-2°07.7	17.0	59.9
19	103°12.9	0°21.3	101°16.0	11.3	-1°50.7	17.0	59.9
20	118°13.1	0°22.3	115°46.3	11.3	-1°33.8	17.0	59.9
21	133°13.3	0°23.3	130°16.7	11.3	-1°16.8	17.0	59.8
22	148°13.4	0°24.3	144°47.0	11.4	-0°59.8	17.0	59.8
23	163°13.6	0°25.3	159°17.4	11.4	-0°42.9	16.9	59.8
SD.=16.1		d=1.0	S.D.=16.4				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	178°13.8	0°26.3	173°47.8	11.4	-0°25.9	16.9	59.8
1	193°14.0	0°27.3	188°18.3	11.5	-0°09.0	16.9	59.7
2	208°14.2	0°28.3	202°48.7	11.5	0°07.9	16.9	59.7
3	223°14.4	0°29.2	217°19.2	11.5	0°24.8	16.9	59.7
4	238°14.6	0°30.2	231°49.7	11.5	0°41.7	16.9	59.7
5	253°14.7	0°31.2	246°20.3	11.6	0°58.6	16.9	59.6
6	268°14.9	0°32.2	260°50.9	11.6	1°15.4	16.8	59.6
7	283°15.1	0°33.2	275°21.4	11.6	1°32.2	16.8	59.6
8	298°15.3	0°34.2	289°52.1	11.6	1°49.1	16.8	59.6
9	313°15.5	0°35.2	304°22.7	11.6	2°05.8	16.8	59.5
10	328°15.7	0°36.2	318°53.3	11.7	2°22.6	16.7	59.5
11	343°15.9	0°37.1	333°24.0	11.7	2°39.3	16.7	59.5
12	358°16.0	0°38.1	347°54.7	11.7	2°56.0	16.7	59.5
13	13°16.2	0°39.1	2°25.4	11.7	3°12.7	16.7	59.4
14	28°16.4	0°40.1	16°56.1	11.7	3°29.3	16.6	59.4
15	43°16.6	0°41.1	31°26.8	11.7	3°45.9	16.6	59.4
16	58°16.8	0°42.1	45°57.5	11.7	4°02.5	16.5	59.3
17	73°17.0	0°43.1	60°28.3	11.7	4°19.0	16.5	59.3
18	88°17.2	0°44.1	74°59.0	11.8	4°35.5	16.5	59.3
19	103°17.3	0°45.0	89°29.8	11.8	4°52.0	16.4	59.3
20	118°17.5	0°46.0	104°00.5	11.8	5°08.4	16.4	59.2
21	133°17.7	0°47.0	118°31.3	11.8	5°24.8	16.3	59.2
22	148°17.9	0°48.0	133°02.1	11.8	5°41.1	16.3	59.2
23	163°18.1	0°49.0	147°32.9	11.8	5°57.4	16.3	59.1
SD.=16.1		d=1.0	S.D.=16.3				
Twilight				Sunrise		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	03:17	04:47	05:55	18:22	19:31	21:03	
70	03:36	04:55	05:56	18:21	19:22	20:42	
68	03:51	05:01	05:57	18:19	19:16	20:26	
66	04:03	05:07	05:58	18:18	19:10	20:14	
64	04:13	05:11	05:59	18:18	19:05	20:04	
62	04:21	05:15	05:59	18:17	19:01	19:55	
60	04:28	05:18	05:60	18:16	18:58	19:48	
58	04:34	05:21	06:00	18:16	18:55	19:42	
56	04:39	05:23	06:01	18:15	18:52	19:37	
54	04:44	05:26	06:01	18:15	18:50	19:32	
52	04:48	05:28	06:01	18:14	18:48	19:28	
50	04:51	05:29	06:01	18:14	18:46	19:24	
45	04:58	05:33	06:02	18:13	18:43	19:17	
40	05:04	05:35	06:02	18:13	18:40	19:11	
35	05:08	05:38	06:03	18:12	18:37	19:07	
30	05:11	05:39	06:03	18:12	18:36	19:04	
20	05:16	05:42	06:04	18:11	18:33	18:59	
10	05:18	05:43	06:04	18:11	18:32	18:56	
0	05:19	05:43	06:04	18:10	18:31	18:55	
-10	05:19	05:43	06:04	18:10	18:31	18:56	
-20	05:16	05:42	06:04	18:10	18:32	18:58	
-30	05:12	05:40	06:04	18:10	18:34	19:02	
-35	05:09	05:38	06:04	18:10	18:35	19:05	
-40	05:05	05:36	06:03	18:10	18:37	19:09	
-45	04:59	05:34	06:03	18:10	18:40	19:14	
-50	04:52	05:31	06:03	18:11	18:43	19:21	
-52	04:49	05:29	06:03	18:11	18:44	19:24	
-54	04:45	05:27	06:02	18:11	18:46	19:28	
-56	04:41	05:25	06:02	18:11	18:48	19:32	
-58	04:36	05:23	06:02	18:11	18:50	19:37	
-60	04:30	05:20	06:02	18:11	18:53	19:43	
Moonrise				Moonset			
Lat.	Mon	Tue	Wed	Mon	Tue	Wed	
72	07:43	06:59	06:23	15:10	17:43	20:07	
70	07:24	06:51	06:24	15:27	17:47	19:59	
68	07:08	06:45	06:25	15:40	17:49	19:53	
66	06:56	06:40	06:27	15:51	17:52	19:48	
64	06:45	06:36	06:28	15:59	17:54	19:44	
62	06:36	06:32	06:28	16:07	17:55	19:40	
60	06:28	06:29	06:29	16:13	17:57	19:37	
58	06:21	06:26	06:30	16:19	17:58	19:34	
56	06:15	06:23	06:30	16:24	17:59	19:32	
54	06:09	06:21	06:31	16:28	18:00	19:30	
52	06:04	06:19	06:31	16:32	18:01	19:28	
50	05:60	06:17	06:32	16:36	18:02	19:26	
45	05:50	06:12	06:33	16:44	18:04	19:22	
40	05:41	06:09	06:34	16:50	18:05	19:19	
35	05:34	06:05	06:35	16:56	18:07	19:16	
30	05:28	06:03	06:35	17:00	18:08	19:13	
20	05:17	05:58	06:36	17:09	18:10	19:09	
10</							

March 23, 24 ,25 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	180°13.6	145°26.6	14°22.2	91°33.1	25°35.8	164°10.4	5°40.2	205°58.7	-12°04.3	Alpheratz	357°36.7	29°13.0					
1	195°16.0	160°26.2	14°23.3	106°34.2	25°35.8	179°12.3	5°40.4	221°00.9	-12°04.2	Ankaa	353°09.0	-42°11.0					
2	210°18.5	175°25.7	14°24.4	121°35.3	25°35.8	194°14.2	5°40.7	236°03.1	-12°04.1	Schedar	349°33.3	56°39.8					
3	225°21.0	190°25.3	14°25.5	136°36.5	25°35.8	209°16.1	5°40.9	251°05.3	-12°04.0	Diphda	348°49.0	-17°51.8					
4	240°23.4	205°24.9	14°26.6	151°37.6	25°35.8	224°18.0	5°41.1	266°07.5	-12°04.0	Achernar	335°21.8	-57°07.3					
5	255°25.9	220°24.5	14°27.8	166°38.8	25°35.8	239°19.9	5°41.3	281°09.7	-12°03.9	Hamal	327°53.2	23°34.2					
6	270°28.4	235°24.1	14°28.9	181°39.9	25°35.7	254°21.9	5°41.6	296°11.9	-12°03.8	Polaris	315°07.0	89°21.9					
7	285°30.8	250°23.7	14°30.0	196°41.1	25°35.7	269°23.8	5°41.8	311°14.1	-12°03.7	Akamar	315°13.2	-40°13.0					
8	300°33.3	265°23.3	14°31.1	211°42.2	25°35.7	284°25.7	5°42.0	326°16.3	-12°03.6	Menkar	314°07.9	4°10.7					
9	315°35.8	280°22.9	14°32.2	226°43.3	25°35.7	299°27.6	5°42.3	341°18.5	-12°03.5	Mirfak	308°30.7	49°56.7					
10	330°38.2	295°22.4	14°33.3	241°44.5	25°35.7	314°29.5	5°42.5	356°20.7	-12°03.4	Aldebaran	290°41.5	16°33.3					
11	345°40.7	310°22.0	14°34.4	256°45.6	25°35.7	329°31.4	5°42.7	11°22.9	-12°03.3	Rigel	281°05.4	-8°10.6					
12	0°43.1	325°21.6	14°35.5	271°46.8	25°35.6	344°33.3	5°43.0	26°25.1	-12°03.2	Capella	280°24.2	46°01.5					
13	15°45.6	340°21.2	14°36.6	286°47.9	25°35.6	359°35.2	5°43.2	41°27.3	-12°03.1	Bellatrix	278°24.5	6°22.2					
14	30°48.1	355°20.8	14°37.7	301°49.0	25°35.6	14°37.2	5°43.4	56°29.5	-12°03.0	Elnath	278°03.8	28°37.7					
15	45°50.5	10°20.4	14°38.8	316°50.2	25°35.6	29°39.1	5°43.6	71°31.7	-12°02.9	Alnilam	275°39.3	-1°11.3					
16	60°53.0	25°19.9	14°39.9	331°51.3	25°35.6	44°41.0	5°43.9	86°33.9	-12°02.8	Betelgeuse	270°53.7	7°24.6					
17	75°55.5	40°19.5	14°41.0	346°52.4	25°35.5	59°42.9	5°44.1	101°36.1	-12°02.7	Canopus	263°53.0	-52°42.7					
18	90°57.9	55°19.1	14°42.1	1°53.6	25°35.5	74°44.8	5°44.3	116°38.3	-12°02.6	Sirius	258°27.4	-16°44.9					
19	106°00.4	70°18.7	14°43.2	16°54.7	25°35.5	89°46.7	5°44.6	131°40.5	-12°02.5	Adara	255°07.0	-29°00.4					
20	121°02.9	85°18.3	14°44.3	31°55.9	25°35.5	104°48.6	5°44.8	146°42.7	-12°02.5	Procyon	244°52.2	5°10.0					
21	136°05.3	100°17.9	14°45.4	46°57.0	25°35.5	119°50.5	5°45.0	161°44.9	-12°02.4	Pollux	243°18.9	27°58.3					
22	151°07.8	115°17.4	14°46.5	61°58.1	25°35.4	134°52.4	5°45.3	176°47.1	-12°02.3	Avior	234°15.0	-59°35.2					
23	166°10.2	130°17.0	14°47.6	76°59.3	25°35.4	149°54.4	5°45.5	191°49.3	-12°02.2	Suhail	222°47.1	-43°31.7					
Mer.pass.:11:57			v-0.4 d1.1 m-3.9			v1.1 d-0.0 m0.8			v1.9 d0.2 m-1.9			v2.2 d0.1 m0.9					
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	181°12.7	145°16.6	14°48.7	92°00.4	25°35.4	164°56.3	5°45.7	206°51.5	-12°02.1	Alpheratz	357°36.7	29°13.0					
1	196°15.2	160°16.2	14°49.8	107°01.5	25°35.4	179°58.2	5°45.9	221°53.7	-12°02.0	Denebola	182°26.1	14°26.5					
2	211°17.6	175°15.8	14°50.9	122°02.7	25°35.4	195°00.1	5°46.2	236°55.9	-12°01.9	Gienah	175°44.8	-17°40.3					
3	226°20.1	190°15.3	14°52.0	137°03.8	25°35.3	210°02.0	5°46.4	251°58.1	-12°01.8	Acrux	173°01.1	-63°13.6					
4	241°22.6	205°14.9	14°53.1	152°04.9	25°35.3	225°03.9	5°46.6	267°00.3	-12°01.7	Gacrux	171°52.8	-57°14.6					
5	256°25.0	220°14.5	14°54.2	167°06.1	25°35.3	240°05.8	5°46.9	282°02.5	-12°01.6	Alioth	166°13.8	55°49.9					
6	271°27.5	235°14.1	14°55.3	182°07.2	25°35.3	255°07.7	5°47.1	297°04.7	-12°01.5	Spica	158°23.6	-11°17.0					
7	286°30.0	250°13.7	14°56.4	197°08.3	25°35.3	270°09.7	5°47.3	312°06.9	-12°01.4	Alcaid	152°52.7	49°11.7					
8	301°32.4	265°13.2	14°57.4	212°09.5	25°35.2	285°11.6	5°47.6	327°09.1	-12°01.3	Hadar	148°37.6	-60°29.0					
9	316°34.9	280°12.8	14°58.5	227°10.6	25°35.2	300°13.5	5°47.8	342°11.3	-12°01.2	Menkent	147°59.1	-36°29.0					
10	331°37.4	295°12.4	14°59.6	242°11.7	25°35.2	315°15.4	5°48.0	357°13.5	-12°01.1	Arcturus	145°48.8	19°03.8					
11	346°39.8	310°12.0	15°00.7	257°12.9	25°35.2	330°17.3	5°48.2	12°15.7	-12°01.1	Rigel Kent.	139°41.9	-60°55.7					
12	1°42.3	325°11.6	15°01.8	272°14.0	25°35.2	345°19.2	5°48.5	27°17.9	-12°01.0	Zubenelg.	136°57.4	-16°08.3					
13	16°44.7	340°11.1	15°02.9	287°15.1	25°35.1	0°21.1	5°48.7	42°20.1	-12°00.9	Kochab	137°18.9	74°03.4					
14	31°47.2	355°10.7	15°04.0	302°16.3	25°35.1	15°23.0	5°48.9	57°22.3	-12°00.8	Alphecca	126°04.8	26°38.0					
15	46°49.7	10°10.3	15°05.1	317°17.4	25°35.1	30°24.9	5°49.2	72°24.5	-12°00.7	Antares	112°17.5	-26°29.0					
16	61°52.1	25°09.9	15°06.2	332°18.5	25°35.1	45°26.9	5°49.4	87°26.7	-12°00.6	Atria	107°13.0	-69°03.9					
17	76°54.6	40°09.4	15°07.2	347°19.7	25°35.0	60°28.8	5°49.6	102°28.9	-12°00.5	Sabik	102°04.4	-15°45.3					
18	91°57.1	55°09.0	15°08.3	2°20.8	25°35.0	75°30.7	5°49.9	117°31.1	-12°00.4	Shaula	96°12.4	-37°07.1					
19	106°59.5	70°08.6	15°09.4	17°21.9	25°35.0	90°32.6	5°50.1	132°33.3	-12°00.3	Rasalhague	95°59.9	12°32.4					
20	122°02.0	85°08.2	15°10.5	32°23.1	25°35.0	105°34.5	5°50.3	147°35.5	-12°00.2	Etamin	90°42.8	51°28.8					
21	137°04.5	100°07.7	15°11.6	47°24.2	25°34.9	120°36.4	5°50.5	162°37.7	-12°00.1	Kaus Aust.	83°34.5	-34°22.3					
22	152°06.9	115°07.3	15°12.7	62°25.3	25°34.9	135°38.3	5°50.8	177°39.9	-12°00.0	Vega	80°34.3	38°47.9					
23	167°09.4	130°06.9	15°13.8	77°26.4	25°34.9	150°40.2	5°51.0	192°42.1	-11°59.9	Nunki	75°49.7	-26°16.1					
Mer.pass.:11:53			v-0.4 d1.1 m-3.9			v1.1 d-0.0 m0.8			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	182°11.9	145°06.5	15°14.8	92°27.6	25°34.9	165°42.1	5°51.2	207°44.3	-11°59.8	Enif	33°40.5	9°58.7					
1	197°14.3	160°06.0	15°15.9	107°28.7	25°34.8	180°44.1	5°51.5	222°46.5	-11°59.8	Alnair	27°35.2	-46°50.9					
2	212°16.8	175°05.6	15°17.0	122°29.8	25°34.8	195°46.0	5°51.7	237°48.7	-11°59.7	Fomalhaut	15°16.6	-29°30.1					
3	227°19.2	190°05.2	15°18.1	137°31.0	25°34.8	210°47.9	5°51.9	252°50.9	-11°59.6	Scheat	13°47.0	28°12.3					
4	242°21.7	205°04.7	15°19.2	152°32.1	25°34.8	225°49.8	5°52.2	267°53.1	-11°59.5	Markab	13°31.7	15°19.6					
5	257°24.2	220°04.3	15°20.2	167°33.2	25°34.7	240°51.7	5°52.4	282°55.3	-11°59.4	2023/3/2			SHA	Mer.pass			
6	272°26.6	235°03.9	15°21.3	182°34.3	25°34.7	255°53.6	5°52.6	297°57.5	-11°59.3	Venus	325°13.0	14:19					
7	287°29.1	250°03.5	15°22.4	197°35.5	25°34.7	270°55.5	5°52.8	312°59.7	-11°59.2	Mars	271°19.5	17:52					
8	302°31.6	265°03.0	15°23.5	212°36.6	25°34.7	285°57.4	5°53.1	328°01.9	-11°59.1	Jupiter	343°56.8	13:02					
9	317°34.0	280°02.6	15°24.5	227°37.7	25°34.6	300°59.3	5°53.3	343°04.2	-11°59.0	Saturn	25°45.1	10:15					
10	332°36.5	295°02.2	15°25.6	242°38.8	25°34.6	316°01.2	5°53.5	358°06.4	-11°58.9	2023/3/2			SHA	Mer.pass			
11	347°39.0	310°01.7	15°26.7	257°40.0	25°34.6	331°03.2	5°53.8	13°08.6	-11°58.8	Venus	324°03.9	14:19					
12	2°41.4	325°01.3	15°27.8	272°41.1	25°34.6	346°05.1	5°54.0	28°10.8	-11°58.7	Mars	270°47.7	17:51					
13	17°43.9	340°00.9	15°28.8	287°42.2	25°34.5	1°07.0	5°54.2	43°13.0	-11°58.6	Jupiter	343°43.6	12:59					
14	32°46.3	355°00.4	15°29.9	302°43.3	25°34.5	16°08.9	5°54.4	58°15.2	-11°58.6	Saturn	25°38.8	10:11					
15	47°48.8	10°00.0	15°31.0	317°44.5	25°34.5	31°10.8	5°54.7	73°17.4									

Sun		Moon					
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	178°18.3	0°50.0	162°03.6	11.8	6°13.6	16.2	59.1
1	193°18.5	0°51.0	176°34.4	11.8	6°29.8	16.2	59.1
2	208°18.6	0°51.9	191°05.2	11.8	6°45.9	16.1	59.0
3	223°18.8	0°52.9	205°36.0	11.8	7°02.0	16.1	59.0
4	238°19.0	0°53.9	220°06.8	11.8	7°18.0	16.0	59.0
5	253°19.2	0°54.9	234°37.6	11.8	7°34.0	15.9	58.9
6	268°19.4	0°55.9	249°08.3	11.8	7°49.9	15.9	58.9
7	283°19.6	0°56.9	263°39.1	11.8	8°05.8	15.8	58.9
8	298°19.8	0°57.9	278°09.9	11.8	8°21.6	15.8	58.8
9	313°19.9	0°58.9	292°40.7	11.8	8°37.3	15.7	58.8
10	328°20.1	0°59.8	307°11.4	11.8	8°53.0	15.6	58.8
11	343°20.3	1°00.8	321°42.2	11.7	9°08.6	15.6	58.8
12	358°20.5	1°01.8	336°12.9	11.7	9°24.1	15.5	58.7
13	13°20.7	1°02.8	350°43.6	11.7	9°39.6	15.5	58.7
14	28°20.9	1°03.8	5°14.4	11.7	9°55.0	15.4	58.7
15	43°21.1	1°04.8	19°45.1	11.7	10°10.4	15.3	58.6
16	58°21.2	1°05.8	34°15.8	11.7	10°25.7	15.2	58.6
17	73°21.4	1°06.7	48°46.5	11.7	10°40.9	15.2	58.5
18	88°21.6	1°07.7	63°17.1	11.7	10°56.0	15.1	58.5
19	103°21.8	1°08.7	77°47.8	11.7	11°11.1	15.0	58.5
20	118°22.0	1°09.7	92°18.4	11.6	11°26.1	15.0	58.4
21	133°22.2	1°10.7	106°49.1	11.6	11°41.0	14.9	58.4
22	148°22.4	1°11.7	121°19.7	11.6	11°55.8	14.8	58.4
23	163°22.6	1°12.7	135°50.3	11.6	12°10.6	14.7	58.3
SD.=16.1		d=1.0	S.D.=16.1				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	178°22.7	1°13.6	150°20.8	11.6	12°25.3	14.6	58.3
1	193°22.9	1°14.6	164°51.4	11.5	12°39.9	14.6	58.3
2	208°23.1	1°15.6	179°21.9	11.5	12°54.4	14.5	58.2
3	223°23.3	1°16.6	193°52.4	11.5	13°08.8	14.4	58.2
4	238°23.5	1°17.6	208°22.9	11.5	13°23.2	14.3	58.2
5	253°23.7	1°18.6	222°53.4	11.5	13°37.4	14.2	58.1
6	268°23.9	1°19.6	237°23.9	11.4	13°51.6	14.1	58.1
7	283°24.1	1°20.5	251°54.3	11.4	14°05.7	14.0	58.1
8	298°24.2	1°21.5	266°24.7	11.4	14°19.7	14.0	58.0
9	313°24.4	1°22.5	280°55.1	11.4	14°33.6	13.9	58.0
10	328°24.6	1°23.5	295°25.4	11.3	14°47.5	13.8	58.0
11	343°24.8	1°24.5	309°55.7	11.3	15°01.2	13.7	57.9
12	358°25.0	1°25.5	324°26.0	11.3	15°14.8	13.6	57.9
13	13°25.2	1°26.5	338°56.3	11.3	15°28.4	13.5	57.8
14	28°25.4	1°27.4	353°26.5	11.2	15°41.8	13.4	57.8
15	43°25.5	1°28.4	7°56.8	11.2	15°55.2	13.3	57.8
16	58°25.7	1°29.4	22°27.0	11.2	16°08.4	13.2	57.7
17	73°25.9	1°30.4	36°57.1	11.1	16°21.6	13.1	57.7
18	88°26.1	1°31.4	51°27.2	11.1	16°34.6	13.0	57.7
19	103°26.3	1°32.4	65°57.3	11.1	16°47.6	12.9	57.6
20	118°26.5	1°33.3	80°27.4	11.1	17°00.4	12.8	57.6
21	133°26.7	1°34.3	94°57.5	11.0	17°13.2	12.7	57.6
22	148°26.9	1°35.3	109°27.5	11.0	17°25.8	12.6	57.5
23	163°27.0	1°36.3	123°57.4	11.0	17°38.4	12.5	57.5
SD.=16.0		d=1.0	S.D.=15.9				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	178°27.2	1°37.3	138°27.4	10.9	17°50.8	12.4	57.4
1	193°27.4	1°38.3	152°57.3	10.9	18°03.2	12.3	57.4
2	208°27.6	1°39.3	167°27.2	10.9	18°15.4	12.2	57.4
3	223°27.8	1°40.2	181°57.0	10.8	18°27.5	12.1	57.3
4	238°28.0	1°41.2	196°26.9	10.8	18°39.5	12.0	57.3
5	253°28.2	1°42.2	210°56.6	10.8	18°51.4	11.8	57.3
6	268°28.4	1°43.2	225°26.4	10.7	19°03.2	11.7	57.2
7	283°28.5	1°44.2	239°56.1	10.7	19°14.9	11.6	57.2
8	298°28.7	1°45.2	254°25.8	10.7	19°26.4	11.5	57.2
9	313°28.9	1°46.1	268°55.4	10.6	19°37.9	11.4	57.1
10	328°29.1	1°47.1	283°25.1	10.6	19°49.2	11.3	57.1
11	343°29.3	1°48.1	297°54.6	10.6	20°00.4	11.2	57.1
12	358°29.5	1°49.1	312°24.2	10.5	20°11.6	11.0	57.0
13	13°29.7	1°50.1	326°53.7	10.5	20°22.5	10.9	57.0
14	28°29.9	1°51.1	341°23.2	10.5	20°33.4	10.8	56.9
15	43°30.1	1°52.0	355°52.6	10.4	20°44.2	10.7	56.9
16	58°30.2	1°53.0	10°22.0	10.4	20°54.8	10.6	56.9
17	73°30.4	1°54.0	24°51.4	10.4	21°05.3	10.5	56.8
18	88°30.6	1°55.0	39°20.8	10.3	21°15.7	10.3	56.8
19	103°30.8	1°56.0	53°50.1	10.3	21°26.0	10.2	56.8
20	118°31.0	1°57.0	68°19.3	10.3	21°36.1	10.1	56.7
21	133°31.2	1°57.9	82°48.6	10.2	21°46.2	10.0	56.7
22	148°31.4	1°58.9	97°17.8	10.2	21°56.1	9.8	56.7
23	163°31.6	1°59.9	111°47.0	10.2	22°05.8	9.7	56.6
SD.=16.0		d=1.0	S.D.=15.7				
		Twilight			Twilight		
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	02:55	04:30	05:39	18:36	19:46	21:23	
70	03:18	04:40	05:42	18:33	19:36	20:59	
68	03:36	04:48	05:44	18:30	19:27	20:40	
66	03:50	04:55	05:46	18:28	19:20	20:26	
64	04:01	05:00	05:48	18:26	19:15	20:14	
62	04:10	05:05	05:49	18:25	19:10	20:05	
60	04:18	05:09	05:51	18:24	19:05	19:57	
58	04:25	05:12	05:52	18:22	19:02	19:50	
56	04:31	05:15	05:53	18:21	18:59	19:44	
54	04:36	05:18	05:53	18:20	18:56	19:38	
52	04:40	05:20	05:54	18:19	18:53	19:34	
50	04:44	05:23	05:55	18:19	18:51	19:30	
45	04:53	05:27	05:56	18:17	18:46	19:21	
40	04:59	05:31	05:58	18:16	18:43	19:15	
35	05:04	05:33	05:59	18:15	18:40	19:10	
30	05:08	05:36	05:60	18:14	18:38	19:05	
20	05:13	05:39	06:01	18:12	18:34	18:60	
10	05:17	05:41	06:02	18:11	18:32	18:56	
0	05:18	05:42	06:03	18:10	18:30	18:54	
-10	05:19	05:43	06:04	18:09	18:30	18:54	
-20	05:17	05:43	06:05	18:08	18:30	18:55	
-30	05:14	05:42	06:06	18:07	18:30	18:58	
-35	05:11	05:41	06:06	18:06	18:31	19:01	
-40	05:08	05:40	06:07	18:05	18:32	19:04	
-45	05:03	05:38	06:07	18:05	18:34	19:08	
-50	04:57	05:35	06:08	18:04	18:36	19:14	
-52	04:55	05:34	06:08	18:04	18:37	19:17	
-54	04:51	05:33	06:08	18:04	18:39	19:20	
-56	04:47	05:31	06:08	18:03	18:40	19:24	
-58	04:43	05:29	06:09	18:03	18:42	19:28	
-60	04:38	05:27	06:09	18:02	18:44	19:33	
		Moonrise		Moonset			
Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
72	05:46	04:58	—:—	22:38	—:—	—:—	
70	05:57	05:23	04:24	22:16	—:—	00:59	
68	06:05	05:42	05:08	21:59	—:—	00:17	
66	06:13	05:57	05:37	21:45	23:49	—:—	
64	06:19	06:10	05:60	21:34	23:27	—:—	
62	06:25	06:21	06:18	21:25	23:10	—:—	
60	06:30	06:30	06:33	21:17	22:56	—:—	
58	06:34	06:39	06:45	21:09	22:44	—:—	
56	06:38	06:46	06:57	21:03	22:34	—:—	
54	06:41	06:52	07:06	20:58	22:25	23:51	
52	06:44	06:58	07:15	20:53	22:17	23:39	
50	06:47	07:04	07:23	20:48	22:10	23:29	
45	06:53	07:15	07:40	20:39	21:54	23:08	
40	06:59	07:25	07:54	20:31	21:42	22:51	
35	07:03	07:33	08:06	20:24	21:31	22:37	
30	07:07	07:41	08:16	20:18	21:22	22:25	
20	07:15	07:53	08:34	20:07	21:06	22:04	
10	07:21	08:05	08:50	19:58	20:52	21:46	
0	07:27	08:15	09:05	19:50	20:39	21:29	

March 26, 27 ,28 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	183°11.0	144°56.1	15°40.6	92°54.6	25°34.2	166°28.0	5°56.7	208°37.2	-11°57.6	Alpheratz	357°36.7	29°13.0					
1	198°13.5	159°55.7	15°41.7	107°55.7	25°34.2	181°29.9	5°57.0	223°39.4	-11°57.5	Ankaa	353°09.0	-42°10.9					
2	213°15.9	174°55.2	15°42.7	122°56.8	25°34.2	196°31.8	5°57.2	238°41.6	-11°57.4	Schedar	349°33.3	56°39.8					
3	228°18.4	189°54.8	15°43.8	137°57.9	25°34.1	211°33.7	5°57.4	253°43.8	-11°57.4	Diphda	348°49.0	-17°51.7					
4	243°20.8	204°54.4	15°44.9	152°59.0	25°34.1	226°35.6	5°57.7	268°46.0	-11°57.3	Achernar	335°21.8	-57°07.3					
5	258°23.3	219°53.9	15°45.9	168°00.2	25°34.1	241°37.5	5°57.9	283°48.2	-11°57.2	Hamal	327°53.2	23°34.2					
6	273°25.8	234°53.5	15°47.0	183°01.3	25°34.0	256°39.4	5°58.1	298°50.4	-11°57.1	Polaris	315°07.7	89°21.9					
7	288°28.2	249°53.1	15°48.1	198°02.4	25°34.0	271°41.4	5°58.4	313°52.6	-11°57.0	Akamar	315°13.2	-40°12.9					
8	303°30.7	264°52.6	15°49.1	213°03.5	25°34.0	286°43.3	5°58.6	328°54.8	-11°56.9	Menkar	314°07.9	4°10.7					
9	318°33.2	279°52.2	15°50.2	228°04.6	25°33.9	301°45.2	5°58.8	343°57.1	-11°56.8	Mirfak	308°30.7	49°56.7					
10	333°35.6	294°51.7	15°51.2	243°05.8	25°33.9	316°47.1	5°59.0	358°59.3	-11°56.7	Aldebaran	290°41.5	16°33.3					
11	348°38.1	309°51.3	15°52.3	258°06.9	25°33.9	331°49.0	5°59.3	14°01.5	-11°56.6	Rigel	281°05.4	-8°10.6					
12	3°40.6	324°50.9	15°53.4	273°08.0	25°33.9	346°50.9	5°59.5	29°03.7	-11°56.5	Capella	280°24.2	46°01.5					
13	18°43.0	339°50.4	15°54.4	288°09.1	25°33.8	1°52.8	5°59.7	44°05.9	-11°56.4	Bellatrix	278°24.5	6°22.2					
14	33°45.5	354°50.0	15°55.5	303°10.2	25°33.8	16°54.7	5°60.0	59°08.1	-11°56.3	Elnath	278°03.8	28°37.7					
15	48°48.0	9°49.5	15°56.5	318°11.3	25°33.8	31°56.6	6°00.2	74°10.3	-11°56.3	Alnilam	275°39.3	-1°11.3					
16	63°50.4	24°49.1	15°57.6	333°12.5	25°33.7	46°58.5	6°00.4	89°12.5	-11°56.2	Betelgeuse	270°53.7	7°24.6					
17	78°52.9	39°48.7	15°58.6	348°13.6	25°33.7	62°00.5	6°00.7	104°14.7	-11°56.1	Canopus	263°53.1	-52°42.8					
18	93°55.3	54°48.2	15°59.7	3°14.7	25°33.7	77°02.4	6°00.9	119°16.9	-11°56.0	Sirius	258°27.4	-16°44.9					
19	108°57.8	69°47.8	16°00.8	18°15.8	25°33.6	92°04.3	6°01.1	134°19.1	-11°55.9	Adara	255°07.0	-29°00.4					
20	124°00.3	84°47.3	16°01.8	33°16.9	25°33.6	107°06.2	6°01.3	149°21.3	-11°55.8	Procyon	244°52.2	5°10.0					
21	139°02.7	99°46.9	16°02.9	48°18.0	25°33.6	122°08.1	6°01.6	164°23.5	-11°55.7	Pollux	243°18.9	27°58.3					
22	154°05.2	114°46.5	16°03.9	63°19.2	25°33.5	137°10.0	6°01.8	179°25.7	-11°55.6	Avior	234°15.1	-59°35.2					
23	169°07.7	129°46.0	16°05.0	78°20.3	25°33.5	152°11.9	6°02.0	194°27.9	-11°55.5	Suhail	222°47.1	-43°31.8					
Mer.pass.:11:45			v-0.4 d1.1 m-3.9			v1.1 d-0.0 m0.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	184°10.1	144°45.6	16°06.0	93°21.4	25°33.5	167°13.8	6°02.3	209°30.1	-11°55.4	Dubhe	193°42.2	61°37.6					
1	199°12.6	159°45.1	16°07.1	108°22.5	25°33.4	182°15.7	6°02.5	224°32.3	-11°55.3	Denebola	182°26.1	14°26.5					
2	214°15.1	174°44.7	16°08.1	123°23.6	25°33.4	197°17.6	6°02.7	239°34.6	-11°55.2	Gienah	175°44.8	-17°40.3					
3	229°17.5	189°44.2	16°09.2	138°24.7	25°33.4	212°19.5	6°03.0	254°36.8	-11°55.2	Acrux	173°01.1	-63°13.7					
4	244°20.0	204°43.8	16°10.2	153°25.8	25°33.3	227°21.5	6°03.2	269°39.0	-11°55.1	Gacrux	171°52.8	-57°14.6					
5	259°22.4	219°43.3	16°11.3	168°27.0	25°33.3	242°23.4	6°03.4	284°41.2	-11°55.0	Alioth	166°13.8	55°50.0					
6	274°24.9	234°42.9	16°12.3	183°28.1	25°33.3	257°25.3	6°03.6	299°43.4	-11°54.9	Spica	158°23.6	-11°17.0					
7	289°27.4	249°42.5	16°13.4	198°29.2	25°33.2	272°27.2	6°03.9	314°45.6	-11°54.8	Alcaid	152°52.7	49°11.7					
8	304°29.8	264°42.0	16°14.4	213°30.3	25°33.2	287°29.1	6°04.1	329°47.8	-11°54.7	Hadar	148°37.6	-60°29.0					
9	319°32.3	279°41.6	16°15.4	228°31.4	25°33.2	302°31.0	6°04.3	344°50.0	-11°54.6	Menkent	147°59.1	-36°29.0					
10	334°34.8	294°41.1	16°16.5	243°32.5	25°33.1	317°32.9	6°04.6	359°52.2	-11°54.5	Arcturus	145°48.8	19°03.8					
11	349°37.2	309°40.7	16°17.5	258°33.6	25°33.1	332°34.8	6°04.8	14°54.4	-11°54.4	Rigel Kent.	139°41.9	-60°55.7					
12	4°39.7	324°40.2	16°18.6	273°34.7	25°33.0	347°36.7	6°05.0	29°56.6	-11°54.3	Zubenelg.	136°57.4	-16°08.3					
13	19°42.2	339°39.8	16°19.6	288°35.8	25°33.0	2°38.6	6°05.2	44°58.8	-11°54.2	Kochab	137°18.8	74°03.4					
14	34°44.6	354°39.3	16°20.7	303°37.0	25°33.0	17°40.5	6°05.5	60°01.0	-11°54.1	Alphecca	126°04.8	26°38.0					
15	49°47.1	9°38.9	16°21.7	318°38.1	25°32.9	32°42.4	6°05.7	75°03.2	-11°54.1	Antares	112°17.5	-26°29.0					
16	64°49.6	24°38.4	16°22.7	333°39.2	25°32.9	47°44.4	6°05.9	90°05.4	-11°54.0	Atria	107°12.9	-69°03.9					
17	79°52.0	39°38.0	16°23.8	348°40.3	25°32.9	62°46.3	6°06.2	105°07.7	-11°53.9	Sabik	102°04.4	-15°45.3					
18	94°54.5	54°37.5	16°24.8	3°41.4	25°32.8	77°48.2	6°06.4	120°09.9	-11°53.8	Shaula	96°12.3	-37°07.1					
19	109°56.9	69°37.1	16°25.9	18°42.5	25°32.8	92°50.1	6°06.6	135°12.1	-11°53.7	Rasalhague	95°59.9	12°32.4					
20	124°59.4	84°36.6	16°26.9	33°43.6	25°32.8	107°52.0	6°06.9	150°14.3	-11°53.6	Etamin	90°42.8	51°28.8					
21	140°01.9	99°36.2	16°27.9	48°44.7	25°32.7	122°53.9	6°07.1	165°16.5	-11°53.5	Kaus Aust.	83°34.5	-34°22.3					
22	155°04.3	114°35.7	16°29.0	63°45.8	25°32.7	137°55.8	6°07.3	180°18.7	-11°53.4	Vega	80°34.3	38°47.9					
23	170°06.8	129°35.3	16°30.0	78°46.9	25°32.6	152°57.7	6°07.5	195°20.9	-11°53.3	Nunki	75°49.7	-26°16.1					
Mer.pass.:11:41			v-0.4 d1.1 m-3.9			v1.1 d-0.0 m0.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	185°09.3	144°34.8	16°31.0	93°48.0	25°32.6	167°59.6	6°07.8	210°23.1	-11°53.2	Fomalhaut	15°16.6	-29°30.1					
1	200°11.7	159°34.4	16°32.1	108°49.2	25°32.6	183°01.5	6°08.0	225°25.3	-11°53.1	Scheat	13°47.0	28°12.3					
2	215°14.2	174°33.9	16°33.1	123°50.3	25°32.5	198°03.4	6°08.2	240°27.5	-11°53.1	Markab	13°31.7	15°19.6					
3	230°16.7	189°33.5	16°34.1	138°51.4	25°32.5	213°05.3	6°08.5	255°29.7	-11°53.0								
4	245°19.1	204°33.0	16°35.2	153°52.5	25°32.4	228°07.2	6°08.7	270°31.9	-11°52.9	2023/3/2	SHA	Mer.pass					
5	260°21.6	219°32.6	16°36.2	168°53.6	25°32.4	243°09.2	6°08.9	285°34.1	-11°52.8	Venus	321°45.1	14:21					
6	275°24.1	234°32.1	16°37.2	183°54.7	25°32.4	258°11.1	6°09.2	300°36.4	-11°52.7	Mars	269°43.6	17:47					
7	290°26.5	249°31.7	16°38.3	198°55.8	25°32.3	273°13.0	6°09.4	315°38.6	-11°52.6	Jupiter	343°17.0	12:52					
8	305°29.0	264°31.2	16°39.3	213°56.9	25°32.3	288°14.9	6°09.6	330°40.8	-11°52.5	Saturn	25°26.2	10:04					
9	320°31.4	279°30.8	16°40.3	228°58.0	25°32.3	303°16.8	6°09.8	345°43.0	-11°52.4	2023/3/2	SHA	Mer.pass					
10	335°33.9	294°30.3	16°40														

h		Sun		Moon			
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	178°31.7	2°00.9	126°16.1	10.1	22°15.5	9.6	56.6
1	193°31.9	2°01.9	140°45.2	10.1	22°25.0	9.5	56.6
2	208°32.1	2°02.8	155°14.3	10.1	22°34.4	9.3	56.5
3	223°32.3	2°03.8	169°43.3	10.0	22°43.7	9.2	56.5
4	238°32.5	2°04.8	184°12.3	10.0	22°52.9	9.1	56.5
5	253°32.7	2°05.8	198°41.3	10.0	23°01.9	9.0	56.4
6	268°32.9	2°06.8	213°10.3	9.9	23°10.8	8.8	56.4
7	283°33.1	2°07.8	227°39.2	9.9	23°19.5	8.7	56.4
8	298°33.2	2°08.7	242°08.1	9.9	23°28.2	8.6	56.3
9	313°33.4	2°09.7	256°36.9	9.8	23°36.7	8.4	56.3
10	328°33.6	2°10.7	271°05.7	9.8	23°45.0	8.3	56.3
11	343°33.8	2°11.7	285°34.5	9.8	23°53.3	8.2	56.2
12	358°34.0	2°12.7	300°03.3	9.7	24°01.4	8.0	56.2
13	13°34.2	2°13.6	314°32.0	9.7	24°09.3	7.9	56.2
14	28°34.4	2°14.6	329°00.7	9.7	24°17.2	7.8	56.1
15	43°34.6	2°15.6	343°29.4	9.7	24°24.9	7.6	56.1
16	58°34.8	2°16.6	357°58.1	9.6	24°32.5	7.5	56.1
17	73°34.9	2°17.6	12°26.7	9.6	24°39.9	7.4	56.0
18	88°35.1	2°18.6	26°55.3	9.6	24°47.2	7.2	56.0
19	103°35.3	2°19.5	41°23.8	9.6	24°54.4	7.1	56.0
20	118°35.5	2°20.5	55°52.4	9.5	25°01.4	7.0	55.9
21	133°35.7	2°21.5	70°20.9	9.5	25°08.3	6.8	55.9
22	148°35.9	2°22.5	84°49.4	9.5	25°15.1	6.7	55.9
23	163°36.1	2°23.5	99°17.9	9.5	25°21.7	6.6	55.9
SD.=16.0		d=1.0	S.D.=15.4				
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	178°36.3	2°24.4	113°46.3	9.4	25°28.2	6.4	55.8
1	193°36.4	2°25.4	128°14.8	9.4	25°34.5	6.3	55.8
2	208°36.6	2°26.4	142°43.2	9.4	25°40.7	6.1	55.8
3	223°36.8	2°27.4	157°11.6	9.4	25°46.8	6.0	55.7
4	238°37.0	2°28.4	171°39.9	9.4	25°52.7	5.9	55.7
5	253°37.2	2°29.3	186°08.3	9.3	25°58.5	5.7	55.7
6	268°37.4	2°30.3	200°36.6	9.3	26°04.2	5.6	55.6
7	283°37.6	2°31.3	215°04.9	9.3	26°09.7	5.4	55.6
8	298°37.8	2°32.3	229°33.2	9.3	26°15.0	5.3	55.6
9	313°38.0	2°33.3	244°01.5	9.3	26°20.3	5.2	55.6
10	328°38.1	2°34.2	258°29.8	9.3	26°25.4	5.0	55.5
11	343°38.3	2°35.2	272°58.1	9.3	26°30.3	4.9	55.5
12	358°38.5	2°36.2	287°26.3	9.2	26°35.1	4.7	55.5
13	13°38.7	2°37.2	301°54.5	9.2	26°39.8	4.6	55.4
14	28°38.9	2°38.2	316°22.8	9.2	26°44.3	4.5	55.4
15	43°39.1	2°39.1	330°51.0	9.2	26°48.7	4.3	55.4
16	58°39.3	2°40.1	345°19.2	9.2	26°52.9	4.2	55.4
17	73°39.5	2°41.1	359°47.4	9.2	26°57.0	4.0	55.3
18	88°39.6	2°42.1	14°15.6	9.2	27°01.0	3.9	55.3
19	103°39.8	2°43.0	28°43.7	9.2	27°04.8	3.7	55.3
20	118°40.0	2°44.0	43°11.9	9.2	27°08.5	3.6	55.3
21	133°40.2	2°45.0	57°40.1	9.2	27°12.0	3.5	55.2
22	148°40.4	2°46.0	72°08.3	9.2	27°15.4	3.3	55.2
23	163°40.6	2°47.0	86°36.4	9.2	27°18.7	3.2	55.2
SD.=16.0		d=1.0	S.D.=15.2				
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	178°40.8	2°47.9	101°04.6	9.2	27°21.8	3.0	55.2
1	193°41.0	2°48.9	115°32.8	9.2	27°24.7	2.9	55.1
2	208°41.2	2°49.9	130°00.9	9.2	27°27.6	2.7	55.1
3	223°41.3	2°50.9	144°29.1	9.2	27°30.2	2.6	55.1
4	238°41.5	2°51.9	158°57.3	9.2	27°32.8	2.5	55.1
5	253°41.7	2°52.8	173°25.4	9.2	27°35.2	2.3	55.0
6	268°41.9	2°53.8	187°53.6	9.2	27°37.4	2.2	55.0
7	283°42.1	2°54.8	202°21.8	9.2	27°39.5	2.0	55.0
8	298°42.3	2°55.8	216°50.0	9.2	27°41.5	1.9	55.0
9	313°42.5	2°56.7	231°18.2	9.2	27°43.3	1.8	55.0
10	328°42.7	2°57.7	245°46.4	9.2	27°45.0	1.6	54.9
11	343°42.8	2°58.7	260°14.7	9.2	27°46.5	1.5	54.9
12	358°43.0	2°59.7	274°42.9	9.2	27°47.9	1.3	54.9
13	13°43.2	3°00.6	289°11.1	9.3	27°49.2	1.2	54.9
14	28°43.4	3°01.6	303°39.4	9.3	27°50.3	1.0	54.9
15	43°43.6	3°02.6	318°07.7	9.3	27°51.3	0.9	54.8
16	58°43.8	3°03.6	332°36.0	9.3	27°52.1	0.8	54.8
17	73°44.0	3°04.6	347°04.3	9.3	27°52.8	0.6	54.8
18	88°44.2	3°05.5	1°32.6	9.3	27°53.4	0.5	54.8
19	103°44.4	3°06.5	16°01.0	9.4	27°53.8	0.3	54.8
20	118°44.5	3°07.5	30°29.4	9.4	27°54.1	0.2	54.7
21	133°44.7	3°08.5	44°57.7	9.4	27°54.2	0.1	54.7
22	148°44.9	3°09.4	59°26.2	9.4	27°54.2	-0.1	54.7
23	163°45.1	3°10.4	73°54.6	9.4	27°54.0	-0.2	54.7
SD.=16.0		d=1.0	S.D.=15.0				
		Twilight		Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	02:31	04:13	05:24	18:50	20:02	21:46	
70	02:59	04:25	05:28	18:45	19:49	21:16	
68	03:20	04:35	05:32	18:41	19:39	20:55	
66	03:36	04:42	05:35	18:38	19:31	20:38	
64	03:48	04:49	05:37	18:35	19:24	20:25	
62	03:59	04:55	05:40	18:33	19:18	20:14	
60	04:08	04:59	05:41	18:31	19:13	20:05	
58	04:16	05:04	05:43	18:29	19:09	19:57	
56	04:22	05:07	05:45	18:27	19:05	19:50	
54	04:28	05:10	05:46	18:26	19:02	19:45	
52	04:33	05:13	05:47	18:25	18:59	19:39	
50	04:37	05:16	05:48	18:23	18:56	19:35	
45	04:47	05:21	05:51	18:21	18:50	19:25	
40	04:54	05:26	05:53	18:19	18:46	19:18	
35	04:59	05:29	05:54	18:17	18:42	19:12	
30	05:04	05:32	05:56	18:15	18:39	19:07	
20	05:11	05:36	05:58	18:13	18:35	19:01	
10	05:15	05:39	06:00	18:11	18:32	18:56	
0	05:17	05:41	06:02	18:09	18:29	18:53	
-10	05:19	05:43	06:04	18:07	18:28	18:52	
-20	05:18	05:44	06:06	18:05	18:27	18:52	
-30	05:16	05:44	06:07	18:03	18:27	18:55	
-35	05:14	05:43	06:08	18:02	18:27	18:56	
-40	05:11	05:43	06:10	18:01	18:28	18:59	
-45	05:07	05:42	06:11	17:59	18:28	19:03	
-50	05:02	05:40	06:12	17:58	18:30	19:07	
-52	04:60	05:39	06:13	17:57	18:30	19:10	
-54	04:57	05:38	06:14	17:56	18:31	19:12	
-56	04:54	05:37	06:14	17:55	18:32	19:16	
-58	04:50	05:36	06:15	17:54	18:33	19:19	
-60	04:46	05:35	06:16	17:53	18:35	19:23	
		Moonrise		Moonset			
Lat.	Sun	Mon	Tue	Sun	Mon	Tue	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	04:58	—:—	—:—	02:13	—:—	—:—	
64	05:44	05:00	—:—	01:28	04:01	—:—	
62	06:15	06:12	06:14	00:59	02:49	04:37	
60	06:37	06:48	07:12	00:36	02:14	03:40	
58	06:56	07:14	07:45	00:18	01:48	03:07	
56	07:12	07:35	08:10	00:03	01:28	02:42	
54	07:25	07:52	08:30	—:—	01:11	02:22	
52	07:37	08:06	08:46	—:—	00:57	02:06	
50	07:47	08:19	09:01	—:—	00:44	01:52	
45	08:10	08:46	09:30	—:—	00:19	01:23	
40	08:27	09:07	09:53	23:58	—:—	01:00	
35	08:42	09:24	10:11	23:41	—:—	00:42	
30	08:56	09:39	10:28	23:27	—:—	00:26	
20	09:18	10:05	10:55	23:02	23:59	—:—	
10	09:38	10:27	11:19	22:41	23:35	—:—	
0	09:56	10:48	11:41	22:21	23:14	—:—	
-10	10:14	11:09	12:03	22:01	22:52	23:44	
-20	10:34	11:32	12:27	21:40	22:29	23:20	
-30	10:57	11:58	12:55	21:16	22:02	22:52	
-35	11:11	12:13	13:11	21:01	21:46	22:36	
-40	11:27	12:32	13:30	20:45	21:27	22:17	
-45	11:46	12:53	13:53	20:25	21:05	21:53	
-50	12:09	13:21	14:23	20:00	20:37	21:24	
-52	12:21	13:35	14:38	19:49	20:23	21:09	
-54	12:34	13:51	14:55	19:35	20:07	20:52	
-56	12:49	14:09	15:16	19:20	19:48	20:31	
-58	13:07	14:33	15:42	19:01	19:24	20:05	
-60	13:29	15:03	16:18	18:38	18:54	19:29	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Pass	Mer.Pass.	Age		
	00 ^h	12 ^h		Upper	Lower		
26	05:53	05:44	12:05	16:08	03:42	5(25%)	
27	05:35	05:26	12:05	17:00	04:34	6(35%)	
28	05:17	05:08	12:05	17:53	05:27	7(44%)	

March 29, 30 ,31 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	SHA	Dec			
0	186°08.4	144°23.9	16°55.7	94°14.6	25°31.6	168°45.4	6°13.3	211°16.1	-11°51.1	Alpheratz	357°36.7	29°13.0					
1	201°10.9	159°23.4	16°56.7	109°15.7	25°31.6	183°47.3	6°13.5	226°18.3	-11°51.0	Ankaa	353°09.0	-42°10.9					
2	216°13.3	174°23.0	16°57.7	124°16.8	25°31.5	198°49.2	6°13.7	241°20.5	-11°50.9	Schedar	349°33.3	56°39.8					
3	231°15.8	189°22.5	16°58.7	139°17.9	25°31.5	213°51.1	6°14.0	256°22.7	-11°50.8	Diphda	348°49.0	-17°51.7					
4	246°18.3	204°22.1	16°59.7	154°19.0	25°31.5	228°53.0	6°14.2	271°25.0	-11°50.7	Achernar	335°21.8	-57°07.3					
5	261°20.7	219°21.6	17°00.7	169°20.1	25°31.4	243°54.9	6°14.4	286°27.2	-11°50.6	Hamal	327°53.2	23°34.2					
6	276°23.2	234°21.1	17°01.7	184°21.2	25°31.4	258°56.8	6°14.7	301°29.4	-11°50.5	Polaris	315°08.5	89°21.9					
7	291°25.7	249°20.7	17°02.8	199°22.3	25°31.3	273°58.7	6°14.9	316°31.6	-11°50.4	Akamar	315°13.2	-40°12.9					
8	306°28.1	264°20.2	17°03.8	214°23.4	25°31.3	289°00.7	6°15.1	331°33.8	-11°50.3	Menkar	314°07.9	4°10.7					
9	321°30.6	279°19.7	17°04.8	229°24.5	25°31.2	304°02.6	6°15.4	346°36.0	-11°50.3	Mirfak	308°30.7	49°56.7					
10	336°33.0	294°19.3	17°05.8	244°25.6	25°31.2	319°04.5	6°15.6	1°38.2	-11°50.2	Aldebaran	290°41.5	16°33.3					
11	351°35.5	309°18.8	17°06.8	259°26.7	25°31.1	334°06.4	6°15.8	16°40.4	-11°50.1	Rigel	281°05.4	-8°10.0					
12	6°38.0	324°18.3	17°07.8	274°27.8	25°31.1	349°08.3	6°16.0	31°42.6	-11°50.0	Capella	280°24.2	46°01.5					
13	21°40.4	339°17.9	17°08.8	289°28.9	25°31.0	4°10.2	6°16.3	46°44.9	-11°49.9	Bellatrix	278°24.6	6°22.2					
14	36°42.9	354°17.4	17°09.8	304°30.0	25°31.0	19°12.1	6°16.5	61°47.1	-11°49.8	Elnath	278°03.8	28°37.7					
15	51°45.4	9°17.0	17°10.8	319°31.1	25°31.0	34°14.0	6°16.7	76°49.3	-11°49.7	Alnilam	275°39.3	-1°11.3					
16	66°47.8	24°16.5	17°11.8	334°32.2	25°30.9	49°15.9	6°17.0	91°51.5	-11°49.6	Betelgeuse	270°53.7	7°24.6					
17	81°50.3	39°16.0	17°12.9	349°33.2	25°30.9	64°17.8	6°17.2	106°53.7	-11°49.5	Canopus	263°53.1	-52°42.8					
18	96°52.8	54°15.6	17°13.9	4°34.3	25°30.8	79°19.7	6°17.4	121°55.9	-11°49.4	Sirius	258°27.4	-16°44.9					
19	111°55.2	69°15.1	17°14.9	19°35.4	25°30.8	94°21.6	6°17.6	136°58.1	-11°49.4	Adara	255°07.0	-29°00.4					
20	126°57.7	84°14.6	17°15.9	34°36.5	25°30.7	109°23.5	6°17.9	152°00.3	-11°49.3	Procyon	244°52.2	5°10.0					
21	142°00.2	99°14.2	17°16.9	49°37.6	25°30.7	124°25.4	6°18.1	167°02.5	-11°49.2	Pollux	243°18.9	27°58.3					
22	157°02.6	114°13.7	17°17.9	64°38.7	25°30.6	139°27.3	6°18.3	182°04.8	-11°49.1	Avior	234°15.1	-59°35.3					
23	172°05.1	129°13.2	17°18.9	79°39.8	25°30.6	154°29.3	6°18.6	197°07.0	-11°49.0	Suhail	222°47.1	-43°31.8					
Mer.pass.:11:33			v-0.5 d1.0 m-3.9			v1.1 d-0.0 m0.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					

Thu	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec							
0	187°07.5	144°12.8	17°19.9	94°40.9	25°30.5	169°31.2	6°18.8							
1	202°10.0	159°12.3	17°20.9	109°42.0	25°30.5	184°33.1	6°19.0							
2	217°12.5	174°11.8	17°21.9	124°43.1	25°30.5	199°35.0	6°19.3							
3	232°14.9	189°11.3	17°22.9	139°44.2	25°30.4	214°36.9	6°19.5							
4	247°17.4	204°10.9	17°23.9	154°45.3	25°30.4	229°38.8	6°19.7							
5	262°19.9	219°10.4	17°24.9	169°46.4	25°30.3	244°40.7	6°19.9							
6	277°22.3	234°09.9	17°25.9	184°47.5	25°30.3	259°42.6	6°20.2							
7	292°24.8	249°09.5	17°26.9	199°48.6	25°30.2	274°44.5	6°20.4							
8	307°27.3	264°09.0	17°27.8	214°49.7	25°30.2	289°46.4	6°20.6							
9	322°29.7	279°08.5	17°28.8	229°50.8	25°30.1	304°48.3	6°20.9							
10	337°32.2	294°08.1	17°29.8	244°51.9	25°30.1	319°50.2	6°21.1							
11	352°34.7	309°07.6	17°30.8	259°53.0	25°30.0	334°52.1	6°21.3							
12	7°37.1	324°07.1	17°31.8	274°54.0	25°30.0	349°54.0	6°21.5							
13	22°39.6	339°06.6	17°32.8	289°55.1	25°29.9	4°55.9	6°21.8							
14	37°42.0	354°06.2	17°33.8	304°56.2	25°29.9	19°57.8	6°22.0							
15	52°44.5	9°05.7	17°34.8	319°57.3	25°29.8	34°59.8	6°22.2							
16	67°47.0	24°05.2	17°35.8	334°58.4	25°29.8	50°01.7	6°22.5							
17	82°49.4	39°04.7	17°36.8	349°59.5	25°29.7	65°03.6	6°22.7							
18	97°51.9	54°04.3	17°37.8	5°00.6	25°29.7	80°05.5	6°22.9							
19	112°54.4	69°03.8	17°38.7	20°01.7	25°29.6	95°07.4	6°23.2							
20	127°56.8	84°03.3	17°39.7	35°02.8	25°29.6	110°09.3	6°23.4							
21	142°59.3	99°02.8	17°40.7	50°03.9	25°29.5	125°11.2	6°23.6							
22	158°01.8	114°02.4	17°41.7	65°05.0	25°29.5	140°13.1	6°23.8							
23	173°04.2	129°01.9	17°42.7	80°06.0	25°29.4	155°15.0	6°24.1							
Mer.pass.:11:29			v-0.5 d1.0 m-3.9			v1.1 d-0.0 m0.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0		

Fri	GHA	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec	GHA Dec							
0	188°06.7	144°01.4	17°43.7	95°07.1	25°29.4	170°16.9	6°24.3							
1	203°09.2	159°00.9	17°44.6	110°08.2	25°29.3	185°18.8	6°24.5							
2	218°11.6	174°00.5	17°45.6	125°09.3	25°29.2	200°20.7	6°24.8							
3	233°14.1	188°60.0	17°46.6	140°10.4	25°29.2	215°22.6	6°25.0							
4	248°16.5	203°59.5	17°47.6	155°11.5	25°29.1	230°24.5	6°25.2							
5	263°19.0	218°59.0	17°48.6	170°12.6	25°29.1	245°26.4	6°25.4							
6	278°21.5	233°58.5	17°49.5	185°13.7	25°29.0	260°28.3	6°25.7							
7	293°23.9	248°58.1	17°50.5	200°14.8	25°29.0	275°30.2	6°25.9							
8	308°26.4	263°57.6	17°51.5	215°15.8	25°28.9	290°32.1	6°26.1							
9	323°28.9	278°57.1	17°52.5	230°16.9	25°28.9	305°34.1	6°26.4							
10	338°31.3	293°56.6	17°53.4	245°18.0	25°28.8	320°36.0	6°26.6							
11	353°33.8	308°56.1	17°54.4	260°19.1	25°28.7	335°37.9	6°26.8							
12	8°36.3	323°55.7	17°55.4	275°20.2	25°28.7	350°39.8	6°27.0							
13	23°38.7	338°55.2	17°56.4	290°21.3	25°28.7	5°41.7	6°27.3							
14	38°41.2	353°54.7	17°57.3	305°22.4	25°28.6	20°43.6	6°27.5							
15	53°43.6	8°54.2	17°58.3	320°23.5	25°28.5	35°45.5	6°27.7							
16	68°46.1	23°53.7	17°59.3	335°24.5	25°28.5	50°47.4	6°28.0							
17	83°48.6	38°53.3	18°00.3	350°25.6	25°28.4	65°49.3	6°28.2							
18	98°51.0	53°52.8	18°01.2	5°26.7	25°28.4	80°51.2	6°28.4							
19	113°53.5	68°52.3	18°02.2	20°27.8	25°28.3	95°53.1	6°28.7							
20	128°56.0	83°51.8	18°03.2	35°28.9	25°28.3	110°55.0	6°28.9							
21	143°58.4	98°51.3	18°04.1	50°30.0	25°28.2	125°56.9	6°29.1							
22	159°00.9	113°50.8	18°05.1	65°31.0	25°28.2	140°58.8	6°29.3							
23	174°03.4	128°50.3	18°06.1	80°32.1	25°28.1	156°00.7	6°29.6							
Mer.pass.:11:25			v-0.5 d1.0 m-3.9			v1.1 d-0.1 m0.9			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0		

2023/3/2	SHA	Mer.pass
	Venus	318°15.5 14:23
	Mars	268°06.2 17:42
	Jupiter	342°37.0 12:43
	Saturn	25°07.7 09:53
2023/3/3	SHA	Mer.pass
	Venus	317°05.2 14:24
	Mars	267°33.4 17:40
	Jupiter	342°23.6 12:40
	Saturn	25°01.6 09:50
2023/3/3	SHA	Mer.pass
	Venus	315°54.7 14:24
	Mars	267°00.5 17:38
	Jupiter	342°10.2 12:37
	Saturn	24°55.6 09:46
Horizontal paralax		
Venus:		0.1
Mars:		0.1

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	178°45.3	3°11.4	88°23.1	9.5	27°53.7	-0.4	54.7
1	193°45.5	3°12.4	102°51.5	9.5	27°53.3	-0.5	54.6
2	208°45.7	3°13.3	117°20.1	9.5	27°52.8	-0.6	54.6
3	223°45.9	3°14.3	131°48.6	9.6	27°52.1	-0.8	54.6
4	238°46.0	3°15.3	146°17.2	9.6	27°51.2	-0.9	54.6
5	253°46.2	3°16.3	160°45.8	9.6	27°50.2	-1.0	54.6
6	268°46.4	3°17.2	175°14.4	9.6	27°49.1	-1.2	54.6
7	283°46.6	3°18.2	189°43.1	9.7	27°47.9	-1.3	54.5
8	298°46.8	3°19.2	204°11.8	9.7	27°46.5	-1.5	54.5
9	313°47.0	3°20.2	218°40.5	9.7	27°45.0	-1.6	54.5
10	328°47.2	3°21.1	233°09.3	9.8	27°43.3	-1.7	54.5
11	343°47.4	3°22.1	247°38.0	9.8	27°41.5	-1.9	54.5
12	358°47.5	3°23.1	262°06.9	9.9	27°39.6	-2.0	54.5
13	13°47.7	3°24.1	276°35.8	9.9	27°37.5	-2.1	54.5
14	28°47.9	3°25.0	291°04.7	9.9	27°35.3	-2.3	54.4
15	43°48.1	3°26.0	305°33.6	10.0	27°33.0	-2.4	54.4
16	58°48.3	3°27.0	320°02.6	10.0	27°30.6	-2.5	54.4
17	73°48.5	3°28.0	334°31.6	10.0	27°28.0	-2.7	54.4
18	88°48.7	3°28.9	349°00.7	10.1	27°25.2	-2.8	54.4
19	103°48.9	3°29.9	3°29.8	10.1	27°22.4	-2.9	54.4
20	118°49.1	3°30.9	17°59.0	10.2	27°19.4	-3.1	54.4
21	133°49.2	3°31.8	32°28.2	10.2	27°16.3	-3.2	54.4
22	148°49.4	3°32.8	46°57.4	10.3	27°13.0	-3.3	54.4
23	163°49.6	3°33.8	61°26.7	10.3	27°09.7	-3.4	54.3
SD.=16.0		d=1.0	S.D.=14.9				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	178°49.8	3°34.8	75°56.0	10.4	27°06.1	-3.6	54.3
1	193°50.0	3°35.7	90°25.4	10.4	27°02.5	-3.7	54.3
2	208°50.2	3°36.7	104°54.8	10.5	26°58.8	-3.8	54.3
3	223°50.4	3°37.7	119°24.3	10.5	26°54.9	-4.0	54.3
4	238°50.6	3°38.7	133°53.8	10.6	26°50.9	-4.1	54.3
5	253°50.7	3°39.6	148°23.4	10.6	26°46.7	-4.2	54.3
6	268°50.9	3°40.6	162°53.1	10.7	26°42.5	-4.3	54.3
7	283°51.1	3°41.6	177°22.7	10.7	26°38.1	-4.5	54.3
8	298°51.3	3°42.5	191°52.5	10.8	26°33.5	-4.6	54.3
9	313°51.5	3°43.5	206°22.2	10.8	26°28.9	-4.7	54.2
10	328°51.7	3°44.5	220°52.1	10.9	26°24.2	-4.8	54.2
11	343°51.9	3°45.5	235°21.9	10.9	26°19.3	-4.9	54.2
12	358°52.1	3°46.4	249°51.9	11.0	26°14.3	-5.1	54.2
13	13°52.2	3°47.4	264°21.9	11.0	26°09.1	-5.2	54.2
14	28°52.4	3°48.4	278°51.9	11.1	26°03.9	-5.3	54.2
15	43°52.6	3°49.3	293°22.0	11.1	25°58.5	-5.4	54.2
16	58°52.8	3°50.3	307°52.2	11.2	25°53.1	-5.5	54.2
17	73°53.0	3°51.3	322°22.4	11.2	25°47.5	-5.7	54.2
18	88°53.2	3°52.3	336°52.7	11.3	25°41.7	-5.8	54.2
19	103°53.4	3°53.2	351°23.0	11.4	25°35.9	-5.9	54.2
20	118°53.6	3°54.2	5°53.4	11.4	25°30.0	-6.0	54.2
21	133°53.7	3°55.2	20°23.8	11.5	25°23.9	-6.1	54.2
22	148°53.9	3°56.1	34°54.3	11.5	25°17.7	-6.2	54.2
23	163°54.1	3°57.1	49°24.8	11.6	25°11.4	-6.4	54.2
SD.=16.0		d=1.0	S.D.=14.8				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	178°54.3	3°58.1	63°55.4	11.6	25°05.0	-6.5	54.2
1	193°54.5	3°59.0	78°26.1	11.7	24°58.5	-6.6	54.2
2	208°54.7	4°00.0	92°56.8	11.8	24°51.8	-6.7	54.2
3	223°54.9	4°01.0	107°27.6	11.8	24°45.1	-6.8	54.2
4	238°55.1	4°02.0	121°58.5	11.9	24°38.2	-6.9	54.2
5	253°55.2	4°02.9	136°29.4	11.9	24°31.3	-7.0	54.2
6	268°55.4	4°03.9	151°00.3	12.0	24°24.2	-7.1	54.2
7	283°55.6	4°04.9	165°31.3	12.0	24°17.0	-7.2	54.2
8	298°55.8	4°05.8	180°02.4	12.1	24°09.7	-7.3	54.2
9	313°56.0	4°06.8	194°33.5	12.2	24°02.3	-7.5	54.2
10	328°56.2	4°07.8	209°04.7	12.2	23°54.8	-7.6	54.2
11	343°56.4	4°08.7	223°36.0	12.3	23°47.2	-7.7	54.2
12	358°56.5	4°09.7	238°07.3	12.3	23°39.5	-7.8	54.2
13	13°56.7	4°10.7	252°38.7	12.4	23°31.7	-7.9	54.2
14	28°56.9	4°11.6	267°10.1	12.5	23°23.7	-8.0	54.2
15	43°57.1	4°12.6	281°41.6	12.5	23°15.7	-8.1	54.2
16	58°57.3	4°13.6	296°13.2	12.6	23°07.6	-8.2	54.2
17	73°57.5	4°14.5	310°44.8	12.6	22°59.3	-8.3	54.2
18	88°57.7	4°15.5	325°16.4	12.7	22°51.0	-8.4	54.2
19	103°57.9	4°16.5	339°48.2	12.8	22°42.6	-8.5	54.2
20	118°58.0	4°17.4	354°19.9	12.8	22°34.1	-8.6	54.2
21	133°58.2	4°18.4	8°51.8	12.9	22°25.4	-8.7	54.2
22	148°58.4	4°19.4	23°23.7	12.9	22°16.7	-8.8	54.2
23	163°58.6	4°20.3	37°55.6	13.0	22°07.9	-8.9	54.2
SD.=16.0		d=1.0	S.D.=14.8				
		Twilight		Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	02:04	03:55	05:08	19:04	20:18	22:14	
70	02:39	04:10	05:14	18:57	20:03	21:36	
68	03:03	04:21	05:19	18:52	19:51	21:11	
66	03:21	04:30	05:23	18:48	19:41	20:51	
64	03:36	04:38	05:27	18:44	19:33	20:36	
62	03:47	04:44	05:30	18:41	19:27	20:24	
60	03:57	04:50	05:32	18:38	19:21	20:14	
58	04:06	04:55	05:35	18:36	19:16	20:05	
56	04:13	04:59	05:37	18:34	19:11	19:58	
54	04:20	05:03	05:39	18:32	19:08	19:51	
52	04:25	05:06	05:40	18:30	19:04	19:45	
50	04:30	05:09	05:42	18:28	19:01	19:40	
45	04:41	05:16	05:45	18:25	18:54	19:30	
40	04:49	05:21	05:48	18:22	18:49	19:21	
35	04:55	05:25	05:50	18:19	18:45	19:15	
30	05:00	05:28	05:52	18:17	18:41	19:09	
20	05:08	05:34	05:56	18:14	18:36	19:02	
10	05:13	05:38	05:59	18:11	18:32	18:56	
0	05:17	05:41	06:01	18:08	18:28	18:53	
-10	05:18	05:43	06:04	18:05	18:26	18:50	
-20	05:19	05:44	06:06	18:02	18:24	18:50	
-30	05:18	05:45	06:09	17:59	18:23	18:51	
-35	05:16	05:46	06:11	17:58	18:23	18:52	
-40	05:14	05:46	06:13	17:56	18:23	18:54	
-45	05:11	05:45	06:15	17:54	18:23	18:57	
-50	05:07	05:45	06:17	17:51	18:23	19:01	
-52	05:05	05:44	06:18	17:50	18:24	19:03	
-54	05:03	05:44	06:19	17:49	18:24	19:05	
-56	05:00	05:43	06:21	17:47	18:24	19:08	
-58	04:57	05:43	06:22	17:46	18:25	19:11	
-60	04:53	05:42	06:24	17:44	18:26	19:14	
		Moonrise		Moonset			
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	—:—	—:—	—:—	—:—	
64	—:—	—:—	09:43	—:—	—:—	06:27	
62	06:57	08:37	10:20	05:44	05:50	05:49	
60	08:02	09:19	10:47	04:39	05:09	05:22	
58	08:36	09:47	11:08	04:04	04:40	05:01	
56	09:02	10:08	11:25	03:39	04:18	04:43	
54	09:22	10:26	11:39	03:19	04:00	04:28	
52	09:38	10:41	11:51	03:02	03:45	04:15	
50	09:53	10:55	12:02	02:48	03:31	04:04	
45	10:22	11:21	12:25	02:18	03:04	03:40	
40	10:45	11:43	12:44	01:55	02:42	03:21	
35	11:04	12:00	12:59	01:36	02:24	03:05	
30	11:20	12:15	13:12	01:20	02:08	02:51	
20	11:48	12:41	13:35	00:52	01:42	02:27	
10	12:11	13:03	13:54	00:28	01:19	02:07	
0	12:33	13:24	14:12	00:06	00:58	01:47	
-10	12:55	13:44	14:30	—:—	00:36	01:28	
-20	13:19	14:06	14:49	—:—	00:13	01:07	
-30	13:46	14:32	15:11	23:47	—:—	00:43	
-35	14:02	14:46	15:24	23:31	—:—	00:28	
-40	14:21	15:04	15:39	23:12	—:—	00:12	
-45	14:44	15:24	15:57	22:50	23:52	—:—	
-50	15:13	15:50	16:19	22:21	23:26	—:—	
-52	15:27	16:03	16:29	22:07	23:14	—:—	
-54	15:44	16:17	16:40	21:51	23:00	—:—	
-56	16:03	16:34	16:54	21:31	22:44	—:—	
-58	16:28	16:54	17:09	21:07	22:24	23:48	
-60	17:01	17:19	17:27	20:34	21:59	23:30	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Mer.	Mer.Pass.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
29	04:59	04:50	12:04	18:45	06:19	8(54%)	
30	04:41	04:32	12:04	19:35	07:10	9(63%)	
31	04:23	04:14	12:04	20:23	07:59	10(72%)	

April 01, 02 ,03 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	189°05.8	143°49.9	18°07.0	95°33.2	25°28.0	171°02.6	6°29.8	213°55.4	-11°44.6	Alpheratz	357°36.7	29°12.9					
1	204°08.3	158°49.4	18°08.0	110°34.3	25°28.0	186°04.5	6°30.0	228°57.6	-11°44.6	Ankaa	353°09.0	-42°10.9					
2	219°10.8	173°48.9	18°09.0	125°35.4	25°27.9	201°06.4	6°30.3	243°59.8	-11°44.5	Schedar	349°33.3	56°39.8					
3	234°13.2	188°48.4	18°09.9	140°36.5	25°27.9	216°08.3	6°30.5	259°02.1	-11°44.4	Diphda	348°49.0	-17°51.7					
4	249°15.7	203°47.9	18°10.9	155°37.5	25°27.8	231°10.3	6°30.7	274°04.3	-11°44.3	Achernar	335°21.8	-57°07.3					
5	264°18.1	218°47.4	18°11.8	170°38.6	25°27.8	246°12.2	6°30.9	289°06.5	-11°44.2	Hamal	327°53.2	23°34.2					
6	279°20.6	233°46.9	18°12.8	185°39.7	25°27.7	261°14.1	6°31.2	304°08.7	-11°44.1	Polaris	315°09.4	89°21.9					
7	294°23.1	248°46.5	18°13.8	200°40.8	25°27.6	276°16.0	6°31.4	319°10.9	-11°44.0	Akamar	315°13.2	-40°12.9					
8	309°25.5	263°46.0	18°14.7	215°41.9	25°27.6	291°17.9	6°31.6	334°13.1	-11°43.9	Menkar	314°07.9	4°10.7					
9	324°28.0	278°45.5	18°15.7	230°43.0	25°27.5	306°19.8	6°31.9	349°15.4	-11°43.9	Mirfak	308°30.8	49°56.7					
10	339°30.5	293°45.0	18°16.6	245°44.0	25°27.5	321°21.7	6°32.1	4°17.6	-11°43.8	Aldebaran	290°41.5	16°33.3					
11	354°32.9	308°44.5	18°17.6	260°45.1	25°27.4	336°23.6	6°32.3	19°19.8	-11°43.7	Rigel	281°05.4	-8°10.6					
12	9°35.4	323°44.0	18°18.5	275°46.2	25°27.3	351°25.5	6°32.5	34°22.0	-11°43.6	Capella	280°24.3	46°01.5					
13	24°37.9	338°43.5	18°19.5	290°47.3	25°27.3	6°27.4	6°32.8	49°24.2	-11°43.5	Bellatrix	278°24.6	6°22.2					
14	39°40.3	353°43.0	18°20.4	305°48.4	25°27.2	21°29.3	6°33.0	64°26.4	-11°43.4	Elnath	278°03.9	28°37.7					
15	54°42.8	8°42.5	18°21.4	320°49.4	25°27.2	36°31.2	6°33.2	79°28.7	-11°43.3	Alnilam	275°39.3	-1°11.3					
16	69°45.3	23°42.1	18°22.4	335°50.5	25°27.1	51°33.1	6°33.5	94°30.9	-11°43.2	Betelgeuse	270°53.8	7°24.6					
17	84°47.7	38°41.6	18°23.3	350°51.6	25°27.0	66°35.0	6°33.7	109°33.1	-11°43.2	Canopus	263°53.1	-52°42.7					
18	99°50.2	53°41.1	18°24.3	5°52.7	25°27.0	81°36.9	6°33.9	124°35.3	-11°43.1	Sirius	258°27.4	-16°44.9					
19	114°52.6	68°40.6	18°25.2	20°53.8	25°26.9	96°38.8	6°34.1	139°37.5	-11°43.0	Adara	255°07.0	-29°00.4					
20	129°55.1	83°40.1	18°26.2	35°54.8	25°26.9	111°40.7	6°34.4	154°39.7	-11°42.9	Procyon	244°52.2	5°10.0					
21	144°57.6	98°39.6	18°27.1	50°55.9	25°26.8	126°42.6	6°34.6	169°42.0	-11°42.8	Pollux	243°18.9	27°58.3					
22	160°00.0	113°39.1	18°28.0	65°57.0	25°26.7	141°44.5	6°34.8	184°44.2	-11°42.7	Avior	234°15.1	-59°35.3					
23	175°02.5	128°38.6	18°29.0	80°58.1	25°26.7	156°46.4	6°35.1	199°46.4	-11°42.6	Suhail	222°47.1	-43°31.8					
Mer.pass.:11:21			v-0.5 d1.0 m-3.9			v1.1 d-0.1 m1.0			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	190°05.0	143°38.1	18°29.9	95°59.2	25°26.6	171°48.3	6°35.3	214°48.6	-11°42.5	Alphard	217°49.0	-8°45.7					
1	205°07.4	158°37.6	18°30.9	111°00.2	25°26.5	186°50.2	6°35.5	229°50.8	-11°42.5	Regulus	207°35.7	11°51.2					
2	220°09.9	173°37.1	18°31.8	126°01.3	25°26.5	201°52.1	6°35.7	244°53.0	-11°42.4	Dubhe	193°42.2	61°37.7					
3	235°12.4	188°36.6	18°32.8	141°02.4	25°26.4	216°54.1	6°36.0	259°55.3	-11°42.3	Denebola	182°26.1	14°26.5					
4	250°14.8	203°36.1	18°33.7	156°03.5	25°26.4	231°56.0	6°36.2	274°57.5	-11°42.2	Gienah	175°44.8	-17°40.3					
5	265°17.3	218°35.6	18°34.7	171°04.5	25°26.3	246°57.9	6°36.4	289°59.7	-11°42.1	Acrux	173°01.1	-63°13.7					
6	280°19.7	233°35.1	18°35.6	186°05.6	25°26.2	261°59.8	6°36.7	305°01.9	-11°42.0	Gacrux	171°52.7	-57°14.6					
7	295°22.2	248°34.6	18°36.5	201°06.7	25°26.2	277°01.7	6°36.9	320°04.1	-11°41.9	Alioth	166°13.7	55°50.0					
8	310°24.7	263°34.1	18°37.5	216°07.8	25°26.1	292°03.6	6°37.1	335°06.3	-11°41.8	Spica	158°23.5	-11°17.0					
9	325°27.1	278°33.7	18°38.4	231°08.9	25°26.0	307°05.5	6°37.4	350°08.6	-11°41.8	Alcaid	152°52.7	49°11.7					
10	340°29.6	293°33.2	18°39.4	246°09.9	25°26.0	322°07.4	6°37.6	5°10.8	-11°41.7	Hadar	148°37.5	-60°29.0					
11	355°32.1	308°32.7	18°40.3	261°11.0	25°25.9	337°09.3	6°37.8	20°13.0	-11°41.6	Menkent	147°59.0	-36°29.1					
12	10°34.5	323°32.2	18°41.2	276°12.1	25°25.9	352°11.2	6°38.0	35°15.2	-11°41.5	Arcturus	145°48.8	19°03.8					
13	25°37.0	338°31.7	18°42.2	291°13.2	25°25.8	7°13.1	6°38.3	50°17.4	-11°41.4	Rigel Kent.	139°41.8	-60°55.8					
14	40°39.5	353°31.2	18°43.1	306°14.2	25°25.7	22°15.0	6°38.5	65°19.7	-11°41.3	Zubenelg.	136°57.4	-16°08.3					
15	55°41.9	8°30.7	18°44.0	321°15.3	25°25.7	37°16.9	6°38.7	80°21.9	-11°41.2	Kochab	137°18.7	74°03.4					
16	70°44.4	23°30.2	18°45.0	336°16.4	25°25.6	52°18.8	6°39.0	95°24.1	-11°41.1	Alphecca	126°04.8	26°38.0					
17	85°46.9	38°29.7	18°45.9	351°17.5	25°25.5	67°20.7	6°39.2	110°26.3	-11°41.1	Antares	112°17.4	-26°29.0					
18	100°49.3	53°29.2	18°46.8	6°18.5	25°25.5	82°22.6	6°39.4	125°28.5	-11°41.0	Atria	107°12.8	-69°03.9					
19	115°51.8	68°28.7	18°47.8	21°19.6	25°25.4	97°24.5	6°39.6	140°30.8	-11°40.9	Sabik	102°04.3	-15°45.3					
20	130°54.2	83°28.2	18°48.7	36°20.7	25°25.3	112°26.4	6°39.9	155°33.0	-11°40.8	Shaula	96°12.3	-37°07.1					
21	145°56.7	98°27.7	18°49.6	51°21.8	25°25.3	127°28.3	6°40.1	170°35.2	-11°40.7	Rasalhague	95°59.8	12°32.4					
22	160°59.2	113°27.2	18°50.6	66°22.8	25°25.2	142°30.2	6°40.3	185°37.4	-11°40.6	Etamin	90°42.8	51°28.8					
23	176°01.6	128°26.7	18°51.5	81°23.9	25°25.1	157°32.1	6°40.6	200°39.6	-11°40.5	Kaus Aust.	83°34.4	-34°22.3					
Mer.pass.:11:17			v-0.5 d0.9 m-3.9			v1.1 d-0.1 m1.0			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	191°04.1	143°26.2	18°52.4	96°25.0	25°25.1	172°34.0	6°40.8	215°41.8	-11°40.4	Nunki	75°49.6	-26°16.1					
1	206°06.6	158°25.7	18°53.3	111°26.0	25°25.0	187°35.9	6°41.0	230°44.1	-11°40.4	Altair	62°01.6	8°55.5					
2	221°09.0	173°25.2	18°54.3	126°27.1	25°24.9	202°37.8	6°41.2	245°46.3	-11°40.3	Peacock	53°08.3	-56°39.5					
3	236°11.5	188°24.6	18°55.2	141°28.2	25°24.9	217°39.7	6°41.5	260°48.5	-11°40.2	Deneb	49°27.0	45°21.4					
4	251°14.0	203°24.1	18°56.1	156°29.3	25°24.8	232°41.7	6°41.7	275°50.7	-11°40.1	Enif	33°40.5	9°58.7					
5	266°16.4	218°23.6	18°57.0	171°30.3	25°24.7	247°43.6	6°41.9	290°52.9	-11°40.0	Alnair	27°35.1	-46°50.9					
6	281°18.9	233°23.1	18°57.9	186°31.4	25°24.7	262°45.5	6°42.2	305°55.2	-11°39.9	Fomalhaut	15°16.5	-29°30.0					
7	296°21.3	248°22.6	18°58.9	201°32.5	25°24.6	277°47.4	6°42.4	320°57.4	-11°39.8	Scheat	13°47.0	28°12.3					
8	311°23.8	263°22.1	18°59.8	216°33.5	25°24.5	292°49.3	6°42.6	335°59.6	-11°39.8	Markab	13°31.7	15°19.6					
9	326°26.3	278°21.6	19°00.7	231°34.6	25°24.5	307°51.2	6°42.8	351°01.8	-11°39.7	2023/4/1							
10	341°28.7	293°21.1	19°01.6	246°35.7	25°24.4	322°53.1	6°43.1	6°04.0	-11°39.6	SHA	314°44.0	14:25					
11	356°31.2	308°20.6	19°02.5	261°36.8	25°24.3	337°55.0	6°43.3	21°06.3	-11°39.5	Mars	266°27.4	17:37					
12	11°33.7	323°20.1	19°03.5	276°37.8	25°24.2	352°56.9	6°43.5	36°08.5	-11°39.4	Jupiter	341°56.8	12:34					
13	26°36.1	338°19.6	19°04.4	291°38.9	25°24.2	7°58.8	6°43.8	51°10.7	-11°39.3	Saturn	24°49.6	09:43					
14	41°38.6	353°19.1	19°05.3	306°40.0	25°24.1	23°00.7	6°44.0	66°12.9	-11°39.2	2023/4/2							
15	56°41.1	8°18.6	19°06.2	321°41.0	25°24.0	38°02.6	6°44.2	81°15.1	-11°39.2	SHA	313°33.1	14:26					
16	71°43.5	23°18.1	19°07.1	336°42.1	25°24.0	53°04.5	6°44.4	96°17.4	-11°39.1	Mars	265°54.2	17:35					
17	86°46.0	38°17.6	19°08.0	351°43.2	25°23.9	68°06.4	6°44.7	111°19.6	-11°39.0	Jupiter	341°43.4	12:31					
18	101°48.5	53°17.1	19°08.9	6°44.3	25°23.8	83°08.3	6°44.9	126°21.8	-11°38.9	Saturn	24°43.6	09:39					
19	116°50.9	68°16.5	19°09.9	21°45.3	25°23.8	98°10.2	6°45.1	141°24.0	-11°38.8	2023/4/3							
20	131°53.4	83°16.0	19°10.8	36°46.4	25°23.7	113°12.1	6°45.4	156°26.2	-11°38.7	SHA	312°22.1	14:27					
21	146°55.8	98°15.5	19°11.7	51°47.5	25°23.6	128°14.0	6°45.6	171°28.5	-11°38.6	Mars	265°20.9	17:33					
22	161°58.3	113°15.0	19°12.6	66°48.5	25°23.5	143°15.9	6°45.8	186°30.7	-11°38.5	Jupiter	341°29.9	12:28					
23	177°00.8	128°14.5	19°13.5	81°49.6	25°23.5	158°17.8	6°46.0	201°32.9	-11°38.5	Saturn	24°37.7	09:36					
Mer.pass.:11:13			v-0.5 d0.9 m-3.9			v1.1 d-0.1 m1.0			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Horizontal parallax																	
Venus: 0.1																	
Mars: 0.1																	

Sun				Moon											
Sat	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	178°58.8	4°21.3		52°27.7	13.0	21°59.0	-9.0	54.2		Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	193°59.0	4°22.3		66°59.7	13.1	21°49.9	-9.1	54.2	72	01:29	03:37	04:52	19:18	20:35	22:51
2	208°59.2	4°23.2		81°31.9	13.2	21°40.8	-9.2	54.2	70	02:15	03:54	05:00	19:10	20:17	21:59
3	223°59.3	4°24.2		96°04.1	13.2	21°31.6	-9.2	54.2	68	02:44	04:07	05:06	19:03	20:03	21:28
4	238°59.5	4°25.2		110°36.3	13.3	21°22.3	-9.3	54.2	66	03:06	04:18	05:12	18:58	19:52	21:05
5	253°59.7	4°26.1		125°08.6	13.3	21°13.0	-9.4	54.2	64	03:22	04:26	05:16	18:53	19:43	20:48
6	268°59.9	4°27.1		139°41.0	13.4	21°03.5	-9.5	54.2	62	03:36	04:34	05:20	18:49	19:35	20:34
7	284°00.1	4°28.1		154°13.4	13.4	20°53.9	-9.6	54.2	60	03:47	04:40	05:23	18:45	19:29	20:23
8	299°00.3	4°29.0		168°45.9	13.5	20°44.2	-9.7	54.2	58	03:56	04:46	05:26	18:42	19:23	20:13
9	314°00.5	4°30.0		183°18.4	13.6	20°34.5	-9.8	54.2	56	04:04	04:51	05:29	18:40	19:18	20:05
10	329°00.6	4°31.0		197°51.0	13.6	20°24.6	-9.9	54.2	54	04:11	04:55	05:31	18:37	19:13	19:57
11	344°00.8	4°31.9		212°23.6	13.7	20°14.7	-10.0	54.2	52	04:18	04:59	05:33	18:35	19:09	19:51
12	359°01.0	4°32.9		226°56.3	13.7	20°04.7	-10.1	54.2	50	04:23	05:03	05:35	18:33	19:06	19:45
13	14°01.2	4°33.9		241°29.1	13.8	19°54.6	-10.1	54.2	45	04:35	05:10	05:40	18:29	18:58	19:34
14	29°01.4	4°34.8		256°01.9	13.8	19°44.4	-10.2	54.2	40	04:43	05:16	05:43	18:25	18:52	19:25
15	44°01.6	4°35.8		270°34.7	13.9	19°34.2	-10.3	54.3	35	04:51	05:21	05:46	18:22	18:47	19:17
16	59°01.8	4°36.8		285°07.6	13.9	19°23.8	-10.4	54.3	30	04:56	05:25	05:49	18:19	18:43	19:11
17	74°01.9	4°37.7		299°40.6	14.0	19°13.4	-10.5	54.3	20	05:05	05:31	05:53	18:14	18:37	19:02
18	89°02.1	4°38.7		314°13.6	14.0	19°02.8	-10.6	54.3	10	05:11	05:36	05:57	18:11	18:32	18:56
19	104°02.3	4°39.7		328°46.7	14.1	18°52.2	-10.6	54.3	0	05:16	05:40	06:00	18:07	18:28	18:52
20	119°02.5	4°40.6		343°19.8	14.1	18°41.6	-10.7	54.3	-10	05:18	05:43	06:04	18:03	18:24	18:49
21	134°02.7	4°41.6		357°52.9	14.2	18°30.8	-10.8	54.3	-20	05:20	05:45	06:07	17:60	18:22	18:47
22	149°02.9	4°42.5		12°26.2	14.2	18°19.9	-10.9	54.3	-30	05:19	05:47	06:11	17:56	18:20	18:47
23	164°03.1	4°43.5		26°59.4	14.3	18°09.0	-11.0	54.3	-35	05:19	05:48	06:13	17:54	18:19	18:48
	SD.=16.0	d=1.0	S.D.=14.8						-40	05:17	05:49	06:16	17:51	18:18	18:49
									-45	05:15	05:49	06:18	17:48	18:17	18:51
									-50	05:12	05:49	06:22	17:45	18:17	18:54
									-52	05:10	05:49	06:23	17:43	18:17	18:56
									-54	05:08	05:49	06:25	17:41	18:17	18:58
									-56	05:06	05:49	06:27	17:40	18:17	18:60
									-58	05:04	05:49	06:29	17:38	18:17	19:02
									-60	05:01	05:49	06:31	17:35	18:17	19:05

April 04, 05 ,06 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	192°03.2	143°14.0	19°14.4	96°50.7	25°23.4	173°19.7	6°46.3	216°35.1	-11°38.4	Alpheratz	357°36.7	29°12.9					
1	207°05.7	158°13.5	19°15.3	111°51.7	25°23.3	188°21.6	6°46.5	231°37.4	-11°38.3	Ankaa	353°09.0	-42°10.9					
2	222°08.2	173°13.0	19°16.2	126°52.8	25°23.3	203°23.5	6°46.7	246°39.6	-11°38.2	Schedar	349°33.3	56°39.7					
3	237°10.6	188°12.5	19°17.1	141°53.9	25°23.2	218°25.4	6°46.9	261°41.8	-11°38.1	Diphda	348°49.0	-17°51.7					
4	252°13.1	203°12.0	19°18.0	156°54.9	25°23.1	233°27.3	6°47.2	276°44.0	-11°38.0	Achernar	335°21.9	-57°07.3					
5	267°15.6	218°11.4	19°18.9	171°56.0	25°23.0	248°29.2	6°47.4	291°46.2	-11°37.9	Hamal	327°53.2	23°34.2					
6	282°18.0	233°10.9	19°19.8	186°57.1	25°23.0	263°31.1	6°47.6	306°48.5	-11°37.9	Polaris	315°10.3	89°21.9					
7	297°20.5	248°10.4	19°20.7	201°58.1	25°22.9	278°33.0	6°47.9	321°50.7	-11°37.8	Akamar	315°13.2	-40°12.9					
8	312°22.9	263°09.9	19°21.6	216°59.2	25°22.8	293°34.9	6°48.1	336°52.9	-11°37.7	Menkar	314°08.0	4°10.7					
9	327°25.4	278°09.4	19°22.5	232°00.3	25°22.7	308°36.8	6°48.3	351°55.1	-11°37.6	Mirfak	308°30.8	49°56.6					
10	342°27.9	293°08.9	19°23.4	247°01.3	25°22.7	323°38.7	6°48.5	6°57.3	-11°37.5	Aldebaran	290°41.5	16°33.3					
11	357°30.3	308°08.4	19°24.3	262°02.4	25°22.6	338°40.6	6°48.8	21°59.6	-11°37.4	Rigel	281°05.4	-8°10.6					
12	12°32.8	323°07.8	19°25.2	277°03.5	25°22.5	353°42.6	6°49.0	37°01.8	-11°37.3	Capella	280°24.3	46°01.4					
13	27°35.3	338°07.3	19°26.1	292°04.5	25°22.5	8°44.5	6°49.2	52°04.0	-11°37.3	Bellatrix	278°24.6	6°22.2					
14	42°37.7	353°06.8	19°27.0	307°05.6	25°22.4	23°46.4	6°49.5	67°06.2	-11°37.2	Elnath	278°03.9	28°37.7					
15	57°40.2	8°06.3	19°27.9	322°06.7	25°22.3	38°48.3	6°49.7	82°08.5	-11°37.1	Alnilam	275°39.3	-1°11.3					
16	72°42.7	23°05.8	19°28.8	337°07.7	25°22.2	53°50.2	6°49.9	97°10.7	-11°37.0	Betelgeuse	270°53.8	7°24.6					
17	87°45.1	38°05.3	19°29.7	352°08.8	25°22.2	68°52.1	6°50.1	112°12.9	-11°36.9	Canopus	263°53.1	-52°42.7					
18	102°47.6	53°04.7	19°30.6	7°09.9	25°22.1	83°54.0	6°50.4	127°15.1	-11°36.8	Sirius	258°27.5	-16°44.9					
19	117°50.1	68°04.2	19°31.5	22°10.9	25°22.0	98°55.9	6°50.6	142°17.4	-11°36.8	Adara	255°07.0	-29°00.4					
20	132°52.5	83°03.7	19°32.4	37°12.0	25°21.9	113°57.8	6°50.8	157°19.6	-11°36.7	Procyon	244°52.2	5°10.0					
21	147°55.0	98°03.2	19°33.3	52°13.0	25°21.8	128°59.7	6°51.1	172°21.8	-11°36.6	Pollux	243°18.9	27°58.3					
22	162°57.4	113°02.7	19°34.1	67°14.1	25°21.8	144°01.6	6°51.3	187°24.0	-11°36.5	Avior	234°15.1	-59°35.3					
23	177°59.9	128°02.2	19°35.0	82°15.2	25°21.7	159°03.5	6°51.5	202°26.2	-11°36.4	Suhail	222°47.2	-43°31.8					
Mer.pass.:11:09			v-0.5 d0.9 m-3.9			v1.1 d-0.1 m1.0			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	193°02.4	143°01.6	19°35.9	97°16.2	25°21.6	174°05.4	6°51.7	217°28.5	-11°36.3	Regulus	207°35.7	11°51.2					
1	208°04.8	158°01.1	19°36.8	112°17.3	25°21.5	189°07.3	6°52.0	232°30.7	-11°36.2	Dubhe	193°42.2	61°37.7					
2	223°07.3	173°00.6	19°37.7	127°18.4	25°21.5	204°09.2	6°52.2	247°32.9	-11°36.2	Denebola	182°26.1	14°26.5					
3	238°09.8	188°00.1	19°38.6	142°19.4	25°21.4	219°11.1	6°52.4	262°35.1	-11°36.1	Gienah	175°44.8	-17°40.3					
4	253°12.2	203°59.6	19°39.5	157°20.5	25°21.3	234°13.0	6°52.7	277°37.4	-11°36.0	Acrux	173°01.1	-63°13.7					
5	268°14.7	217°59.0	19°40.3	172°21.5	25°21.2	249°14.9	6°52.9	292°39.6	-11°35.9	Gacrux	171°52.7	-57°14.6					
6	283°17.2	232°58.5	19°41.2	187°22.6	25°21.2	264°16.8	6°53.1	307°41.8	-11°35.8	Alioth	166°13.7	55°50.0					
7	298°19.6	247°58.0	19°42.1	202°23.7	25°21.1	279°18.7	6°53.3	322°44.0	-11°35.7	Spica	158°23.5	-11°17.0					
8	313°22.1	262°57.5	19°43.0	217°24.7	25°21.0	294°20.6	6°53.6	337°46.3	-11°35.6	Alcaid	152°52.7	49°11.7					
9	328°24.6	277°57.0	19°43.9	232°25.8	25°20.9	309°22.5	6°53.8	352°48.5	-11°35.6	Hadar	148°37.5	-60°29.0					
10	343°27.0	292°56.4	19°44.7	247°26.9	25°20.8	324°24.4	6°54.0	7°50.7	-11°35.5	Menkent	147°59.0	-36°29.1					
11	358°29.5	307°55.9	19°45.6	262°27.9	25°20.8	339°26.3	6°54.2	22°52.9	-11°35.4	Arcturus	145°48.8	19°03.8					
12	13°31.9	322°55.4	19°46.5	277°29.0	25°20.7	354°28.2	6°54.5	37°55.2	-11°35.3	Rigil Kent.	139°41.8	-60°55.8					
13	28°34.4	337°54.9	19°47.4	292°30.0	25°20.6	9°30.1	6°54.7	52°57.4	-11°35.2	Zubenelg.	136°57.4	-16°08.4					
14	43°36.9	352°54.3	19°48.3	307°31.1	25°20.5	24°32.0	6°54.9	67°59.6	-11°35.1	Kochab	137°18.7	74°03.4					
15	58°39.3	7°53.8	19°49.1	322°32.2	25°20.4	39°33.9	6°55.2	83°01.8	-11°35.1	Alphecca	126°04.7	26°38.0					
16	73°41.8	22°53.3	19°50.0	337°33.2	25°20.4	54°35.8	6°55.4	98°04.0	-11°35.0	Antares	112°17.4	-26°29.0					
17	88°44.3	37°52.8	19°50.9	352°34.3	25°20.3	69°37.7	6°55.6	113°06.3	-11°34.9	Atria	107°12.8	-69°03.9					
18	103°46.7	52°52.2	19°51.7	7°35.3	25°20.2	84°39.6	6°55.8	128°08.5	-11°34.8	Sabik	102°04.3	-15°45.3					
19	118°49.2	67°51.7	19°52.6	22°36.4	25°20.1	99°41.5	6°56.1	143°10.7	-11°34.7	Shaula	96°12.2	-37°07.1					
20	133°51.7	82°51.2	19°53.5	37°37.4	25°20.0	114°43.4	6°56.3	158°12.9	-11°34.6	Rasalhague	95°59.8	12°32.4					
21	148°54.1	97°50.7	19°54.4	52°38.5	25°20.0	129°45.3	6°56.5	173°15.2	-11°34.5	Etamin	90°42.7	51°28.8					
22	163°56.6	112°50.1	19°55.2	67°39.6	25°19.9	144°47.2	6°56.8	188°17.4	-11°34.5	Kaus Aust.	83°34.4	-34°22.3					
23	178°59.0	127°49.6	19°56.1	82°40.6	25°19.8	159°49.1	6°57.0	203°19.6	-11°34.4	Vega	80°34.2	38°47.9					
Mer.pass.:11:06			v-0.5 d0.9 m-3.9			v1.1 d-0.1 m1.0			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	194°01.5	142°49.1	19°57.0	97°41.7	25°19.7	174°51.0	6°57.2	218°21.8	-11°34.3	Nunki	75°49.6	-26°16.1					
1	209°04.0	157°48.6	19°57.8	112°42.7	25°19.6	189°52.9	6°57.4	233°24.1	-11°34.2	Altair	62°01.5	8°55.5					
2	224°06.4	172°48.0	19°58.7	127°43.8	25°19.5	204°54.8	6°57.7	248°26.3	-11°34.1	Peacock	53°08.2	-56°39.5					
3	239°08.9	187°47.5	19°59.6	142°44.9	25°19.5	219°56.7	6°57.9	263°28.5	-11°34.0	Deneb	49°27.0	45°21.4					
4	254°11.4	202°47.0	20°00.4	157°45.9	25°19.4	234°58.6	6°58.1	278°30.8	-11°34.0	Enif	33°40.5	9°58.7					
5	269°13.8	217°46.4	20°01.3	172°47.0	25°19.3	250°00.5	6°58.3	293°33.0	-11°33.9	Alnair	27°35.1	-46°50.9					
6	284°16.3	232°45.9	20°02.1	187°48.0	25°19.2	265°02.4	6°58.6	308°35.2	-11°33.8	Fomalhaut	15°16.5	-29°30.0					
7	299°18.8	247°45.4	20°03.0	202°49.1	25°19.1	280°04.3	6°58.8	323°37.4	-11°33.7	Scheat	13°47.0	28°12.3					
8	314°21.2	262°44.8	20°03.9	217°50.1	25°19.1	295°06.3	6°59.0	338°39.7	-11°33.6	Markab	13°31.7	15°19.6					
9	329°23.7	277°44.3	20°04.7	232°51.2	25°19.0	310°08.2	6°59.3	353°41.9	-11°33.5	2023/4/4			SHA	Mer.pass			
10	344°26.2	292°43.8	20°05.6	247°52.3	25°18.9	325°10.1	6°59.5	8°44.1	-11°33.4	Venus	311°10.8	14:28					
11	359°28.6	307°43.3	20°06.4	262°53.3	25°18.8	340°12.0	6°59.7	23°46.3	-11°33.4	Mars	264°47.4	17:31					
12	14°31.1	322°42.7	20°07.3	277°54.4	25°18.7	355°13.9	6°59.9	38°48.6	-11°33.3	Jupiter	341°16.5	12:25					
13	29°33.5	337°42.2	20°08.1	292°55.4	25°18.6	10°15.8	7°00.2	53°50.8	-11°33.2	Saturn	24°31.9	09:32					
14	44°36.0	352°41.7	20°09.0	307°56.5	25°18.5	25°17.7	7°00.4	68°53.0	-11°33.1	2023/4/5			SHA	Mer.pass			
15	59°38.5	7°41.1	20°09.9	322°57.5	25°18.5	40°19.6	7°00.6	83°55.2	-11°33.0	Venus	309°59.3	14:28					
16	74°40.9	22°40.6	20°10.7	337°58.6	25°18.4	55°21.5											

Sun			Moon												
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	179°12.1	5°30.5	20°55.8	15.8	7°53.1	-13.9	55.0	72	00:28	03:18	04:36	19:32	20:53	--	
1	194°12.3	5°31.5	35°30.6	15.8	7°39.2	-13.9	55.0	70	01:48	03:37	04:46	19:22	20:32	22:26	
2	209°12.5	5°32.4	50°05.5	15.8	7°25.3	-13.9	55.0	68	02:25	03:53	04:54	19:14	20:16	21:46	
3	224°12.6	5°33.4	64°40.3	15.9	7°11.3	-14.0	55.1	66	02:49	04:05	05:00	19:08	20:03	21:20	
4	239°12.8	5°34.3	79°15.2	15.9	6°57.3	-14.0	55.1	64	03:08	04:15	05:05	19:02	19:53	21:01	
5	254°13.0	5°35.3	93°50.1	15.9	6°43.3	-14.1	55.1	62	03:23	04:23	05:10	18:57	19:44	20:45	
6	269°13.2	5°36.2	108°25.0	15.9	6°29.2	-14.1	55.1	60	03:36	04:31	05:14	18:53	19:37	20:32	
7	284°13.4	5°37.2	122°59.8	15.9	6°15.1	-14.1	55.1	58	03:46	04:37	05:18	18:49	19:30	20:21	
8	299°13.5	5°38.1	137°34.7	15.9	6°00.9	-14.2	55.1	56	03:55	04:43	05:21	18:46	19:24	20:12	
9	314°13.7	5°39.1	152°09.6	15.9	5°46.8	-14.2	55.2	54	04:03	04:48	05:24	18:43	19:19	20:04	
10	329°13.9	5°40.1	166°44.5	15.9	5°32.5	-14.2	55.2	52	04:10	04:52	05:27	18:40	19:15	19:57	
11	344°14.1	5°41.0	181°19.4	15.9	5°18.3	-14.3	55.2	50	04:16	04:56	05:29	18:38	19:11	19:51	
12	359°14.3	5°42.0	195°54.3	15.9	5°04.0	-14.3	55.2	45	04:29	05:04	05:34	18:32	19:02	19:38	
13	14°14.5	5°42.9	210°29.2	15.9	4°49.7	-14.3	55.2	40	04:38	05:11	05:38	18:28	18:55	19:28	
14	29°14.6	5°43.9	225°04.1	15.9	4°35.4	-14.4	55.3	35	04:46	05:16	05:42	18:24	18:50	19:20	
15	44°14.8	5°44.8	239°39.0	15.9	4°21.0	-14.4	55.3	30	04:53	05:21	05:45	18:21	18:45	19:13	
16	59°15.0	5°45.8	254°13.9	15.9	4°06.6	-14.4	55.3	20	05:02	05:28	05:51	18:15	18:37	19:03	
17	74°15.2	5°46.7	268°48.7	15.9	3°52.2	-14.4	55.3	10	05:09	05:34	05:55	18:10	18:32	18:56	
18	89°15.4	5°47.7	283°23.6	15.9	3°37.7	-14.5	55.3	0	05:15	05:39	05:59	18:06	18:27	18:51	
19	104°15.5	5°48.6	297°58.5	15.9	3°23.3	-14.5	55.4	-10	05:18	05:43	06:04	18:02	18:23	18:47	
20	119°15.7	5°49.6	312°33.4	15.9	3°08.8	-14.5	55.4	-20	05:20	05:46	06:08	17:57	18:19	18:45	
21	134°15.9	5°50.5	327°08.2	15.9	2°54.3	-14.5	55.4	-30	05:21	05:49	06:13	17:52	18:16	18:44	
22	149°16.1	5°51.5	341°43.1	15.8	2°39.7	-14.6	55.4	-35	05:21	05:50	06:16	17:49	18:15	18:44	
23	164°16.3	5°52.4	356°17.9	15.8	2°25.1	-14.6	55.4	-40	05:20	05:52	06:19	17:46	18:13	18:45	
SD.=16.0			d=1.0	S.D.=15.0					-45	05:19	05:53	06:22	17:43	18:12	18:46
								-50	05:17	05:54	06:26	17:38	18:11	18:48	
								-52	05:15	05:54	06:28	17:36	18:10	18:49	
								-54	05:14	05:55	06:30	17:34	18:10	18:50	
								-56	05:12	05:55	06:33	17:32	18:09	18:52	
								-58	05:10	05:56	06:35	17:29	18:08	18:54	
								-60	05:08	05:56	06:38	17:26	18:08	18:56	
								Lat.	Moonrise			Moonset			
								72	16:14	18:17	20:27	06:07	05:35	05:02	
								70	16:20	18:14	20:13	05:58	05:34	05:09	
								68	16:25	18:11	20:02	05:51	05:33	05:15	
								66	16:29	18:09	19:52	05:45	05:32	05:20	
								64	16:32	18:07	19:45	05:39	05:32	05:24	
								62	16:35	18:05	19:38	05:35	05:31	05:27	
								60	16:37	18:04	19:32	05:31	05:31	05:30	
								58	16:40	18:02	19:27	05:27	05:30	05:33	
								56	16:41	18:01	19:23	05:24	05:30	05:36	
								54	16:43	17:60	19:19	05:21	05:30	05:38	
								52	16:45	17:59	19:15	05:19	05:29	05:40	
								50	16:46	17:58	19:12	05:16	05:29	05:42	
								45	16:49	17:56	19:05	05:11	05:28	05:46	
								40	16:52	17:55	18:59	05:07	05:28	05:49	
								35	16:54	17:53	18:54	05:03	05:28	05:52	
								30	16:56	17:52	18:50	04:60	05:27	05:55	
								20	16:60	17:50	18:43	04:54	05:26	05:59	
								10	17:03	17:49	18:36	04:49	05:26	06:03	
								0	17:05	17:47	18:30	04:44	05:25	06:07	
								-10	17:08	17:45	18:24	04:39	05:25	06:11	
								-20	17:11	17:44	18:18	04:34	05:24	06:15	
								-30	17:14	17:42	18:10	04:27	05:23	06:20	
								-35	17:16	17:41	18:06	04:24	05:23	06:22	
								-40	17:19	17:40	18:02	04:20	05:22	06:26	
								-45	17:21	17:38	17:56	04:15	05:21	06:29	
								-50	17:24	17:37	17:50	04:09	05:21	06:33	
								-52	17:25	17:36	17:47	04:07	05:20	06:35	
								-54	17:27	17:35	17:44	04:04	05:20	06:37	
								-56	17:29	17:34	17:40	04:01	05:19	06:40	
								-58	17:30	17:33	17:37	03:57	05:19	06:43	
								-60	17:32	17:32	17:32	03:53	05:18	06:46	
								Day	Sun			Moon			
									Eqn. of Time	Mer.	Mer.Pass.		Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								4	03:12	03:03	12:03	23:15	10:54	14(97%)	
								5	02:54	02:45	12:02	23:57	11:36	15(99%)	
								6	02:37	02:28	12:02	00:40	12:18	16(100%)	
SD.=16.0			d=0.9	S.D.=15.3											

April 07, 08 ,09 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	195°00.6	142°36.3	20°17.5	98°07.0	25°17.7	175°36.7	7°02.7	219°15.3	-11°32.3	Alpheratz	357°36.7	29°12.9					
1	210°03.1	157°35.8	20°18.3	113°08.1	25°17.6	190°38.6	7°02.9	234°17.5	-11°32.2	Ankaa	353°09.0	-42°10.9					
2	225°05.6	172°35.2	20°19.2	128°09.1	25°17.5	205°40.5	7°03.1	249°19.7	-11°32.1	Schedar	349°33.3	56°39.7					
3	240°08.0	187°34.7	20°20.0	143°10.2	25°17.4	220°42.4	7°03.4	264°22.0	-11°32.0	Diphda	348°49.0	-17°51.7					
4	255°10.5	202°34.2	20°20.9	158°11.2	25°17.3	235°44.3	7°03.6	279°24.2	-11°31.9	Achernar	335°21.9	-57°07.3					
5	270°13.0	217°33.6	20°21.7	173°12.3	25°17.2	250°46.2	7°03.8	294°26.4	-11°31.9	Hamal	327°53.2	23°34.2					
6	285°15.4	232°33.1	20°22.6	188°13.3	25°17.2	265°48.1	7°04.0	309°28.7	-11°31.8	Polaris	315°11.0	89°21.8					
7	300°17.9	247°32.6	20°23.4	203°14.4	25°17.1	280°50.0	7°04.3	324°30.9	-11°31.7	Akamar	315°13.2	-40°12.9					
8	315°20.4	262°32.0	20°24.2	218°15.4	25°17.0	295°51.9	7°04.5	339°33.1	-11°31.6	Menkar	314°08.0	4°10.7					
9	330°22.8	277°31.5	20°25.1	233°16.5	25°16.9	310°53.8	7°04.7	354°35.3	-11°31.5	Mirfak	308°30.8	49°56.6					
10	345°25.3	292°30.9	20°25.9	248°17.6	25°16.8	325°55.7	7°04.9	9°37.6	-11°31.4	Aldebaran	290°41.5	16°33.3					
11	0°27.8	307°30.4	20°26.7	263°18.6	25°16.7	340°57.6	7°05.2	24°39.8	-11°31.4	Rigel	281°05.4	-8°10.6					
12	15°30.2	322°29.9	20°27.6	278°19.7	25°16.6	355°59.5	7°05.4	39°42.0	-11°31.3	Capella	280°24.3	46°01.4					
13	30°32.7	337°29.3	20°28.4	293°20.7	25°16.5	11°01.4	7°05.6	54°44.2	-11°31.2	Bellatrix	278°24.6	6°22.2					
14	45°35.1	352°28.8	20°29.2	308°21.8	25°16.4	26°03.3	7°05.9	69°46.5	-11°31.1	Elnath	278°03.9	28°37.7					
15	60°37.6	7°28.2	20°30.1	323°22.8	25°16.4	41°05.2	7°06.1	84°48.7	-11°31.0	Alnilam	275°39.4	-1°11.3					
16	75°40.1	22°27.7	20°30.9	338°23.9	25°16.3	56°07.1	7°06.3	99°50.9	-11°30.9	Betelgeuse	270°53.8	7°24.6					
17	90°42.5	37°27.2	20°31.7	353°24.9	25°16.2	71°09.0	7°06.5	114°53.2	-11°30.9	Canopus	263°53.2	-52°42.7					
18	105°45.0	52°26.6	20°32.6	8°26.0	25°16.1	86°10.9	7°06.8	129°55.4	-11°30.8	Sirius	258°27.5	-16°44.9					
19	120°47.5	67°26.1	20°33.4	23°27.0	25°16.0	101°12.8	7°07.0	144°57.6	-11°30.7	Adara	255°07.0	-29°00.4					
20	135°49.9	82°25.5	20°34.2	38°28.1	25°15.9	116°14.7	7°07.2	159°59.9	-11°30.6	Procyon	244°52.2	5°10.0					
21	150°52.4	97°25.0	20°35.1	53°29.1	25°15.8	131°16.6	7°07.4	175°02.1	-11°30.5	Pollux	243°18.9	27°58.3					
22	165°54.9	112°24.5	20°35.9	68°30.2	25°15.7	146°18.5	7°07.7	190°04.3	-11°30.4	Avior	234°15.2	-59°35.3					
23	180°57.3	127°23.9	20°36.7	83°31.2	25°15.6	161°20.4	7°07.9	205°06.5	-11°30.4	Suhail	222°47.2	-43°31.8					
Mer.pass.:10:58			v-0.5 d0.8 m-3.9			v1.1 d-0.1 m1.1			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	195°59.8	142°23.4	20°37.5	98°32.3	25°15.5	176°22.3	7°08.1	220°08.8	-11°30.3	Alphard	217°49.0	-8°45.7					
1	211°02.2	157°22.8	20°38.4	113°33.3	25°15.4	191°24.2	7°08.4	235°11.0	-11°30.2	Regulus	207°35.7	11°51.2					
2	226°04.7	172°22.3	20°39.2	128°34.4	25°15.3	206°26.1	7°08.6	250°13.2	-11°30.1	Dubhe	193°42.2	61°37.7					
3	241°07.2	187°21.7	20°40.0	143°35.4	25°15.3	221°28.0	7°08.8	265°15.5	-11°30.0	Denebola	182°26.1	14°26.5					
4	256°09.6	202°21.2	20°40.8	158°36.5	25°15.2	236°29.9	7°09.0	280°17.7	-11°29.9	Gienah	175°44.8	-17°40.3					
5	271°12.1	217°20.6	20°41.6	173°37.5	25°15.1	251°31.8	7°09.3	295°19.9	-11°29.9	Acrux	173°01.1	-63°13.7					
6	286°14.6	232°20.1	20°42.5	188°38.5	25°15.0	266°33.7	7°09.5	310°22.1	-11°29.8	Gacrux	171°52.7	-57°14.7					
7	301°17.0	247°19.6	20°43.3	203°39.6	25°14.9	281°35.6	7°09.7	325°24.4	-11°29.7	Alioth	166°13.7	55°50.0					
8	316°19.5	262°19.0	20°44.1	218°40.6	25°14.8	296°37.5	7°09.9	340°26.6	-11°29.6	Spica	158°23.5	-11°17.0					
9	331°22.0	277°18.5	20°44.9	233°41.7	25°14.7	311°39.4	7°10.2	355°28.8	-11°29.5	Alcaid	152°52.7	49°11.7					
10	346°24.4	292°17.9	20°45.7	248°42.7	25°14.6	326°41.3	7°10.4	10°31.1	-11°29.5	Hadar	148°37.5	-60°29.1					
11	1°26.9	307°17.4	20°46.5	263°43.8	25°14.5	341°43.2	7°10.6	25°33.3	-11°29.4	Menkent	147°59.0	-36°29.1					
12	16°29.4	322°16.8	20°47.4	278°44.8	25°14.4	356°45.1	7°10.9	40°35.5	-11°29.3	Arcturus	145°48.8	19°03.8					
13	31°31.8	337°16.3	20°48.2	293°45.9	25°14.3	11°47.0	7°11.1	55°37.8	-11°29.2	Rigil Kent.	139°41.8	-60°55.8					
14	46°34.3	352°15.7	20°49.0	308°46.9	25°14.2	26°48.9	7°11.3	70°40.0	-11°29.1	Zubenelg.	136°57.4	-16°08.4					
15	61°36.7	7°15.2	20°49.8	323°48.0	25°14.1	41°50.8	7°11.5	85°42.2	-11°29.0	Kochab	137°18.7	74°03.4					
16	76°39.2	22°14.6	20°50.6	338°49.0	25°14.0	56°52.7	7°11.8	100°44.5	-11°29.0	Alphecca	126°04.7	26°38.0					
17	91°41.7	37°14.1	20°51.4	353°50.1	25°13.9	71°54.6	7°12.0	115°46.7	-11°28.9	Antares	112°17.4	-26°29.0					
18	106°44.1	52°13.5	20°52.2	8°51.1	25°13.8	86°56.5	7°12.2	130°48.9	-11°28.8	Atria	107°12.7	-69°03.9					
19	121°46.6	67°13.0	20°53.0	23°52.2	25°13.7	101°58.4	7°12.4	145°51.1	-11°28.7	Sabik	102°04.3	-15°45.3					
20	136°49.1	82°12.4	20°53.8	38°53.2	25°13.6	117°00.3	7°12.7	160°53.4	-11°28.6	Shaula	96°12.2	-37°07.1					
21	151°51.5	97°11.9	20°54.6	53°54.2	25°13.6	132°02.2	7°12.9	175°55.6	-11°28.5	Rasalhague	95°59.8	12°32.4					
22	166°54.0	112°11.3	20°55.4	68°55.3	25°13.5	147°04.1	7°13.1	190°57.8	-11°28.5	Etamin	90°42.7	51°28.8					
23	181°56.5	127°10.8	20°56.2	83°56.3	25°13.4	162°06.0	7°13.3	206°00.1	-11°28.4	Kaus Aust.	83°34.4	-34°22.3					
Mer.pass.:10:54			v-0.5 d0.8 m-3.9			v1.0 d-0.1 m1.1			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	196°58.9	142°10.2	20°57.0	98°57.4	25°13.3	177°07.9	7°13.6	221°02.3	-11°28.3	Venus	307°35.7	14:30					
1	212°01.4	157°09.7	20°57.9	113°58.4	25°13.2	192°09.8	7°13.8	236°04.5	-11°28.2	Mars	263°06.4	17:26					
2	227°03.9	172°09.1	20°58.7	128°59.5	25°13.1	207°11.7	7°14.0	251°06.8	-11°28.1	Jupiter	340°36.0	12:16					
3	242°06.3	187°08.6	20°59.5	144°00.5	25°13.0	222°13.6	7°14.3	266°09.0	-11°28.1	Saturn	24°14.6	09:22					
4	257°08.8	202°08.0	21°00.3	159°01.6	25°12.9	237°15.5	7°14.5	281°11.2	-11°28.0	2023/4/7	SHA	Mer.pass					
5	272°11.2	217°07.5	21°01.0	174°02.6	25°12.8	252°17.4	7°14.7	296°13.5	-11°27.9	Venus	307°35.7	14:30					
6	287°13.7	232°06.9	21°01.8	189°03.6	25°12.7	267°19.3	7°14.9	311°15.7	-11°27.8	Mars	263°06.4	17:26					
7	302°16.2	247°06.3	21°02.6	204°04.7	25°12.6	282°21.2	7°15.2	326°17.9	-11°27.7	Jupiter	340°36.0	12:16					
8	317°18.6	262°05.8	21°03.4	219°05.7	25°12.5	297°23.1	7°15.4	341°20.2	-11°27.6	Saturn	24°14.6	09:22					
9	332°21.1	277°05.2	21°04.2	234°06.8	25°12.4	312°25.0	7°15.6	356°22.4	-11°27.6	2023/4/8	SHA	Mer.pass					
10	347°23.6	292°04.7	21°05.0	249°07.8	25°12.3	327°26.9	7°15.8	11°24.6	-11°27.5	Venus	306°23.6	14:31					
11	2°26.0	307°04.1	21°05.8	264°08.9	25°12.2	342°28.8	7°16.1	26°26.9	-11°27.4	Mars	262°32.5	17:25					
12	17°28.5	322°03.6	21°06.6	279°09.9	25°12.1	357°30.7	7°16.3	41°29.1	-11°27.3	Jupiter	340°22.5	12:13					
13	32°31.0	337°03.0	21°07.4	294°11.0	25°12.0	12°32.6	7°16.5	56°31.3	-11°27.2	Saturn	24°09.0	09:18					
14	47°33.4	352°02.5	21°08.2	309°12.0	25°11.9	27°34.5	7°16.7	71°33.6	-11°27.2	2023/4/9	SHA	Mer.pass					
15	62°35.9	7°01.9	21°09.0	324°13.0	25°11.8	42°36.4	7°17.0	86°35.8	-11°27.1	Venus	305°11.3	14:32					
16	77°38.4	22°01.3	21°09.8	339°14.1	25°11.7	57°38.3	7°17.2	101°38.0	-11°27.0	Mars	261°58.5	17:23					
17	92°40.8	37°00.8	21°10.6	354°15.1	25°11.6	72°40.2	7°17.4	116°40.3	-11°26.9	Jupiter	340°09.0	12:10					
18	107°43.3	52°00.2	21°11.3	9°16.2	25°11.5	87°42.1	7°17.7	131°42.5	-11°26.8	Saturn	24°03.4	09:14					
19	122°45.7	66°59.7	21°12.1	24°17.2	25°11.4	102°44.0	7°17.9	146°44.7	-11°26.8	Horizontal paralax	Venus:	0.1					
20	137°48.2	81°59.1	21°12.9	39°18.2	25°11.3	117°45.9	7°18.1	161°47.0	-11°26.7		Mars:	0.1					
21	152°50.7	96°58.6	21°13.7	54°19.3	25°11.2												

h		Sun		Moon			
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	179°25.0	6°38.8	350°10.5	14.0	-9°34.9	-14.4	56.5
1	194°25.2	6°39.8	4°43.5	13.9	-9°49.3	-14.4	56.5
2	209°25.4	6°40.7	19°16.4	13.9	-10°03.7	-14.3	56.5
3	224°25.6	6°41.7	33°49.3	13.8	-10°18.0	-14.3	56.5
4	239°25.8	6°42.6	48°22.1	13.7	-10°32.3	-14.3	56.6
5	254°25.9	6°43.5	62°54.8	13.7	-10°46.5	-14.2	56.6
6	269°26.1	6°44.5	77°27.4	13.6	-11°00.7	-14.2	56.6
7	284°26.3	6°45.4	92°00.0	13.5	-11°14.9	-14.2	56.6
8	299°26.5	6°46.4	106°32.5	13.5	-11°29.0	-14.1	56.7
9	314°26.6	6°47.3	121°04.9	13.4	-11°43.1	-14.1	56.7
10	329°26.8	6°48.2	135°37.3	13.3	-11°57.2	-14.0	56.7
11	344°27.0	6°49.2	150°09.6	13.3	-12°11.2	-14.0	56.7
12	359°27.2	6°50.1	164°41.8	13.2	-12°25.1	-13.9	56.7
13	14°27.3	6°51.1	179°13.9	13.1	-12°39.1	-13.9	56.8
14	29°27.5	6°52.0	193°46.0	13.0	-12°52.9	-13.8	56.8
15	44°27.7	6°52.9	208°18.0	12.9	-13°06.7	-13.8	56.8
16	59°27.9	6°53.9	222°49.9	12.9	-13°20.5	-13.7	56.8
17	74°28.0	6°54.8	237°21.7	12.8	-13°34.2	-13.7	56.8
18	89°28.2	6°55.8	251°53.5	12.7	-13°47.9	-13.6	56.9
19	104°28.4	6°56.7	266°25.1	12.6	-14°01.5	-13.6	56.9
20	119°28.6	6°57.6	280°56.7	12.5	-14°15.1	-13.5	56.9
21	134°28.7	6°58.6	295°28.2	12.5	-14°28.6	-13.5	56.9
22	149°28.9	6°59.5	309°59.6	12.4	-14°42.0	-13.4	56.9
23	164°29.1	7°00.4	324°31.0	12.3	-14°55.4	-13.4	57.0
SD.=16.0		d=0.9	S.D.=15.4				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	179°29.3	7°01.4	339°02.2	12.2	-15°08.7	-13.3	57.0
1	194°29.4	7°02.3	353°33.4	12.1	-15°22.0	-13.2	57.0
2	209°29.6	7°03.3	8°04.4	12.0	-15°35.2	-13.2	57.0
3	224°29.8	7°04.2	22°35.4	11.9	-15°48.3	-13.1	57.1
4	239°30.0	7°05.1	37°06.3	11.8	-16°01.4	-13.0	57.1
5	254°30.1	7°06.1	51°37.1	11.8	-16°14.3	-13.0	57.1
6	269°30.3	7°07.0	66°07.8	11.7	-16°27.3	-12.9	57.1
7	284°30.5	7°07.9	80°38.5	11.6	-16°40.1	-12.8	57.1
8	299°30.7	7°08.9	95°09.0	11.5	-16°52.9	-12.7	57.2
9	314°30.8	7°09.8	109°39.4	11.4	-17°05.6	-12.7	57.2
10	329°31.0	7°10.7	124°09.8	11.3	-17°18.2	-12.6	57.2
11	344°31.2	7°11.7	138°40.0	11.2	-17°30.8	-12.5	57.2
12	359°31.4	7°12.6	153°10.2	11.1	-17°43.3	-12.4	57.2
13	14°31.5	7°13.5	167°40.2	11.0	-17°55.7	-12.4	57.3
14	29°31.7	7°14.5	182°10.2	10.9	-18°08.0	-12.3	57.3
15	44°31.9	7°15.4	196°40.0	10.8	-18°20.2	-12.2	57.3
16	59°32.1	7°16.4	211°09.8	10.7	-18°32.3	-12.1	57.3
17	74°32.2	7°17.3	225°39.5	10.6	-18°44.4	-12.0	57.3
18	89°32.4	7°18.2	240°09.0	10.5	-18°56.4	-11.9	57.4
19	104°32.6	7°19.2	254°38.5	10.4	-19°08.3	-11.8	57.4
20	119°32.7	7°20.1	269°07.9	10.3	-19°20.0	-11.7	57.4
21	134°32.9	7°21.0	283°37.1	10.2	-19°31.7	-11.7	57.4
22	149°33.1	7°22.0	298°06.3	10.1	-19°43.3	-11.6	57.4
23	164°33.3	7°22.9	312°35.4	10.0	-19°54.9	-11.5	57.5
SD.=16.0		d=0.9	S.D.=15.5				
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	179°33.4	7°23.8	327°04.4	9.9	-20°06.3	-11.4	57.5
1	194°33.6	7°24.7	341°33.2	9.8	-20°17.6	-11.3	57.5
2	209°33.8	7°25.7	356°02.0	9.7	-20°28.8	-11.2	57.5
3	224°33.9	7°26.6	10°30.6	9.6	-20°39.9	-11.1	57.5
4	239°34.1	7°27.5	24°59.2	9.5	-20°50.9	-11.0	57.6
5	254°34.3	7°28.5	39°27.7	9.4	-21°01.8	-10.8	57.6
6	269°34.5	7°29.4	53°56.0	9.3	-21°12.6	-10.7	57.6
7	284°34.6	7°30.3	68°24.3	9.2	-21°23.3	-10.6	57.6
8	299°34.8	7°31.3	82°52.4	9.1	-21°33.9	-10.5	57.6
9	314°35.0	7°32.2	97°20.4	9.0	-21°44.3	-10.4	57.7
10	329°35.1	7°33.1	111°48.4	8.9	-21°54.7	-10.3	57.7
11	344°35.3	7°34.1	126°16.2	8.8	-22°04.9	-10.2	57.7
12	359°35.5	7°35.0	140°43.9	8.7	-22°15.1	-10.1	57.7
13	14°35.7	7°35.9	155°11.6	8.6	-22°25.1	-9.9	57.7
14	29°35.8	7°36.8	169°39.1	8.5	-22°35.0	-9.8	57.8
15	44°36.0	7°37.8	184°06.5	8.4	-22°44.7	-9.7	57.8
16	59°36.2	7°38.7	198°33.8	8.3	-22°54.4	-9.6	57.8
17	74°36.3	7°39.6	213°01.0	8.2	-23°03.9	-9.5	57.8
18	89°36.5	7°40.6	227°28.2	8.1	-23°13.3	-9.3	57.8
19	104°36.7	7°41.5	241°55.2	8.0	-23°22.6	-9.2	57.8
20	119°36.9	7°42.4	256°22.1	7.9	-23°31.7	-9.1	57.9
21	134°37.0	7°43.3	270°48.9	7.8	-23°40.7	-8.9	57.9
22	149°37.2	7°44.3	285°15.6	7.7	-23°49.6	-8.8	57.9
23	164°37.4	7°45.2	299°42.2	7.6	-23°58.4	-8.7	57.9
SD.=16.0		d=0.9	S.D.=15.7				
Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	—:—	02:57	04:20	19:47	21:12	—:—	
70	01:13	03:20	04:32	19:35	20:48	23:04	
68	02:02	03:38	04:41	19:26	20:29	22:08	
66	02:32	03:52	04:48	19:18	20:15	21:36	
64	02:54	04:03	04:55	19:11	20:03	21:14	
62	03:11	04:13	05:00	19:05	19:53	20:56	
60	03:25	04:21	05:05	19:00	19:45	20:42	
58	03:36	04:28	05:10	18:56	19:37	20:30	
56	03:46	04:34	05:13	18:52	19:31	20:20	
54	03:55	04:40	05:17	18:48	19:25	20:11	
52	04:02	04:45	05:20	18:45	19:20	20:03	
50	04:09	04:49	05:23	18:42	19:16	19:56	
45	04:22	04:59	05:29	18:36	19:06	19:42	
40	04:33	05:06	05:34	18:31	18:59	19:32	
35	04:42	05:12	05:38	18:27	18:52	19:23	
30	04:49	05:17	05:42	18:23	18:47	19:16	
20	04:60	05:26	05:48	18:16	18:38	19:04	
10	05:08	05:32	05:54	18:10	18:32	18:56	
0	05:14	05:38	05:59	18:05	18:26	18:50	
-10	05:18	05:42	06:04	18:00	18:21	18:46	
-20	05:21	05:47	06:09	17:55	18:17	18:42	
-30	05:23	05:51	06:15	17:49	18:13	18:40	
-35	05:23	05:53	06:18	17:45	18:11	18:40	
-40	05:23	05:54	06:22	17:42	18:09	18:40	
-45	05:22	05:56	06:26	17:37	18:07	18:41	
-50	05:21	05:59	06:31	17:32	18:04	18:42	
-52	05:20	05:59	06:33	17:30	18:03	18:42	
-54	05:19	06:00	06:36	17:27	18:02	18:43	
-56	05:18	06:01	06:39	17:24	18:01	18:44	
-58	05:17	06:02	06:42	17:21	18:00	18:46	
-60	05:15	06:03	06:45	17:17	17:59	18:47	
Moonrise		Moonset					
Lat.	Fri	Sat	Sun	Fri	Sat	Sun	
72	23:06	—:—	—:—	04:24	03:22	—:—	
70	22:29	—:—	—:—	04:41	04:01	—:—	
68	22:04	—:—	00:40	04:55	04:28	03:35	
66	21:45	23:55	—:—	05:06	04:49	04:22	
64	21:29	23:25	—:—	05:15	05:05	04:52	
62	21:17	23:03	—:—	05:23	05:19	05:15	
60	21:06	22:46	—:—	05:30	05:31	05:34	
58	20:57	22:31	—:—	05:37	05:41	05:49	
56	20:48	22:18	23:51	05:42	05:51	06:03	
54	20:41	22:07	23:35	05:47	05:59	06:14	
52	20:35	21:58	23:22	05:52	06:06	06:24	
50	20:29	21:49	23:11	05:56	06:12	06:34	
45	20:17	21:31	22:47	06:05	06:26	06:53	
40	20:06	21:16	22:28	06:12	06:38	07:09	
35	19:58	21:04	22:12	06:19	06:48	07:23	
30	19:50	20:53	21:59	06:24	06:57	07:34	
20	19:37	20:35	21:36	06:34	07:12	07:55	
10	19:26	20:19	21:16	06:43	07:26	08:12	
0	19:15	20:04	20:57	06:51	07:38	08:29	
-10	19:05	19:50	20:39	06:60	07:51	08:46	
-20	18:54	19:34	20:19	07:08	08:04	09:04	
-30	18:41	19:16	19:57	07:19	08:20	09:24	
-35	18:34	19:06	19:44	07:24	08:29	09:36	
-40	18:26	18:54	19:29	07:31	08:40	09:50	
-45	18:17	18:41	19:11	07:39	08:52	10:07	
-50	18:05	18:24	18:49	07:49	09:07	10:28	
-52	17:60	18:16	18:39	07:53	09:14	10:38	
-54	17:54	18:08	18:27	07:58	09:22	10:49	
-56	17:48	17:58	18:14	08:03	09:31	11:02	
-58	17:41	17:47	17:58	08:09	09:41	11:17	
-60	17:33	17:35	17:40	08:16	09:52	11:34	
Sun		Moon					
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer.	Mer.Pass.	Age		
7	02:20	02:11	12:02	00:40	13:03	17(98%)	
8	02:03	01:55	12:01	01:26	13:51	18(94%)	
9	01:46	01:38	12:01	02:16	14:42	19(88%)	

April 10, 11 ,12 (Mon., Tue., Wed.)

Aries			Venus		Mars		Jupiter		Saturn		Stars			
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	197°58.1	141°56.9	21°16.0	99°22.4	25°10.9	177°53.5	7°19.0	221°55.9	-11°26.3	Alpheratz	357°36.7	29°12.9		
1	213°00.5	156°56.3	21°16.8	114°23.4	25°10.8	192°55.4	7°19.2	236°58.1	-11°26.3	Ankaa	353°09.0	-42°10.9		
2	228°03.0	171°55.8	21°17.6	129°24.5	25°10.7	207°57.3	7°19.5	252°00.4	-11°26.2	Schedar	349°33.3	56°39.7		
3	243°05.5	186°55.2	21°18.4	144°25.5	25°10.6	222°59.2	7°19.7	267°02.6	-11°26.1	Diphda	348°49.0	-17°51.7		
4	258°07.9	201°54.6	21°19.2	159°26.6	25°10.4	238°01.1	7°19.9	282°04.8	-11°26.0	Achernar	335°21.9	-57°07.2		
5	273°10.4	216°54.1	21°19.9	174°27.6	25°10.3	253°03.0	7°20.1	297°07.1	-11°25.9	Hamal	327°53.2	23°34.2		
6	288°12.8	231°53.5	21°20.7	189°28.6	25°10.2	268°04.9	7°20.4	312°09.3	-11°25.9	Polaris	315°11.3	89°21.8		
7	303°15.3	246°53.0	21°21.5	204°29.7	25°10.1	283°06.8	7°20.6	327°11.5	-11°25.8	Akamar	315°13.3	-40°12.9		
8	318°17.8	261°52.4	21°22.3	219°30.7	25°10.0	298°08.7	7°20.8	342°13.8	-11°25.7	Menkar	314°08.0	4°10.7		
9	333°20.2	276°51.8	21°23.0	234°31.8	25°09.9	313°10.6	7°21.1	357°16.0	-11°25.6	Mirfak	308°30.8	49°56.6		
10	348°22.7	291°51.3	21°23.8	249°32.8	25°09.8	328°12.5	7°21.3	12°18.2	-11°25.5	Aldebaran	290°41.5	16°33.3		
11	3°25.2	306°50.7	21°24.6	264°33.8	25°09.7	343°14.4	7°21.5	27°20.5	-11°25.5	Rigel	281°05.4	-8°10.6		
12	18°27.6	321°50.1	21°25.3	279°34.9	25°09.6	358°16.3	7°21.7	42°22.7	-11°25.4	Capella	280°24.3	46°01.4		
13	33°30.1	336°49.6	21°26.1	294°35.9	25°09.5	13°18.2	7°22.0	57°24.9	-11°25.3	Bellatrix	278°24.6	6°22.2		
14	48°32.6	351°49.0	21°26.9	309°37.0	25°09.4	28°20.1	7°22.2	72°27.2	-11°25.2	Elnath	278°03.9	28°37.7		
15	63°35.0	6°48.5	21°27.6	324°38.0	25°09.3	43°22.0	7°22.4	87°29.4	-11°25.1	Alnilam	275°39.4	-1°11.3		
16	78°37.5	21°47.9	21°28.4	339°39.0	25°09.2	58°23.9	7°22.6	102°31.7	-11°25.1	Betelgeuse	270°53.8	7°24.6		
17	93°40.0	36°47.3	21°29.2	354°40.1	25°09.1	73°25.8	7°22.9	117°33.9	-11°25.0	Canopus	263°53.2	-52°42.7		
18	108°42.4	51°46.8	21°29.9	9°41.1	25°09.0	88°27.7	7°23.1	132°36.1	-11°24.9	Sirius	258°27.5	-16°44.9		
19	123°44.9	66°46.2	21°30.7	24°42.1	25°08.9	103°29.6	7°23.3	147°38.4	-11°24.8	Adara	255°07.0	-29°00.4		
20	138°47.3	81°45.6	21°31.5	39°43.2	25°08.8	118°31.5	7°23.5	162°40.6	-11°24.7	Procyon	244°52.3	5°10.0		
21	153°49.8	96°45.1	21°32.2	54°44.2	25°08.7	133°33.4	7°23.8	177°42.8	-11°24.6	Pollux	243°19.0	27°58.3		
22	168°52.3	111°44.5	21°33.0	69°45.3	25°08.5	148°35.3	7°24.0	192°45.1	-11°24.6	Avior	234°15.2	-59°35.3		
23	183°54.7	126°43.9	21°33.7	84°46.3	25°08.4	163°37.2	7°24.2	207°47.3	-11°24.5	Suhail	222°47.2	-43°31.8		
Mer.pass.:10:46			v-0.6 d0.8 m-4.0		v1.0 d-0.1 m1.1		v1.9 d0.2 m-1.9		v2.2 d0.1 m1.0		Miaplacidus		221°38.2	-69°49.0
											Alphard		217°49.0	-8°45.7
											Regulus		207°35.7	11°51.2
											Dubhe		193°42.2	61°37.7
											Denebola		182°26.1	14°26.5
											Gienah		175°44.8	-17°40.4
											Acrux		173°01.1	-63°13.7
											Gacrux		171°52.7	-57°14.7
											Alioth		166°13.7	55°50.0
											Spica		158°23.5	-11°17.0
											Alcaid		152°52.7	49°11.8
											Hadar		148°37.5	-60°29.1
											Menkent		147°59.0	-36°29.1
											Arcturus		145°48.8	19°03.9
											Rigel Kent.		139°41.7	-60°55.8
											Zubenelg.		136°57.3	-16°08.4
											Kochab		137°18.7	74°03.4
											Alphecca		126°04.7	26°38.0
											Antares		112°17.4	-26°29.0
											Atria		107°12.6	-69°03.9
											Sabik		102°04.3	-15°45.3
											Shaula		96°12.2	-37°07.1
											Rasalhague		95°59.8	12°32.4
											Etamin		90°42.7	51°28.8
											Kaus Aust.		83°34.3	-34°22.3
											Vega		80°34.2	38°47.9
											Nunki		75°49.5	-26°16.1
											Altair		62°01.5	8°55.5
											Peacock		53°08.2	-56°39.5
											Deneb		49°27.0	45°21.4
											Enif		33°40.4	9°58.7
											Alnair		27°35.1	-46°50.8
											Fomalhaut		15°16.5	-29°30.0
											Scheat		13°47.0	28°12.3
											Markab		13°31.6	15°19.6
											2023/4/1		SHA	Mer.pass
											Venus		303°58.8	14:33
											Mars		261°24.3	17:21
											Jupiter		339°55.5	12:07
											Saturn		23°57.8	09:11
											2023/4/1		SHA	Mer.pass
											Venus		302°46.2	14:34
											Mars		260°50.1	17:20
											Jupiter		339°41.9	12:04
											Saturn		23°52.3	09:07
											2023/4/1		SHA	Mer.pass
											Venus		301°33.3	14:35
											Mars		260°15.8	17:18
											Jupiter		339°28.4	12:01
											Saturn		23°46.9	09:04
											Horizontal parallax			
											Venus:		0.1	
											Mars:		0.1	
Mer.pass.:10:38			v-0.6 d0.7 m-4.0		v1.0 d-0.1 m1.1		v1.9 d0.2 m-1.9		v2.2 d0.1 m1.0					

Sun				Moon										
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	179°37.5	7°46.1	314°08.7	7.5	-24°07.0	-8.5	57.9	72	—:—	02:35	04:04	20:02	21:34	—:—
1	194°37.7	7°47.1	328°35.1	7.4	-24°15.4	-8.4	58.0	70	—:—	03:02	04:17	19:48	21:04	—:—
2	209°37.9	7°48.0	343°01.4	7.3	-24°23.8	-8.3	58.0	68	01:36	03:23	04:28	19:37	20:43	22:35
3	224°38.0	7°48.9	357°27.6	7.2	-24°32.0	-8.1	58.0	66	02:13	03:39	04:37	19:28	20:27	21:54
4	239°38.2	7°49.8	11°53.7	7.1	-24°40.0	-8.0	58.0	64	02:38	03:51	04:44	19:20	20:13	21:28
5	254°38.4	7°50.8	26°19.7	7.0	-24°48.0	-7.8	58.0	62	02:58	04:02	04:51	19:13	20:02	21:08
6	269°38.5	7°51.7	40°45.6	6.9	-24°55.7	-7.7	58.0	60	03:13	04:11	04:56	19:08	19:53	20:52
7	284°38.7	7°52.6	55°11.4	6.8	-25°03.4	-7.6	58.1	58	03:26	04:19	05:01	19:02	19:45	20:39
8	299°38.9	7°53.5	69°37.1	6.7	-25°10.9	-7.4	58.1	56	03:37	04:26	05:06	18:58	19:38	20:27
9	314°39.0	7°54.5	84°02.8	6.6	-25°18.2	-7.3	58.1	54	03:46	04:32	05:09	18:54	19:31	20:18
10	329°39.2	7°55.4	98°28.3	6.5	-25°25.4	-7.1	58.1	52	03:54	04:38	05:13	18:50	19:26	20:09
11	344°39.4	7°56.3	112°53.7	6.4	-25°32.4	-7.0	58.1	50	04:02	04:43	05:16	18:47	19:21	20:02
12	359°39.6	7°57.2	127°19.1	6.3	-25°39.3	-6.8	58.2	45	04:16	04:53	05:23	18:40	19:10	19:47
13	14°39.7	7°58.2	141°44.4	6.2	-25°46.0	-6.7	58.2	40	04:28	05:01	05:29	18:34	19:02	19:35
14	29°39.9	7°59.1	156°09.5	6.1	-25°52.6	-6.5	58.2	35	04:37	05:08	05:34	18:29	18:55	19:26
15	44°40.1	8°00.0	170°34.6	6.0	-25°59.0	-6.3	58.2	30	04:45	05:14	05:38	18:25	18:49	19:18
16	59°40.2	8°00.9	184°59.6	6.0	-26°05.3	-6.2	58.2	20	04:57	05:23	05:46	18:17	18:39	19:05
17	74°40.4	8°01.9	199°24.5	5.9	-26°11.4	-6.0	58.2	10	05:06	05:31	05:52	18:10	18:32	18:56
18	89°40.6	8°02.8	213°49.3	5.8	-26°17.4	-5.9	58.3	0	05:13	05:37	05:58	18:04	18:25	18:50
19	104°40.7	8°03.7	228°14.1	5.7	-26°23.2	-5.7	58.3	-10	05:18	05:42	06:04	17:58	18:20	18:44
20	119°40.9	8°04.6	242°38.7	5.6	-26°28.8	-5.5	58.3	-20	05:22	05:47	06:10	17:52	18:14	18:40
21	134°41.1	8°05.5	257°03.3	5.5	-26°34.2	-5.4	58.3	-30	05:25	05:52	06:16	17:45	18:09	18:37
22	149°41.2	8°06.5	271°27.8	5.5	-26°39.5	-5.2	58.3	-35	05:25	05:55	06:20	17:41	18:07	18:36
23	164°41.4	8°07.4	285°52.2	5.4	-26°44.7	-5.0	58.3	-40	05:26	05:57	06:25	17:37	18:04	18:36
	SD.=16.0	d=0.9	S.D.=15.8					-45	05:26	06:00	06:30	17:32	18:01	18:35
								-50	05:26	06:03	06:36	17:26	17:58	18:36
								-52	05:25	06:04	06:38	17:23	17:57	18:36
								-54	05:25	06:06	06:41	17:20	17:56	18:36
								-56	05:24	06:07	06:45	17:17	17:54	18:37
								-58	05:23	06:09	06:48	17:13	17:52	18:38
								-60	05:22	06:10	06:52	17:09	17:51	18:39
									Moonrise			Moonset		
								Lat.	Mon	Tue	Wed	Mon	Tue	Wed
								72	—:—	—:—	—:—	—:—	—:—	—:—
								70	—:—	—:—	—:—	—:—	—:—	—:—
								68	—:—	—:—	—:—	—:—	—:—	—:—
								66	—:—	—:—	—:—	—:—	—:—	—:—
								64	01:44	—:—	—:—	04:26	—:—	—:—
								62	00:60	03:07	—:—	05:11	05:05	—:—
								60	00:31	02:15	03:37	05:40	05:58	06:44
								58	00:09	01:43	02:59	06:03	06:30	07:21
								56	—:—	01:19	02:33	06:22	06:54	07:47
								54	—:—	00:60	02:12	06:37	07:13	08:08
								52	—:—	00:44	01:54	06:51	07:30	08:26
								50	—:—	00:30	01:39	07:03	07:44	08:41
								45	—:—	00:02	01:09	07:28	08:13	09:11
								40	23:39	—:—	00:46	07:47	08:35	09:34
								35	23:21	—:—	00:26	08:04	08:54	09:54
								30	23:05	—:—	00:10	08:18	09:10	10:10
								20	22:39	23:42	—:—	08:43	09:38	10:38
								10	22:16	23:18	—:—	09:04	10:01	11:02
								0	21:55	22:55	23:57	09:24	10:23	11:25
								-10	21:33	22:33	23:35	09:44	10:45	11:47
								-20	21:11	22:09	23:12	10:06	11:09	12:11
								-30	20:45	21:41	22:45	10:30	11:36	12:38
								-35	20:30	21:25	22:28	10:45	11:52	12:55
								-40	20:12	21:05	22:10	11:02	12:11	13:14
								-45	19:51	20:42	21:47	11:23	12:34	13:37
								-50	19:24	20:13	21:18	11:49	13:04	14:06
								-52	19:11	19:58	21:04	12:01	13:18	14:20
								-54	18:56	19:41	20:47	12:16	13:35	14:37
								-56	18:39	19:21	20:28	12:33	13:55	14:57
								-58	18:18	18:56	20:03	12:53	14:20	15:22
								-60	17:52	18:22	19:30	13:19	14:54	15:55
									Sun			Moon		
								Day	Eqn.of Time	Mer.		Mer.Pass.		Age
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	01:30	01:22	12:01	03:10	15:39	20(80%)
								11	01:14	01:06	12:01	04:08	16:39	21(71%)
								12	00:58	00:50	12:00	05:09	17:40	22(60%)
					</									

April 13, 14 ,15 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	200°55.5	141°15.8	22°09.8	100°36.9	25°02.9	180°10.3	7°35.3	224°37.0	-11°20.6	Alpheratz	357°36.6	29°12.9					
1	215°57.9	156°15.2	22°10.5	115°37.9	25°02.8	195°12.2	7°35.5	239°39.2	-11°20.5	Ankaa	353°09.0	-42°10.9					
2	231°00.4	171°14.6	22°11.2	130°39.0	25°02.7	210°14.1	7°35.7	254°41.5	-11°20.4	Schedar	349°33.3	56°39.7					
3	246°02.9	186°14.0	22°11.9	145°40.0	25°02.5	225°16.0	7°36.0	269°43.7	-11°20.4	Diphda	348°49.0	-17°51.7					
4	261°05.3	201°13.5	22°12.6	160°41.0	25°02.4	240°17.9	7°36.2	284°46.0	-11°20.3	Achernar	335°21.9	-57°07.2					
5	276°07.8	216°12.9	22°13.3	175°42.0	25°02.3	255°19.8	7°36.4	299°48.2	-11°20.2	Hamal	327°53.2	23°34.2					
6	291°10.3	231°12.3	22°14.0	190°43.1	25°02.2	270°21.7	7°36.6	314°50.4	-11°20.1	Polaris	315°11.7	89°21.8					
7	306°12.7	246°11.7	22°14.7	205°44.1	25°02.1	285°23.6	7°36.9	329°52.7	-11°20.0	Akamar	315°13.3	-40°12.9					
8	321°15.2	261°11.1	22°15.4	220°45.1	25°01.9	300°25.5	7°37.1	344°54.9	-11°20.0	Menkar	314°08.0	4°10.7					
9	336°17.7	276°10.5	22°16.1	235°46.2	25°01.8	315°27.4	7°37.3	359°57.2	-11°19.9	Mirfak	308°30.8	49°56.6					
10	351°20.1	291°10.0	22°16.8	250°47.2	25°01.7	330°29.3	7°37.5	14°59.4	-11°19.8	Aldebaran	290°41.5	16°33.3					
11	6°22.6	306°09.4	22°17.5	265°48.2	25°01.6	345°31.2	7°37.8	30°01.6	-11°19.7	Rigel	281°05.4	-8°10.6					
12	21°25.1	321°08.8	22°18.2	280°49.2	25°01.5	0°33.1	7°38.0	45°03.9	-11°19.7	Capella	280°24.3	46°01.4					
13	36°27.5	336°08.2	22°18.9	295°50.3	25°01.3	15°35.0	7°38.2	60°06.1	-11°19.6	Bellatrix	278°24.6	6°22.2					
14	51°30.0	351°07.6	22°19.6	310°51.3	25°01.2	30°36.9	7°38.4	75°08.4	-11°19.5	Elnath	278°03.9	28°37.7					
15	66°32.4	6°07.0	22°20.3	325°52.3	25°01.1	45°38.8	7°38.7	90°10.6	-11°19.4	Alnilam	275°39.4	-1°11.3					
16	81°34.9	21°06.4	22°21.0	340°53.3	25°01.0	60°40.7	7°38.9	105°12.9	-11°19.3	Betelgeuse	270°53.8	7°24.6					
17	96°37.4	36°05.9	22°21.7	355°54.4	25°00.9	75°42.6	7°39.1	120°15.1	-11°19.3	Canopus	263°53.2	-52°42.7					
18	111°39.8	51°05.3	22°22.4	10°55.4	25°00.7	90°44.5	7°39.3	135°17.3	-11°19.2	Sirius	258°27.5	-16°44.9					
19	126°42.3	66°04.7	22°23.1	25°56.4	25°00.6	105°46.4	7°39.6	150°19.6	-11°19.1	Adara	255°07.1	-29°00.4					
20	141°44.8	81°04.1	22°23.8	40°57.4	25°00.5	120°48.3	7°39.8	165°21.8	-11°19.0	Procyon	244°52.3	5°10.0					
21	156°47.2	96°03.5	22°24.5	55°58.5	25°00.4	135°50.2	7°40.0	180°24.1	-11°19.0	Pollux	243°19.0	27°58.3					
22	171°49.7	111°02.9	22°25.2	70°59.5	25°00.2	150°52.1	7°40.2	195°26.3	-11°18.9	Avior	234°15.2	-59°35.3					
23	186°52.2	126°02.3	22°25.9	86°00.5	25°00.1	165°54.0	7°40.5	210°28.6	-11°18.8	Suhail	222°47.2	-43°31.8					
Mer.pass.:10:34			v-0.6 d0.7 m-4.0			v1.0 d-0.1 m1.1			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	201°54.6	141°01.7	22°26.6	101°01.5	24°60.0	180°55.9	7°40.7	225°30.8	-11°18.7	Alphard	217°49.0	-8°45.7					
1	216°57.1	156°01.2	22°27.3	116°02.6	24°59.9	195°57.8	7°40.9	240°33.0	-11°18.6	Regulus	207°35.7	11°51.2					
2	231°59.6	171°00.6	22°27.9	131°03.6	24°59.7	210°59.7	7°41.1	255°35.3	-11°18.6	Dubhe	193°42.2	61°37.7					
3	247°02.0	185°00.0	22°28.6	146°04.6	24°59.6	226°01.6	7°41.4	270°37.5	-11°18.5	Denebola	182°26.1	14°26.5					
4	262°04.5	200°59.4	22°29.3	161°05.6	24°59.5	241°03.5	7°41.6	285°39.8	-11°18.4	Gienah	175°44.7	-17°40.4					
5	277°06.9	215°58.8	22°30.0	176°06.7	24°59.4	256°05.4	7°41.8	300°42.0	-11°18.3	Acrux	173°01.1	-63°13.8					
6	292°09.4	230°58.2	22°30.7	191°07.7	24°59.3	271°07.3	7°42.0	315°44.3	-11°18.3	Gacrux	171°52.7	-57°14.7					
7	307°11.9	245°57.6	22°31.4	206°08.7	24°59.1	286°09.2	7°42.3	330°46.5	-11°18.2	Alioth	166°13.7	55°50.0					
8	322°14.3	260°57.0	22°32.0	221°09.7	24°59.0	301°11.1	7°42.5	345°48.8	-11°18.1	Spica	158°23.5	-11°17.0					
9	337°16.8	275°56.4	22°32.7	236°10.8	24°58.9	316°13.0	7°42.7	0°51.0	-11°18.0	Alcaid	152°52.6	49°11.8					
10	352°19.3	290°55.8	22°33.4	251°11.8	24°58.7	331°14.9	7°42.9	15°53.2	-11°17.9	Hadar	148°37.5	-60°29.1					
11	7°21.7	305°55.3	22°34.1	266°12.8	24°58.6	346°16.8	7°43.1	30°55.5	-11°17.9	Menkent	147°59.0	-36°29.1					
12	22°24.2	320°54.7	22°34.7	281°13.8	24°58.5	1°18.7	7°43.4	45°57.7	-11°17.8	Arcturus	145°48.8	19°03.9					
13	37°26.7	335°54.1	22°35.4	296°14.9	24°58.4	16°20.6	7°43.6	60°60.0	-11°17.7	Rigel Kent.	139°41.7	-60°55.8					
14	52°29.1	350°53.5	22°36.1	311°15.9	24°58.2	31°22.5	7°43.8	76°02.2	-11°17.6	Zubenelg.	136°57.3	-16°08.4					
15	67°31.6	5°52.9	22°36.8	326°16.9	24°58.1	46°24.4	7°44.0	91°04.5	-11°17.6	Kochab	137°18.6	74°03.4					
16	82°34.1	20°52.3	22°37.4	341°17.9	24°58.0	61°26.3	7°44.3	106°06.7	-11°17.5	Alphecca	126°04.7	26°38.0					
17	97°36.5	35°51.7	22°38.1	356°19.0	24°57.9	76°28.2	7°44.5	121°09.0	-11°17.4	Antares	112°17.4	-26°29.0					
18	112°39.0	50°51.1	22°38.8	11°20.0	24°57.7	91°30.1	7°44.7	136°11.2	-11°17.3	Atria	107°12.6	-69°03.9					
19	127°41.4	65°50.5	22°39.5	26°21.0	24°57.6	106°32.0	7°44.9	151°13.4	-11°17.3	Sabik	102°04.3	-15°45.3					
20	142°43.9	80°49.9	22°40.1	41°22.0	24°57.5	121°33.9	7°45.2	166°15.7	-11°17.2	Shaula	96°12.2	-37°07.2					
21	157°46.4	95°49.3	22°40.8	56°23.0	24°57.3	136°35.8	7°45.4	181°17.9	-11°17.1	Rasalhague	95°59.8	12°32.4					
22	172°48.8	110°48.7	22°41.5	71°24.1	24°57.2	151°37.7	7°45.6	196°20.2	-11°17.0	Etamin	90°42.6	51°28.8					
23	187°51.3	125°48.1	22°42.1	86°25.1	24°57.1	166°39.6	7°45.8	211°22.4	-11°16.9	Kaus Aust.	83°34.3	-34°22.3					
Mer.pass.:10:30			v-0.6 d0.7 m-4.0			v1.0 d-0.1 m1.1			v1.9 d0.2 m-1.9			v2.2 d0.1 m1.0					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	202°53.8	140°47.5	22°42.8	101°26.1	24°57.0	181°41.5	7°46.1	226°24.7	-11°16.9	Enif	33°40.4	9°58.7					
1	217°56.2	155°46.9	22°43.5	116°27.1	24°56.8	196°43.4	7°46.3	241°26.9	-11°16.8	Alnair	27°35.0	-46°50.8					
2	232°58.7	170°46.3	22°44.1	131°28.2	24°56.7	211°45.3	7°46.5	256°29.2	-11°16.7	Fomalhaut	15°16.5	-29°30.0					
3	248°01.2	185°45.8	22°44.8	146°29.2	24°56.6	226°47.2	7°46.7	271°31.4	-11°16.6	Scheat	13°46.9	28°12.3					
4	263°03.6	200°45.2	22°45.4	161°30.2	24°56.4	241°49.1	7°47.0	286°33.7	-11°16.6	Markab	13°31.6	15°19.6					
5	278°06.1	215°44.6	22°46.1	176°31.2	24°56.3	256°51.0	7°47.2	301°35.9	-11°16.5	2023/4/1			SHA	Mer.pass			
6	293°08.5	230°44.0	22°46.8	191°32.2	24°56.2	271°52.9	7°47.4	316°38.1	-11°16.4	Venus	300°20.3	14:36					
7	308°11.0	245°43.4	22°47.4	206°33.3	24°56.1	286°54.8	7°47.6	331°40.4	-11°16.3	Mars	259°41.4	17:16					
8	323°13.5	260°42.8	22°48.1	221°34.3	24°55.9	301°56.7	7°47.9	346°42.6	-11°16.3	Jupiter	339°14.9	11:58					
9	338°15.9	275°42.2	22°48.7	236°35.3	24°55.8	316°58.6	7°48.1	1°44.9	-11°16.2	Saturn	23°41.5	09:00					
10	353°18.4	290°41.6	22°49.4	251°36.3	24°55.7	332°00.5	7°48.3	16°47.1	-11°16.1	2023/4/1			SHA	Mer.pass			
11	8°20.9	305°41.0	22°50.0	266°37.3	24°55.5	347°02.4	7°48.5	31°49.4	-11°16.0	Venus	299°07.1	14:36					
12	23°23.3	320°40.4	22°50.7	281°38.4	24°55.4	2°04.3	7°48.8	46°51.6	-11°16.0	Mars	259°06.9	17:15					
13	38°25.8	335°39.8	22°51.3	296°39.4	24°55.3	17°06.2	7°49.0	61°53.9	-11°15.9	Jupiter	339°01.3	11:55					
14	53°28.3	350°39.2	22°52.0	311°40.4	24°55.1	32°08.1	7°49.2	76°56.1	-11°15.8	Saturn	23°36.2	08:57					
15	68°30.7	5°38.6	22°52.6	326°41.4	24°55.0	47°10.0	7°49.4	91°58.4	-11°15.7	2023/4/1			SHA	Mer.pass			
16	83°33.2	20°38.0	22°53.3	341°42.4	24°54.9	62°11.9											

Sun				Moon										
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	179°49.4	8°52.3	270°55.3	4.2	-27°16.4	3.9	59.1	72	—:—	02:10	03:47	20:18	21:58	—:—
1	194°49.5	8°53.2	285°18.4	4.2	-27°12.4	4.1	59.1	70	—:—	02:43	04:02	20:01	21:22	—:—
2	209°49.7	8°54.1	299°41.6	4.2	-27°08.2	4.3	59.1	68	01:01	03:07	04:15	19:48	20:58	23:15
3	224°49.9	8°55.0	314°04.9	4.3	-27°03.8	4.5	59.1	66	01:52	03:25	04:25	19:38	20:39	22:15
4	239°50.0	8°55.9	328°28.1	4.3	-26°59.3	4.6	59.1	64	02:22	03:39	04:34	19:29	20:24	21:43
5	254°50.2	8°56.8	342°51.5	4.4	-26°54.6	4.8	59.1	62	02:44	03:52	04:41	19:21	20:11	21:20
6	269°50.3	8°57.7	357°14.8	4.4	-26°49.7	5.0	59.1	60	03:01	04:02	04:47	19:15	20:01	21:02
7	284°50.5	8°58.6	11°38.2	4.4	-26°44.6	5.2	59.1	58	03:16	04:10	04:53	19:09	19:52	20:48
8	299°50.7	8°59.5	26°01.6	4.5	-26°39.3	5.4	59.2	56	03:27	04:18	04:58	19:04	19:44	20:35
9	314°50.8	9°00.4	40°25.1	4.5	-26°33.8	5.5	59.2	54	03:38	04:25	05:02	18:60	19:37	20:25
10	329°51.0	9°01.4	54°48.6	4.6	-26°28.2	5.7	59.2	52	03:47	04:31	05:06	18:55	19:31	20:16
11	344°51.1	9°02.3	69°12.2	4.6	-26°22.4	5.9	59.2	50	03:54	04:36	05:10	18:52	19:26	20:08
12	359°51.3	9°03.2	83°35.9	4.7	-26°16.4	6.1	59.2	45	04:10	04:47	05:18	18:44	19:14	19:51
13	14°51.5	9°04.1	97°59.5	4.7	-26°10.3	6.2	59.2	40	04:23	04:56	05:24	18:37	19:05	19:39
14	29°51.6	9°05.0	112°23.3	4.8	-26°03.9	6.4	59.2	35	04:33	05:04	05:30	18:31	18:57	19:28
15	44°51.8	9°05.9	126°47.1	4.8	-25°57.4	6.6	59.2	30	04:41	05:10	05:35	18:26	18:51	19:20
16	59°51.9	9°06.8	141°10.9	4.9	-25°50.7	6.8	59.2	20	04:54	05:21	05:43	18:18	18:40	19:07
17	74°52.1	9°07.7	155°34.8	4.9	-25°43.9	6.9	59.3	10	05:04	05:29	05:50	18:10	18:32	18:57
18	89°52.2	9°08.6	169°58.8	5.0	-25°36.9	7.1	59.3	0	05:12	05:36	05:57	18:04	18:25	18:49
19	104°52.4	9°09.5	184°22.8	5.1	-25°29.7	7.3	59.3	-10	05:18	05:42	06:04	17:57	18:18	18:43
20	119°52.6	9°10.4	198°46.9	5.1	-25°22.3	7.5	59.3	-20	05:23	05:48	06:11	17:50	18:12	18:38
21	134°52.7	9°11.3	213°11.1	5.2	-25°14.8	7.6	59.3	-30	05:26	05:54	06:18	17:42	18:06	18:34
22	149°52.9	9°12.2	227°35.3	5.3	-25°07.1	7.8	59.3	-35	05:28	05:57	06:23	17:37	18:03	18:32
23	164°53.0	9°13.1	241°59.6	5.3	-24°59.2	8.0	59.3	-40	05:29	06:00	06:28	17:32	17:60	18:31
SD.=16.0 d=0.9 S.D.=16.1								-45	05:30	06:04	06:33	17:27	17:56	18:30
								-50	05:30	06:07	06:40	17:20	17:52	18:30
								-52	05:30	06:09	06:43	17:16	17:51	18:30
								-54	05:30	06:11	06:47	17:13	17:49	18:30
								-56	05:30	06:13	06:51	17:09	17:47	18:30
								-58	05:29	06:15	06:55	17:05	17:45	18:30
								-60	05:29	06:17	06:60	16:60	17:42	18:30
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	179°53.2	9°14.0	256°24.0	5.4	-24°51.1	8.1	59.3	72	—:—	—:—	—:—	—:—	—:—	—:—
1	194°53.3	9°14.9	270°48.4	5.5	-24°43.0	8.3	59.3	70	—:—	—:—	07:16	—:—	—:—	09:22
2	209°53.5	9°15.8	285°12.9	5.5	-24°34.6	8.4	59.3	68	—:—	—:—	06:15	—:—	—:—	10:21
3	224°53.7	9°16.7	299°37.5	5.6	-24°26.1	8.6	59.4	66	—:—	07:02	05:40	—:—	07:34	10:55
4	239°53.8	9°17.6	314°02.2	5.7	-24°17.4	8.8	59.4	64	—:—	05:36	05:14	—:—	08:59	11:19
5	254°54.0	9°18.5	328°26.9	5.8	-24°08.6	8.9	59.4	62	05:04	04:59	04:54	07:26	09:36	11:38
6	269°54.1	9°19.4	342°51.7	5.8	-23°59.6	9.1	59.4	60	04:17	04:32	04:38	08:12	10:02	11:54
7	284°54.3	9°20.3	357°16.6	5.9	-23°50.4	9.2	59.4	58	03:46	04:11	04:24	08:43	10:23	12:07
8	299°54.4	9°21.3	11°41.6	6.0	-23°41.1	9.4	59.4	56	03:23	03:53	04:12	09:06	10:40	12:18
9	314°54.6	9°22.2	26°06.6	6.1	-23°31.7	9.5	59.4	54	03:04	03:38	04:01	09:24	10:54	12:28
10	329°54.7	9°23.1	40°31.7	6.2	-23°22.0	9.7	59.4	52	02:48	03:26	03:51	09:40	11:06	12:37
11	344°54.9	9°24.0	54°56.9	6.2	-23°12.3	9.8	59.4	50	02:34	03:14	03:43	09:54	11:17	12:44
12	359°55.0	9°24.9	69°22.2	6.3	-23°02.4	10.0	59.4	45	02:06	02:50	03:25	10:21	11:40	13:01
13	14°55.2	9°25.8	83°47.5	6.4	-22°52.3	10.1	59.4	40	01:43	02:31	03:10	10:43	11:58	13:14
14	29°55.4	9°26.7	98°13.0	6.5	-22°42.1	10.3	59.4	35	01:25	02:15	02:57	11:01	12:13	13:26
15	44°55.5	9°27.6	112°38.5	6.6	-22°31.8	10.4	59.5	30	01:09	02:01	02:46	11:17	12:26	13:36
16	59°55.7	9°28.5	127°04.1	6.6	-22°21.3	10.6	59.5	20	00:42	01:37	02:27	11:43	12:48	13:53
17	74°55.8	9°29.4	141°29.8	6.7	-22°10.6	10.7	59.5	10	00:19	01:17	02:10	12:05	13:07	14:07
18	89°56.0	9°30.3	155°55.5	6.8	-21°59.9	10.8	59.5	0	—:—	00:57	01:55	12:26	13:25	14:21
19	104°56.1	9°31.2	170°21.4	6.9	-21°49.0	11.0	59.5	-10	—:—	00:38	01:39	12:47	13:43	14:34
20	119°56.3	9°32.0	184°47.3	7.0	-21°37.9	11.1	59.5	-20	—:—	00:17	01:22	13:09	14:02	14:49
21	134°56.4	9°32.9	199°13.3	7.1	-21°26.7	11.3	59.5	-30	23:53	—:—	01:03	13:34	14:23	15:05
22	149°56.6	9°33.8	213°39.4	7.1	-21°15.4	11.4	59.5	-35	23:39	—:—	00:51	13:49	14:35	15:14
23	164°56.7	9°34.7	228°05.6	7.2	-21°04.0	11.5	59.5	-40	23:22	—:—	00:38	14:07	14:50	15:25
SD.=16.0 d=0.9 S.D.=16.2								-45	23:02	—:—	00:22	14:27	15:07	15:37
								-50	22:37	—:—	00:03	14:53	15:27	15:52
								-52	22:25	23:54	—:—	15:06	15:37	15:59
								-54	22:11	23:44	—:—	15:20	15:48	16:07
								-56	21:55	23:32	—:—	15:37	16:01	16:15
								-58	21:35	23:18	—:—	15:57	16:15	16:25
								-60	21:11	23:02	—:—	16:21	16:32	16:36
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		
0	179°56.9	9°35.6	242°31.9	7.3	-20°52.4	11.6	59.5		Eqn.of Time	Mer.		Mer.Pass.	Age	
1	194°57.0	9°36.5	256°58.3	7.4	-20°40.7	11.8	59.5		00 ^h	12 ^h	Pass	Upper	Lower	
2	209°57.2	9°37.4	271°24.7	7.5	-20°28.8	11.9	59.5	13	00:42	00:35	12:00	06:11	18:41	23(49%)
3	224°57.3	9°38.3	285°51.2	7.6	-20°16.9	12.0	59.5	14	00:27	00:20	12:00	07:11	19:40	24(37%)
4	239°57.5	9°39.2	300°17.8	7.7	-20°04.8	12.2	59.5	15	00:12	00:05	12:00	08:07	20:34	25(27%)
5	254°57.7	9°40.1	314°44.5	7.7	-19°52.6	12.3	59.5							
6	269°57.8	9°41.0	329°11.3	7.8	-19°40.2	12.4	59.5							
7	284°58.0	9°41.9	343°38.2	7.9	-19°27.8	12.5	59.5							
8	299°58.1	9°42.8	358°05.1	8.0	-19°15.2	12.6	59.5							
9	314°58.3	9°43.7	12°32.2	8.1	-19°02.5	12.7	59.6							
10	329°58.4	9°44.6	26°59.3	8.2	-18°49.7	12.9	59.6							
11	344°58.6	9°45.5	41°26.5	8.2	-18°36.8	13.0	59.6							
12	359°58.7	9°46.4	55°53.8	8.3	-18°23.8	13.1	59.6							
13	14°58.9	9°47.3	70°21.1	8.4	-18°10.6	13.2	59.6							
14	29°59.0	9°48.2	84°48.6	8.5	-17°57.4	13.3	59.6							
15	44°59.2	9°49.1	99°16.1	8.6	-17°44.0	13.4	59.6							
16	59°59.3	9°50.0	113°43.7	8.7	-17°30.6	13.5	59.6							
17	74°59.5	9°50.9	128°11.4	8.7	-17°17.0	13.6	59.6							
18	89°59.6	9°51.7	142°39.2	8.8	-17°03.3	13.7	59.6							
19	104°59.8	9°52.6	157°07.1	8.9	-16°49.6	13.8	59.6							
20	119°59.9	9°53.5	171°35.0	9.0	-16°35.7	13.9	59.6							
21	135°00.1	9°54.4	186°03.0	9.1	-16°21.8	14.0	59.6							
22	150°00.2	9°55.3	200°31.1	9.1	-16°07.7	14.1	59.6							
23	165°00.4	9°56.2	214°59.3	9.2	-15°53.6	14.2	59.6							
SD.=15.9 d=0.9 S.D.=16.2														

April 16, 17 ,18 (Sun., Mon., Tue.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	203°52.9	140°33.2	22°58.4	101°50.6	24°53.8	182°27.1	7°51.4	227°18.6	-11°15.0	Alpheratz	357°36.6	29°12.9
1	218°55.4	155°32.6	22°59.1	116°51.6	24°53.7	197°29.0	7°51.7	242°20.8	-11°15.0	Ankaa	353°09.0	-42°10.8
2	233°57.8	170°32.0	22°59.7	131°52.6	24°53.5	212°30.9	7°51.9	257°23.1	-11°14.9	Schedar	349°33.3	56°39.7
3	249°00.3	185°31.4	23°00.4	146°53.6	24°53.4	227°32.8	7°52.1	272°25.3	-11°14.8	Diphda	348°49.0	-17°51.7
4	264°02.8	200°30.8	23°01.0	161°54.7	24°53.3	242°34.7	7°52.3	287°27.6	-11°14.7	Achernar	335°21.9	-57°07.2
5	279°05.2	215°30.2	23°01.6	176°55.7	24°53.1	257°36.6	7°52.6	302°29.8	-11°14.7	Hamal	327°53.2	23°34.2
6	294°07.7	230°29.6	23°02.3	191°56.7	24°53.0	272°38.5	7°52.8	317°32.1	-11°14.6	Polaris	315°12.3	89°21.8
7	309°10.2	245°29.0	23°02.9	206°57.7	24°52.8	287°40.4	7°53.0	332°34.3	-11°14.5	Akamar	315°13.3	-40°12.9
8	324°12.6	260°28.4	23°03.5	221°58.7	24°52.7	302°42.3	7°53.2	347°36.6	-11°14.4	Menkar	314°08.0	4°10.7
9	339°15.1	275°27.8	23°04.2	236°59.7	24°52.6	317°44.2	7°53.5	2°38.8	-11°14.4	Mirfak	308°30.8	49°56.6
10	354°17.5	290°27.2	23°04.8	252°00.8	24°52.4	332°46.1	7°53.7	17°41.1	-11°14.3	Aldebaran	290°41.5	16°33.3
11	9°20.0	305°26.6	23°05.4	267°01.8	24°52.3	347°48.0	7°53.9	32°43.3	-11°14.2	Rigel	281°05.5	-8°10.6
12	24°22.5	320°25.9	23°06.0	282°02.8	24°52.2	2°49.9	7°54.1	47°45.6	-11°14.1	Capella	280°24.3	46°01.4
13	39°24.9	335°25.3	23°06.7	297°03.8	24°52.0	17°51.8	7°54.4	62°47.8	-11°14.1	Bellatrix	278°24.6	6°22.2
14	54°27.4	350°24.7	23°07.3	312°04.8	24°51.9	32°53.7	7°54.6	77°50.1	-11°14.0	Elnath	278°03.9	28°37.7
15	69°29.9	5°24.1	23°07.9	327°05.8	24°51.8	47°55.6	7°54.8	92°52.3	-11°13.9	Alnilam	275°39.4	-1°11.3
16	84°32.3	20°23.5	23°08.5	342°06.9	24°51.6	62°57.5	7°55.0	107°54.6	-11°13.8	Betelgeuse	270°53.8	7°24.6
17	99°34.8	35°22.9	23°09.2	357°07.9	24°51.5	77°59.4	7°55.2	122°56.8	-11°13.8	Canopus	263°53.2	-52°42.7
18	114°37.3	50°22.3	23°09.8	12°08.9	24°51.3	93°01.3	7°55.5	137°59.1	-11°13.7	Sirius	258°27.5	-16°44.9
19	129°39.7	65°21.7	23°10.4	27°09.9	24°51.2	108°03.2	7°55.7	153°01.3	-11°13.6	Adara	255°07.1	-29°00.4
20	144°42.2	80°21.1	23°11.0	42°10.9	24°51.1	123°05.1	7°55.9	168°03.6	-11°13.5	Procyon	244°52.3	5°10.0
21	159°44.6	95°20.5	23°11.6	57°11.9	24°50.9	138°07.0	7°56.1	183°05.8	-11°13.5	Pollux	243°19.0	27°58.3
22	174°47.1	110°19.9	23°12.3	72°12.9	24°50.8	153°08.9	7°56.4	198°08.1	-11°13.4	Avior	234°15.3	-59°35.3
23	189°49.6	125°19.3	23°12.9	87°14.0	24°50.6	168°10.8	7°56.6	213°10.3	-11°13.3	Suhail	222°47.2	-43°31.8
Mer.pass.:10:22		v-0.6 d0.6 m-4.0		v1.0 d-0.1 m1.2		v1.9 d0.2 m-1.9		v2.2 d0.1 m1.0		Miaplacidus	221°38.3	-69°49.0
										Alphard	217°49.0	-8°45.7
										Regulus	207°35.8	11°51.2
										Dubhe	193°42.2	61°37.7
										Denebola	182°26.1	14°26.5
										Gienah	175°44.8	-17°40.4
										Acrux	173°01.1	-63°13.8
										Gacrux	171°52.7	-57°14.7
										Alioth	166°13.7	55°50.0
										Spica	158°23.5	-11°17.0
										Alcaid	152°52.6	49°11.8
										Hadar	148°37.5	-60°29.1
										Menkent	147°59.0	-36°29.1
										Arcturus	145°48.8	19°03.9
										Rigel Kent.	139°41.7	-60°55.8
										Zubenelg.	136°57.3	-16°08.4
										Kochab	137°18.6	74°03.5
										Alphecca	126°04.7	26°38.0
										Antares	112°17.3	-26°29.0
										Atria	107°12.5	-69°04.0
										Sabik	102°04.2	-15°45.3
										Shaula	96°12.1	-37°07.2
										Rasalhague	95°59.7	12°32.4
										Etamin	90°42.6	51°28.8
										Kaus Aust.	83°34.3	-34°22.3
										Vega	80°34.1	38°47.9
										Nunki	75°49.5	-26°16.1
										Altair	62°01.5	8°55.5
										Peacock	53°08.1	-56°39.4
										Deneb	49°26.9	45°21.4
										Enif	33°40.4	9°58.7
										Alnair	27°35.0	-46°50.8
										Fomalhaut	15°16.4	-29°30.0
										Scheat	13°46.9	28°12.3
										Markab	13°31.6	15°19.6
										2023/4/1	SHA	Mer.pass
										Venus	296°40.3	14:38
										Mars	257°57.7	17:11
										Jupiter	338°34.2	11:49
										Saturn	23°25.7	08:49
										2023/4/1	SHA	Mer.pass
										Venus	295°26.6	14:39
										Mars	257°22.9	17:10
										Jupiter	338°20.6	11:46
										Saturn	23°20.5	08:46
										2023/4/1	SHA	Mer.pass
										Venus	294°12.9	14:40
										Mars	256°48.1	17:08
										Jupiter	338°07.1	11:43
										Saturn	23°15.5	08:42
										Horizontal paralax		
										Venus:	0.1	
										Mars:	0.1	
Mer.pass.:10:14		v-0.6 d0.6 m-4.0		v1.0 d-0.1 m1.2		v1.9 d0.2 m-1.9		v2.3 d0.1 m1.0				

Sun								Moon							
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	180°00.5	9°57.1	229°27.5	9.3	-15°39.3	14.3	59.6	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	195°00.7	9°58.0	243°55.9	9.4	-15°25.0	14.4	59.6	70	--	01:41	03:29	20:34	22:28	--	
2	210°00.8	9°58.9	258°24.3	9.4	-15°10.6	14.5	59.6	70	--	02:23	03:47	20:15	21:42	--	
3	225°01.0	9°59.8	272°52.8	9.5	-14°56.1	14.5	59.6	68	--	02:50	04:02	20:00	21:13	--	
4	240°01.1	10°00.7	287°21.3	9.6	-14°41.5	14.6	59.6	66	01:27	03:11	04:13	19:48	20:52	22:41	
5	255°01.2	10°01.5	301°49.9	9.7	-14°26.9	14.7	59.6	64	02:04	03:27	04:23	19:38	20:35	22:00	
6	270°01.4	10°02.4	316°18.6	9.7	-14°12.1	14.8	59.6	62	02:30	03:41	04:31	19:30	20:21	21:33	
7	285°01.5	10°03.3	330°47.4	9.8	-13°57.3	14.9	59.6	60	02:49	03:52	04:39	19:22	20:09	21:13	
8	300°01.7	10°04.2	345°16.2	9.9	-13°42.4	14.9	59.6	58	03:05	04:01	04:45	19:16	19:60	20:57	
9	315°01.8	10°05.1	359°45.2	9.9	-13°27.4	15.0	59.6	56	03:18	04:10	04:50	19:10	19:51	20:43	
10	330°02.0	10°06.0	14°14.1	10.0	-13°12.4	15.1	59.6	54	03:29	04:17	04:55	19:05	19:44	20:32	
11	345°02.1	10°06.9	28°43.2	10.1	-12°57.2	15.2	59.6	52	03:39	04:24	04:60	19:01	19:37	20:22	
12	0°02.3	10°07.8	43°12.3	10.2	-12°42.0	15.2	59.6	50	03:47	04:30	05:04	18:56	19:31	20:14	
13	15°02.4	10°08.6	57°41.5	10.2	-12°26.8	15.3	59.6	45	04:04	04:42	05:13	18:47	19:18	19:56	
14	30°02.6	10°09.5	72°10.7	10.3	-12°11.4	15.4	59.6	40	04:18	04:52	05:20	18:40	19:08	19:42	
15	45°02.7	10°10.4	86°40.1	10.3	-11°56.0	15.4	59.6	35	04:29	04:60	05:26	18:34	18:60	19:31	
16	60°02.9	10°11.3	101°09.4	10.4	-11°40.6	15.5	59.6	30	04:38	05:07	05:31	18:28	18:53	19:22	
17	75°03.0	10°12.2	115°38.9	10.5	-11°25.1	15.6	59.6	20	04:52	05:18	05:41	18:19	18:41	19:08	
18	90°03.2	10°13.1	130°08.4	10.5	-11°09.5	15.6	59.6	10	05:03	05:27	05:49	18:11	18:32	18:57	
19	105°03.3	10°14.0	144°37.9	10.6	-10°53.8	15.7	59.6	0	05:11	05:35	05:56	18:03	18:24	18:48	
20	120°03.4	10°14.8	159°07.6	10.7	-10°38.1	15.7	59.5	-10	05:18	05:42	06:04	17:55	18:17	18:41	
21	135°03.6	10°15.7	173°37.3	10.7	-10°22.4	15.8	59.5	-20	05:23	05:49	06:11	17:48	18:10	18:36	
22	150°03.7	10°16.6	188°07.0	10.8	-10°06.5	15.8	59.5	-30	05:28	05:56	06:20	17:39	18:03	18:31	
23	165°03.9	10°17.5	202°36.8	10.8	-9°50.7	15.9	59.5	-35	05:30	05:59	06:25	17:34	17:59	18:29	
	SD.=15.9	d=0.9	S.D.=16.3					-40	05:32	06:03	06:31	17:28	17:55	18:27	
								-45	05:33	06:07	06:37	17:21	17:51	18:25	
								-50	05:34	06:12	06:45	17:14	17:46	18:24	
								-52	05:35	06:14	06:48	17:10	17:44	18:24	
								-54	05:35	06:16	06:52	17:06	17:42	18:23	
								-56	05:35	06:19	06:57	17:02	17:40	18:23	
								-58	05:35	06:21	07:01	16:57	17:37	18:23	
								-60	05:36	06:24	07:07	16:51	17:34	18:22	
									Moonrise			Moonset			
								Lat.	Sun	Mon	Tue	Sun	Mon	Tue	
								72	06:22	05:29	04:51	12:10	14:49	17:12	
								70	05:54	05:17	04:49	12:35	14:58	17:09	
								68	05:33	05:07	04:47	12:54	15:05	17:07	
								66	05:16	04:59	04:45	13:09	15:10	17:06	
								64	05:02	04:52	04:44	13:22	15:15	17:04	
								62	04:50	04:46	04:42	13:32	15:19	17:03	
								60	04:40	04:41	04:41	13:41	15:23	17:02	
								58	04:31	04:36	04:40	13:48	15:26	17:01	
								56	04:23	04:32	04:39	13:55	15:29	17:01	
								54	04:17	04:28	04:38	14:01	15:32	16:60	
								52	04:10	04:25	04:38	14:06	15:34	16:59	
								50	04:05	04:22	04:37	14:11	15:36	16:59	
								45	03:52	04:15	04:36	14:22	15:40	16:57	
								40	03:42	04:09	04:34	14:30	15:44	16:56	
								35	03:33	04:04	04:33	14:37	15:47	16:55	
								30	03:25	04:00	04:32	14:44	15:50	16:55	
								20	03:12	03:53	04:31	14:55	15:55	16:53	
								10	02:60	03:46	04:29	15:04	15:59	16:52	
								0	02:49	03:40	04:28	15:13	16:03	16:51	
								-10	02:37	03:33	04:27	15:22	16:07	16:50	
								-20	02:25	03:26	04:25	15:31	16:11	16:48	
								-30	02:12	03:19	04:24	15:42	16:15	16:47	
								-35	02:04	03:14	04:23	15:48	16:18	16:46	
								-40	01:54	03:09	04:22	15:54	16:20	16:45	
								-45	01:43	03:03	04:21	16:02	16:24	16:44	
								-50	01:30	02:56	04:19	16:12	16:28	16:43	
								-52	01:24	02:53	04:19	16:16	16:30	16:42	
								-54	01:17	02:49	04:18	16:21	16:31	16:41	
								-56	01:10	02:45	04:17	16:26	16:34	16:41	
								-58	01:01	02:40	04:16	16:31	16:36	16:40	
								-60	00:51	02:35	04:15	16:38	16:39	16:39	
									Sun			Moon			
								Day	Eqn.of Time	Mer.		Mer.Pass.		Age	
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23	11:59	09:51	22:15	27(9%)	
								18	00:30	00:36	11:59	10:39	23:03	28(4%)	
									Sun			Moon			
									00 ^h	12 ^h	Pass	Upper	Lower		
								16	00:02	00:09	11:59	09:01	21:26	26(17%)	
								17	00:16	00:23</					

April 19, 20 ,21 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	206°50.3	139°49.3	23°41.8	103°03.5	24°43.5	184°43.8	8°07.5	230°00.7	-11°09.7				Alpheratz	357°36.6	29°12.9		
1	221°52.8	154°48.7	23°42.4	118°04.5	24°43.4	199°45.7	8°07.7	245°03.0	-11°09.6				Ankaa	353°09.0	-42°10.8		
2	236°55.2	169°48.0	23°43.0	133°05.5	24°43.2	214°47.6	8°07.9	260°05.3	-11°09.6				Schedar	349°33.3	56°39.7		
3	251°57.7	184°47.4	23°43.5	148°06.6	24°43.1	229°49.5	8°08.2	275°07.5	-11°09.5				Diphda	348°49.0	-17°51.7		
4	267°00.2	199°46.8	23°44.1	163°07.6	24°42.9	244°51.4	8°08.4	290°09.8	-11°09.4				Achernar	335°21.9	-57°07.2		
5	282°02.6	214°46.2	23°44.6	178°08.6	24°42.8	259°53.3	8°08.6	305°12.0	-11°09.3				Hamal	327°53.2	23°34.2		
6	297°05.1	229°45.6	23°45.2	193°09.6	24°42.6	274°55.2	8°08.8	320°14.3	-11°09.3				Polaris	315°12.8	89°21.8		
7	312°07.6	244°45.0	23°45.8	208°10.6	24°42.5	289°57.1	8°09.1	335°16.5	-11°09.2				Akamar	315°13.3	-40°12.8		
8	327°10.0	259°44.3	23°46.3	223°11.6	24°42.3	304°59.0	8°09.3	350°18.8	-11°09.1				Menkar	314°08.0	4°10.7		
9	342°12.5	274°43.7	23°46.9	238°12.6	24°42.1	320°00.9	8°09.5	5°21.0	-11°09.0				Mirfak	308°30.8	49°56.6		
10	357°15.0	289°43.1	23°47.4	253°13.6	24°42.0	335°02.8	8°09.7	20°23.3	-11°09.0				Aldebaran	290°41.6	16°33.3		
11	12°17.4	304°42.5	23°48.0	268°14.6	24°41.8	350°04.7	8°09.9	35°25.6	-11°08.9				Rigel	281°05.5	-8°10.6		
12	27°19.9	319°41.9	23°48.5	283°15.6	24°41.7	5°06.6	8°10.2	50°27.8	-11°08.8				Capella	280°24.4	46°01.4		
13	42°22.3	334°41.2	23°49.1	298°16.6	24°41.5	20°08.5	8°10.4	65°30.1	-11°08.8				Bellatrix	278°24.6	6°22.2		
14	57°24.8	349°40.6	23°49.6	313°17.6	24°41.4	35°10.4	8°10.6	80°32.3	-11°08.7				Elnath	278°03.9	28°37.7		
15	72°27.3	4°40.0	23°50.2	328°18.6	24°41.2	50°12.3	8°10.8	95°34.6	-11°08.6				Alnilam	275°39.4	-1°11.3		
16	87°29.7	19°39.4	23°50.7	343°19.7	24°41.1	65°14.2	8°11.1	110°36.8	-11°08.5				Betelgeuse	270°53.8	7°24.6		
17	102°32.2	34°38.8	23°51.3	358°20.7	24°40.9	80°16.1	8°11.3	125°39.1	-11°08.5				Canopus	263°53.3	-52°42.7		
18	117°34.7	49°38.1	23°51.8	13°21.7	24°40.8	95°18.0	8°11.5	140°41.4	-11°08.4				Sirius	258°27.5	-16°44.9		
19	132°37.1	64°37.5	23°52.4	28°22.7	24°40.6	110°19.9	8°11.7	155°43.6	-11°08.3				Adara	255°07.1	-29°00.4		
20	147°39.6	79°36.9	23°52.9	43°23.7	24°40.4	125°21.8	8°11.9	170°45.9	-11°08.3				Procyon	244°52.3	5°10.0		
21	162°42.1	94°36.3	23°53.5	58°24.7	24°40.3	140°23.7	8°12.2	185°48.1	-11°08.2				Pollux	243°19.0	27°58.3		
22	177°44.5	109°35.7	23°54.0	73°25.7	24°40.1	155°25.6	8°12.4	200°50.4	-11°08.1				Avior	234°15.3	-59°35.3		
23	192°47.0	124°35.0	23°54.5	88°26.7	24°40.0	170°27.5	8°12.6	215°52.7	-11°08.0				Suhail	222°47.3	-43°31.8		
Mer.pass.:10:10			v-0.6 d0.6 m-4.0			v1.0 d-0.2 m1.2			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	207°49.5	139°34.4	23°55.1	103°27.7	24°39.8	185°29.4	8°12.8	230°54.9	-11°08.0				Dubhe	193°42.3	61°37.7		
1	222°51.9	154°33.8	23°55.6	118°28.7	24°39.7	200°31.3	8°13.0	245°57.2	-11°07.9				Denebola	182°26.1	14°26.5		
2	237°54.4	169°33.2	23°56.2	133°29.7	24°39.5	215°33.2	8°13.3	260°59.4	-11°07.8				Gienah	175°44.8	-17°40.4		
3	252°56.8	184°32.5	23°56.7	148°30.7	24°39.4	230°35.1	8°13.5	276°01.7	-11°07.8				Acrux	173°01.1	-63°13.8		
4	267°59.3	199°31.9	23°57.2	163°31.7	24°39.2	245°37.0	8°13.7	291°03.9	-11°07.7				Gacrux	171°52.7	-57°14.7		
5	283°01.8	214°31.3	23°57.8	178°32.7	24°39.0	260°38.9	8°13.9	306°06.2	-11°07.6				Alioth	166°13.7	55°50.1		
6	298°04.2	229°30.7	23°58.3	193°33.7	24°38.9	275°40.8	8°14.2	321°08.5	-11°07.5				Spica	158°23.5	-11°17.0		
7	313°06.7	244°30.1	23°58.8	208°34.7	24°38.7	290°42.7	8°14.4	336°10.7	-11°07.5				Alcaid	152°52.6	49°11.8		
8	328°09.2	259°29.4	23°59.4	223°35.7	24°38.6	305°44.6	8°14.6	351°13.0	-11°07.4				Hadar	148°37.4	-60°29.1		
9	343°11.6	274°28.8	23°59.9	238°36.7	24°38.4	320°46.5	8°14.8	6°15.2	-11°07.3				Menkent	147°59.0	-36°29.1		
10	358°14.1	289°28.2	24°00.4	253°37.7	24°38.2	335°48.4	8°15.0	21°17.5	-11°07.3				Arcturus	145°48.7	19°03.9		
11	13°16.6	304°27.6	24°00.9	268°38.8	24°38.1	350°50.3	8°15.3	36°19.8	-11°07.2				Rigel Kent.	139°41.7	-60°55.8		
12	28°19.0	319°26.9	24°01.5	283°39.8	24°37.9	5°52.2	8°15.5	51°22.0	-11°07.1				Zubenelg.	136°57.3	-16°08.4		
13	43°21.5	334°26.3	24°02.0	298°40.8	24°37.8	20°54.1	8°15.7	66°24.3	-11°07.0				Kochab	137°18.6	74°03.5		
14	58°23.9	349°25.7	24°02.5	313°41.8	24°37.6	35°56.0	8°15.9	81°26.5	-11°07.0				Alphecca	126°04.7	26°38.0		
15	73°26.4	4°25.1	24°03.0	328°42.8	24°37.4	50°57.9	8°16.1	96°28.8	-11°06.9				Antares	112°17.3	-26°29.0		
16	88°28.9	19°24.4	24°03.6	343°43.8	24°37.3	65°59.8	8°16.4	111°31.1	-11°06.8				Atria	107°12.5	-69°04.0		
17	103°31.3	34°23.8	24°04.1	358°44.8	24°37.1	81°01.7	8°16.6	126°33.3	-11°06.8				Sabik	102°04.2	-15°45.3		
18	118°33.8	49°23.2	24°04.6	13°45.8	24°37.0	96°03.6	8°16.8	141°35.6	-11°06.7				Shaula	96°12.1	-37°07.2		
19	133°36.3	64°22.6	24°05.1	28°46.8	24°36.8	111°05.5	8°17.0	156°37.8	-11°06.6				Rasalhague	95°59.7	12°32.4		
20	148°38.7	79°21.9	24°05.7	43°47.8	24°36.6	126°07.4	8°17.3	171°40.1	-11°06.5				Etamin	90°42.6	51°28.8		
21	163°41.2	94°21.3	24°06.2	58°48.8	24°36.5	141°09.3	8°17.5	186°42.4	-11°06.5				Kaus Aust.	83°34.3	-34°22.3		
22	178°43.7	109°20.7	24°06.7	73°49.8	24°36.3	156°11.2	8°17.7	201°44.6	-11°06.4				Vega	80°34.1	38°47.9		
23	193°46.1	124°20.1	24°07.2	88°50.8	24°36.2	171°13.1	8°17.9	216°46.9	-11°06.3				Nunki	75°49.5	-26°16.1		
Mer.pass.:10:07			v-0.6 d0.5 m-4.0			v1.0 d-0.2 m1.2			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	208°48.6	139°19.4	24°07.7	103°51.8	24°36.0	186°15.0	8°18.1	231°49.1	-11°06.3				2023/4/1	SHA	Mer.pass		
1	223°51.1	154°18.8	24°08.2	118°52.8	24°35.8	201°16.9	8°18.4	246°51.4	-11°06.2				Venus	292°59.0	14:41		
2	238°53.5	169°18.2	24°08.7	133°53.8	24°35.7	216°18.8	8°18.6	261°53.7	-11°06.1				Mars	256°13.2	17:07		
3	253°56.0	184°17.6	24°09.3	148°54.8	24°35.5	231°20.7	8°18.8	276°55.9	-11°06.0				Jupiter	337°53.5	11:40		
4	268°58.4	199°16.9	24°09.8	163°55.8	24°35.3	246°22.6	8°19.0	291°58.2	-11°06.0				Saturn	23°10.4	08:39		
5	284°00.9	214°16.3	24°10.3	178°56.8	24°35.2	261°24.5	8°19.2	307°00.5	-11°05.9								
6	299°03.4	229°15.7	24°10.8	193°57.8	24°35.0	276°26.4	8°19.5	322°02.7	-11°05.8				2023/4/2	SHA	Mer.pass		
7	314°05.8	244°15.1	24°11.3	208°58.8	24°34.9	291°28.3	8°19.7	337°05.0	-11°05.8				Venus	291°45.0	14:42		
8	329°08.3	259°14.4	24°11.8	223°59.8	24°34.7	306°30.2	8°19.9	352°07.2	-11°05.7				Mars	255°38.2	17:05		
9	344°10.8	274°13.8	24°12.3	239°00.8	24°34.5	321°32.1	8°20.1	7°09.5	-11°05.6				Jupiter	337°40.0	11:37		
10	359°13.2	289°13.2	24°12.8	254°01.8	24°34.4	336°34.0	8°20.3										

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	180°10.8	11°00.5	193°43.0	12.2	3°36.5	16.4	58.9
1	195°10.9	11°01.3	208°14.1	12.2	3°52.9	16.4	58.9
2	210°11.0	11°02.2	222°45.3	12.2	4°09.3	16.4	58.9
3	225°11.2	11°03.1	237°16.5	12.2	4°25.7	16.3	58.9
4	240°11.3	11°03.9	251°47.7	12.2	4°42.0	16.3	58.9
5	255°11.5	11°04.8	266°18.9	12.2	4°58.3	16.3	58.9
6	270°11.6	11°05.7	280°50.0	12.2	5°14.5	16.2	58.8
7	285°11.7	11°06.5	295°21.2	12.2	5°30.7	16.2	58.8
8	300°11.9	11°07.4	309°52.3	12.2	5°46.9	16.2	58.8
9	315°12.0	11°08.3	324°23.5	12.1	6°03.0	16.1	58.8
10	330°12.1	11°09.1	338°54.6	12.1	6°19.1	16.1	58.8
11	345°12.3	11°10.0	353°25.8	12.1	6°35.1	16.0	58.7
12	0°12.4	11°10.9	7°56.9	12.1	6°51.1	16.0	58.7
13	15°12.5	11°11.7	22°28.0	12.1	7°07.1	15.9	58.7
14	30°12.7	11°12.6	36°59.1	12.1	7°23.0	15.9	58.7
15	45°12.8	11°13.5	51°30.1	12.1	7°38.9	15.8	58.6
16	60°12.9	11°14.3	66°01.2	12.0	7°54.7	15.8	58.6
17	75°13.1	11°15.2	80°32.2	12.0	8°10.5	15.7	58.6
18	90°13.2	11°16.0	95°03.3	12.0	8°26.2	15.7	58.6
19	105°13.3	11°16.9	109°34.3	12.0	8°41.8	15.6	58.6
20	120°13.5	11°17.8	124°05.2	12.0	8°57.4	15.6	58.5
21	135°13.6	11°18.6	138°36.2	12.0	9°13.0	15.5	58.5
22	150°13.7	11°19.5	153°07.2	11.9	9°28.5	15.5	58.5
23	165°13.9	11°20.4	167°38.1	11.9	9°43.9	15.4	58.5
SD.=15.9		d=0.9	S.D.=16.1				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°14.0	11°21.2	182°09.0	11.9	9°59.3	15.3	58.4
1	195°14.1	11°22.1	196°39.9	11.9	10°14.6	15.3	58.4
2	210°14.3	11°22.9	211°10.7	11.8	10°29.8	15.2	58.4
3	225°14.4	11°23.8	225°41.5	11.8	10°45.0	15.1	58.4
4	240°14.5	11°24.7	240°12.3	11.8	11°00.1	15.1	58.3
5	255°14.7	11°25.5	254°43.1	11.8	11°15.1	15.0	58.3
6	270°14.8	11°26.4	269°13.9	11.7	11°30.1	14.9	58.3
7	285°14.9	11°27.2	283°44.6	11.7	11°45.0	14.9	58.3
8	300°15.0	11°28.1	298°15.3	11.7	11°59.8	14.8	58.2
9	315°15.2	11°29.0	312°45.9	11.6	12°14.6	14.7	58.2
10	330°15.3	11°29.8	327°16.5	11.6	12°29.3	14.6	58.2
11	345°15.4	11°30.7	341°47.1	11.6	12°43.9	14.6	58.2
12	0°15.6	11°31.5	356°17.7	11.5	12°58.4	14.5	58.1
13	15°15.7	11°32.4	10°48.2	11.5	13°12.9	14.4	58.1
14	30°15.8	11°33.2	25°18.7	11.5	13°27.3	14.3	58.1
15	45°16.0	11°34.1	39°49.2	11.4	13°41.6	14.3	58.1
16	60°16.1	11°35.0	54°19.6	11.4	13°55.8	14.2	58.0
17	75°16.2	11°35.8	68°50.0	11.4	14°09.9	14.1	58.0
18	90°16.3	11°36.7	83°20.4	11.3	14°23.9	14.0	58.0
19	105°16.5	11°37.5	97°50.7	11.3	14°37.9	13.9	57.9
20	120°16.6	11°38.4	112°21.0	11.3	14°51.8	13.8	57.9
21	135°16.7	11°39.2	126°51.2	11.2	15°05.6	13.7	57.9
22	150°16.9	11°40.1	141°21.4	11.2	15°19.3	13.6	57.9
23	165°17.0	11°40.9	155°51.6	11.2	15°32.9	13.6	57.8
SD.=15.9		d=0.9	S.D.=15.9				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	180°17.1	11°41.8	170°21.7	11.1	15°46.4	13.5	57.8
1	195°17.2	11°42.7	184°51.8	11.1	15°59.8	13.4	57.8
2	210°17.4	11°43.5	199°21.9	11.0	16°13.1	13.3	57.7
3	225°17.5	11°44.4	213°51.9	11.0	16°26.3	13.2	57.7
4	240°17.6	11°45.2	228°21.9	11.0	16°39.5	13.1	57.7
5	255°17.8	11°46.1	242°51.8	10.9	16°52.5	13.0	57.7
6	270°17.9	11°46.9	257°21.7	10.9	17°05.4	12.9	57.6
7	285°18.0	11°47.8	271°51.5	10.8	17°18.3	12.8	57.6
8	300°18.1	11°48.6	286°21.3	10.8	17°31.0	12.7	57.6
9	315°18.3	11°49.5	300°51.1	10.7	17°43.7	12.6	57.5
10	330°18.4	11°50.3	315°20.8	10.7	17°56.2	12.5	57.5
11	345°18.5	11°51.2	329°50.5	10.7	18°08.6	12.4	57.5
12	0°18.6	11°52.0	344°20.1	10.6	18°20.9	12.3	57.5
13	15°18.8	11°52.9	358°49.7	10.6	18°33.1	12.2	57.4
14	30°18.9	11°53.7	13°19.3	10.5	18°45.2	12.1	57.4
15	45°19.0	11°54.6	27°48.8	10.5	18°57.2	11.9	57.4
16	60°19.1	11°55.4	42°18.3	10.4	19°09.1	11.8	57.3
17	75°19.3	11°56.3	56°47.7	10.4	19°20.9	11.7	57.3
18	90°19.4	11°57.1	71°17.1	10.4	19°32.6	11.6	57.3
19	105°19.5	11°58.0	85°46.4	10.3	19°44.1	11.5	57.3
20	120°19.6	11°58.8	100°15.7	10.3	19°55.5	11.4	57.2
21	135°19.8	11°59.6	114°44.9	10.2	20°06.9	11.3	57.2
22	150°19.9	12°00.5	129°14.1	10.2	20°18.1	11.1	57.2
23	165°20.0	12°01.3	143°43.3	10.1	20°29.2	11.0	57.1
SD.=15.9		d=0.9	S.D.=15.8				
Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	--	01:01	03:11	20:51	23:15	--	
70	--	01:60	03:32	20:29	22:05	--	
68	--	02:33	03:49	20:12	21:30	--	
66	00:53	02:57	04:02	19:59	21:05	23:21	
64	01:44	03:15	04:13	19:47	20:46	22:20	
62	02:14	03:30	04:22	19:38	20:31	21:48	
60	02:37	03:42	04:30	19:30	20:18	21:25	
58	02:54	03:53	04:37	19:23	20:07	21:07	
56	03:08	04:02	04:43	19:16	19:58	20:52	
54	03:20	04:10	04:48	19:11	19:50	20:40	
52	03:31	04:17	04:53	19:06	19:43	20:29	
50	03:40	04:23	04:58	19:01	19:36	20:20	
45	03:59	04:36	05:07	18:51	19:22	20:01	
40	04:13	04:47	05:15	18:43	19:12	19:46	
35	04:25	04:56	05:22	18:36	19:03	19:34	
30	04:34	05:04	05:28	18:30	18:55	19:24	
20	04:49	05:16	05:39	18:20	18:42	19:09	
10	05:01	05:26	05:47	18:11	18:32	18:57	
0	05:10	05:35	05:56	18:02	18:23	18:48	
-10	05:18	05:42	06:04	17:54	18:15	18:40	
-20	05:24	05:50	06:12	17:45	18:08	18:34	
-30	05:30	05:58	06:22	17:36	17:60	18:28	
-35	05:32	06:02	06:27	17:30	17:56	18:25	
-40	05:34	06:06	06:34	17:24	17:51	18:23	
-45	05:37	06:11	06:41	17:16	17:46	18:21	
-50	05:39	06:16	06:49	17:08	17:41	18:18	
-52	05:39	06:19	06:53	17:04	17:38	18:18	
-54	05:40	06:21	06:58	16:59	17:36	18:17	
-56	05:41	06:24	07:03	16:54	17:33	18:16	
-58	05:41	06:27	07:08	16:49	17:30	18:15	
-60	05:42	06:31	07:14	16:43	17:26	18:15	
Moonrise		Moonset					
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	04:16	03:35	02:30	19:35	22:24	--	
70	04:22	03:52	03:10	19:21	21:46	--	
68	04:27	04:06	03:38	19:10	21:20	23:59	
66	04:31	04:17	03:59	19:01	21:00	23:12	
64	04:35	04:26	04:17	18:53	20:44	22:42	
62	04:38	04:35	04:31	18:46	20:31	22:19	
60	04:41	04:42	04:43	18:41	20:20	22:01	
58	04:44	04:48	04:54	18:36	20:11	21:46	
56	04:46	04:54	05:03	18:31	20:02	21:33	
54	04:48	04:59	05:11	18:27	19:55	21:22	
52	04:50	05:03	05:18	18:24	19:48	21:13	
50	04:52	05:07	05:25	18:21	19:43	21:04	
45	04:56	05:16	05:39	18:14	19:30	20:45	
40	04:59	05:24	05:51	18:08	19:19	20:30	
35	05:02	05:30	06:02	18:03	19:11	20:18	
30	05:04	05:36	06:11	17:59	19:03	20:07	
20	05:08	05:46	06:26	17:51	18:49	19:48	
10	05:12	05:55	06:40	17:45	18:38	19:32	
0	05:16	06:04	06:53	17:39	18:27	19:17	
-10	05:20	06:12	07:06	17:32	18:16	19:02	
-20	05:24	06:22	07:20	17:26	18:05	18:46	
-30	05:28	06:32	07:36	17:19	17:52	18:28	
-35	05:31	06:38	07:46	17:14	17:44	18:17	
-40	05:34	06:45	07:57	17:10	17:36	18:05	
-45	05:37	06:54	08:09	17:04	17:26	17:51	
-50	05:42	07:04	08:25	16:57	17:14	17:33	
-52	05:44	07:08	08:33	16:54	17:08	17:25	
-54	05:46	07:13	08:41	16:51	17:02	17:16	
-56	05:48	07:19	08:50	16:48	16:56	17:06	
-58	05:51	07:26	09:01	16:44	16:48	16:55	
-60	05:54	07:33	09:13	16:39	16:40	16:42	
Sun		Moon					
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age		
19	00:43	00:50	11:59	11:27	23:51	29(1%)	
20	00:56	01:02	11:58	12:15	00:39	0(0%)	
21	01:08	01:15	11:58	13:04	00:39	1(2%)	

April 22, 23 ,24 (Sat., Sun., Mon.)

Aries			Venus		Mars		Jupiter		Saturn		Stars			
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	209°47.7	139°04.4	24°19.7	104°15.8	24°32.0	187°00.6	8°23.4	232°43.4	-11°04.6	Alpheratz	357°36.6	29°12.9		
1	224°50.2	154°03.7	24°20.2	119°16.8	24°31.9	202°02.5	8°23.6	247°45.7	-11°04.5	Ankaa	353°08.9	-42°10.8		
2	239°52.7	169°03.1	24°20.7	134°17.8	24°31.7	217°04.4	8°23.9	262°48.0	-11°04.4	Schedar	349°33.3	56°39.7		
3	254°55.1	184°02.5	24°21.2	149°18.8	24°31.5	232°06.3	8°24.1	277°50.2	-11°04.4	Diphda	348°49.0	-17°51.7		
4	269°57.6	199°01.9	24°21.7	164°19.8	24°31.4	247°08.2	8°24.3	292°52.5	-11°04.3	Achernar	335°21.9	-57°07.2		
5	285°00.0	214°01.2	24°22.2	179°20.8	24°31.2	262°10.1	8°24.5	307°54.8	-11°04.2	Hamal	327°53.2	23°34.2		
6	300°02.5	229°00.6	24°22.6	194°21.8	24°31.0	277°12.0	8°24.8	322°57.0	-11°04.2	Polaris	315°12.9	89°21.8		
7	315°05.0	243°00.0	24°23.1	209°22.8	24°30.9	292°13.9	8°25.0	337°59.3	-11°04.1	Akamar	315°13.3	-40°12.8		
8	330°07.4	258°59.3	24°23.6	224°23.8	24°30.7	307°15.8	8°25.2	353°01.6	-11°04.0	Menkar	314°08.0	4°10.7		
9	345°09.9	273°58.7	24°24.1	239°24.8	24°30.5	322°17.7	8°25.4	8°03.8	-11°03.9	Mirfak	308°30.8	49°56.6		
10	0°12.4	288°58.1	24°24.5	254°25.8	24°30.3	337°19.6	8°25.6	23°06.1	-11°03.9	Aldebaran	290°41.6	16°33.3		
11	15°14.8	303°57.4	24°25.0	269°26.8	24°30.2	352°21.5	8°25.9	38°08.4	-11°03.8	Rigel	281°05.5	-8°10.6		
12	30°17.3	318°56.8	24°25.5	284°27.8	24°30.0	7°23.4	8°26.1	53°10.6	-11°03.7	Capella	280°24.4	46°01.4		
13	45°19.8	333°56.2	24°26.0	299°28.8	24°29.8	22°25.3	8°26.3	68°12.9	-11°03.7	Bellatrix	278°24.6	6°22.2		
14	60°22.2	348°55.6	24°26.4	314°29.8	24°29.7	37°27.2	8°26.5	83°15.2	-11°03.6	Elnath	278°03.9	28°37.6		
15	75°24.7	3°54.9	24°26.9	329°30.8	24°29.5	52°29.1	8°26.7	98°17.4	-11°03.5	Alnilam	275°39.4	-1°11.3		
16	90°27.2	18°54.3	24°27.4	344°31.8	24°29.3	67°31.0	8°27.0	113°19.7	-11°03.5	Betelgeuse	270°53.8	7°24.6		
17	105°29.6	33°53.7	24°27.9	359°32.8	24°29.1	82°32.9	8°27.2	128°22.0	-11°03.4	Canopus	263°53.3	-52°42.7		
18	120°32.1	48°53.0	24°28.3	14°33.8	24°29.0	97°34.8	8°27.4	143°24.2	-11°03.3	Sirius	258°27.5	-16°44.9		
19	135°34.5	63°52.4	24°28.8	29°34.8	24°28.8	112°36.7	8°27.6	158°26.5	-11°03.3	Adara	255°07.1	-29°00.4		
20	150°37.0	78°51.8	24°29.3	44°35.8	24°28.6	127°38.6	8°27.8	173°28.7	-11°03.2	Procyon	244°52.3	5°10.0		
21	165°39.5	93°51.1	24°29.7	59°36.8	24°28.5	142°40.5	8°28.1	188°31.0	-11°03.1	Pollux	243°19.0	27°58.3		
22	180°41.9	108°50.5	24°30.2	74°37.8	24°28.3	157°42.4	8°28.3	203°33.3	-11°03.1	Avior	234°15.3	-59°35.3		
23	195°44.4	123°49.9	24°30.7	89°38.8	24°28.1	172°44.3	8°28.5	218°35.5	-11°03.0	Suhail	222°47.3	-43°31.8		
Mer.pass.:9:59:			v-0.6 d0.5 m-4.0		v1.0 d-0.2 m1.2		v1.9 d0.2 m-1.9		v2.3 d0.1 m1.0					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	210°46.9	138°49.2	24°31.1	104°39.8	24°27.9	187°46.2	8°28.7	233°37.8	-11°02.9	Dubhe	193°42.3	61°37.7		
1	225°49.3	153°48.6	24°31.6	119°40.8	24°27.8	202°48.1	8°28.9	248°40.1	-11°02.8	Denebola	182°26.1	14°26.5		
2	240°51.8	168°48.0	24°32.0	134°41.8	24°27.6	217°50.0	8°29.1	263°42.3	-11°02.8	Gienah	175°44.8	-17°40.4		
3	255°54.3	183°47.3	24°32.5	149°42.8	24°27.4	232°51.9	8°29.4	278°44.6	-11°02.7	Acrux	173°01.1	-63°13.8		
4	270°56.7	198°46.7	24°33.0	164°43.8	24°27.2	247°53.8	8°29.6	293°46.9	-11°02.6	Gacrux	171°52.7	-57°14.7		
5	285°59.2	213°46.1	24°33.4	179°44.8	24°27.1	262°55.7	8°29.8	308°49.1	-11°02.6	Alioth	166°13.7	55°50.1		
6	301°01.7	228°45.5	24°33.9	194°45.8	24°26.9	277°57.6	8°30.0	323°51.4	-11°02.5	Spica	158°23.5	-11°17.0		
7	316°04.1	243°44.8	24°34.3	209°46.8	24°26.7	292°59.5	8°30.2	338°53.7	-11°02.4	Alcaid	152°52.6	49°11.8		
8	331°06.6	258°44.2	24°34.8	224°47.8	24°26.5	308°01.4	8°30.5	353°55.9	-11°02.4	Hadar	148°37.4	-60°29.1		
9	346°09.0	273°43.6	24°35.2	239°48.8	24°26.4	323°03.3	8°30.7	8°58.2	-11°02.3	Menkent	147°58.9	-36°29.1		
10	1°11.5	288°42.9	24°35.7	254°49.8	24°26.2	338°05.2	8°30.9	24°00.5	-11°02.2	Arcturus	145°48.7	19°03.9		
11	16°14.0	303°42.3	24°36.1	269°50.8	24°26.0	353°07.1	8°31.1	39°02.8	-11°02.2	Rigel Kent.	139°41.7	-60°55.9		
12	31°16.4	318°41.7	24°36.6	284°51.8	24°25.8	8°09.0	8°31.3	54°05.0	-11°02.1	Zubenelg.	136°57.3	-16°08.4		
13	46°18.9	333°41.0	24°37.0	299°52.8	24°25.7	23°10.9	8°31.6	69°07.3	-11°02.0	Kochab	137°18.6	74°03.5		
14	61°21.4	348°40.4	24°37.5	314°53.7	24°25.5	38°12.8	8°31.8	84°09.6	-11°02.0	Alphecca	126°04.6	26°38.0		
15	76°23.8	3°39.8	24°37.9	329°54.7	24°25.3	53°14.7	8°32.0	99°11.8	-11°01.9	Antares	112°17.3	-26°29.0		
16	91°26.3	18°39.1	24°38.4	344°55.7	24°25.1	68°16.6	8°32.2	114°14.1	-11°01.8	Atria	107°12.4	-69°04.0		
17	106°28.8	33°38.5	24°38.8	359°56.7	24°25.0	83°18.5	8°32.4	129°16.4	-11°01.8	Sabik	102°04.2	-15°45.3		
18	121°31.2	48°37.9	24°39.2	14°57.7	24°24.8	98°20.4	8°32.7	144°18.6	-11°01.7	Shaula	96°12.1	-37°07.2		
19	136°33.7	63°37.2	24°39.7	29°58.7	24°24.6	113°22.3	8°32.9	159°20.9	-11°01.6	Rasalhague	95°59.7	12°32.4		
20	151°36.2	78°36.6	24°40.1	44°59.7	24°24.4	128°24.2	8°33.1	174°23.2	-11°01.6	Etamin	90°42.6	51°28.8		
21	166°38.6	93°36.0	24°40.6	60°00.7	24°24.2	143°26.1	8°33.3	189°25.4	-11°01.5	Kaus Aust.	83°34.2	-34°22.3		
22	181°41.1	108°35.3	24°41.0	75°01.7	24°24.1	158°28.0	8°33.5	204°27.7	-11°01.4	Vega	80°34.1	38°47.9		
23	196°43.5	123°34.7	24°41.4	90°02.7	24°23.9	173°29.9	8°33.8	219°30.0	-11°01.3	Nunki	75°49.4	-26°16.0		
Mer.pass.:9:55:			v-0.6 d0.5 m-4.0		v1.0 d-0.2 m1.2		v1.9 d0.2 m-1.9		v2.3 d0.1 m1.0					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	211°46.0	138°34.1	24°41.9	105°03.7	24°23.7	188°31.8	8°34.0	234°32.2	-11°01.3	Alnair	27°35.0	-46°50.8		
1	226°48.5	153°33.4	24°42.3	120°04.7	24°23.5	203°33.7	8°34.2	249°34.5	-11°01.2	Fomalhaut	15°16.4	-29°30.0		
2	241°50.9	168°32.8	24°42.7	135°05.7	24°23.4	218°35.6	8°34.4	264°36.8	-11°01.1	Scheat	13°46.9	28°12.2		
3	256°53.4	183°32.2	24°43.2	150°06.7	24°23.2	233°37.5	8°34.6	279°39.1	-11°01.1	Markab	13°31.6	15°19.6		
4	271°55.9	198°31.5	24°43.6	165°07.7	24°23.0	248°39.4	8°34.8	294°41.3	-11°01.0					
5	286°58.3	213°30.9	24°44.0	180°08.7	24°22.8	263°41.3	8°35.1	309°43.6	-11°00.9	2023/4/2	SHA	Mer.pass		
6	302°00.8	228°30.2	24°44.5	195°09.7	24°22.6	278°43.2	8°35.3	324°45.9	-11°00.9	Venus	289°16.6	14:44		
7	317°03.3	243°29.6	24°44.9	210°10.7	24°22.5	293°45.1	8°35.5	339°48.1	-11°00.8	Mars	254°28.1	17:02		
8	332°05.7	258°29.0	24°45.3	225°11.7	24°22.3	308°47.0	8°35.7	354°50.4	-11°00.7	Jupiter	337°12.8	11:31		
9	347°08.2	273°28.3	24°45.7	240°12.7	24°22.1	323°48.9	8°35.9	9°52.7	-11°00.7	Saturn	22°55.7	08:28		
10	2°10.6	288°27.7	24°46.2	255°13.7	24°21.9	338°50.8	8°36.2	24°54.9	-11°00.6	2023/4/2	SHA	Mer.pass		
11	17°13.1	303°27.1	24°46.6	270°14.6	24°21.7	353°52.7	8°36.4	39°57.2	-11°00.5	Venus	288°02.4	14:45		
12	32°15.6	318°26.4	24°47.0	285°15.6	24°21.5	8°54.6	8°36.6	54°59.5	-11°00.5	Mars	253°52.9	17:00		
13	47°18.0	333°25.8	24°47.4	300°16.6	24°21.4	23°56.5	8°36.8	70°01.8	-11°00.4	Jupiter	336°59.3	11:27		
14	62°20.5	348°25.2	24°47.8	315°17.6	24°21.2	38°58.4	8°37.0	85°04.0	-11°00.3	Saturn				

Sun				Moon										
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180°20.1	12°02.2	158°12.4	10.1	20°40.1	10.9	57.1	72	--	--	02:52	21:09	--	--
1	195°20.2	12°03.0	172°41.5	10.1	20°51.0	10.8	57.1	70	--	--	01:33	03:17	20:44	22:33
2	210°20.4	12°03.9	187°10.5	10.0	21°01.7	10.7	57.0	68	--	--	02:14	03:35	20:24	21:48
3	225°20.5	12°04.7	201°39.5	10.0	21°12.3	10.5	57.0	66	--	--	02:42	03:50	20:09	21:19
4	240°20.6	12°05.6	216°08.4	9.9	21°22.8	10.4	57.0	64	01:21	03:02	04:02	19:57	20:58	22:44
5	255°20.7	12°06.4	230°37.3	9.9	21°33.2	10.3	57.0	62	01:58	03:19	04:12	19:46	20:41	22:03
6	270°20.9	12°07.2	245°06.2	9.8	21°43.4	10.2	56.9	60	02:23	03:32	04:21	19:37	20:27	21:37
7	285°21.0	12°08.1	259°35.0	9.8	21°53.5	10.1	56.9	58	02:43	03:44	04:29	19:29	20:15	21:17
8	300°21.1	12°08.9	274°03.8	9.8	22°03.5	9.9	56.9	56	02:58	03:54	04:36	19:22	20:05	21:01
9	315°21.2	12°09.8	288°32.5	9.7	22°13.4	9.8	56.8	54	03:12	04:02	04:42	19:16	19:56	20:47
10	330°21.3	12°10.6	303°01.2	9.7	22°23.1	9.7	56.8	52	03:23	04:10	04:47	19:11	19:48	20:36
11	345°21.5	12°11.5	317°29.9	9.6	22°32.7	9.5	56.8	50	03:33	04:17	04:52	19:06	19:41	20:26
12	0°21.6	12°12.3	331°58.5	9.6	22°42.2	9.4	56.7	45	03:53	04:31	05:02	18:55	19:27	20:05
13	15°21.7	12°13.1	346°27.1	9.6	22°51.6	9.3	56.7	40	04:08	04:43	05:11	18:46	19:15	19:50
14	30°21.8	12°14.0	0°55.6	9.5	23°00.8	9.2	56.7	35	04:21	04:52	05:19	18:39	19:05	19:37
15	45°22.0	12°14.8	15°24.1	9.5	23°09.9	9.0	56.7	30	04:31	05:00	05:25	18:32	18:57	19:27
16	60°22.1	12°15.7	29°52.5	9.4	23°18.9	8.9	56.6	20	04:47	05:14	05:36	18:21	18:43	19:10
17	75°22.2	12°16.5	44°21.0	9.4	23°27.7	8.8	56.6	10	04:59	05:24	05:46	18:11	18:32	18:58
18	90°22.3	12°17.3	58°49.3	9.4	23°36.4	8.6	56.6	0	05:09	05:34	05:55	18:02	18:23	18:48
19	105°22.4	12°18.2	73°17.7	9.3	23°44.9	8.5	56.5	-10	05:18	05:42	06:04	17:53	18:14	18:39
20	120°22.6	12°19.0	87°46.0	9.3	23°53.4	8.4	56.5	-20	05:25	05:51	06:13	17:43	18:06	18:32
21	135°22.7	12°19.9	102°14.3	9.3	24°01.7	8.2	56.5	-30	05:31	05:59	06:24	17:33	17:57	18:25
22	150°22.8	12°20.7	116°42.5	9.2	24°09.8	8.1	56.5	-35	05:34	06:04	06:30	17:26	17:52	18:22
23	165°22.9	12°21.5	131°10.7	9.2	24°17.8	8.0	56.4	-40	05:37	06:09	06:37	17:20	17:47	18:19
SD.=15.9 d=0.8 S.D.=15.6								-45	05:40	06:14	06:45	17:12	17:42	18:16
								-50	05:43	06:21	06:54	17:02	17:35	18:13
								-52	05:44	06:23	06:58	16:58	17:32	18:12
								-54	05:45	06:26	07:03	16:53	17:29	18:11
								-56	05:46	06:30	07:09	16:47	17:26	18:10
								-58	05:47	06:33	07:15	16:41	17:22	18:08
								-60	05:49	06:37	07:21	16:35	17:18	18:07
Sun	GHA	Dec	GHA	ν	Dec	d	HP							
0	180°23.0	12°22.4	145°38.9	9.2	24°25.7	7.8	56.4							
1	195°23.1	12°23.2	160°07.0	9.1	24°33.5	7.7	56.4							
2	210°23.3	12°24.0	174°35.1	9.1	24°41.1	7.5	56.3							
3	225°23.4	12°24.9	189°03.2	9.1	24°48.6	7.4	56.3							
4	240°23.5	12°25.7	203°31.2	9.0	24°55.9	7.3	56.3							
5	255°23.6	12°26.6	217°59.3	9.0	25°03.1	7.1	56.2							
6	270°23.7	12°27.4	232°27.2	9.0	25°10.1	7.0	56.2							
7	285°23.9	12°28.2	246°55.2	8.9	25°17.0	6.8	56.2							
8	300°24.0	12°29.1	261°23.1	8.9	25°23.8	6.7	56.2							
9	315°24.1	12°29.9	275°51.0	8.9	25°30.4	6.6	56.1							
10	330°24.2	12°30.7	290°18.9	8.9	25°36.9	6.4	56.1							
11	345°24.3	12°31.6	304°46.8	8.8	25°43.2	6.3	56.1							
12	0°24.4	12°32.4	319°14.6	8.8	25°49.4	6.1	56.1							
13	15°24.6	12°33.2	333°42.4	8.8	25°55.5	6.0	56.0							
14	30°24.7	12°34.1	348°10.2	8.8	26°01.4	5.8	56.0							
15	45°24.8	12°34.9	2°38.0	8.8	26°07.2	5.7	56.0							
16	60°24.9	12°35.7	17°05.7	8.7	26°12.8	5.5	55.9							
17	75°25.0	12°36.5	31°33.4	8.7	26°18.3	5.4	55.9							
18	90°25.1	12°37.4	46°01.1	8.7	26°23.6	5.3	55.9							
19	105°25.2	12°38.2	60°28.8	8.7	26°28.8	5.1	55.9							
20	120°25.4	12°39.0	74°56.5	8.7	26°33.8	5.0	55.8							
21	135°25.5	12°39.9	89°24.2	8.7	26°38.7	4.8	55.8							
22	150°25.6	12°40.7	103°51.9	8.7	26°43.5	4.7	55.8							
23	165°25.7	12°41.5	118°19.5	8.6	26°48.1	4.5	55.7							
SD.=15.9 d=0.8 S.D.=15.4														
Mon	GHA	Dec	GHA	ν	Dec	d	HP							
0	180°25.8	12°42.4	132°47.1	8.6	26°52.5	4.4	55.7							
1	195°25.9	12°43.2	147°14.8	8.6	26°56.8	4.2	55.7							
2	210°26.0	12°44.0	161°42.4	8.6	27°01.0	4.1	55.7							
3	225°26.2	12°44.8	176°10.0	8.6	27°05.0	3.9	55.6							
4	240°26.3	12°45.7	190°37.6	8.6	27°08.9	3.8	55.6							
5	255°26.4	12°46.5	205°05.2	8.6	27°12.6	3.6	55.6							
6	270°26.5	12°47.3	219°32.8	8.6	27°16.2	3.5	55.6							
7	285°26.6	12°48.1	234°00.4	8.6	27°19.6	3.3	55.5							
8	300°26.7	12°49.0	248°28.0	8.6	27°22.9	3.2	55.5							
9	315°26.8	12°49.8	262°55.6	8.6	27°26.0	3.1	55.5							
10	330°26.9	12°50.6	277°23.2	8.6	27°29.0	2.9	55.5							
11	345°27.1	12°51.4	291°50.8	8.6	27°31.8	2.8	55.4							
12	0°27.2	12°52.3	306°18.4	8.6	27°34.5	2.6	55.4							
13	15°27.3	12°53.1	320°46.0	8.6	27°37.0	2.5	55.4							
14	30°27.4	12°53.9	335°13.6	8.6	27°39.4	2.3	55.4							
15	45°27.5	12°54.7	349°41.3	8.6	27°41.7	2.2	55.3							
16	60°27.6	12°55.6	4°08.9	8.6	27°43.8	2.0	55.3							
17	75°27.7	12°56.4	18°36.6	8.7	27°45.7	1.9	55.3							
18	90°27.8	12°57.2	33°04.2	8.7	27°47.5	1.7	55.3							
19	105°27.9	12°58.0	47°31.9	8.7	27°49.2	1.6	55.3							
20	120°28.1	12°58.8	61°59.6	8.7	27°50.7	1.4	55.2							
21	135°28.2	12°59.7	76°27.3	8.7	27°52.0	1.3	55.2							
22	150°28.3	13°00.5	90°55.0	8.7	27°53.2	1.1	55.2							
23	165°28.4	13°01.3	105°22.7	8.8	27°54.3	1.0	55.2							
SD.=15.9 d=0.8 S.D.=15.2														
Day	Sun			Moon			Age							
	Eqn. of Time	Mer.	Mer.Pass.	Upper	Lower									
22	00 ^h	12 ^h	Pass											
23	01:20	01:26	11:58	13:56	01:30	2(6%)								
24	01:32	01:38	11:58	14:49	02:22	3(12%)								
	01:43	01:49	11:58	15:42	03:15	4(20%)								

April 25, 26 ,27 (Tue., Wed., Thu.)

Aries			Venus		Mars		Jupiter		Saturn		Stars				
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	212°45.1	138°18.8	24°52.0	105°27.6	24°19.4	189°17.4	8°39.2	235°26.7	-10°59.7			Alpheratz	357°36.6	29°12.9	
1	227°47.6	153°18.2	24°52.4	120°28.6	24°19.2	204°19.3	8°39.4	250°29.0	-10°59.6			Ankaa	353°08.9	-42°10.8	
2	242°50.1	168°17.6	24°52.8	135°29.5	24°19.0	219°21.2	8°39.7	265°31.3	-10°59.5			Schedar	349°33.2	56°39.7	
3	257°52.5	183°16.9	24°53.2	150°30.5	24°18.8	234°23.1	8°39.9	280°33.6	-10°59.5			Diphda	348°48.9	-17°51.6	
4	272°55.0	198°16.3	24°53.6	165°31.5	24°18.6	249°25.0	8°40.1	295°35.8	-10°59.4			Achernar	335°21.8	-57°07.1	
5	287°57.5	213°15.6	24°54.0	180°32.5	24°18.4	264°26.9	8°40.3	310°38.1	-10°59.3			Hamal	327°53.2	23°34.2	
6	302°59.9	228°15.0	24°54.4	195°33.5	24°18.2	279°28.8	8°40.5	325°40.4	-10°59.3			Polaris	315°12.9	89°21.8	
7	318°02.4	243°14.4	24°54.8	210°34.5	24°18.1	294°30.7	8°40.7	340°42.7	-10°59.2			Akamar	315°13.3	-40°12.8	
8	333°04.9	258°13.7	24°55.2	225°35.5	24°17.9	309°32.6	8°41.0	355°44.9	-10°59.1			Menkar	314°08.0	4°10.7	
9	348°07.3	273°13.1	24°55.6	240°36.5	24°17.7	324°34.5	8°41.2	10°47.2	-10°59.1			Mirfak	308°30.8	49°56.6	
10	3°09.8	288°12.5	24°56.0	255°37.5	24°17.5	339°36.4	8°41.4	25°49.5	-10°59.0			Aldebaran	290°41.6	16°33.3	
11	18°12.3	303°11.8	24°56.4	270°38.5	24°17.3	354°38.3	8°41.6	40°51.7	-10°58.9			Rigel	281°05.5	-8°10.6	
12	33°14.7	318°11.2	24°56.8	285°39.5	24°17.1	9°40.2	8°41.8	55°54.0	-10°58.9			Capella	280°24.4	46°01.4	
13	48°17.2	333°10.6	24°57.2	300°40.5	24°16.9	24°42.1	8°42.1	70°56.3	-10°58.8			Bellatrix	278°24.6	6°22.2	
14	63°19.6	348°09.9	24°57.6	315°41.5	24°16.7	39°44.0	8°42.3	85°58.6	-10°58.7			Elnath	278°03.9	28°37.6	
15	78°22.1	3°09.3	24°58.0	330°42.4	24°16.6	54°45.9	8°42.5	101°00.8	-10°58.7			Alnilam	275°39.4	-1°11.3	
16	93°24.6	18°08.7	24°58.4	345°43.4	24°16.4	69°47.8	8°42.7	116°03.1	-10°58.6			Betelgeuse	270°53.8	7°24.6	
17	108°27.0	33°08.0	24°58.8	0°44.4	24°16.2	84°49.7	8°42.9	131°05.4	-10°58.6			Canopus	263°53.3	-52°42.7	
18	123°29.5	48°07.4	24°59.1	15°45.4	24°16.0	99°51.6	8°43.1	146°07.7	-10°58.5			Sirius	258°27.6	-16°44.9	
19	138°32.0	63°06.7	24°59.5	30°46.4	24°15.8	114°53.5	8°43.4	161°09.9	-10°58.4			Adara	255°07.1	-29°00.4	
20	153°34.4	78°06.1	24°59.9	45°47.4	24°15.6	129°55.4	8°43.6	176°12.2	-10°58.4			Procyon	244°52.3	5°10.0	
21	168°36.9	93°05.5	25°00.3	60°48.4	24°15.4	144°57.3	8°43.8	191°14.5	-10°58.3			Pollux	243°19.0	27°58.3	
22	183°39.4	108°04.8	25°00.7	75°49.4	24°15.2	159°59.2	8°44.0	206°16.8	-10°58.2			Avior	234°15.3	-59°35.3	
23	198°41.8	123°04.2	25°01.1	90°50.4	24°15.0	175°01.1	8°44.2	221°19.0	-10°58.2			Suhail	222°47.3	-43°31.8	
Mer.pass.:9:47:			v-0.6 d0.4 m-4.0		v1.0 d-0.2 m1.3		v1.9 d0.2 m-1.9		v2.3 d0.1 m1.0						
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	213°44.3	138°03.6	25°01.4	105°51.4	24°14.9	190°03.0	8°44.4	236°21.3	-10°58.1			Alphard	217°49.1	-8°45.7	
1	228°46.8	153°02.9	25°01.8	120°52.4	24°14.7	205°04.9	8°44.7	251°23.6	-10°58.0			Regulus	207°35.8	11°51.2	
2	243°49.2	168°02.3	25°02.2	135°53.3	24°14.5	220°06.8	8°44.9	266°25.9	-10°58.0			Dubhe	193°42.3	61°37.8	
3	258°51.7	183°01.7	25°02.6	150°54.3	24°14.3	235°08.7	8°45.1	281°28.1	-10°57.9			Denebola	182°26.1	14°26.5	
4	273°54.1	198°01.0	25°03.0	165°55.3	24°14.1	250°10.6	8°45.3	296°30.4	-10°57.8			Gienah	175°44.8	-17°40.4	
5	288°56.6	213°00.4	25°03.3	180°56.3	24°13.9	265°12.5	8°45.5	311°32.7	-10°57.8			Acrux	173°01.1	-63°13.8	
6	303°59.1	227°59.7	25°03.7	195°57.3	24°13.7	280°14.4	8°45.8	326°35.0	-10°57.7			Gacrux	171°52.7	-57°14.7	
7	319°01.5	242°59.1	25°04.1	210°58.3	24°13.5	295°16.3	8°46.0	341°37.2	-10°57.6			Alioth	166°13.7	55°50.1	
8	334°04.0	257°58.5	25°04.5	225°59.3	24°13.3	310°18.2	8°46.2	356°39.5	-10°57.6			Spica	158°23.5	-11°17.0	
9	349°06.5	272°57.8	25°04.8	241°00.3	24°13.1	325°20.1	8°46.4	11°41.8	-10°57.5			Alcaid	152°52.6	49°11.8	
10	4°08.9	287°57.2	25°05.2	256°01.3	24°12.9	340°22.0	8°46.6	26°44.1	-10°57.4			Hadar	148°37.4	-60°29.1	
11	19°11.4	302°56.6	25°05.6	271°02.3	24°12.7	355°23.9	8°46.8	41°46.3	-10°57.4			Menkent	147°58.9	-36°29.1	
12	34°13.9	317°55.9	25°05.9	286°03.2	24°12.6	10°25.8	8°47.1	56°48.6	-10°57.3			Arcturus	145°48.7	19°03.9	
13	49°16.3	332°55.3	25°06.3	301°04.2	24°12.4	25°27.7	8°47.3	71°50.9	-10°57.2			Rigel Kent.	139°41.6	-60°55.9	
14	64°18.8	347°54.7	25°06.7	316°05.2	24°12.2	40°29.6	8°47.5	86°53.2	-10°57.2			Zubenelg.	136°57.3	-16°08.4	
15	79°21.3	2°54.0	25°07.0	331°06.2	24°12.0	55°31.5	8°47.7	101°55.4	-10°57.1			Kochab	137°18.6	74°03.5	
16	94°23.7	17°53.4	25°07.4	346°07.2	24°11.8	70°33.4	8°47.9	116°57.7	-10°57.1			Alphecca	126°04.6	26°38.1	
17	109°26.2	32°52.7	25°07.8	1°08.2	24°11.6	85°35.3	8°48.1	132°00.0	-10°57.0			Antares	112°17.3	-26°29.0	
18	124°28.6	47°52.1	25°08.1	16°09.2	24°11.4	100°37.2	8°48.4	147°02.3	-10°56.9			Atria	107°12.4	-69°04.0	
19	139°31.1	62°51.5	25°08.5	31°10.2	24°11.2	115°39.1	8°48.6	162°04.6	-10°56.9			Sabik	102°04.2	-15°45.3	
20	154°33.6	77°50.8	25°08.8	46°11.2	24°11.0	130°41.0	8°48.8	177°06.8	-10°56.8			Shaula	96°12.0	-37°07.2	
21	169°36.0	92°50.2	25°09.2	61°12.2	24°10.8	145°42.9	8°49.0	192°09.1	-10°56.7			Rasalhague	95°59.7	12°32.4	
22	184°38.5	107°49.6	25°09.6	76°13.1	24°10.6	160°44.8	8°49.2	207°11.4	-10°56.7			Etamin	90°42.5	51°28.8	
23	199°41.0	122°48.9	25°09.9	91°14.1	24°10.4	175°46.7	8°49.4	222°13.7	-10°56.6			Kaus Aust.	83°34.2	-34°22.3	
Mer.pass.:9:43:			v-0.6 d0.4 m-4.0		v1.0 d-0.2 m1.3		v1.9 d0.2 m-1.9		v2.3 d0.1 m1.0						
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	214°43.4	137°48.3	25°10.3	106°15.1	24°10.2	190°48.6	8°49.7	237°15.9	-10°56.5			Vega	80°34.0	38°48.0	
1	229°45.9	152°47.7	25°10.6	121°16.1	24°10.0	205°50.5	8°49.9	252°18.2	-10°56.5			Nunki	75°49.4	-26°16.0	
2	244°48.4	167°47.0	25°11.0	136°17.1	24°09.8	220°52.4	8°50.1	267°20.5	-10°56.4			Peacock	53°08.0	-56°39.4	
3	259°50.8	182°46.4	25°11.3	151°18.1	24°09.6	235°54.3	8°50.3	282°22.8	-10°56.3			Deneb	49°26.8	45°21.4	
4	274°53.3	197°45.7	25°11.7	166°19.1	24°09.4	250°56.2	8°50.5	297°25.1	-10°56.3			Enif	33°40.3	9°58.7	
5	289°55.7	212°45.1	25°12.0	181°20.1	24°09.2	265°58.1	8°50.7	312°27.3	-10°56.2			Alnair	27°34.9	-46°50.8	
6	304°58.2	227°44.5	25°12.4	196°21.1	24°09.0	281°00.0	8°51.0	327°29.6	-10°56.2			Fomalhaut	15°16.4	-29°29.9	
7	320°00.7	242°43.8	25°12.7	211°22.0	24°08.8	296°01.9	8°51.2	342°31.9	-10°56.1			Scheat	13°46.9	28°12.2	
8	335°03.1	257°43.2	25°13.1	226°23.0	24°08.6	311°03.8	8°51.4	357°34.2	-10°56.0			Markab	13°31.6	15°19.6	
9	350°05.6	272°42.6	25°13.4	241°24.0	24°08.4	326°05.7	8°51.6	12°36.4	-10°56.0			2023/4/2		SHA	Mer.pass
10	5°08.1	287°41.9	25°13.8	256°25.0	24°08.3	341°07.6	8°51.8	27°38.7	-10°55.9			Venus	285°33.7	14:47	
11	20°10.5	302°41.3	25°14.1	271°26.0	24°08.1	356°09.5	8°52.0	42°41.0	-10°55.8			Mars	252°42.4	16:57	
12	35°13.0	317°40.7	25°14.4	286°27.0	24°07.9	11°11.4	8°52.3	57°43.3	-10°55.8			Jupiter			

Sun				Moon											
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Sunrise	Sunset	Twilight	
									Naut.	Civil				Civil	Naut.
0	180°28.5	13°02.1	119°50.5	8.8	27°55.2	0.9	55.1	72	--	--	02:32	21:29	--	--	
1	195°28.6	13°02.9	134°18.3	8.8	27°56.0	0.7	55.1	70	--	00:57	03:01	20:59	23:15	--	--
2	210°28.7	13°03.8	148°46.1	8.8	27°56.7	0.6	55.1	68	--	01:53	03:22	20:37	22:09	--	--
3	225°28.8	13°04.6	163°13.9	8.8	27°57.1	0.4	55.1	66	--	02:26	03:38	20:20	21:34	--	--
4	240°28.9	13°05.4	177°41.8	8.9	27°57.5	0.3	55.1	64	00:49	02:49	03:52	20:06	21:10	23:21	
5	255°29.0	13°06.2	192°09.7	8.9	27°57.7	0.1	55.0	62	01:40	03:07	04:03	19:55	20:51	22:21	
6	270°29.1	13°07.0	206°37.6	8.9	27°57.7	-0.0	55.0	60	02:09	03:22	04:13	19:45	20:36	21:50	
7	285°29.3	13°07.9	221°05.5	9.0	27°57.6	-0.2	55.0	58	02:31	03:35	04:21	19:36	20:23	21:27	
8	300°29.4	13°08.7	235°33.5	9.0	27°57.4	-0.3	55.0	56	02:49	03:46	04:28	19:29	20:12	21:10	
9	315°29.5	13°09.5	250°01.5	9.0	27°57.0	-0.4	55.0	54	03:03	03:55	04:35	19:22	20:02	20:55	
10	330°29.6	13°10.3	264°29.5	9.0	27°56.5	-0.6	54.9	52	03:15	04:03	04:41	19:16	19:54	20:42	
11	345°29.7	13°11.1	278°57.6	9.1	27°55.9	-0.7	54.9	50	03:26	04:11	04:46	19:10	19:46	20:32	
12	0°29.8	13°11.9	293°25.7	9.1	27°55.1	-0.9	54.9	45	03:47	04:26	04:58	18:59	19:31	20:10	
13	15°29.9	13°12.7	307°53.8	9.1	27°54.1	-1.0	54.9	40	04:03	04:38	05:07	18:49	19:18	19:53	
14	30°30.0	13°13.6	322°22.0	9.2	27°53.0	-1.2	54.9	35	04:17	04:48	05:15	18:41	19:08	19:40	
15	45°30.1	13°14.4	336°50.2	9.2	27°51.8	-1.3	54.8	30	04:27	04:57	05:22	18:34	18:59	19:29	
16	60°30.2	13°15.2	351°18.4	9.3	27°50.4	-1.4	54.8	20	04:45	05:11	05:34	18:22	18:45	19:11	
17	75°30.3	13°16.0	5°46.7	9.3	27°48.9	-1.6	54.8	10	04:58	05:23	05:45	18:11	18:33	18:58	
18	90°30.4	13°16.8	20°15.0	9.3	27°47.3	-1.7	54.8	0	05:09	05:33	05:54	18:01	18:22	18:47	
19	105°30.5	13°17.6	34°43.4	9.4	27°45.5	-1.9	54.8	-10	05:18	05:43	06:04	17:51	18:13	18:38	
20	120°30.6	13°18.4	49°11.8	9.4	27°43.6	-2.0	54.7	-20	05:26	05:52	06:14	17:41	18:04	18:30	
21	135°30.7	13°19.2	63°40.3	9.5	27°41.5	-2.1	54.7	-30	05:33	06:01	06:26	17:30	17:54	18:22	
22	150°30.8	13°20.1	78°08.8	9.5	27°39.3	-2.3	54.7	-35	05:36	06:06	06:32	17:23	17:49	18:19	
23	165°31.0	13°20.9	92°37.3	9.6	27°37.0	-2.4	54.7	-40	05:40	06:12	06:40	17:16	17:43	18:15	
SD.=15.9 d=0.8 S.D.=15.0								-45	05:43	06:18	06:48	17:07	17:37	18:12	
								-50	05:47	06:25	06:59	16:56	17:30	18:08	
								-52	05:48	06:28	07:03	16:52	17:27	18:06	
								-54	05:50	06:32	07:09	16:46	17:23	18:05	
								-56	05:51	06:35	07:15	16:40	17:20	18:03	
								-58	05:53	06:39	07:21	16:34	17:15	18:02	
								-60	05:55	06:44	07:28	16:26	17:11	17:60	
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
									Tue	Wed	Thu	Tue	Wed	Thu	
0	180°31.1	13°21.7	107°05.9	9.6	27°34.5	-2.5	54.7	72	--	--	--	--	--	--	
1	195°31.2	13°22.5	121°34.5	9.7	27°31.9	-2.7	54.7	70	--	--	--	--	--	--	
2	210°31.3	13°23.3	136°03.2	9.7	27°29.2	-2.8	54.6	68	--	--	--	--	--	--	
3	225°31.4	13°24.1	150°32.0	9.8	27°26.3	-2.9	54.6	66	--	--	--	--	--	--	
4	240°31.5	13°24.9	165°00.7	9.8	27°23.3	-3.1	54.6	64	--	--	06:57	--	--	04:56	
5	255°31.6	13°25.7	179°29.6	9.9	27°20.2	-3.2	54.6	62	04:35	06:04	07:50	03:44	04:04	04:03	
6	270°31.7	13°26.5	193°58.5	9.9	27°16.9	-3.3	54.6	60	05:48	06:56	08:22	02:31	03:12	03:31	
7	285°31.8	13°27.3	208°27.4	10.0	27°13.5	-3.5	54.6	58	06:23	07:27	08:46	01:56	02:41	03:07	
8	300°31.9	13°28.2	222°56.4	10.0	27°10.0	-3.6	54.6	56	06:49	07:51	09:05	01:30	02:17	02:47	
9	315°32.0	13°29.0	237°25.5	10.1	27°06.3	-3.7	54.5	54	07:09	08:10	09:21	01:09	01:58	02:31	
10	330°32.1	13°29.8	251°54.6	10.1	27°02.6	-3.9	54.5	52	07:26	08:26	09:34	00:52	01:41	02:17	
11	345°32.2	13°30.6	266°23.8	10.2	26°58.6	-4.0	54.5	50	07:41	08:40	09:46	00:38	01:27	02:04	
12	0°32.3	13°31.4	280°53.0	10.3	26°54.6	-4.1	54.5	45	08:11	09:08	10:11	00:08	00:59	01:39	
13	15°32.4	13°32.2	295°22.3	10.3	26°50.4	-4.2	54.5	40	08:34	09:30	10:31	--	00:36	01:19	
14	30°32.5	13°33.0	309°51.6	10.4	26°46.1	-4.4	54.5	35	08:53	09:49	10:47	--	00:17	01:02	
15	45°32.6	13°33.8	324°21.0	10.4	26°41.7	-4.5	54.5	30	09:09	10:04	11:01	--	00:01	00:47	
16	60°32.7	13°34.6	338°50.4	10.5	26°37.1	-4.6	54.5	20	09:37	10:31	11:25	23:34	--	00:22	
17	75°32.8	13°35.4	353°20.0	10.5	26°32.5	-4.7	54.4	10	10:01	10:54	11:46	23:11	--	00:00	
18	90°32.9	13°36.2	7°49.5	10.6	26°27.7	-4.9	54.4	0	10:23	11:15	12:05	22:49	23:40	--	
19	105°33.0	13°37.0	22°19.2	10.7	26°22.7	-5.0	54.4	-10	10:46	11:37	12:24	22:27	23:19	--	
20	120°33.1	13°37.8	36°48.9	10.7	26°17.7	-5.1	54.4	-20	11:09	11:59	12:45	22:03	22:57	23:51	
21	135°33.2	13°38.6	51°18.6	10.8	26°12.5	-5.2	54.4	-30	11:37	12:26	13:08	21:36	22:32	23:29	
22	150°33.3	13°39.4	65°48.4	10.9	26°07.2	-5.3	54.4	-35	11:54	12:42	13:22	21:19	22:17	23:16	
23	165°33.4	13°40.2	80°18.3	10.9	26°01.8	-5.5	54.4	-40	12:13	12:60	13:38	21:00	21:59	23:00	
SD.=15.9 d=0.8 S.D.=14.9								-45	12:36	13:21	13:57	20:37	21:38	22:42	
								-50	13:06	13:49	14:21	20:08	21:11	22:20	
								-52	13:21	14:02	14:32	19:53	20:58	22:09	
								-54	13:38	14:18	14:45	19:36	20:42	21:56	
								-56	13:58	14:36	14:60	19:15	20:24	21:42	
								-58	14:24	14:58	15:17	18:50	20:03	21:25	
								-60	15:00	15:27	15:38	18:14	19:34	21:05	
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun		Mer.	Moon		Age	
									Eqn.of Time 00 ^h	12 ^h	Pass	Mer.Pass. Upper Lower			
0	180°33.5	13°41.0	94°48.3	11.0	25°56.3	-5.6	54.4	25	01:54	01:59	11:58	16:36 04:09	5(28%)		
1	195°33.6	13°41.8	109°18.3	11.0	25°50.7	-5.7	54.4	26	02:04	02:09	11:57	17:27 05:02	6(37%)		
2	210°33.7	13°42.6	123°48.4	11.1	25°44.9	-5.8	54.4	27	02:14	02:19	11:57	18:16 05:52	7(46%)		
3	225°33.8	13°43.4	138°18.5	11.2	25°39.0	-5.9	54.3								
4	240°33.9	13°44.2	152°48.7	11.2	25°33.0	-6.1	54.3								
5	255°34.0	13°45.0	167°19.0	11.3	25°26.9	-6.2	54.3								
6	270°34.1	13°45.8	181°49.3	11.4	25°20.7	-6.3	54.3								
7	285°34.2	13°46.6	196°19.7	11.4	25°14.3	-6.4	54.3								
8	300°34.3	13°47.4	210°50.1	11.5	25°07.9	-6.5	54.3								
9	315°34.4	13°48.2	225°20.7	11.6	25°01.3	-6.6	54.3								
10	330°34.5	13°49.0	239°51.3	11.6	24°54.6	-6.7	54.3								
11	345°34.6	13°49.8	254°21.9	11.7	24°47.8	-6.8	54.3								
12	0°34.7	13°50.6	268°52.6	11.8	24°40.9	-7.0	54.3								
13	15°34.8	13°51.4	283°23.4	11.8	24°33.9	-7.1	54.3								
14	30°34.9	13°52.2	297°54.3	11.9	24°26.8	-7.2	54.3								
15	45°35.0	13°53.0	312°25.2	12.0	24°19.6	-7.3	54.3								
16	60°35.1	13°53.8	326°56.2	12.0	24°12.2	-7.4	54.3								
17	75°35.2	13°54.6	341°27.3	12.1	24°04.8	-7.5	54.3								
18	90°35.3	13°55.4	355°58.4	12.2	23°57.3	-7.6	54.3								
19	105°35.3	13°56.2	10°29.6	12.2	23°49.6	-7.7	54.3								
20	120°35.4	13°57.0	25°00.8	12.3	23°41.9	-7.8	54.3								
21	135°35.5	13°57.7	39°32.1	12.4	23°34.0	-7.9	54.2								
22	150°35.6	13°58.5	54°03.5	12.4	23°26.0	-8.0	54.2								
23	165°35.7	13°59.3	68°35.0	12.5	23°18.0	-8.1	54.2								
SD.=15.9 d=0.8 S.D.=14.8															

April 28, 29 ,30 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars			
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	215°42.6	137°33.0	25°18.4	106°38.8	24°05.5	191°34.3	8°54.9	238°10.6	-10°55.0	Alpheratz	357°36.6	29°12.9						
1	230°45.0	152°32.4	25°18.8	121°39.8	24°05.3	206°36.2	8°55.1	253°12.9	-10°55.0	Ankaa	353°08.9	-42°10.8						
2	245°47.5	167°31.8	25°19.1	136°40.8	24°05.1	221°38.1	8°55.3	268°15.2	-10°54.9	Schedar	349°33.2	56°39.7						
3	260°50.0	182°31.1	25°19.4	151°41.8	24°04.8	236°40.0	8°55.5	283°17.5	-10°54.8	Diphda	348°48.9	-17°51.6						
4	275°52.4	197°30.5	25°19.7	166°42.8	24°04.6	251°41.9	8°55.7	298°19.8	-10°54.8	Achernar	335°21.8	-57°07.1						
5	290°54.9	212°29.9	25°20.1	181°43.8	24°04.4	266°43.8	8°55.9	313°22.1	-10°54.7	Hamal	327°53.2	23°34.2						
6	305°57.4	227°29.2	25°20.4	196°44.8	24°04.2	281°45.7	8°56.2	328°24.3	-10°54.6	Polaris	315°13.1	89°21.7						
7	320°59.8	242°28.6	25°20.7	211°45.7	24°04.0	296°47.6	8°56.4	343°26.6	-10°54.6	Akamar	315°13.3	-40°12.8						
8	336°02.3	257°27.9	25°21.0	226°46.7	24°03.8	311°49.5	8°56.6	358°28.9	-10°54.5	Menkar	314°08.0	4°10.7						
9	351°04.7	272°27.3	25°21.3	241°47.7	24°03.6	326°51.4	8°56.8	13°31.2	-10°54.5	Mirfak	308°30.8	49°56.6						
10	6°07.2	287°26.7	25°21.7	256°48.7	24°03.4	341°53.3	8°57.0	28°33.5	-10°54.4	Aldebaran	290°41.6	16°33.3						
11	21°09.7	302°26.0	25°22.0	271°49.7	24°03.2	356°55.2	8°57.2	43°35.7	-10°54.3	Rigel	281°05.5	-8°10.6						
12	36°12.1	317°25.4	25°22.3	286°50.7	24°03.0	11°57.1	8°57.4	58°38.0	-10°54.3	Capella	280°24.4	46°01.4						
13	51°14.6	332°24.8	25°22.6	301°51.7	24°02.8	26°59.0	8°57.7	73°40.3	-10°54.2	Bellatrix	278°24.6	6°22.2						
14	66°17.1	347°24.1	25°22.9	316°52.6	24°02.6	42°00.9	8°57.9	88°42.6	-10°54.1	Elnath	278°04.0	28°37.6						
15	81°19.5	2°23.5	25°23.2	331°53.6	24°02.4	57°02.8	8°58.1	103°44.9	-10°54.1	Alnilam	275°39.4	-1°11.3						
16	96°22.0	17°22.9	25°23.5	346°54.6	24°02.2	72°04.7	8°58.3	118°47.2	-10°54.0	Betelgeuse	270°53.8	7°24.6						
17	111°24.5	32°22.2	25°23.8	1°55.6	24°02.0	87°06.6	8°58.5	133°49.4	-10°54.0	Canopus	263°53.3	-52°42.7						
18	126°26.9	47°21.6	25°24.1	16°56.6	24°01.8	102°08.5	8°58.7	148°51.7	-10°53.9	Sirius	258°27.6	-16°44.8						
19	141°29.4	62°21.0	25°24.4	31°57.6	24°01.6	117°10.4	8°59.0	163°54.0	-10°53.8	Adara	255°07.1	-29°00.4						
20	156°31.8	77°20.3	25°24.8	46°58.6	24°01.4	132°12.3	8°59.2	178°56.3	-10°53.8	Procyon	244°52.3	5°10.0						
21	171°34.3	92°19.7	25°25.1	61°59.5	24°01.2	147°14.2	8°59.4	193°58.6	-10°53.7	Pollux	243°19.0	27°58.3						
22	186°36.8	107°19.1	25°25.4	77°00.5	24°01.0	162°16.1	8°59.6	209°00.9	-10°53.6	Avior	234°15.4	-59°35.3						
23	201°39.2	122°18.4	25°25.7	92°01.5	24°00.8	177°18.0	8°59.8	224°03.1	-10°53.6	Suhail	222°47.3	-43°31.8						
Mer.pass.:9:35:			v-0.6 d0.3 m-4.0			v1.0 d-0.2 m1.3			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0						
												Miaplacidus			221°38.5	-69°49.0		
															Alphard		217°49.1	-8°45.7
															Regulus		207°35.8	11°51.2
															Dubhe		193°42.3	61°37.8
															Denebola		182°26.1	14°26.5
															Gienah		175°44.8	-17°40.4
															Acrux		173°01.1	-63°13.8
															Gacrux		171°52.7	-57°14.8
															Alioth		166°13.7	55°50.1
															Spica		158°23.5	-11°17.0
															Alcaid		152°52.6	49°11.8
															Hadar		148°37.4	-60°29.2
															Menkent		147°58.9	-36°29.1
															Arcturus		145°48.7	19°03.9
															Rigel Kent.		139°41.6	-60°55.9
															Zubenelg.		136°57.3	-16°08.4
															Kochab		137°18.5	74°03.5
															Alphecca		126°04.6	26°38.1
															Antares		112°17.3	-26°29.0
															Atria		107°12.3	-69°04.0
															Sabik		102°04.2	-15°45.3
															Shaula		96°12.0	-37°07.2
															Rasalhague		95°59.7	12°32.4
															Etamin		90°42.5	51°28.8
															Kaus Aust.		83°34.2	-34°22.3
															Vega		80°34.0	38°48.0
															Nunki		75°49.4	-26°16.0
															Altair		62°01.4	8°55.5
															Peacock		53°07.9	-56°39.4
															Deneb		49°26.8	45°21.4
															Enif		33°40.3	9°58.7
															Alnair		27°34.9	-46°50.8
															Fomalhaut		15°16.4	-29°29.9
															Scheat		13°46.9	28°12.3
															Markab		13°31.5	15°19.6
															2023/4/2		SHA	Mer.pass
															Venus		281°50.5	14:50
															Mars		250°56.3	16:52
															Jupiter		335°51.7	11:12
															Saturn		22°28.1	08:06
															2023/4/2		SHA	Mer.pass
															Venus		280°36.1	14:51
															Mars		250°20.8	16:51
															Jupiter		335°38.2	11:09
															Saturn		22°23.7	08:02
															2023/4/3		SHA	Mer.pass
															Venus		279°21.7	14:52
															Mars		249°45.3	16:49
															Jupiter		335°24.7	11:06
															Saturn		22°19.4	07:59
															Horizontal paralax			
															Venus:		0.1	
															Mars:		0.1	
Mer.pass.:9:27:			v-0.6 d0.3 m-4.0			v1.0 d-0.2 m1.3			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0						

h Sun Moon

	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight				
								Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Twilight	Naut.	
0	180°35.8	14°00.1	83°06.5	12.5	23°09.8	-8.2	54.2	72	—	—	02:11	21:50	—	—		
1	195°35.9	14°00.9	97°38.1	12.6	23°01.5	-8.3	54.2	70	—	—	02:44	21:15	—	—		
2	210°36.0	14°01.7	112°09.7	12.7	22°53.2	-8.4	54.2	70	—	—	02:44	21:15	—	—		
3	225°36.1	14°02.5	126°41.4	12.7	22°44.7	-8.5	54.2	68	—	01:29	03:08	20:50	22:33	—		
4	240°36.2	14°03.3	141°13.2	12.8	22°36.2	-8.6	54.2	66	—	02:09	03:27	20:31	21:50	—		
5	255°36.3	14°04.1	155°45.0	12.9	22°27.5	-8.7	54.2	64	—	02:36	03:41	20:16	21:22	—		
6	270°36.4	14°04.9	170°17.0	12.9	22°18.8	-8.8	54.2	62	01:19	02:56	03:54	20:03	21:01	22:43		
7	285°36.5	14°05.6	184°48.9	13.0	22°09.9	-8.9	54.2	60	01:55	03:13	04:04	19:52	20:45	22:04		
8	300°36.6	14°06.4	199°21.0	13.1	22°01.0	-9.0	54.2	58	02:19	03:26	04:13	19:43	20:31	21:39		
9	315°36.7	14°07.2	213°53.1	13.1	21°51.9	-9.1	54.2	56	02:39	03:38	04:21	19:35	20:19	21:19		
10	330°36.8	14°08.0	228°25.2	13.2	21°42.8	-9.2	54.2	54	02:54	03:48	04:29	19:27	20:09	21:03		
11	345°36.8	14°08.8	242°57.4	13.3	21°33.6	-9.3	54.2	52	03:07	03:57	04:35	19:21	19:60	20:49		
12	0°36.9	14°09.6	257°29.7	13.3	21°24.3	-9.4	54.2	50	03:19	04:04	04:41	19:15	19:52	20:38		
13	15°37.0	14°10.4	272°02.1	13.4	21°14.9	-9.4	54.2	45	03:41	04:21	04:53	19:03	19:35	20:15		
14	30°37.1	14°11.2	286°34.5	13.4	21°05.4	-9.5	54.2	40	03:59	04:34	05:03	18:52	19:22	19:57		
15	45°37.2	14°11.9	301°06.9	13.5	20°55.8	-9.6	54.2	35	04:13	04:45	05:12	18:44	19:10	19:43		
16	60°37.3	14°12.7	315°39.5	13.6	20°46.1	-9.7	54.2	30	04:24	04:54	05:19	18:36	19:01	19:31		
17	75°37.4	14°13.5	330°12.1	13.6	20°36.4	-9.8	54.2	20	04:42	05:09	05:32	18:23	18:46	19:13		
18	90°37.5	14°14.3	344°44.7	13.7	20°26.6	-9.9	54.3	10	04:56	05:22	05:44	18:11	18:33	18:59		
19	105°37.6	14°15.1	359°17.4	13.7	20°16.6	-10.0	54.3	0	05:08	05:33	05:54	18:01	18:22	18:47		
20	120°37.7	14°15.9	13°50.2	13.8	20°06.6	-10.1	54.3	-10	05:18	05:43	06:04	17:50	18:12	18:37		
21	135°37.8	14°16.6	28°23.0	13.9	19°56.5	-10.1	54.3	-20	05:26	05:53	06:15	17:39	18:02	18:28		
22	150°37.8	14°17.4	42°55.9	13.9	19°46.3	-10.2	54.3	-30	05:35	06:03	06:28	17:27	17:52	18:20		
23	165°37.9	14°18.2	57°28.8	14.0	19°36.1	-10.3	54.3	-35	05:39	06:08	06:35	17:20	17:46	18:16		
	SD.=15.9	d=0.8	S.D.=14.8					-40	05:43	06:15	06:43	17:12	17:40	18:12		
								-45	05:47	06:21	06:52	17:02	17:33	18:07		
								-50	05:51	06:29	07:03	16:51	17:25	18:03		
								-52	05:53	06:33	07:08	16:46	17:21	18:01		
								-54	05:55	06:37	07:14	16:40	17:17	17:59		
								-56	05:57	06:41	07:20	16:34	17:13	17:57		
								-58	05:59	06:45	07:28	16:26	17:09	17:55		
								-60	06:01	06:50	07:36	16:18	17:03	17:53		
								Lat.	Fri	Moonrise		Moonset				
								72	—	—	11:22	—	—	05:18		
								70	—	09:25	11:46	—	05:44	04:52		
								68	—	10:04	12:04	—	05:03	04:33		
								66	08:26	10:31	12:18	05:07	04:35	04:17		
								64	09:05	10:52	12:30	04:28	04:14	04:04		
								62	09:32	11:08	12:40	03:60	03:56	03:53		
								60	09:52	11:22	12:48	03:39	03:42	03:43		
								58	10:09	11:33	12:56	03:21	03:29	03:35		
								56	10:24	11:43	13:02	03:06	03:19	03:27		
								54	10:36	11:52	13:08	02:53	03:09	03:21		
								52	10:47	12:00	13:13	02:42	03:01	03:15		
								50	10:56	12:07	13:18	02:32	02:53	03:09		
								45	11:16	12:22	13:28	02:11	02:36	02:58		
								40	11:33	12:35	13:36	01:54	02:23	02:48		
								35	11:46	12:45	13:44	01:39	02:11	02:39		
								30	11:58	12:54	13:50	01:26	02:01	02:32		
								20	12:18	13:10	14:01	01:05	01:44	02:19		
								10	12:36	13:24	14:10	00:46	01:28	02:08		
								0	12:52	13:36	14:19	00:28	01:14	01:57		
								-10	13:08	13:49	14:28	00:10	00:59	01:46		
								-20	13:25	14:03	14:37	—	00:43	01:35		
								-30	13:45	14:18	14:47	—	00:25	01:21		
								-35	13:57	14:27	14:54	—	00:15	01:13		
								-40	14:10	14:37	15:00	—	00:03	01:05		
								-45	14:25	14:49	15:08	23:48	—	00:54		
								-50	14:44	15:03	15:18	23:30	—	00:41		
								-52	14:53	15:09	15:22	23:22	—	00:35		
								-54	15:03	15:17	15:27	23:13	—	00:29		
								-56	15:15	15:25	15:32	23:02	—	00:21		
								-58	15:28	15:34	15:38	22:50	—	00:13		
								-60	15:43	15:44	15:45	22:35	—	00:04		
								Day	Sun		Mer.	Moon		Age		
									Eqn.of Time	12 ^h	Pass	Upper	Lower			
								00 ^h								
								28	02:23	02:28	11:57	19:02	06:40	8(56%)		
								29	02:32	02:36	11:57	19:46	07:25	9(65%)		
								30	02:40	02:44	11:57	20:28	08:07	10(74%)		

May 01, 02 ,03 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	218°40.0	136°47.5	25°39.0	107°49.7	23°50.3	193°51.3	9°10.3	240°55.2	-10°50.6				Alpheratz	357°36.6	29°12.9		
1	233°42.4	151°46.8	25°39.3	122°50.7	23°50.1	208°53.2	9°10.5	255°57.5	-10°50.5				Ankaa	353°08.9	-42°10.8		
2	248°44.9	166°46.2	25°39.5	137°51.7	23°49.9	223°55.1	9°10.7	270°59.8	-10°50.5				Schedar	349°33.2	56°39.7		
3	263°47.4	181°45.6	25°39.8	152°52.7	23°49.7	238°57.0	9°11.0	286°02.0	-10°50.4				Diphda	348°48.9	-17°51.6		
4	278°49.8	196°44.9	25°40.0	167°53.7	23°49.5	253°58.9	9°11.2	301°04.3	-10°50.4				Achernar	335°21.8	-57°07.1		
5	293°52.3	211°44.3	25°40.2	182°54.6	23°49.2	269°00.8	9°11.4	316°06.6	-10°50.3				Hamal	327°53.2	23°34.2		
6	308°54.8	226°43.7	25°40.5	197°55.6	23°49.0	284°02.7	9°11.6	331°08.9	-10°50.3				Polaris	315°13.3	89°21.7		
7	323°57.2	241°43.1	25°40.7	212°56.6	23°48.8	299°04.6	9°11.8	346°11.2	-10°50.2				Akamar	315°13.3	-40°12.8		
8	338°59.7	256°42.4	25°40.9	227°57.6	23°48.6	314°06.5	9°12.0	1°13.5	-10°50.1				Menkar	314°08.0	4°10.8		
9	354°02.2	271°41.8	25°41.2	242°58.6	23°48.4	329°08.4	9°12.2	16°15.8	-10°50.1				Mirfak	308°30.8	49°56.6		
10	9°04.6	286°41.2	25°41.4	257°59.6	23°48.1	344°10.3	9°12.5	31°18.1	-10°50.0				Aldebaran	290°41.6	16°33.3		
11	24°07.1	301°40.5	25°41.6	273°00.5	23°47.9	359°12.2	9°12.7	46°20.4	-10°50.0				Rigel	281°05.5	-8°10.6		
12	39°09.6	316°39.9	25°41.9	288°01.5	23°47.7	14°14.1	9°12.9	61°22.7	-10°49.9				Capella	280°24.4	46°01.4		
13	54°12.0	331°39.3	25°42.1	303°02.5	23°47.5	29°16.0	9°13.1	76°25.0	-10°49.8				Bellatrix	278°24.7	6°22.2		
14	69°14.5	346°38.7	25°42.3	318°03.5	23°47.3	44°17.9	9°13.3	91°27.2	-10°49.8				Elnath	278°04.0	28°37.6		
15	84°16.9	1°38.0	25°42.6	333°04.5	23°47.0	59°19.8	9°13.5	106°29.5	-10°49.7				Alnilam	275°39.4	-1°11.3		
16	99°19.4	16°37.4	25°42.8	348°05.4	23°46.8	74°21.7	9°13.7	121°31.8	-10°49.7				Betelgeuse	270°53.9	7°24.6		
17	114°21.9	31°36.8	25°43.0	3°06.4	23°46.6	89°23.6	9°13.9	136°34.1	-10°49.6				Canopus	263°53.4	-52°42.7		
18	129°24.3	46°36.1	25°43.2	18°07.4	23°46.4	104°25.5	9°14.2	151°36.4	-10°49.5				Sirius	258°27.6	-16°44.8		
19	144°26.8	61°35.5	25°43.5	33°08.4	23°46.1	119°27.4	9°14.4	166°38.7	-10°49.5				Adara	255°07.1	-29°00.4		
20	159°29.3	76°34.9	25°43.7	48°09.4	23°45.9	134°29.4	9°14.6	181°41.0	-10°49.4				Procyon	244°52.3	5°10.0		
21	174°31.7	91°34.3	25°43.9	63°10.4	23°45.7	149°31.3	9°14.8	196°43.3	-10°49.4				Pollux	243°19.0	27°58.3		
22	189°34.2	106°33.6	25°44.1	78°11.3	23°45.5	164°33.2	9°15.0	211°45.6	-10°49.3				Avior	234°15.4	-59°35.3		
23	204°36.7	121°33.0	25°44.3	93°12.3	23°45.3	179°35.1	9°15.2	226°47.9	-10°49.3				Suhail	222°47.3	-43°31.8		
Mer.pass.:9:23:			v-0.6 d0.2 m-4.0			v1.0 d-0.2 m1.3			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					

Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	219°39.1	136°32.4	25°44.6	108°13.3	23°45.0	194°37.0	9°15.4	241°50.2	-10°49.2					
1	234°41.6	151°31.8	25°44.8	123°14.3	23°44.8	209°38.9	9°15.6	256°52.5	-10°49.1					
2	249°44.0	166°31.1	25°45.0	138°15.3	23°44.6	224°40.8	9°15.9	271°54.8	-10°49.1					
3	264°46.5	181°30.5	25°45.2	153°16.2	23°44.4	239°42.7	9°16.1	286°57.0	-10°49.0					
4	279°49.0	196°29.9	25°45.4	168°17.2	23°44.1	254°44.6	9°16.3	301°59.3	-10°49.0					
5	294°51.4	211°29.3	25°45.6	183°18.2	23°43.9	269°46.5	9°16.5	317°01.6	-10°48.9					
6	309°53.9	226°28.6	25°45.8	198°19.2	23°43.7	284°48.4	9°16.7	332°03.9	-10°48.8					
7	324°56.4	241°28.0	25°46.1	213°20.2	23°43.5	299°50.3	9°16.9	347°06.2	-10°48.8					
8	339°58.8	256°27.4	25°46.3	228°21.1	23°43.2	314°52.2	9°17.1	2°08.5	-10°48.7					
9	355°01.3	271°26.8	25°46.5	243°22.1	23°43.0	329°54.1	9°17.3	17°10.8	-10°48.7					
10	10°03.8	286°26.1	25°46.7	258°23.1	23°42.8	344°56.0	9°17.6	32°13.1	-10°48.6					
11	25°06.2	301°25.5	25°46.9	273°24.1	23°42.6	359°57.9	9°17.8	47°15.4	-10°48.6					
12	40°08.7	316°24.9	25°47.1	288°25.1	23°42.3	14°59.8	9°18.0	62°17.7	-10°48.5					
13	55°11.2	331°24.3	25°47.3	303°26.1	23°42.1	30°01.7	9°18.2	77°20.0	-10°48.4					
14	70°13.6	346°23.6	25°47.5	318°27.0	23°41.9	45°03.6	9°18.4	92°22.3	-10°48.4					
15	85°16.1	1°23.0	25°47.7	333°28.0	23°41.6	60°05.5	9°18.6	107°24.6	-10°48.3					
16	100°18.5	16°22.4	25°47.9	348°29.0	23°41.4	75°07.4	9°18.8	122°26.9	-10°48.3					
17	115°21.0	31°21.8	25°48.1	3°30.0	23°41.2	90°09.4	9°19.0	137°29.2	-10°48.2					
18	130°23.5	46°21.2	25°48.3	18°31.0	23°41.0	105°11.3	9°19.3	152°31.5	-10°48.2					
19	145°25.9	61°20.5	25°48.5	33°31.9	23°40.7	120°13.2	9°19.5	167°33.7	-10°48.1					
20	160°28.4	76°19.9	25°48.7	48°32.9	23°40.5	135°15.1	9°19.7	182°36.0	-10°48.0					
21	175°30.9	91°19.3	25°48.9	63°33.9	23°40.3	150°17.0	9°19.9	197°38.3	-10°48.0					
22	190°33.3	106°18.7	25°49.1	78°34.9	23°40.0	165°18.9	9°20.1	212°40.6	-10°47.9					
23	205°35.8	121°18.0	25°49.3	93°35.9	23°39.8	180°20.8	9°20.3	227°42.9	-10°47.9					
Mer.pass.:9:19:			v-0.6 d0.2 m-4.0			v1.0 d-0.2 m1.3			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0		

Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	220°38.3	136°17.4	25°49.4	108°36.8	23°39.6	195°22.7	9°20.5	242°45.2	-10°47.8					
1	235°40.7	151°16.8	25°49.6	123°37.8	23°39.4	210°24.6	9°20.7	257°47.5	-10°47.8					
2	250°43.2	166°16.2	25°49.8	138°38.8	23°39.1	225°26.5	9°21.0	272°49.8	-10°47.7					
3	265°45.6	181°15.6	25°50.0	153°39.8	23°38.9	240°28.4	9°21.2	287°52.1	-10°47.6					
4	280°48.1	196°14.9	25°50.2	168°40.8	23°38.7	255°30.3	9°21.4	302°54.4	-10°47.6					
5	295°50.6	211°14.3	25°50.4	183°41.7	23°38.4	270°32.2	9°21.6	317°56.7	-10°47.5					
6	310°53.0	226°13.7	25°50.6	198°42.7	23°38.2	285°34.1	9°21.8	332°59.0	-10°47.5					
7	325°55.5	241°13.1	25°50.7	213°43.7	23°38.0	300°36.0	9°22.0	348°01.3	-10°47.4					
8	340°58.0	256°12.5	25°50.9	228°44.7	23°37.7	315°37.9	9°22.2	3°03.6	-10°47.4					
9	356°00.4	271°11.8	25°51.1	243°45.7	23°37.5	330°39.8	9°22.4	18°05.9	-10°47.3					
10	11°02.9	286°11.2	25°51.3	258°46.6	23°37.3	345°41.7	9°22.6	33°08.2	-10°47.2					
11	26°05.4	301°10.6	25°51.5	273°47.6	23°37.0	0°43.6	9°22.9	48°10.5	-10°47.2					
12	41°07.8	316°10.0	25°51.6	288°48.6	23°36.8	15°45.5	9°23.1	63°12.8	-10°47.1					
13	56°10.3	331°09.4	25°51.8	303°49.6	23°36.6	30°47.5	9°23.3	78°15.1	-10°47.1					
14	71°12.8	346°08.7	25°52.0	318°50.6	23°36.3	45°49.4	9°23.5	93°17.4	-10°47.0					
15	86°15.2	1°08.1	25°52.2	333°51.5	23°36.1	60°51.3	9°23.7	108°19.7	-10°47.0					
16	101°17.7	16°07.5	25°52.3	348°52.5	23°35.9	75°53.2	9°23.9	123°22.0	-10°46.9					
17	116°20.1	31°06.9	25°52.5	3°53.5	23°35.6	90°55.1	9°24.1	138°24.3	-10°46.9					
18	131°22.6	46°06.3	25°52.7	18°54.5	23°35.4	105°57.0	9°24.3	153°26.6	-10°46.8					
19	146°25.1	61°05.7	25°52.8	33°55.4	23°35.2	120°58.9	9°24.5	168°28.9	-10°46.7					
20	161°27.5	76°05.0	25°53.0	48°56.4	23°34.9	136°00.8	9°24.8	183°31.2	-10°46.7					
21	176°30.0	91°04.4	25°53.2	63°57.4	23°34.7	151°02.7	9°25.0	198°33.5	-10°46.6					
22	191°32.5	106°03.8	25°53.3	78°58.4	23°34.5	166°04.6	9°25.2	213°35.8	-10°46.6					
23	206°34.9	121°03.2	25°53.5	93°59.4	23°34.2	181°06.5	9°25.4	228°38.1	-10°46.5					
Mer.pass.:9:15:			v-0.6 d0.2 m-4.0			v1.0 d-0.2 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0		

			SHA	Dec	
			2023/5/1	SHA	Mer.pass
			Venus	278°07.5	14:53
			Mars	249°09.8	16:48
			Jupiter	335°11.3	11:03
			Saturn	22°15.2	07:55
			2023/5/2	SHA	Mer.pass
			Venus	276°53.3	14:54
			Mars		

h		Sun		Moon					
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	180° 42.0	14° 56.0	51° 18.6	15.9	9° 46.8	-13.5	54.8	72	Naut. Civil Sunrise
1	195° 42.1	14° 56.8	65° 53.4	15.9	9° 33.3	-13.5	54.9	70	22:15
2	210° 42.2	14° 57.5	80° 28.3	15.9	9° 19.8	-13.6	54.9	68	21:32
3	225° 42.3	14° 58.3	95° 03.2	15.9	9° 06.2	-13.6	54.9	66	21:03 23:08
4	240° 42.4	14° 59.1	109° 38.1	15.9	8° 52.6	-13.6	54.9	64	20:42 22:08
5	255° 42.4	14° 59.8	124° 13.0	15.9	8° 38.9	-13.7	54.9	62	20:25 21:36
6	270° 42.5	15° 00.6	138° 48.0	15.9	8° 25.2	-13.7	55.0	60	20:11 21:12 23:13
7	285° 42.6	15° 01.3	153° 22.9	16.0	8° 11.4	-13.8	55.0	58	19:50 20:54 22:20
8	300° 42.7	15° 02.1	167° 57.9	16.0	7° 57.6	-13.8	55.0	56	19:30 20:39 21:50
9	315° 42.7	15° 02.9	182° 32.8	16.0	7° 43.8	-13.9	55.0	54	19:11 20:26 21:28
10	330° 42.8	15° 03.6	197° 07.8	16.0	7° 29.9	-13.9	55.0	52	19:06 20:15 21:11
11	345° 42.9	15° 04.4	211° 42.8	16.0	7° 16.0	-13.9	55.1	50	19:26 20:05 20:56
12	0° 43.0	15° 05.1	226° 17.8	16.0	7° 02.1	-14.0	55.1	45	19:20 19:57 20:44
13	15° 43.0	15° 05.9	240° 52.8	16.0	6° 48.1	-14.0	55.1	40	19:06 19:39 20:19
14	30° 43.1	15° 06.6	255° 27.8	16.0	6° 34.0	-14.0	55.1	35	18:55 19:25 20:01
15	45° 43.2	15° 07.4	270° 02.7	16.0	6° 20.0	-14.1	55.1	30	18:46 19:13 19:46
16	60° 43.3	15° 08.1	284° 37.7	16.0	6° 05.9	-14.1	55.2	20	18:38 19:03 19:34
17	75° 43.3	15° 08.9	299° 12.7	16.0	5° 51.7	-14.2	55.2	10	18:24 18:47 19:14
18	90° 43.4	15° 09.7	313° 47.7	16.0	5° 37.6	-14.2	55.2	0	18:12 18:34 18:59
19	105° 43.5	15° 10.4	328° 22.7	16.0	5° 23.4	-14.2	55.2	-10	18:00 18:22 18:47
20	120° 43.6	15° 11.2	342° 57.7	16.0	5° 09.1	-14.3	55.2	-20	17:49 18:11 18:36
21	135° 43.6	15° 11.9	357° 32.7	16.0	4° 54.9	-14.3	55.3	-30	17:38 18:00 18:27
22	150° 43.7	15° 12.7	12° 07.7	16.0	4° 40.5	-14.3	55.3	-40	17:24 17:49 18:17
23	165° 43.8	15° 13.4	26° 42.7	16.0	4° 26.2	-14.3	55.3	-50	17:17 17:43 18:13
SD.=15.9		d=0.8			S.D.=15.0				-60
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	180° 43.9	15° 14.2	41° 17.7	16.0	4° 11.9	-14.4	55.3	72	Naut. Civil Sunrise
1	195° 43.9	15° 14.9	55° 52.6	16.0	3° 57.5	-14.4	55.4	70	22:15
2	210° 44.0	15° 15.7	70° 27.6	16.0	3° 43.0	-14.4	55.4	68	21:32
3	225° 44.1	15° 16.4	85° 02.5	15.9	3° 28.6	-14.5	55.4	66	21:03 23:08
4	240° 44.1	15° 17.2	99° 37.5	15.9	3° 14.1	-14.5	55.4	64	20:42 22:08
5	255° 44.2	15° 17.9	114° 12.4	15.9	2° 59.6	-14.5	55.5	62	20:25 21:36
6	270° 44.3	15° 18.7	128° 47.3	15.9	2° 45.1	-14.5	55.5	60	20:11 21:12 23:13
7	285° 44.4	15° 19.4	143° 22.2	15.9	2° 30.6	-14.6	55.5	58	19:50 20:54 22:20
8	300° 44.4	15° 20.2	157° 57.1	15.9	2° 16.0	-14.6	55.5	56	19:30 20:39 21:50
9	315° 44.5	15° 20.9	172° 31.9	15.9	2° 01.4	-14.6	55.5	54	19:11 20:26 21:28
10	330° 44.6	15° 21.6	187° 06.8	15.8	1° 46.8	-14.6	55.6	52	19:06 20:15 21:11
11	345° 44.6	15° 22.4	201° 41.6	15.8	1° 32.1	-14.6	55.6	50	19:26 20:05 20:56
12	0° 44.7	15° 23.1	216° 16.4	15.8	1° 17.5	-14.7	55.6	45	19:20 19:57 20:44
13	15° 44.8	15° 23.9	230° 51.2	15.8	1° 02.8	-14.7	55.6	40	19:06 19:39 20:19
14	30° 44.9	15° 24.6	245° 25.9	15.7	0° 48.1	-14.7	55.7	35	18:55 19:25 20:01
15	45° 44.9	15° 25.4	260° 00.7	15.7	0° 33.4	-14.7	55.7	30	18:46 19:13 19:46
16	60° 45.0	15° 26.1	274° 35.4	15.7	0° 18.7	-14.7	55.7	20	18:38 19:03 19:34
17	75° 45.1	15° 26.9	289° 10.1	15.7	0° 03.9	-14.8	55.7	10	18:24 18:47 19:14
18	90° 45.1	15° 27.6	303° 44.7	15.6	-0° 10.8	-14.8	55.8	0	18:12 18:34 18:59
19	105° 45.2	15° 28.3	318° 19.4	15.6	-0° 25.6	-14.8	55.8	-10	18:00 18:22 18:47
20	120° 45.3	15° 29.1	332° 54.0	15.6	-0° 40.4	-14.8	55.8	-20	17:49 18:11 18:36
21	135° 45.3	15° 29.8	347° 28.5	15.6	-0° 55.2	-14.8	55.8	-30	17:38 18:00 18:27
22	150° 45.4	15° 30.6	2° 03.1	15.5	-1° 10.0	-14.8	55.9	-40	17:24 17:49 18:17
23	165° 45.5	15° 31.3	16° 37.6	15.5	-1° 24.8	-14.8	55.9	-50	17:17 17:43 18:13
SD.=15.9		d=0.8			S.D.=15.1				-60
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight
0	180° 45.5	15° 32.1	31° 12.1	15.5	-1° 39.6	-14.8	55.9	72	Naut. Civil Sunrise
1	195° 45.6	15° 32.8	45° 46.5	15.4	-1° 54.5	-14.8	56.0	70	22:15
2	210° 45.7	15° 33.5	60° 20.9	15.4	-2° 09.3	-14.8	56.0	68	21:32
3	225° 45.7	15° 34.3	74° 55.3	15.3	-2° 24.2	-14.9	56.0	66	21:03 23:08
4	240° 45.8	15° 35.0	89° 29.6	15.3	-2° 39.0	-14.9	56.0	64	20:42 22:08
5	255° 45.9	15° 35.7	104° 03.9	15.3	-2° 53.9	-14.9	56.1	62	20:25 21:36
6	270° 45.9	15° 36.5	118° 38.1	15.2	-3° 08.7	-14.9	56.1	60	20:11 21:12 23:13
7	285° 46.0	15° 37.2	133° 12.3	15.2	-3° 23.6	-14.9	56.1	58	19:50 20:54 22:20
8	300° 46.1	15° 38.0	147° 46.5	15.1	-3° 38.5	-14.9	56.1	56	19:30 20:39 21:50
9	315° 46.1	15° 38.7	162° 20.6	15.1	-3° 53.3	-14.9	56.2	54	19:11 20:26 21:28
10	330° 46.2	15° 39.4	176° 54.7	15.0	-4° 08.2	-14.9	56.2	52	19:06 20:15 21:11
11	345° 46.3	15° 40.2	191° 28.7	15.0	-4° 23.0	-14.9	56.2	50	19:26 20:05 20:56
12	0° 46.3	15° 40.9	206° 02.7	15.0	-4° 37.9	-14.9	56.2	45	19:20 19:57 20:44
13	15° 46.4	15° 41.6	220° 36.6	14.9	-4° 52.8	-14.9	56.3	40	19:06 19:39 20:19
14	30° 46.5	15° 42.4	235° 10.5	14.9	-5° 07.6	-14.8	56.3	35	18:55 19:25 20:01
15	45° 46.5	15° 43.1	249° 44.3	14.8	-5° 22.5	-14.8	56.3	30	18:46 19:13 19:46
16	60° 46.6	15° 43.8	264° 18.1	14.7	-5° 37.3	-14.8	56.3	20	18:38 19:03 19:34
17	75° 46.7	15° 44.6	278° 51.8	14.7	-5° 52.1	-14.8	56.4	10	18:24 18:47 19:14
18	90° 46.7	15° 45.3	293° 25.5	14.6	-6° 06.9	-14.8	56.4	0	18:12 18:34 18:59
19	105° 46.8	15° 46.0	307° 59.1	14.6	-6° 21.8	-14.8	56.4	-10	18:00 18:22 18:47
20	120° 46.8	15° 46.8	322° 32.6	14.5	-6° 36.5	-14.8	56.5	-20	17:49 18:11 18:36
21	135° 46.9	15° 47.5	337° 06.1	14.5	-6° 51.3	-14.8	56.5	-30	17:38 18:00 18:27
22	150° 47.0	15° 48.2	351° 39.5	14.4	-7° 06.1	-14.8	56.5	-40	17:24 17:49 18:17
23	165° 47.0	15° 49.0	6° 12.9	14.3	-7° 20.9	-14.7	56.5	-50	17:17 17:43 18:13
SD.=15.9		d=0.7			S.D.=15.3				-60
		Sun		Moon					
Day	Eqn.of Time	Mer.	Mer.	Mer.	Age				
1	02:48	02:52	11:57	21:10	08:49	11(82%)			
2	02:55	02:59	11:57	21:51	09:30	12(89%)			
3	03:02	03:05	11:56	22:34	10:12	13(95%)			

May 04, 05 ,06 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	221°37.4	136°02.6	25°53.7	109°00.3	23°34.0	196°08.4	9°25.6	243°40.4	-10°46.5				Alpheratz	357°36.5	29°12.9		
1	236°39.9	151°02.0	25°53.8	124°01.3	23°33.8	211°10.3	9°25.8	258°42.7	-10°46.4				Ankaa	353°08.9	-42°10.7		
2	251°42.3	166°01.3	25°54.0	139°02.3	23°33.5	226°12.2	9°26.0	273°45.0	-10°46.3				Schedar	349°33.2	56°39.7		
3	266°44.8	181°00.7	25°54.1	154°03.3	23°33.3	241°14.1	9°26.2	288°47.3	-10°46.3				Diphda	348°48.9	-17°51.6		
4	281°47.2	196°00.1	25°54.3	169°04.3	23°33.1	256°16.0	9°26.4	303°49.6	-10°46.2				Achernar	335°21.8	-57°07.1		
5	296°49.7	210°59.5	25°54.5	184°05.2	23°32.8	271°17.9	9°26.7	318°51.9	-10°46.2				Hamal	327°53.2	23°34.2		
6	311°52.2	225°58.9	25°54.6	199°06.2	23°32.6	286°19.9	9°26.9	333°54.2	-10°46.1				Polaris	315°13.3	89°21.7		
7	326°54.6	240°58.3	25°54.8	214°07.2	23°32.4	301°21.8	9°27.1	348°56.5	-10°46.1				Akamar	315°13.3	-40°12.8		
8	341°57.1	255°57.6	25°54.9	229°08.2	23°32.1	316°23.7	9°27.3	3°58.8	-10°46.0				Menkar	314°08.0	4°10.8		
9	356°59.6	270°57.0	25°55.1	244°09.2	23°31.9	331°25.6	9°27.5	19°01.1	-10°46.0				Mirfak	308°30.8	49°56.6		
10	12°02.0	285°56.4	25°55.2	259°10.1	23°31.6	346°27.5	9°27.7	34°03.4	-10°45.9				Aldebaran	290°41.6	16°33.3		
11	27°04.5	300°55.8	25°55.4	274°11.1	23°31.4	1°29.4	9°27.9	49°05.7	-10°45.8				Rigel	281°05.5	-8°10.6		
12	42°07.0	315°55.2	25°55.5	289°12.1	23°31.2	16°31.3	9°28.1	64°08.0	-10°45.8				Capella	280°24.4	46°01.4		
13	57°09.4	330°54.6	25°55.7	304°13.1	23°30.9	31°33.2	9°28.3	79°10.3	-10°45.7				Bellatrix	278°24.7	6°22.2		
14	72°11.9	345°54.0	25°55.8	319°14.0	23°30.7	46°35.1	9°28.6	94°12.6	-10°45.7				Elnath	278°04.0	28°37.6		
15	87°14.4	0°53.4	25°56.0	334°15.0	23°30.5	61°37.0	9°28.8	109°14.9	-10°45.6				Alnilam	275°39.4	-1°11.3		
16	102°16.8	15°52.7	25°56.1	349°16.0	23°30.2	76°38.9	9°29.0	124°17.2	-10°45.6				Betelgeuse	270°53.9	7°24.6		
17	117°19.3	30°52.1	25°56.3	4°17.0	23°30.0	91°40.8	9°29.2	139°19.5	-10°45.5				Canopus	263°53.4	-52°42.7		
18	132°21.7	45°51.5	25°56.4	19°18.0	23°29.7	106°42.7	9°29.4	154°21.8	-10°45.5				Sirius	258°27.6	-16°44.8		
19	147°24.2	60°50.9	25°56.5	34°18.9	23°29.5	121°44.6	9°29.6	169°24.1	-10°45.4				Adara	255°07.2	-29°00.4		
20	162°26.7	75°50.3	25°56.7	49°19.9	23°29.3	136°46.5	9°29.8	184°26.4	-10°45.4				Procyon	244°52.3	5°10.0		
21	177°29.1	90°49.7	25°56.8	64°20.9	23°29.0	151°48.4	9°30.0	199°28.7	-10°45.3				Pollux	243°19.1	27°58.3		
22	192°31.6	105°49.1	25°57.0	79°21.9	23°28.8	166°50.4	9°30.2	214°31.0	-10°45.2				Avior	234°15.4	-59°35.3		
23	207°34.1	120°48.5	25°57.1	94°22.9	23°28.5	181°52.3	9°30.4	229°33.3	-10°45.2				Suhail	222°47.3	-43°31.8		
Mer.pass.:9:11:			v-0.6 d0.2 m-4.0			v1.0 d-0.2 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	222°36.5	135°47.8	25°57.2	109°23.8	23°28.3	196°54.2	9°30.7	244°35.6	-10°45.1				Dubhe	193°42.4	61°37.8		
1	237°39.0	150°47.2	25°57.4	124°24.8	23°28.1	211°56.1	9°30.9	259°37.9	-10°45.1				Denebola	182°26.1	14°26.5		
2	252°41.5	165°46.6	25°57.5	139°25.8	23°27.8	226°58.0	9°31.1	274°40.2	-10°45.0				Gienah	175°44.8	-17°40.4		
3	267°43.9	180°46.0	25°57.6	154°26.8	23°27.6	241°59.9	9°31.3	289°42.5	-10°45.0				Acrux	173°01.1	-63°13.9		
4	282°46.4	195°45.4	25°57.8	169°27.7	23°27.3	257°01.8	9°31.5	304°44.8	-10°44.9				Gacrux	171°52.8	-57°14.8		
5	297°48.9	210°44.8	25°57.9	184°28.7	23°27.1	272°03.7	9°31.7	319°47.1	-10°44.9				Alioth	166°13.8	55°50.1		
6	312°51.3	225°44.2	25°58.0	199°29.7	23°26.8	287°05.6	9°31.9	334°49.4	-10°44.8				Spica	158°23.5	-11°17.0		
7	327°53.8	240°43.6	25°58.1	214°30.7	23°26.6	302°07.5	9°32.1	349°51.7	-10°44.8				Alcaid	152°52.6	49°11.9		
8	342°56.2	255°43.0	25°58.3	229°31.7	23°26.4	317°09.4	9°32.3	4°54.0	-10°44.7				Hadar	148°37.4	-60°29.2		
9	357°58.7	270°42.4	25°58.4	244°32.6	23°26.1	332°11.3	9°32.5	19°56.3	-10°44.6				Menkent	147°58.9	-36°29.2		
10	13°01.2	285°41.8	25°58.5	259°33.6	23°25.9	347°13.2	9°32.8	34°58.6	-10°44.6				Arcturus	145°48.7	19°03.9		
11	28°03.6	300°41.2	25°58.6	274°34.6	23°25.6	2°15.1	9°33.0	50°00.9	-10°44.5				Rigel Kent.	139°41.6	-60°55.9		
12	43°06.1	315°40.5	25°58.8	289°35.6	23°25.4	17°17.1	9°33.2	65°03.2	-10°44.5				Zubenelg.	136°57.3	-16°08.4		
13	58°08.6	330°39.9	25°58.9	304°36.5	23°25.1	32°19.0	9°33.4	80°05.5	-10°44.4				Kochab	137°18.5	74°03.6		
14	73°11.0	345°39.3	25°59.0	319°37.5	23°24.9	47°20.9	9°33.6	95°07.8	-10°44.4				Alphecca	126°04.6	26°38.1		
15	88°13.5	0°38.7	25°59.1	334°38.5	23°24.7	62°22.8	9°33.8	110°10.1	-10°44.3				Antares	112°17.2	-26°29.0		
16	103°16.0	15°38.1	25°59.2	349°39.5	23°24.4	77°24.7	9°34.0	125°12.4	-10°44.3				Atria	107°12.3	-69°04.0		
17	118°18.4	30°37.5	25°59.3	4°40.5	23°24.2	92°26.6	9°34.2	140°14.7	-10°44.2				Sabik	102°04.1	-15°45.3		
18	133°20.9	45°36.9	25°59.5	19°41.4	23°23.9	107°28.5	9°34.4	155°17.0	-10°44.2				Shaula	96°12.0	-37°07.2		
19	148°23.3	60°36.3	25°59.6	34°42.4	23°23.7	122°30.4	9°34.6	170°19.3	-10°44.1				Rasalhague	95°59.6	12°32.5		
20	163°25.8	75°35.7	25°59.7	49°43.4	23°23.4	137°32.3	9°34.8	185°21.6	-10°44.1				Etamin	90°42.5	51°28.9		
21	178°28.3	90°35.1	25°59.8	64°44.4	23°23.2	152°34.2	9°35.1	200°23.9	-10°44.0				Kaus Aust.	83°34.1	-34°22.3		
22	193°30.7	105°34.5	25°59.9	79°45.3	23°22.9	167°36.1	9°35.3	215°26.2	-10°43.9				Vega	80°34.0	38°48.0		
23	208°33.2	120°33.9	26°00.0	94°46.3	23°22.7	182°38.0	9°35.5	230°28.5	-10°43.9				Nunki	75°49.3	-26°16.0		
Mer.pass.:9:08:			v-0.6 d0.1 m-4.0			v1.0 d-0.2 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	223°35.7	135°33.3	26°00.1	109°47.3	23°22.4	197°39.9	9°35.7	245°30.9	-10°43.8								
1	238°38.1	150°32.7	26°00.2	124°48.3	23°22.2	212°41.8	9°35.9	260°33.2	-10°43.8								
2	253°40.6	165°32.1	26°00.3	139°49.2	23°21.9	227°43.8	9°36.1	275°35.5	-10°43.7								
3	268°43.1	180°31.5	26°00.4	154°50.2	23°21.7	242°45.7	9°36.3	290°37.8	-10°43.7								
4	283°45.5	195°30.9	26°00.5	169°51.2	23°21.5	257°47.6	9°36.5	305°40.1	-10°43.6								
5	298°48.0	210°30.3	26°00.6	184°52.2	23°21.2	272°49.5	9°36.7	320°42.4	-10°43.6								
6	313°50.5	225°29.7	26°00.7	199°53.2	23°21.0	287°51.4	9°36.9	335°44.7	-10°43.5								
7	328°52.9	240°29.1	26°00.8	214°54.1	23°20.7	302°53.3	9°37.1	350°47.0	-10°43.5								
8	343°55.4	255°28.5	26°00.9	229°55.1	23°20.5	317°55.2	9°37.4	5°49.3	-10°43.4								
9	358°57.8	270°27.9	26°01.0	244°56.1	23°20.2	332°57.1	9°37.6	20°51.6	-10°43.4								
10	14°00.3	285°27.3	26°01.1	259°57.1	23°20.0	347°59.0	9°37.8	35°53.9	-10°43.3								
11	29°02.8	300°26.7	26°01.2	27													

Sun				Moon											
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Sunset	Twilight	
									Naut.	Civil	Sunrise		Civil	Naut.	
0	180°47.1	15°49.7		20°46.2	14.3	-7°35.6	-14.7	56.6	72	--	--	01:17	22:47	--	--
1	195°47.2	15°50.4		35°19.5	14.2	-7°50.3	-14.7	56.6	70	--	--	02:09	21:50	--	--
2	210°47.2	15°51.1		49°52.6	14.2	-8°05.0	-14.7	56.6	68	--	--	02:40	21:17	--	--
3	225°47.3	15°51.9		64°25.8	14.1	-8°19.7	-14.7	56.6	66	--	01:31	03:03	20:53	22:29	--
4	240°47.3	15°52.6		78°58.8	14.0	-8°34.4	-14.6	56.7	64	--	02:08	03:21	20:35	21:50	--
5	255°47.4	15°53.3		93°31.8	13.9	-8°49.0	-14.6	56.7	62	--	02:33	03:36	20:20	21:23	--
6	270°47.5	15°54.1		108°04.7	13.9	-9°03.6	-14.6	56.7	60	01:21	02:53	03:48	20:07	21:03	22:39
7	285°47.5	15°54.8		122°37.6	13.8	-9°18.2	-14.6	56.8	58	01:54	03:09	03:59	19:56	20:47	22:03
8	300°47.6	15°55.5		137°10.3	13.7	-9°32.8	-14.6	56.8	56	02:18	03:22	04:08	19:47	20:33	21:38
9	315°47.6	15°56.2		151°43.0	13.7	-9°47.3	-14.5	56.8	54	02:37	03:34	04:16	19:38	20:21	21:19
10	330°47.7	15°57.0		166°15.7	13.6	-10°01.8	-14.5	56.8	52	02:52	03:44	04:24	19:31	20:11	21:04
11	345°47.8	15°57.7		180°48.2	13.5	-10°16.3	-14.5	56.9	50	03:05	03:53	04:30	19:24	20:02	20:50
12	0°47.8	15°58.4		195°20.7	13.4	-10°30.7	-14.4	56.9	45	03:30	04:11	04:44	19:10	19:43	20:24
13	15°47.9	15°59.1		209°53.1	13.4	-10°45.1	-14.4	56.9	40	03:50	04:26	04:56	18:58	19:28	20:04
14	30°47.9	15°59.8		224°25.4	13.3	-10°59.5	-14.4	56.9	35	04:05	04:38	05:06	18:48	19:16	19:49
15	45°48.0	16°00.6		238°57.7	13.2	-11°13.9	-14.3	57.0	30	04:18	04:49	05:14	18:40	19:05	19:36
16	60°48.1	16°01.3		253°29.8	13.1	-11°28.2	-14.3	57.0	20	04:38	05:06	05:29	18:25	18:48	19:16
17	75°48.1	16°02.0		268°01.9	13.0	-11°42.4	-14.2	57.0	10	04:54	05:20	05:42	18:12	18:34	18:60
18	90°48.2	16°02.7		282°33.9	13.0	-11°56.7	-14.2	57.1	0	05:07	05:32	05:53	18:00	18:22	18:47
19	105°48.2	16°03.5		297°05.8	12.9	-12°10.9	-14.2	57.1	-10	05:18	05:43	06:05	17:48	18:10	18:35
20	120°48.3	16°04.2		311°37.7	12.8	-12°25.0	-14.1	57.1	-20	05:28	05:54	06:17	17:36	17:59	18:25
21	135°48.3	16°04.9		326°09.4	12.7	-12°39.1	-14.1	57.1	-30	05:38	06:06	06:31	17:22	17:47	18:15
22	150°48.4	16°05.6		340°41.1	12.6	-12°53.2	-14.0	57.2	-35	05:43	06:13	06:39	17:14	17:40	18:10
23	165°48.5	16°06.3		355°12.7	12.5	-13°07.2	-14.0	57.2	-40	05:48	06:20	06:49	17:04	17:33	18:05
SD.=15.9 d=0.7 S.D.=15.4								-45	05:53	06:28	06:59	16:54	17:25	17:60	
								-50	05:59	06:37	07:12	16:41	17:15	17:54	
								-52	06:01	06:42	07:18	16:35	17:11	17:51	
								-54	06:04	06:46	07:25	16:28	17:06	17:49	
								-56	06:07	06:51	07:32	16:21	17:01	17:46	
								-58	06:10	06:57	07:40	16:12	16:56	17:43	
								-60	06:13	07:03	07:50	16:03	16:49	17:40	
								Lat.	Moonrise			Moonset			
								Thu	Fri	Sat	Thu	Fri	Sat		
								72	20:07	--	--	02:54	02:05	--	
								70	19:43	22:32	--	03:06	02:32	01:25	
								68	19:24	21:44	--	03:16	02:52	02:15	
								66	19:10	21:13	23:57	03:24	03:08	02:46	
								64	18:58	20:51	23:01	03:31	03:22	03:10	
								62	18:48	20:33	22:28	03:37	03:33	03:29	
								60	18:39	20:18	22:04	03:43	03:43	03:45	
								58	18:32	20:06	21:45	03:47	03:52	03:58	
								56	18:25	19:55	21:29	03:52	03:59	04:10	
								54	18:19	19:46	21:15	03:55	04:06	04:20	
								52	18:14	19:37	21:03	03:59	04:12	04:29	
								50	18:09	19:30	20:53	04:02	04:17	04:37	
								45	17:59	19:14	20:31	04:09	04:29	04:54	
								40	17:51	19:01	20:14	04:15	04:39	05:09	
								35	17:44	18:50	19:59	04:20	04:48	05:21	
								30	17:37	18:40	19:47	04:24	04:56	05:32	
								20	17:27	18:24	19:25	04:32	05:09	05:50	
								10	17:17	18:10	19:07	04:39	05:20	06:06	
								0	17:09	17:57	18:49	04:45	05:31	06:21	
								-10	17:00	17:44	18:32	04:51	05:42	06:36	
								-20	16:51	17:30	18:14	04:58	05:54	06:53	
								-30	16:41	17:14	17:53	05:06	06:07	07:12	
								-35	16:35	17:05	17:41	05:11	06:15	07:23	
								-40	16:28	16:55	17:27	05:16	06:24	07:35	
								-45	16:20	16:43	17:11	05:22	06:34	07:50	
								-50	16:11	16:28	16:51	05:29	06:47	08:09	
								-52	16:07	16:22	16:42	05:33	06:53	08:18	
								-54	16:02	16:14	16:31	05:36	06:60	08:28	
								-56	15:57	16:06	16:19	05:40	07:07	08:39	
								-58	15:51	15:57	16:06	05:45	07:16	08:52	
								-60	15:45	15:46	15:50	05:50	07:25	09:07	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								4	03:08	03:11	11:56	23:19	10:56	14(98%)	
								5	03:14	03:17	11:56	00:08	11:43	15(100%)	
								6	03:19	03:21	11:56	00:08	12:35	16(99%)	
SD.=15.9 d=0.7 S.D.=15.8															

May 07, 08 ,09 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	224°34.8	135°18.9	26°02.4	110°10.7	23°16.5	198°25.7	9°40.7	246°26.2	-10°42.6				Alpheratz	357°36.5	29°12.9		
1	239°37.3	150°18.3	26°02.4	125°11.7	23°16.2	213°27.6	9°40.9	261°28.5	-10°42.5				Ankaa	353°08.9	-42°10.7		
2	254°39.7	165°17.7	26°02.5	140°12.7	23°16.0	228°29.5	9°41.1	276°30.8	-10°42.5				Schedar	349°33.1	56°39.6		
3	269°42.2	180°17.1	26°02.6	155°13.7	23°15.7	243°31.5	9°41.3	291°33.1	-10°42.4				Diphda	348°48.9	-17°51.6		
4	284°44.7	195°16.5	26°02.7	170°14.6	23°15.4	258°33.4	9°41.5	306°35.4	-10°42.4				Achernar	335°21.8	-57°07.1		
5	299°47.1	210°15.9	26°02.8	185°15.6	23°15.2	273°35.3	9°41.7	321°37.8	-10°42.3				Hamal	327°53.2	23°34.2		
6	314°49.6	225°15.3	26°02.8	200°16.6	23°14.9	288°37.2	9°41.9	336°40.1	-10°42.3				Polaris	315°12.9	89°21.7		
7	329°52.1	240°14.7	26°02.9	215°17.6	23°14.7	303°39.1	9°42.1	351°42.4	-10°42.2				Akamar	315°13.3	-40°12.8		
8	344°54.5	255°14.1	26°03.0	230°18.5	23°14.4	318°41.0	9°42.4	6°44.7	-10°42.2				Menkar	314°08.0	4°10.8		
9	359°57.0	270°13.5	26°03.0	245°19.5	23°14.2	333°42.9	9°42.6	21°47.0	-10°42.1				Mirfak	308°30.8	49°56.5		
10	14°59.5	285°12.9	26°03.1	260°20.5	23°13.9	348°44.8	9°42.8	36°49.3	-10°42.1				Aldebaran	290°41.6	16°33.3		
11	30°01.9	300°12.3	26°03.2	275°21.5	23°13.7	3°46.7	9°43.0	51°51.6	-10°42.0				Rigel	281°05.5	-8°10.6		
12	45°04.4	315°11.7	26°03.2	290°22.5	23°13.4	18°48.6	9°43.2	66°53.9	-10°41.9				Capella	280°24.4	46°01.4		
13	60°06.8	330°11.2	26°03.3	305°23.4	23°13.2	33°50.5	9°43.4	81°56.2	-10°41.9				Bellatrix	278°24.7	6°22.2		
14	75°09.3	345°10.6	26°03.4	320°24.4	23°12.9	48°52.4	9°43.6	96°58.5	-10°41.8				Elnath	278°04.0	28°37.6		
15	90°11.8	0°10.0	26°03.4	335°25.4	23°12.6	63°54.4	9°43.8	112°00.8	-10°41.8				Alnilam	275°39.4	-1°11.3		
16	105°14.2	15°09.4	26°03.5	350°26.4	23°12.4	78°56.3	9°44.0	127°03.2	-10°41.7				Betelgeuse	270°53.9	7°24.6		
17	120°16.7	30°08.8	26°03.6	5°27.3	23°12.1	93°58.2	9°44.2	142°05.5	-10°41.7				Canopus	263°53.4	-52°42.7		
18	135°19.2	45°08.2	26°03.6	20°28.3	23°11.9	109°00.1	9°44.4	157°07.8	-10°41.6				Sirius	258°27.6	-16°44.8		
19	150°21.6	60°07.6	26°03.7	35°29.3	23°11.6	124°02.0	9°44.6	172°10.1	-10°41.6				Adara	255°07.2	-29°00.4		
20	165°24.1	75°07.0	26°03.7	50°30.3	23°11.4	139°03.9	9°44.9	187°12.4	-10°41.5				Procyon	244°52.4	5°10.0		
21	180°26.6	90°06.4	26°03.8	65°31.2	23°11.1	154°05.8	9°45.1	202°14.7	-10°41.5				Pollux	243°19.1	27°58.3		
22	195°29.0	105°05.8	26°03.8	80°32.2	23°10.9	169°07.7	9°45.3	217°17.0	-10°41.4				Avior	234°15.5	-59°35.3		
23	210°31.5	120°05.2	26°03.9	95°33.2	23°10.6	184°09.6	9°45.5	232°19.3	-10°41.4				Suhail	222°47.4	-43°31.8		
Mer.pass.:9:00:			v-0.6 d0.1 m-4.1			v1.0 d-0.3 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					

Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	225°34.0	135°04.7	26°04.0	110°34.2	23°10.3	199°11.5	9°45.7	247°21.6	-10°41.3								
1	240°36.4	150°04.1	26°04.0	125°35.1	23°10.1	214°13.4	9°45.9	262°24.0	-10°41.3								
2	255°38.9	165°03.5	26°04.1	140°36.1	23°09.8	229°15.4	9°46.1	277°26.3	-10°41.2								
3	270°41.3	180°02.9	26°04.1	155°37.1	23°09.6	244°17.3	9°46.3	292°28.6	-10°41.2								
4	285°43.8	195°02.3	26°04.2	170°38.1	23°09.3	259°19.2	9°46.5	307°30.9	-10°41.1								
5	300°46.3	210°01.7	26°04.2	185°39.0	23°09.0	274°21.1	9°46.7	322°33.2	-10°41.1								
6	315°48.7	225°01.1	26°04.2	200°40.0	23°08.8	289°23.0	9°46.9	337°35.5	-10°41.0								
7	330°51.2	240°00.6	26°04.3	215°41.0	23°08.5	304°24.9	9°47.1	352°37.8	-10°41.0								
8	345°53.7	254°00.0	26°04.3	230°42.0	23°08.3	319°26.8	9°47.3	7°40.1	-10°40.9								
9	0°56.1	269°59.4	26°04.4	245°42.9	23°08.0	334°28.7	9°47.5	22°42.5	-10°40.9								
10	15°58.6	284°58.8	26°04.4	260°43.9	23°07.7	349°30.6	9°47.8	37°44.8	-10°40.8								
11	31°01.1	299°58.2	26°04.5	275°44.9	23°07.5	4°32.5	9°48.0	52°47.1	-10°40.8								
12	46°03.5	314°57.6	26°04.5	290°45.9	23°07.2	19°34.5	9°48.2	67°49.4	-10°40.7								
13	61°06.0	329°57.0	26°04.5	305°46.8	23°07.0	34°36.4	9°48.4	82°51.7	-10°40.7								
14	76°08.4	344°56.5	26°04.6	320°47.8	23°06.7	49°38.3	9°48.6	97°54.0	-10°40.6								
15	91°10.9	359°55.9	26°04.6	335°48.8	23°06.4	64°40.2	9°48.8	112°56.3	-10°40.6								
16	106°13.4	14°55.3	26°04.6	350°49.8	23°06.2	79°42.1	9°49.0	127°58.6	-10°40.5								
17	121°15.8	29°54.7	26°04.7	5°50.7	23°05.9	94°44.0	9°49.2	143°01.0	-10°40.5								
18	136°18.3	44°54.1	26°04.7	20°51.7	23°05.7	109°45.9	9°49.4	158°03.3	-10°40.4								
19	151°20.8	59°53.6	26°04.7	35°52.7	23°05.4	124°47.8	9°49.6	173°05.6	-10°40.4								
20	166°23.2	74°53.0	26°04.8	50°53.7	23°05.1	139°49.7	9°49.8	188°07.9	-10°40.3								
21	181°25.7	89°52.4	26°04.8	65°54.6	23°04.9	154°51.6	9°50.0	203°10.2	-10°40.3								
22	196°28.2	104°51.8	26°04.8	80°55.6	23°04.6	169°53.6	9°50.2	218°12.5	-10°40.2								
23	211°30.6	119°51.2	26°04.9	95°56.6	23°04.3	184°55.5	9°50.4	233°14.8	-10°40.2								
Mer.pass.:8:56:			v-0.6 d0.1 m-4.1			v1.0 d-0.3 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.1 m1.0					

Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	226°33.1	134°50.7	26°04.9	110°57.6	23°04.1	199°57.4	9°50.6	248°17.2	-10°40.1								
1	241°35.6	149°50.1	26°04.9	125°58.5	23°03.8	214°59.3	9°50.9	263°19.5	-10°40.1								
2	256°38.0	164°49.5	26°04.9	140°59.5	23°03.6	230°01.2	9°51.1	278°21.8	-10°40.0								
3	271°40.5	179°48.9	26°05.0	156°00.5	23°03.3	245°03.1	9°51.3	293°24.1	-10°40.0								
4	286°42.9	194°48.3	26°05.0	171°01.5	23°03.0	260°05.0	9°51.5	308°26.4	-10°39.9								
5	301°45.4	209°47.8	26°05.0	186°02.4	23°02.8	275°06.9	9°51.7	323°28.7	-10°39.9								
6	316°47.9	224°47.2	26°05.0	201°03.4	23°02.5	290°08.8	9°51.9	338°31.0	-10°39.8								
7	331°50.3	239°46.6	26°05.0	216°04.4	23°02.2	305°10.7	9°52.1	353°33.4	-10°39.8								
8	346°52.8	254°46.0	26°05.0	231°05.4	23°02.0	320°12.7	9°52.3	8°35.7	-10°39.7								
9	1°55.3	269°45.5	26°05.1	246°06.3	23°01.7	335°14.6	9°52.5	23°38.0	-10°39.7								
10	16°57.7	284°44.9	26°05.1	261°07.3	23°01.4	350°16.5	9°52.7	38°40.3	-10°39.6								
11	32°00.2	299°44.3	26°05.1	276°08.3	23°01.2	5°18.4	9°52.9	53°42.6	-10°39.6								
12	47°02.7	314°43.7	26°05.1	291°09.3	23°00.9	20°20.3	9°53.1	68°44.9	-10°39.5								
13	62°05.1	329°43.2	26°05.1	306°10.2	23°00.6	35°22.2	9°53.3	83°47.3	-10°39.5								
14	77°07.6	344°42.6	26°05.1	321°11.2	23°00.4	50°24.1	9°53.5	98°49.6	-10°39.4								
15	92°10.1	359°42.0	26°05.1	336°12.2	23°00.1	65°26.0	9°53.7	113°51.9	-10°39.4								
16	107°12.5	14°41.4	26°05.1	351°13.2	22°59.8	80°27.9	9°53.9	128°54.2	-10°39.3								
17	122°15.0	29°40.9	26°05.1	6°14.1	22°59.6	95°29.9	9°54.1	143°56.5	-10°39.3								
18	137°17.4	44°40.3	26°05.2	21°15.1	22°59.3	110°31.8	9°54.4	158°58.8	-10°39.2								
19	152°19.9	59°39.7	26°05.2	36°16.1	22°59.0	125°33.7	9°54.6	174°01.2	-10°39.2								
20	167°22.4	74°39.1	26°05.2	51°17.1	22°58.8	140°35.6	9°54.8	189°03.5	-10°39.1								
21	182°24.8	89°38.6	26°05.2	66°18.0	22°58.5	155°37.5	9°55.0	204°05.8	-10°39.1								
22	197°27.3	104°38.0	26°05.2	81°19.0	22°58.2	170°39.4	9°55.2	219°08.1	-10°39.1								
23	212°29.8	119°37.4	26°05.2	96°20.0	22°58.0	185°41.3	9°55.4	234°10.4	-10°39.0								
Mer.pass.:8:52:			v-0.6 d0.0 m-4.1			v1.0 d-0.3 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.0 m1.0					

Stars		
Alpheratz	357°36.5	29°12.9
Ankaa	353°08.9	-42°10.7
Schedar	349°33.1	56°39.6
Diphda	348°48.9	-17°51.6
Achernar	335°21.8	-57°07.1
Hamal	327°53.2	23°34.2
Polaris	315°12.9	89°21.7
Akamar	315°13.3	-40°12.8
Menkar	314°08.0	4°10.8
Mirfak	308°30.8	49°56.5
Aldebaran	290°41.6	16°33.3
Rigel	281°05.5	-8°10.6
Capella	280°24.4	4

Sun			Moon											
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180°50.9	16°41.0	344°56.2	7.4	-23°03.4	-9.7	58.4	72	—:—	—:—	00:32	—:—	—:—	—:—
1	195°51.0	16°41.7	359°22.5	7.3	-23°13.0	-9.5	58.4	70	—:—	—:—	01:48	22:11	—:—	—:—
2	210°51.0	16°42.4	13°48.8	7.2	-23°22.5	-9.4	58.4	68	—:—	—:—	02:25	21:32	—:—	—:—
3	225°51.1	16°43.1	28°14.9	7.1	-23°31.8	-9.3	58.4	66	—:—	01:06	02:51	21:05	22:56	—:—
4	240°51.1	16°43.8	42°40.9	6.9	-23°41.0	-9.1	58.4	64	—:—	01:52	03:11	20:44	22:05	—:—
5	255°51.1	16°44.5	57°06.8	6.8	-23°50.1	-9.0	58.5	62	—:—	02:21	03:27	20:28	21:35	—:—
6	270°51.2	16°45.1	71°32.5	6.7	-23°59.0	-8.9	58.5	60	00:59	02:43	03:40	20:14	21:13	23:02
7	285°51.2	16°45.8	85°58.2	6.6	-24°07.8	-8.7	58.5	58	01:41	03:00	03:52	20:03	20:55	22:17
8	300°51.3	16°46.5	100°23.8	6.5	-24°16.4	-8.6	58.5	56	02:07	03:15	04:02	19:53	20:40	21:49
9	315°51.3	16°47.2	114°49.3	6.4	-24°24.9	-8.4	58.5	54	02:28	03:27	04:10	19:44	20:27	21:28
10	330°51.3	16°47.9	129°14.6	6.3	-24°33.3	-8.3	58.6	52	02:44	03:38	04:18	19:36	20:16	21:11
11	345°51.4	16°48.6	143°39.9	6.2	-24°41.5	-8.1	58.6	50	02:58	03:47	04:25	19:29	20:07	20:57
12	0°51.4	16°49.3	158°05.0	6.1	-24°49.6	-8.0	58.6	45	03:25	04:07	04:40	19:14	19:47	20:29
13	15°51.5	16°50.0	172°30.1	6.0	-24°57.5	-7.8	58.6	40	03:46	04:22	04:52	19:01	19:31	20:08
14	30°51.5	16°50.7	186°55.1	5.9	-25°05.3	-7.7	58.6	35	04:02	04:35	05:03	18:51	19:18	19:52
15	45°51.6	16°51.4	201°19.9	5.8	-25°12.9	-7.5	58.6	30	04:15	04:46	05:12	18:42	19:07	19:38
16	60°51.6	16°52.0	215°44.7	5.7	-25°20.3	-7.4	58.7	20	04:36	05:04	05:27	18:26	18:49	19:17
17	75°51.6	16°52.7	230°09.3	5.6	-25°27.6	-7.2	58.7	10	04:53	05:19	05:41	18:13	18:35	19:00
18	90°51.7	16°53.4	244°33.9	5.5	-25°34.7	-7.1	58.7	0	05:06	05:31	05:53	17:60	18:22	18:47
19	105°51.7	16°54.1	258°58.4	5.4	-25°41.7	-6.9	58.7	-10	05:18	05:43	06:05	17:48	18:09	18:35
20	120°51.8	16°54.8	273°22.8	5.3	-25°48.5	-6.7	58.7	-20	05:29	05:55	06:18	17:34	17:57	18:24
21	135°51.8	16°55.5	287°47.0	5.2	-25°55.2	-6.6	58.7	-30	05:39	06:08	06:33	17:19	17:45	18:13
22	150°51.8	16°56.2	302°11.2	5.2	-26°01.7	-6.4	58.8	-35	05:45	06:15	06:42	17:11	17:38	18:08
23	165°51.9	16°56.9	316°35.4	5.1	-26°08.0	-6.2	58.8	-40	05:50	06:23	06:51	17:01	17:30	18:02
								-45	05:56	06:31	07:03	16:50	17:21	17:56
								-50	06:03	06:42	07:16	16:36	17:11	17:50
								-52	06:05	06:46	07:23	16:30	17:06	17:47
								-54	06:08	06:51	07:30	16:22	17:01	17:44
								-56	06:12	06:57	07:38	16:15	16:56	17:41
								-58	06:15	07:03	07:47	16:06	16:50	17:37
								-60	06:19	07:09	07:57	15:55	16:43	17:34
								Lat.	Moonrise			Moonset		
								72	—:—	—:—	—:—	—:—	—:—	—:—
								70	—:—	—:—	—:—	—:—	—:—	—:—
								68	—:—	—:—	—:—	—:—	—:—	—:—
								66	—:—	—:—	—:—	01:54	—:—	—:—
								64	—:—	—:—	—:—	02:51	—:—	—:—
								62	—:—	00:34	—:—	03:25	03:20	—:—
								60	23:52	—:—	01:27	03:50	04:02	04:37
								58	23:24	—:—	00:50	04:09	04:31	05:14
								56	23:02	—:—	00:24	04:26	04:53	05:40
								54	22:44	—:—	00:03	04:40	05:12	06:01
								52	22:29	23:46	—:—	04:52	05:27	06:18
								50	22:16	23:31	—:—	05:03	05:41	06:33
								45	21:49	23:01	—:—	05:26	06:08	07:03
								40	21:27	22:37	23:39	05:45	06:30	07:27
								35	21:10	22:18	23:20	06:00	06:49	07:46
								30	20:55	22:02	23:04	06:14	07:04	08:03
								20	20:29	21:34	22:36	06:37	07:31	08:31
								10	20:07	21:10	22:13	06:57	07:54	08:55
								0	19:47	20:48	21:50	07:16	08:15	09:18
								-10	19:26	20:26	21:28	07:35	08:37	09:40
								-20	19:05	20:02	21:05	07:55	08:60	10:04
								-30	18:40	19:34	20:37	08:19	09:27	10:32
								-35	18:25	19:18	20:20	08:33	09:43	10:48
								-40	18:08	18:59	20:01	08:49	10:01	11:08
								-45	17:48	18:37	19:38	09:08	10:24	11:31
								-50	17:23	18:08	19:09	09:32	10:52	12:00
								-52	17:11	17:53	18:54	09:44	11:06	12:15
								-54	16:57	17:37	18:37	09:57	11:22	12:32
								-56	16:41	17:18	18:17	10:13	11:41	12:52
								-58	16:22	16:53	17:52	10:31	12:05	13:18
								-60	15:59	16:21	17:17	10:54	12:37	13:53
								Day	Sun			Moon		
									Eqn. of Time	Mer.		Mer. Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								7	03:24	03:26	11:56	01:02	13:31	17(96%)
								8	03:28	03:29	11:56	02:00	14:31	18(91%)
								9	03:31	03:33	11:56	03:02	15:34	19(83%)

May 10, 11 ,12 (Wed., Thu., Fri.)

Aries				Venus				Mars				Jupiter				Saturn				Stars							
Wed	GHA			GHA			Dec			GHA			Dec			GHA			Dec			SHA			Dec		
0	227°32.2	134°36.9	26°05.2	111°21.0	22°57.7	200°43.2	9°55.6	249°12.7	-10°39.0	Alpheratz	357°36.5	29°12.9															
1	242°34.7	149°36.3	26°05.2	126°21.9	22°57.4	215°45.1	9°55.8	264°15.1	-10°38.9	Ankaa	353°08.8	-42°10.7															
2	257°37.2	164°35.7	26°05.2	141°22.9	22°57.2	230°47.1	9°56.0	279°17.4	-10°38.9	Schedar	349°33.1	56°39.6															
3	272°39.6	179°35.2	26°05.2	156°23.9	22°56.9	245°49.0	9°56.2	294°19.7	-10°38.8	Diphda	348°48.9	-17°51.6															
4	287°42.1	194°34.6	26°05.1	171°24.9	22°56.6	260°50.9	9°56.4	309°22.0	-10°38.8	Achernar	335°21.8	-57°07.1															
5	302°44.6	209°34.0	26°05.1	186°25.8	22°56.3	275°52.8	9°56.6	324°24.3	-10°38.7	Hamal	327°53.1	23°34.2															
6	317°47.0	224°33.5	26°05.1	201°26.8	22°56.1	290°54.7	9°56.8	339°26.7	-10°38.7	Polaris	315°12.5	89°21.7															
7	332°49.5	239°32.9	26°05.1	216°27.8	22°55.8	305°56.6	9°57.0	354°29.0	-10°38.6	Akamar	315°13.3	-40°12.7															
8	347°51.9	254°32.3	26°05.1	231°28.8	22°55.5	320°58.5	9°57.2	9°31.3	-10°38.6	Menkar	314°07.9	4°10.8															
9	2°54.4	269°31.8	26°05.1	246°29.7	22°55.3	336°00.4	9°57.4	24°33.6	-10°38.5	Mirfak	308°30.8	49°56.5															
10	17°56.9	284°31.2	26°05.1	261°30.7	22°55.0	351°02.3	9°57.6	39°35.9	-10°38.5	Aldebaran	290°41.6	16°33.3															
11	32°59.3	299°30.6	26°05.1	276°31.7	22°54.7	6°04.3	9°57.8	54°38.2	-10°38.4	Rigel	281°05.5	-8°10.1															
12	48°01.8	314°30.1	26°05.1	291°32.7	22°54.5	21°06.2	9°58.0	69°40.6	-10°38.4	Capella	280°24.4	46°01.4															
13	63°04.3	329°29.5	26°05.0	306°33.6	22°54.2	36°08.1	9°58.3	84°42.9	-10°38.3	Bellatrix	278°24.7	6°22.2															
14	78°06.7	344°28.9	26°05.0	321°34.6	22°53.9	51°10.0	9°58.5	99°45.2	-10°38.3	Elnath	278°04.0	28°37.6															
15	93°09.2	359°28.4	26°05.0	336°35.6	22°53.6	66°11.9	9°58.7	114°47.5	-10°38.2	Alnilam	275°39.4	-1°11.3															
16	108°11.7	14°27.8	26°05.0	351°36.6	22°53.4	81°13.8	9°58.9	129°49.8	-10°38.2	Betelgeuse	270°53.9	7°24.6															
17	123°14.1	29°27.2	26°05.0	6°37.5	22°53.1	96°15.7	9°59.1	144°52.2	-10°38.1	Canopus	263°53.4	-52°42.7															
18	138°16.6	44°26.7	26°04.9	21°38.5	22°52.8	111°17.6	9°59.3	159°54.5	-10°38.1	Sirius	258°27.6	-16°44.8															
19	153°19.1	59°26.1	26°04.9	36°39.5	22°52.5	126°19.6	9°59.5	174°56.8	-10°38.0	Adara	255°07.2	-29°00.4															
20	168°21.5	74°25.6	26°04.9	51°40.4	22°52.3	141°21.5	9°59.7	189°59.1	-10°38.0	Procyon	244°52.4	5°10.0															
21	183°24.0	89°25.0	26°04.9	66°41.4	22°52.0	156°23.4	9°59.9	205°01.4	-10°38.0	Pollux	243°19.1	27°58.3															
22	198°26.4	104°24.4	26°04.9	81°42.4	22°51.7	171°25.3	10°00.1	220°03.8	-10°37.9	Avior	234°15.5	-59°35.3															
23	213°28.9	119°23.9	26°04.8	96°43.4	22°51.5	186°27.2	10°00.3	235°06.1	-10°37.9	Suhail	222°47.4	-43°31.8															
Mer.pass.:8:48:				v-0.6 d-0.0 m-4.1				v1.0 d-0.3 m1.4				v1.9 d0.2 m-1.9				v2.3 d0.0 m1.0											

Thu	GHA			GHA			Dec			GHA			Dec			GHA			Dec		
0	228°31.4	134°23.3	26°04.8	111°44.3	22°51.2	201°29.1	10°00.5	250°08.4	-10°37.8	Dubhe	193°42.4	61°37.8									
1	243°33.8	149°22.8	26°04.8	126°45.3	22°50.9	216°31.0	10°00.7	265°10.7	-10°37.8	Denebola	182°26.1	14°26.5									
2	258°36.3	164°22.2	26°04.7	141°46.3	22°50.6	231°32.9	10°00.9	280°13.1	-10°37.7	Gienah	175°44.8	-17°40.4									
3	273°38.8	179°21.6	26°04.7	156°47.3	22°50.4	246°34.9	10°01.1	295°15.4	-10°37.7	Acrux	173°01.2	-63°13.9									
4	288°41.2	194°21.1	26°04.7	171°48.2	22°50.1	261°36.8	10°01.3	310°17.7	-10°37.6	Gacrux	171°52.8	-57°14.8									
5	303°43.7	209°20.5	26°04.6	186°49.2	22°49.8	276°38.7	10°01.5	325°20.0	-10°37.6	Alioth	166°13.8	55°50.1									
6	318°46.2	224°20.0	26°04.6	201°50.2	22°49.5	291°40.6	10°01.7	340°22.3	-10°37.5	Spica	158°23.5	-11°17.0									
7	333°48.6	239°19.4	26°04.6	216°51.2	22°49.2	306°42.5	10°01.9	355°24.7	-10°37.5	Alcaid	152°52.6	49°11.9									
8	348°51.1	254°18.9	26°04.5	231°52.1	22°49.0	321°44.4	10°02.1	10°27.0	-10°37.4	Hadar	148°37.4	-60°29.2									
9	3°53.6	269°18.3	26°04.5	246°53.1	22°48.7	336°46.3	10°02.3	25°29.3	-10°37.4	Menkent	147°58.9	-36°29.2									
10	18°56.0	284°17.8	26°04.5	261°54.1	22°48.4	351°48.2	10°02.5	40°31.6	-10°37.3	Arcturus	145°48.7	19°03.9									
11	33°58.5	299°17.2	26°04.4	276°55.1	22°48.1	6°50.2	10°02.8	55°34.0	-10°37.3	Rigel Kent.	139°41.6	-60°55.9									
12	49°00.9	314°16.6	26°04.4	291°56.0	22°47.9	21°52.1	10°03.0	70°36.3	-10°37.3	Zubenelg.	136°57.2	-16°08.4									
13	64°03.4	329°16.1	26°04.3	306°57.0	22°47.6	36°54.0	10°03.2	85°38.6	-10°37.2	Kochab	137°18.5	74°03.6									
14	79°05.9	344°15.5	26°04.3	321°58.0	22°47.3	51°55.9	10°03.4	100°40.9	-10°37.2	Alphecca	126°04.6	26°38.1									
15	94°08.3	359°15.0	26°04.2	336°59.0	22°47.0	66°57.8	10°03.6	115°43.2	-10°37.1	Antares	112°17.2	-26°29.0									
16	109°10.8	14°14.4	26°04.2	351°59.9	22°46.8	81°59.7	10°03.8	130°45.6	-10°37.1	Atria	107°12.2	-69°04.0									
17	124°13.3	29°13.9	26°04.1	7°00.9	22°46.5	97°01.6	10°04.0	145°47.9	-10°37.0	Sabik	102°04.1	-15°45.3									
18	139°15.7	44°13.3	26°04.1	22°01.9	22°46.2	112°03.5	10°04.2	160°50.2	-10°37.0	Shaula	96°11.9	-37°07.2									
19	154°18.2	59°12.8	26°04.0	37°02.8	22°45.9	127°05.5	10°04.4	175°52.5	-10°36.9	Rasalhague	95°59.6	12°32.5									
20	169°20.7	74°12.2	26°04.0	52°03.8	22°45.6	142°07.4	10°04.6	190°54.9	-10°36.9	Etamin	90°42.4	51°28.9									
21	184°23.1	89°11.7	26°03.9	67°04.8	22°45.4	157°09.3	10°04.8	205°57.2	-10°36.8	Kaus Aust.	83°34.1	-34°22.3									
22	199°25.6	104°11.1	26°03.9	82°05.8	22°45.1	172°11.2	10°05.0	220°59.5	-10°36.8	Vega	80°33.9	38°48.0									
23	214°28.0	119°10.6	26°03.8	97°06.7	22°44.8	187°13.1	10°05.2	236°01.8	-10°36.7	Nunki	75°49.3	-26°16.0									
Mer.pass.:8:44:				v-0.6 d-0.0 m-4.1				v1.0 d-0.3 m1.4				v1.9 d0.2 m-1.9				v2.3 d0.0 m1.0					

Fri	GHA			GHA			Dec			GHA			Dec			GHA			Dec		
0	229°30.5	134°10.0	26°03.8	112°07.7	22°44.5	202°15.0	10°05.4	251°04.2	-10°36.7	Enif	33°40.2	9°58.7									
1	244°33.0	149°09.5	26°03.7	127°08.7	22°44.2	217°16.9	10°05.6	266°06.5	-10°36.7	Alnair	27°34.8	-46°50.7									
2	259°35.4	164°08.9	26°03.7	142°09.7	22°44.0	232°18.8	10°05.8	281°08.8	-10°36.6	Fomalhaut	15°16.3	-29°29.9									
3	274°37.9	179°08.4	26°03.6	157°10.6	22°43.7	247°20.8	10°06.0	296°11.1	-10°36.6	Scheat	13°46.8	28°12.3									
4	289°40.4	194°07.9	26°03.6	172°11.6	22°43.4	262°22.7	10°06.2	311°13.5	-10°36.5	Markab	13°31.5	15°19.6									
5	304°42.8	209°07.3	26°03.5	187°12.6	22°43.1	277°24.6	10°06.4	326°15.8	-10°36.5	2023/5/1			SHA	Mer.pass							
6	319°45.3	224°06.8	26°03.4	202°13.6	22°42.8	292°26.5	10°06.6	341°18.1	-10°36.4	Venus	267°04.6	15:02									
7	334°47.8	239°06.2	26°03.4	217°14.5	22°42.6	307°28.4	10°06.8	356°20.4	-10°36.4	Mars	243°48.7	16:34									
8	349°50.2	254°05.7	26°03.3	232°15.5	22°42.3	322°30.3	10°07.0	11°22.8	-10°36.3	Jupiter	333°11.0	10:36									
9	4°52.7	269°05.1	26°03.2	247°16.5	22°42.0	337°32.2	10°07.2	26°25.1	-10°36.3	Saturn	21°40.5	07:22									
10	19°55.2	284°04.6	26°03.2	262°17.4	22°41.7	352°34.2	10°07.4	41°27.4	-10°36.2	2023/5/1			SHA	Mer.pass							
11	34°57.6	299°04.0	26°03.1	277°18.4	22°41.4	7°36.1	10°07.6	56°29.7	-10°36.2	Venus	265°51.9	15:03									
12	50°00.1	314°03.5	26°03.0	292°19.4	22°41.1	22°38.0	10°07.8	71°32.7	-10°36.2	Mars	243°13.0	16:32									
13	65°02.5	329°03.0	26°03.0	307°20.4	22°40.9	37°39.9	10°08.0	86°34.4	-10°36.1	Jupiter	332°57.7	10:33									
14	80°05.0	344°02.4	26°02.9	322°21.3	22°40.6	52°41.8	10°08.2	101°36.7	-10°36.1	Saturn	21°37.0	07:18									
15	95°07.5	359°01.9	26°02.8	337°22.3	22°40.3	67°43.7	10°08.4	116°39.0	-10°36.0	2023/5/1			SHA	Mer.pass							
16	110°09.9	14°01.3	26°02.8	352°23.3	22°40.0	82°45.6	10°08.7	131°41.4	-10°36.0	Venus	264°39.5	15:04									
17	125°12.4	29°00.8	26°02.7	7°24.3	22°39.7	97°47.6	10°08.9	146°43.7	-10°35.9	Mars	242°37.2	16:30									
18	140°14.9	44°00.3	26°02.6	22°25.2	22°39.4	112°49.5	10°09.1	161°46.0	-10°35.9	Jupiter	332°44.5	10:30									
19	155°17.3	58°59.7	26°02.5	37°26.2	22°39.2	127°51.4	10°09.3	176°48.3	-10°35.8	Saturn	21°33.6	07:15									
20	170°19.8	73°59.2	26°02.5	52°27.2	22°38.9	142°53.3	10°09.5	191°50.7	-10°35.8	Horizontal parallax											
21	185°22.3	88°58.6	26°02.4	67°28.1	22°38.6	157°55.2	10°09.7	206°53.0	-10°35.8	Venus:		0.2									
22	200°24.7	103°58.1	26°02.3	82°29.1	22°38.3	172°57.1	10°09.9	221°55.3	-10°35.7	Mars:		0.1									
23	215°27.2	118°57.6	26°02.2	97°30.1	22°38.0	187°59.0	10°10.1	236°57.7	-10°35.7												
Mer.pass.:8:40:				v-0.5 d-0.1 m-4.1				v1.0 d-0.3 m1.4				v1.9 d0.2 m-1.9				v2.3 d0.0 m1.0					

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	180°53.5	17°29.8	301°12.7	3.5	-27°34.7	2.9	59.3
1	195°53.5	17°30.4	315°35.2	3.6	-27°31.7	3.1	59.3
2	210°53.5	17°31.1	329°57.8	3.6	-27°28.5	3.3	59.3
3	225°53.5	17°31.8	344°20.4	3.6	-27°25.1	3.5	59.3
4	240°53.6	17°32.4	358°43.0	3.7	-27°21.5	3.7	59.3
5	255°53.6	17°33.1	13°05.7	3.7	-27°17.8	3.9	59.3
6	270°53.6	17°33.7	27°28.4	3.8	-27°13.8	4.0	59.3
7	285°53.6	17°34.4	41°51.2	3.8	-27°09.7	4.2	59.3
8	300°53.7	17°35.1	56°14.0	3.8	-27°05.4	4.4	59.3
9	315°53.7	17°35.7	70°36.9	3.9	-27°00.9	4.6	59.3
10	330°53.7	17°36.4	84°59.8	3.9	-26°56.2	4.8	59.3
11	345°53.7	17°37.0	99°22.8	4.0	-26°51.3	5.0	59.3
12	0°53.8	17°37.7	113°45.8	4.1	-26°46.3	5.1	59.3
13	15°53.8	17°38.3	128°08.9	4.1	-26°41.0	5.3	59.3
14	30°53.8	17°39.0	142°32.1	4.2	-26°35.6	5.5	59.3
15	45°53.8	17°39.6	156°55.3	4.2	-26°30.0	5.7	59.3
16	60°53.9	17°40.3	171°18.6	4.3	-26°24.2	5.9	59.4
17	75°53.9	17°40.9	185°41.9	4.4	-26°18.3	6.0	59.4
18	90°53.9	17°41.6	200°05.3	4.4	-26°12.1	6.2	59.4
19	105°53.9	17°42.2	214°28.8	4.5	-26°05.8	6.4	59.4
20	120°53.9	17°42.9	228°52.3	4.6	-25°59.3	6.6	59.4
21	135°54.0	17°43.5	243°16.0	4.7	-25°52.7	6.7	59.4
22	150°54.0	17°44.2	257°39.7	4.7	-25°45.8	6.9	59.4
23	165°54.0	17°44.8	272°03.4	4.8	-25°38.9	7.1	59.4
SD.=15.8		d=0.7	S.D.=16.2				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°54.0	17°45.5	286°27.3	4.9	-25°31.7	7.3	59.4
1	195°54.0	17°46.1	300°51.2	5.0	-25°24.3	7.4	59.4
2	210°54.1	17°46.8	315°15.2	5.0	-25°16.8	7.6	59.4
3	225°54.1	17°47.4	329°39.3	5.1	-25°09.2	7.8	59.4
4	240°54.1	17°48.1	344°03.5	5.2	-25°01.3	7.9	59.4
5	255°54.1	17°48.7	358°27.7	5.3	-24°53.3	8.1	59.4
6	270°54.1	17°49.4	12°52.1	5.4	-24°45.2	8.2	59.4
7	285°54.2	17°50.0	27°16.5	5.5	-24°36.9	8.4	59.4
8	300°54.2	17°50.6	41°41.0	5.6	-24°28.4	8.6	59.4
9	315°54.2	17°51.3	56°05.6	5.6	-24°19.8	8.7	59.4
10	330°54.2	17°51.9	70°30.3	5.7	-24°11.0	8.9	59.4
11	345°54.2	17°52.6	84°55.1	5.8	-24°02.0	9.0	59.4
12	0°54.2	17°53.2	99°19.9	5.9	-23°52.9	9.2	59.4
13	15°54.3	17°53.9	113°44.9	6.0	-23°43.7	9.3	59.4
14	30°54.3	17°54.5	128°09.9	6.1	-23°34.3	9.5	59.4
15	45°54.3	17°55.1	142°35.1	6.2	-23°24.7	9.6	59.4
16	60°54.3	17°55.8	157°00.3	6.3	-23°15.0	9.8	59.4
17	75°54.3	17°56.4	171°25.7	6.4	-23°05.2	9.9	59.4
18	90°54.3	17°57.1	185°51.1	6.5	-22°55.2	10.1	59.4
19	105°54.4	17°57.7	200°16.6	6.6	-22°45.1	10.2	59.4
20	120°54.4	17°58.3	214°42.2	6.7	-22°34.8	10.3	59.3
21	135°54.4	17°59.0	229°07.9	6.8	-22°24.4	10.5	59.3
22	150°54.4	17°59.6	243°33.8	6.9	-22°13.9	10.6	59.3
23	165°54.4	18°00.2	257°59.7	7.0	-22°03.2	10.7	59.3
SD.=15.8		d=0.6	S.D.=16.2				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	180°54.4	18°00.9	272°25.7	7.1	-21°52.4	10.9	59.3
1	195°54.4	18°01.5	286°51.8	7.1	-21°41.5	11.0	59.3
2	210°54.5	18°02.1	301°18.0	7.2	-21°30.4	11.1	59.3
3	225°54.5	18°02.8	315°44.3	7.3	-21°19.2	11.3	59.3
4	240°54.5	18°03.4	330°10.6	7.4	-21°07.9	11.4	59.3
5	255°54.5	18°04.0	344°37.1	7.5	-20°56.4	11.5	59.3
6	270°54.5	18°04.7	359°03.7	7.6	-20°44.9	11.6	59.3
7	285°54.5	18°05.3	13°30.4	7.7	-20°33.2	11.8	59.3
8	300°54.5	18°05.9	27°57.2	7.8	-20°21.3	11.9	59.3
9	315°54.5	18°06.6	42°24.1	7.9	-20°09.4	12.0	59.3
10	330°54.6	18°07.2	56°51.0	8.0	-19°57.4	12.1	59.3
11	345°54.6	18°07.8	71°18.1	8.1	-19°45.2	12.2	59.3
12	0°54.6	18°08.5	85°45.3	8.2	-19°32.9	12.3	59.3
13	15°54.6	18°09.1	100°12.5	8.3	-19°20.5	12.4	59.3
14	30°54.6	18°09.7	114°39.9	8.4	-19°08.0	12.6	59.3
15	45°54.6	18°10.4	129°07.3	8.5	-18°55.4	12.7	59.3
16	60°54.6	18°11.0	143°34.9	8.6	-18°42.7	12.8	59.3
17	75°54.6	18°11.6	158°02.5	8.7	-18°29.9	12.9	59.3
18	90°54.6	18°12.2	172°30.3	8.8	-18°16.9	13.0	59.3
19	105°54.6	18°12.9	186°58.1	8.9	-18°03.9	13.1	59.3
20	120°54.7	18°13.5	201°26.0	9.0	-17°50.8	13.2	59.2
21	135°54.7	18°14.1	215°54.0	9.1	-17°37.5	13.3	59.2
22	150°54.7	18°14.7	230°22.1	9.1	-17°24.2	13.4	59.2
23	165°54.7	18°15.4	244°50.3	9.2	-17°10.8	13.5	59.2
SD.=15.8		d=0.6	S.D.=16.2				
Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	01:26	22:35	—:—	—:—	
68	—:—	—:—	02:10	21:47	—:—	—:—	
66	—:—	00:30	02:39	21:17	—:—	—:—	
64	—:—	01:36	03:01	20:54	22:22	—:—	
62	—:—	02:09	03:18	20:36	21:47	—:—	
60	00:26	02:33	03:33	20:22	21:22	—:—	
58	01:26	02:52	03:45	20:09	21:03	22:32	
56	01:57	03:08	03:56	19:59	20:47	21:59	
54	02:19	03:21	04:05	19:49	20:34	21:36	
52	02:37	03:32	04:13	19:41	20:22	21:18	
50	02:52	03:42	04:20	19:33	20:12	21:03	
45	03:20	04:03	04:36	19:17	19:51	20:34	
40	03:42	04:19	04:49	19:04	19:35	20:12	
35	03:59	04:32	05:00	18:53	19:21	19:55	
30	04:13	04:44	05:10	18:44	19:10	19:41	
20	04:35	05:02	05:26	18:27	18:51	19:18	
10	04:52	05:18	05:40	18:13	18:35	19:01	
0	05:06	05:31	05:53	17:60	18:22	18:47	
-10	05:18	05:44	06:06	17:47	18:09	18:34	
-20	05:30	05:56	06:20	17:33	17:56	18:23	
-30	05:41	06:10	06:35	17:17	17:43	18:11	
-35	05:47	06:17	06:44	17:08	17:35	18:06	
-40	05:53	06:25	06:54	16:58	17:27	17:59	
-45	05:59	06:35	07:06	16:46	17:18	17:53	
-50	06:06	06:45	07:21	16:31	17:07	17:46	
-52	06:09	06:50	07:28	16:25	17:02	17:43	
-54	06:13	06:56	07:35	16:17	16:56	17:39	
-56	06:16	07:02	07:43	16:09	16:50	17:36	
-58	06:20	07:08	07:53	15:59	16:44	17:32	
-60	06:24	07:15	08:04	15:48	16:37	17:28	
Moonrise		Moonset					
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	04:53	—:—	—:—	07:33	
66	—:—	—:—	04:03	—:—	—:—	08:22	
64	—:—	04:02	03:32	—:—	06:22	08:52	
62	03:19	03:12	03:08	04:57	07:11	09:15	
60	02:21	02:41	02:49	05:55	07:42	09:33	
58	01:47	02:18	02:33	06:28	08:05	09:48	
56	01:23	01:58	02:19	06:52	08:23	10:01	
54	01:03	01:42	02:08	07:12	08:39	10:12	
52	00:46	01:28	01:57	07:28	08:52	10:22	
50	00:32	01:16	01:48	07:43	09:04	10:31	
45	00:02	00:51	01:28	08:11	09:29	10:49	
40	—:—	00:31	01:12	08:34	09:48	11:04	
35	—:—	00:14	00:58	08:53	10:04	11:17	
30	23:59	—:—	00:46	09:09	10:18	11:27	
20	23:34	—:—	00:25	09:36	10:41	11:46	
10	23:12	—:—	00:07	09:59	11:02	12:02	
0	22:52	23:51	—:—	10:20	11:20	12:17	
-10	22:32	23:34	—:—	10:42	11:39	12:32	
-20	22:10	23:15	—:—	11:04	11:59	12:47	
-30	21:45	22:54	—:—	11:31	12:22	13:05	
-35	21:30	22:42	23:54	11:46	12:35	13:16	
-40	21:12	22:28	23:44	12:04	12:50	13:27	
-45	20:52	22:11	23:31	12:26	13:08	13:41	
-50	20:25	21:50	23:16	12:53	13:31	13:58	
-52	20:12	21:40	23:09	13:06	13:41	14:06	
-54	19:57	21:28	23:01	13:21	13:53	14:14	
-56	19:40	21:15	22:52	13:39	14:07	14:24	
-58	19:19	20:60	22:42	14:01	14:23	14:35	
-60	18:52	20:42	22:31	14:28	14:42	14:48	
Sun		Moon					
Day	Eqn.of Time	Mer.	Mer.	Mer.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
10	03:34	03:35	11:56	04:05	16:36	20(73%)	
11	03:36	03:37	11:56	05:06	17:35	21(63%)	
12	03:38	03:38	11:56	06:03	18:31	22(51%)	

May 13, 14 ,15 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	230°29.7	133°57.0	26°02.1	112°31.1	22°37.7	203°01.0	10°10.3	251°60.0	-10°35.6					Alpheratz	357°36.5	29°12.9	
1	245°32.1	148°56.5	26°02.1	127°32.0	22°37.4	218°02.9	10°10.5	267°02.3	-10°35.6					Ankaa	353°08.8	-42°10.7	
2	260°34.6	163°56.0	26°02.0	142°33.0	22°37.2	233°04.8	10°10.7	282°04.6	-10°35.5					Schedar	349°33.1	56°39.6	
3	275°37.0	178°55.4	26°01.9	157°34.0	22°36.9	248°06.7	10°10.9	297°07.0	-10°35.5					Diphda	348°48.8	-17°51.6	
4	290°39.5	193°54.9	26°01.8	172°35.0	22°36.6	263°08.6	10°11.1	312°09.3	-10°35.4					Achernar	335°21.8	-57°07.0	
5	305°42.0	208°54.4	26°01.7	187°35.9	22°36.3	278°10.5	10°11.3	327°11.6	-10°35.4					Hamal	327°53.1	23°34.2	
6	320°44.4	223°53.8	26°01.6	202°36.9	22°36.0	293°12.4	10°11.5	342°14.0	-10°35.4					Polaris	315°12.4	89°21.7	
7	335°46.9	238°53.3	26°01.5	217°37.9	22°35.7	308°14.4	10°11.7	357°16.3	-10°35.3					Akamar	315°13.3	-40°12.7	
8	350°49.4	253°52.8	26°01.4	232°38.9	22°35.4	323°16.3	10°11.9	12°18.6	-10°35.3					Menkar	314°07.9	4°10.8	
9	5°51.8	268°52.2	26°01.4	247°39.8	22°35.2	338°18.2	10°12.1	27°20.9	-10°35.2					Mirfak	308°30.8	49°56.5	
10	20°54.3	283°51.7	26°01.3	262°40.8	22°34.9	353°20.1	10°12.3	42°23.3	-10°35.2					Aldebaran	290°41.6	16°33.3	
11	35°56.8	298°51.2	26°01.2	277°41.8	22°34.6	8°22.0	10°12.5	57°25.6	-10°35.1					Rigel	281°05.5	-8°10.6	
12	50°59.2	313°50.6	26°01.1	292°42.7	22°34.3	23°23.9	10°12.7	72°27.9	-10°35.1					Capella	280°24.4	46°01.4	
13	66°01.7	328°50.1	26°01.0	307°43.7	22°34.0	38°25.8	10°12.9	87°30.3	-10°35.0					Bellatrix	278°24.7	6°22.2	
14	81°04.2	343°49.6	26°00.9	322°44.7	22°33.7	53°27.8	10°13.1	102°32.6	-10°35.0					Elnath	278°04.0	28°37.6	
15	96°06.6	358°49.1	26°00.8	337°45.7	22°33.4	68°29.7	10°13.3	117°34.9	-10°35.0					Alnilam	275°39.4	-1°11.3	
16	111°09.1	13°48.5	26°00.7	352°46.6	22°33.1	83°31.6	10°13.5	132°37.2	-10°34.9					Betelgeuse	270°53.9	7°24.6	
17	126°11.5	28°48.0	26°00.6	7°47.6	22°32.8	98°33.5	10°13.7	147°39.6	-10°34.9					Canopus	263°53.4	-52°42.7	
18	141°14.0	43°47.5	26°00.5	22°48.6	22°32.6	113°35.4	10°13.9	162°41.9	-10°34.8					Sirius	258°27.6	-16°44.8	
19	156°16.5	58°47.0	26°00.4	37°49.6	22°32.3	128°37.3	10°14.1	177°44.2	-10°34.8					Adara	255°07.2	-29°00.4	
20	171°18.9	73°46.4	26°00.3	52°50.5	22°32.0	143°39.3	10°14.3	192°46.6	-10°34.7					Procyon	244°52.4	5°10.0	
21	186°21.4	88°45.9	26°00.2	67°51.5	22°31.7	158°41.2	10°14.5	207°48.9	-10°34.7					Pollux	243°19.1	27°58.3	
22	201°23.9	103°45.4	26°00.1	82°52.5	22°31.4	173°43.1	10°14.7	222°51.2	-10°34.7					Avior	234°15.5	-59°35.3	
23	216°26.3	118°44.9	25°60.0	97°53.4	22°31.1	188°45.0	10°14.9	237°53.6	-10°34.6					Suhail	222°47.4	-43°31.8	
Mer.pass.:8:36:			v-0.5 d-0.1 m-4.1			v1.0 d-0.3 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.0 m1.0					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	231°28.8	133°44.3	25°59.9	112°54.4	22°30.8	203°46.9	10°15.1	252°55.9	-10°34.6					Dubhe	193°42.4	61°37.8	
1	246°31.3	148°43.8	25°59.7	127°55.4	22°30.5	218°48.8	10°15.3	267°58.2	-10°34.5					Denebola	182°26.1	14°26.6	
2	261°33.7	163°43.3	25°59.6	142°56.4	22°30.2	233°50.7	10°15.5	283°00.6	-10°34.5					Gienah	175°44.8	-17°40.4	
3	276°36.2	178°42.8	25°59.5	157°57.3	22°29.9	248°52.7	10°15.7	298°02.9	-10°34.4					Acrux	173°01.2	-63°13.9	
4	291°38.6	193°42.2	25°59.4	172°58.3	22°29.6	263°54.6	10°15.9	313°05.2	-10°34.4					Gacrux	171°52.8	-57°14.8	
5	306°41.1	208°41.7	25°59.3	187°59.3	22°29.4	278°56.5	10°16.1	328°07.5	-10°34.4					Alioth	166°13.8	55°50.2	
6	321°43.6	223°41.2	25°59.2	203°00.2	22°29.1	293°58.4	10°16.3	343°09.9	-10°34.3					Spica	158°23.5	-11°17.0	
7	336°46.0	238°40.7	25°59.1	218°01.2	22°28.8	309°00.3	10°16.5	358°12.2	-10°34.3					Alcaid	152°52.6	49°11.9	
8	351°48.5	253°40.2	25°58.9	233°02.2	22°28.5	324°02.2	10°16.7	13°14.5	-10°34.2					Hadar	148°37.4	-60°29.2	
9	6°51.0	268°39.6	25°58.8	248°03.2	22°28.2	339°04.2	10°16.9	28°16.9	-10°34.2					Menkent	147°58.9	-36°29.2	
10	21°53.4	283°39.1	25°58.7	263°04.1	22°27.9	354°06.1	10°17.1	43°19.2	-10°34.1					Arcturus	145°48.7	19°03.9	
11	36°55.9	298°38.6	25°58.6	278°05.1	22°27.6	9°08.0	10°17.3	58°21.5	-10°34.1					Rigel Kent.	139°41.6	-60°56.0	
12	51°58.4	313°38.1	25°58.5	293°06.1	22°27.3	24°09.9	10°17.5	73°23.9	-10°34.1					Zubenelg.	136°57.2	-16°08.4	
13	67°00.8	328°37.6	25°58.4	308°07.1	22°27.0	39°11.8	10°17.7	88°26.2	-10°34.0					Kochab	137°18.6	74°03.6	
14	82°03.3	343°37.1	25°58.2	323°08.0	22°26.7	54°13.7	10°17.9	103°28.5	-10°34.0					Alphecca	126°04.6	26°38.1	
15	97°05.8	358°36.5	25°58.1	338°09.0	22°26.4	69°15.7	10°18.1	118°30.9	-10°33.9					Antares	112°17.2	-26°29.0	
16	112°08.2	13°36.0	25°58.0	353°10.0	22°26.1	84°17.6	10°18.3	133°33.2	-10°33.9					Atria	107°12.2	-69°04.1	
17	127°10.7	28°35.5	25°57.9	8°10.9	22°25.8	99°19.5	10°18.5	148°35.5	-10°33.9					Sabik	102°04.1	-15°45.3	
18	142°13.1	43°35.0	25°57.7	23°11.9	22°25.5	114°21.4	10°18.7	163°37.9	-10°33.8					Shaula	96°11.9	-37°07.2	
19	157°15.6	58°34.5	25°57.6	38°12.9	22°25.2	129°23.3	10°18.9	178°40.2	-10°33.8					Rasalhague	95°59.6	12°32.5	
20	172°18.1	73°34.0	25°57.5	53°13.9	22°24.9	144°25.2	10°19.1	193°42.5	-10°33.7					Etamin	90°42.4	51°28.9	
21	187°20.5	88°33.5	25°57.3	68°14.8	22°24.6	159°27.2	10°19.3	208°44.9	-10°33.7					Kaus Aust.	83°34.0	-34°22.3	
22	202°23.0	103°33.0	25°57.2	83°15.8	22°24.4	174°29.1	10°19.5	223°47.2	-10°33.6					Vega	80°33.9	38°48.0	
23	217°25.5	118°32.4	25°57.1	98°16.8	22°24.1	189°31.0	10°19.7	238°49.5	-10°33.6					Nunki	75°49.3	-26°16.0	
Mer.pass.:8:32:			v-0.5 d-0.1 m-4.1			v1.0 d-0.3 m1.4			v1.9 d0.2 m-1.9			v2.3 d0.0 m1.0					
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	232°27.9	133°31.9	25°56.9	113°17.8	22°23.8	204°32.9	10°19.9	253°51.9	-10°33.6								
1	247°30.4	148°31.4	25°56.8	128°18.7	22°23.5	219°34.8	10°20.1	268°54.2	-10°33.5								
2	262°32.9	163°30.9	25°56.7	143°19.7	22°23.2	234°36.7	10°20.3	283°56.5	-10°33.5								
3	277°35.3	178°30.4	25°56.5	158°20.7	22°22.9	249°38.7	10°20.5	298°58.9	-10°33.4								
4	292°37.8	193°29.9	25°56.4	173°21.6	22°22.6	264°40.6	10°20.7	314°01.2	-10°33.4								
5	307°40.2	208°29.4	25°56.3	188°22.6	22°22.3	279°42.5	10°20.9	329°03.6	-10°33.4								
6	322°42.7	223°28.9	25°56.1	203°23.6	22°22.0	294°44.4	10°21.1	344°05.9	-10°33.3								
7	337°45.2	238°28.4	25°56.0	218°24.6	22°21.7	309°46.3	10°21.3	359°08.2	-10°33.3								
8	352°47.6	253°27.9	25°55.8	233°25.5	22°21.4	324°48.2	10°21.5	14°10.6	-10°33.2								
9	7°50.1	268°27.4	25°55.7	248°26.5	22°21.1	339°50.2	10°21.7	29°12.9	-10°33.2								
10	22°52.6	283°26.9	25°55.5	263°27.5	22°200												

Sun				Moon											
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	180°54.7	18°16.0	259°18.6	9.3	-16°57.3	13.6	59.2	72	—:—	—:—	—:—	—:—	—:—	—:—	
1	195°54.7	18°16.6	273°46.9	9.4	-16°43.7	13.7	59.2	70	—:—	—:—	00:57	23:07	—:—	—:—	
2	210°54.7	18°17.2	288°15.4	9.5	-16°30.0	13.7	59.2	68	—:—	—:—	01:54	22:03	—:—	—:—	
3	225°54.7	18°17.8	302°43.9	9.6	-16°16.2	13.8	59.2	66	—:—	—:—	02:27	21:28	—:—	—:—	
4	240°54.7	18°18.5	317°12.6	9.7	-16°02.3	13.9	59.2	64	—:—	01:17	02:51	21:04	22:42	—:—	
5	255°54.7	18°19.1	331°41.3	9.8	-15°48.4	14.0	59.2	62	—:—	01:57	03:10	20:45	21:60	—:—	
6	270°54.7	18°19.7	346°10.1	9.8	-15°34.3	14.1	59.2	60	—:—	02:23	03:26	20:29	21:32	—:—	
7	285°54.7	18°20.3	0°39.0	9.9	-15°20.2	14.2	59.2	58	01:09	02:44	03:39	20:16	21:11	22:49	
8	300°54.7	18°20.9	15°07.9	10.0	-15°06.0	14.2	59.2	56	01:45	03:00	03:50	20:04	20:54	22:11	
9	315°54.7	18°21.6	29°37.0	10.1	-14°51.7	14.3	59.2	54	02:10	03:14	03:60	19:54	20:40	21:45	
10	330°54.8	18°22.2	44°06.1	10.2	-14°37.4	14.4	59.2	52	02:29	03:26	04:08	19:45	20:28	21:25	
11	345°54.8	18°22.8	58°35.3	10.3	-14°22.9	14.5	59.1	50	02:45	03:37	04:16	19:38	20:17	21:09	
12	0°54.8	18°23.4	73°04.6	10.3	-14°08.4	14.5	59.1	45	03:16	03:59	04:33	19:21	19:55	20:38	
13	15°54.8	18°24.0	87°34.0	10.4	-13°53.8	14.6	59.1	40	03:38	04:16	04:46	19:07	19:38	20:16	
14	30°54.8	18°24.6	102°03.5	10.5	-13°39.2	14.7	59.1	35	03:56	04:30	04:58	18:56	19:24	19:58	
15	45°54.8	18°25.3	116°33.0	10.6	-13°24.5	14.8	59.1	30	04:10	04:41	05:08	18:46	19:12	19:43	
16	60°54.8	18°25.9	131°02.6	10.6	-13°09.7	14.8	59.1	20	04:33	05:01	05:25	18:28	18:52	19:20	
17	75°54.8	18°26.5	145°32.3	10.7	-12°54.8	14.9	59.1	10	04:51	05:17	05:39	18:14	18:36	19:02	
18	90°54.8	18°27.1	160°02.0	10.8	-12°39.9	14.9	59.1	0	05:06	05:31	05:53	17:60	18:22	18:47	
19	105°54.8	18°27.7	174°31.8	10.9	-12°24.9	15.0	59.1	-10	05:19	05:44	06:06	17:46	18:08	18:34	
20	120°54.8	18°28.3	189°01.7	10.9	-12°09.9	15.1	59.1	-20	05:31	05:57	06:21	17:32	17:55	18:22	
21	135°54.8	18°28.9	203°31.7	11.0	-11°54.8	15.1	59.1	-30	05:43	06:12	06:37	17:15	17:41	18:10	
22	150°54.8	18°29.5	218°01.7	11.1	-11°39.6	15.2	59.1	-35	05:49	06:19	06:46	17:06	17:33	18:03	
23	165°54.8	18°30.2	232°31.8	11.1	-11°24.4	15.2	59.0	-40	05:55	06:28	06:57	16:55	17:24	17:57	
SD.=15.8 d=0.6 S.D.=16.2								-45	06:02	06:38	07:10	16:43	17:14	17:50	
								-50	06:10	06:49	07:25	16:27	17:03	17:42	
								-52	06:13	06:55	07:32	16:20	16:58	17:39	
								-54	06:17	07:00	07:40	16:12	16:52	17:35	
								-56	06:21	07:07	07:49	16:03	16:46	17:31	
								-58	06:25	07:13	07:59	15:53	16:39	17:27	
								-60	06:29	07:21	08:10	15:42	16:31	17:23	
								Lat.	Sat	Moonrise		Moonset			
								72	04:60	03:56	03:16	09:22	12:11	14:33	
								70	04:22	03:40	03:10	09:58	12:24	14:35	
								68	03:55	03:27	03:06	10:23	12:35	14:36	
								66	03:34	03:16	03:02	10:42	12:43	14:37	
								64	03:18	03:07	02:59	10:57	12:50	14:38	
								62	03:04	02:60	02:56	11:10	12:56	14:38	
								60	02:52	02:53	02:53	11:20	13:02	14:39	
								58	02:42	02:47	02:51	11:29	13:06	14:40	
								56	02:33	02:42	02:49	11:37	13:10	14:40	
								54	02:25	02:37	02:47	11:45	13:14	14:40	
								52	02:17	02:33	02:46	11:51	13:17	14:41	
								50	02:11	02:29	02:44	11:57	13:20	14:41	
								45	01:57	02:20	02:41	12:09	13:26	14:42	
								40	01:45	02:13	02:38	12:19	13:32	14:43	
								35	01:35	02:07	02:36	12:28	13:36	14:43	
								30	01:26	02:01	02:34	12:35	13:40	14:44	
								20	01:11	01:52	02:30	12:48	13:47	14:45	
								10	00:58	01:44	02:27	12:59	13:53	14:45	
								0	00:45	01:36	02:24	13:09	13:59	14:46	
								-10	00:32	01:28	02:21	13:20	14:04	14:46	
								-20	00:19	01:19	02:17	13:31	14:10	14:47	
								-30	00:03	01:09	02:14	13:43	14:16	14:48	
								-35	—:—	01:04	02:11	13:50	14:20	14:48	
								-40	—:—	00:57	02:09	13:58	14:24	14:49	
								-45	—:—	00:50	02:06	14:07	14:29	14:49	
								-50	—:—	00:41	02:03	14:18	14:35	14:50	
								-52	—:—	00:36	02:01	14:23	14:38	14:50	
								-54	—:—	00:32	01:59	14:29	14:40	14:50	
								-56	—:—	00:27	01:58	14:35	14:44	14:50	
								-58	—:—	00:21	01:55	14:42	14:47	14:51	
								-60	—:—	00:14	01:53	14:50	14:51	14:51	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								13	03:39	03:39	11:56	06:57	19:22	23(40%)	
								14	03:39	03:39	11:56	07:47	20:11	24(29%)	
								15	03:39	03:39	11:56	08:34	20:58	25(19%)	
SD.=15.8 d=0.6 S.D.=16.0															

May 16, 17 ,18 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	233°27.1	133°19.9	25°53.4	113°41.1	22°16.6	205°18.9	10°24.7	254°47.9	-10°32.6	Alpheratz	357°36.5	29°12.9
1	248°29.5	148°19.4	25°53.2	128°42.1	22°16.3	220°20.8	10°24.9	269°50.3	-10°32.5	Ankaa	353°08.8	-42°10.7
2	263°32.0	163°18.9	25°53.1	143°43.0	22°16.0	235°22.8	10°25.1	284°52.6	-10°32.5	Schedar	349°33.1	56°39.6
3	278°34.5	178°18.4	25°52.9	158°44.0	22°15.7	250°24.7	10°25.3	299°55.0	-10°32.5	Diphda	348°48.8	-17°51.6
4	293°36.9	193°17.9	25°52.7	173°45.0	22°15.4	265°26.6	10°25.5	314°57.3	-10°32.4	Achernar	335°21.8	-57°07.0
5	308°39.4	208°17.4	25°52.6	188°45.9	22°15.1	280°28.5	10°25.7	329°59.6	-10°32.4	Hamal	327°53.1	23°34.2
6	323°41.9	223°16.9	25°52.4	203°46.9	22°14.8	295°30.4	10°25.9	345°02.0	-10°32.3	Polaris	315°12.1	89°21.7
7	338°44.3	238°16.4	25°52.2	218°47.9	22°14.4	310°32.4	10°26.1	0°04.3	-10°32.3	Akamar	315°13.2	-40°12.7
8	353°46.8	253°15.9	25°52.1	233°48.9	22°14.1	325°34.3	10°26.3	15°06.7	-10°32.3	Menkar	314°07.9	4°10.8
9	8°49.2	268°15.5	25°51.9	248°49.8	22°13.8	340°36.2	10°26.5	30°09.0	-10°32.2	Mirfak	308°30.8	49°56.5
10	23°51.7	283°15.0	25°51.7	263°50.8	22°13.5	355°38.1	10°26.7	45°11.3	-10°32.2	Aldebaran	290°41.6	16°33.3
11	38°54.2	298°14.5	25°51.6	278°51.8	22°13.2	10°40.0	10°26.9	60°13.7	-10°32.1	Rigel	281°05.5	-8°10.6
12	53°56.6	313°14.0	25°51.4	293°52.7	22°12.9	25°42.0	10°27.1	75°16.0	-10°32.1	Capella	280°24.4	46°01.4
13	68°59.1	328°13.5	25°51.2	308°53.7	22°12.6	40°43.9	10°27.3	90°18.4	-10°32.1	Bellatrix	278°24.7	6°22.2
14	84°01.6	343°13.0	25°51.0	323°54.7	22°12.3	55°45.8	10°27.5	105°20.7	-10°32.0	Elnath	278°04.0	28°37.6
15	99°04.0	358°12.5	25°50.9	338°55.7	22°12.0	70°47.7	10°27.7	120°23.0	-10°32.0	Alnilam	275°39.4	-1°11.3
16	114°06.5	13°12.0	25°50.7	353°56.6	22°11.7	85°49.6	10°27.9	135°25.4	-10°31.9	Betelgeuse	270°53.9	7°24.6
17	129°09.0	28°11.6	25°50.5	8°57.6	22°11.4	100°51.5	10°28.1	150°27.7	-10°31.9	Canopus	263°53.4	-52°42.6
18	144°11.4	43°11.1	25°50.3	23°58.6	22°11.1	115°53.5	10°28.3	165°30.1	-10°31.9	Sirius	258°27.6	-16°44.8
19	159°13.9	58°10.6	25°50.2	38°59.5	22°10.8	130°55.4	10°28.5	180°32.4	-10°31.8	Adara	255°07.2	-29°00.4
20	174°16.3	73°10.1	25°50.0	54°00.5	22°10.5	145°57.3	10°28.7	195°34.7	-10°31.8	Procyon	244°52.4	5°10.0
21	189°18.8	88°09.6	25°49.8	69°01.5	22°10.2	160°59.2	10°28.9	210°37.1	-10°31.7	Pollux	243°19.1	27°58.3
22	204°21.3	103°09.1	25°49.6	84°02.5	22°09.9	176°01.1	10°29.1	225°39.4	-10°31.7	Avior	234°15.6	-59°35.3
23	219°23.7	118°08.7	25°49.4	99°03.4	22°09.6	191°03.1	10°29.3	240°41.8	-10°31.7	Suhail	222°47.4	-43°31.8
Mer.pass.:8:24:		v-0.5 d-0.2 m-4.1		v1.0 d-0.3 m1.5		v1.9 d0.2 m-1.9		v2.3 d0.0 m1.0		Miaplacidus	221°38.7	-69°49.0
										Alphard	217°49.1	-8°45.7
										Regulus	207°35.8	11°51.2
										Dubhe	193°42.4	61°37.8
										Denebola	182°26.1	14°26.6
										Gienah	175°44.8	-17°40.4
										Acrux	173°01.2	-63°13.9
										Gacrux	171°52.8	-57°14.8
										Alioth	166°13.8	55°50.2
										Spica	158°23.5	-11°17.0
										Alcaid	152°52.6	49°11.9
										Hadar	148°37.4	-60°29.2
										Menkent	147°58.9	-36°29.2
										Arcturus	145°48.7	19°03.9
										Rigel Kent.	139°41.6	-60°56.0
										Zubenelg.	136°57.2	-16°08.4
										Kochab	137°18.6	74°03.6
										Alphecca	126°04.6	26°38.1
										Antares	112°17.2	-26°29.0
										Atria	107°12.1	-69°04.1
										Sabik	102°04.1	-15°45.3
										Shaula	96°11.9	-37°07.2
										Rasalhague	95°59.6	12°32.5
										Etamin	90°42.4	51°28.9
										Kaus Aust.	83°34.0	-34°22.3
										Vega	80°33.9	38°48.0
										Nunki	75°49.2	-26°16.0
										Altair	62°01.2	8°55.6
										Peacock	53°07.7	-56°39.4
										Deneb	49°26.6	45°21.5
										Enif	33°40.2	9°58.7
										Alnair	27°34.7	-46°50.7
										Fomalhaut	15°16.2	-29°29.9
										Scheat	13°46.7	28°12.3
										Markab	13°31.4	15°19.6
2023/5/1		SHA		Mer.pass								
Venus		259°52.8		15:07								
Mars		240°14.0		16:24								
Jupiter		331°51.9		10:17								
Saturn		21°20.9		06:60								
2023/5/1		SHA		Mer.pass								
Venus		258°42.0		15:08								
Mars		239°38.2		16:23								
Jupiter		331°38.8		10:14								
Saturn		21°17.9		06:56								
2023/5/1		SHA		Mer.pass								
Venus		257°31.5		15:09								
Mars		239°02.4		16:21								
Jupiter		331°25.7		10:11								
Saturn		21°15.0		06:52								
Horizontal paralax												
Venus:				0.2								
Mars:				0.1								
Mer.pass.:8:16:		v-0.5 d-0.2 m-4.1		v1.0 d-0.3 m1.5		v1.9 d0.2 m-1.9		v2.3 d0.0 m1.0				

h		Sun		Moon			
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	180°54.6	18°59.4	224°04.2	12.9	1°39.1	16.2	58.4
1	195°54.6	18°60.0	238°36.1	12.9	1°55.2	16.2	58.4
2	210°54.6	19°00.6	253°08.0	12.9	2°11.4	16.1	58.4
3	225°54.6	19°01.2	267°39.9	12.9	2°27.5	16.1	58.4
4	240°54.5	19°01.7	282°11.8	12.9	2°43.6	16.1	58.4
5	255°54.5	19°02.3	296°43.7	12.9	2°59.7	16.1	58.4
6	270°54.5	19°02.9	311°15.7	12.9	3°15.7	16.1	58.3
7	285°54.5	19°03.5	325°47.6	12.9	3°31.8	16.0	58.3
8	300°54.5	19°04.1	340°19.5	12.9	3°47.8	16.0	58.3
9	315°54.5	19°04.6	354°51.4	12.9	4°03.8	16.0	58.3
10	330°54.5	19°05.2	9°23.3	12.9	4°19.7	15.9	58.3
11	345°54.5	19°05.8	23°55.2	12.9	4°35.7	15.9	58.3
12	0°54.4	19°06.4	38°27.1	12.9	4°51.6	15.9	58.2
13	15°54.4	19°06.9	52°59.0	12.9	5°07.4	15.9	58.2
14	30°54.4	19°07.5	67°30.9	12.9	5°23.3	15.8	58.2
15	45°54.4	19°08.1	82°02.7	12.9	5°39.1	15.8	58.2
16	60°54.4	19°08.7	96°34.6	12.8	5°54.9	15.8	58.2
17	75°54.4	19°09.2	111°06.4	12.8	6°10.6	15.7	58.2
18	90°54.4	19°09.8	125°38.3	12.8	6°26.3	15.7	58.1
19	105°54.3	19°10.4	140°10.1	12.8	6°42.0	15.6	58.1
20	120°54.3	19°11.0	154°41.9	12.8	6°57.6	15.6	58.1
21	135°54.3	19°11.5	169°13.6	12.8	7°13.1	15.6	58.1
22	150°54.3	19°12.1	183°45.4	12.7	7°28.7	15.5	58.1
23	165°54.3	19°12.7	198°17.1	12.7	7°44.2	15.5	58.1
SD.=15.8		d=0.6	S.D.=15.9				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	180°54.3	19°13.3	212°48.8	12.7	7°59.6	15.4	58.0
1	195°54.2	19°13.8	227°20.5	12.7	8°15.0	15.4	58.0
2	210°54.2	19°14.4	241°52.2	12.7	8°30.4	15.3	58.0
3	225°54.2	19°15.0	256°23.9	12.6	8°45.7	15.3	58.0
4	240°54.2	19°15.5	270°55.5	12.6	9°00.9	15.2	58.0
5	255°54.2	19°16.1	285°27.1	12.6	9°16.1	15.2	57.9
6	270°54.2	19°16.7	299°58.7	12.6	9°31.3	15.1	57.9
7	285°54.1	19°17.2	314°30.2	12.5	9°46.3	15.1	57.9
8	300°54.1	19°17.8	329°01.7	12.5	10°01.4	15.0	57.9
9	315°54.1	19°18.4	343°33.2	12.5	10°16.4	14.9	57.9
10	330°54.1	19°18.9	358°04.7	12.4	10°31.3	14.9	57.8
11	345°54.1	19°19.5	12°36.1	12.4	10°46.1	14.8	57.8
12	0°54.0	19°20.1	27°07.5	12.4	11°00.9	14.8	57.8
13	15°54.0	19°20.6	41°38.9	12.3	11°15.7	14.7	57.8
14	30°54.0	19°21.2	56°10.2	12.3	11°30.3	14.6	57.8
15	45°54.0	19°21.7	70°41.5	12.3	11°45.0	14.6	57.7
16	60°54.0	19°22.3	85°12.7	12.2	11°59.5	14.5	57.7
17	75°53.9	19°22.9	99°44.0	12.2	12°14.0	14.4	57.7
18	90°53.9	19°23.4	114°15.2	12.2	12°28.4	14.4	57.7
19	105°53.9	19°24.0	128°46.3	12.1	12°42.7	14.3	57.7
20	120°53.9	19°24.5	143°17.4	12.1	12°57.0	14.2	57.6
21	135°53.9	19°25.1	157°48.5	12.1	13°11.2	14.2	57.6
22	150°53.8	19°25.7	172°19.5	12.0	13°25.3	14.1	57.6
23	165°53.8	19°26.2	186°50.5	12.0	13°39.4	14.0	57.6
SD.=15.8		d=0.6	S.D.=15.8				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°53.8	19°26.8	201°21.5	11.9	13°53.3	13.9	57.6
1	195°53.8	19°27.3	215°52.4	11.9	14°07.2	13.9	57.5
2	210°53.7	19°27.9	230°23.2	11.8	14°21.0	13.8	57.5
3	225°53.7	19°28.4	244°54.0	11.8	14°34.8	13.7	57.5
4	240°53.7	19°29.0	259°24.8	11.8	14°48.4	13.6	57.5
5	255°53.7	19°29.5	273°55.6	11.7	15°02.0	13.5	57.5
6	270°53.6	19°30.1	288°26.2	11.7	15°15.5	13.4	57.4
7	285°53.6	19°30.6	302°56.9	11.6	15°28.9	13.4	57.4
8	300°53.6	19°31.2	317°27.5	11.6	15°42.2	13.3	57.4
9	315°53.6	19°31.8	331°58.0	11.5	15°55.5	13.2	57.4
10	330°53.6	19°32.3	346°28.5	11.5	16°08.6	13.1	57.4
11	345°53.5	19°32.9	0°59.0	11.4	16°21.7	13.0	57.3
12	0°53.5	19°33.4	15°29.4	11.4	16°34.6	12.9	57.3
13	15°53.5	19°34.0	29°59.8	11.3	16°47.5	12.8	57.3
14	30°53.4	19°34.5	44°30.1	11.3	17°00.3	12.7	57.3
15	45°53.4	19°35.0	59°00.3	11.2	17°13.0	12.6	57.2
16	60°53.4	19°35.6	73°30.5	11.2	17°25.6	12.5	57.2
17	75°53.4	19°36.1	88°00.7	11.1	17°38.1	12.5	57.2
18	90°53.3	19°36.7	102°30.8	11.1	17°50.5	12.4	57.2
19	105°53.3	19°37.2	117°00.9	11.0	18°02.8	12.3	57.2
20	120°53.3	19°37.8	131°30.9	11.0	18°15.0	12.2	57.1
21	135°53.3	19°38.3	146°00.8	10.9	18°27.1	12.1	57.1
22	150°53.2	19°38.9	160°30.7	10.9	18°39.1	11.9	57.1
23	165°53.2	19°39.4	175°00.6	10.8	18°51.0	11.8	57.1
SD.=15.8		d=0.6	S.D.=15.7				
Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	--	--	--	--	--	--	
70	--	--	--	--	--	--	
68	--	--	01:37	22:21	--	--	
66	--	--	02:15	21:41	--	--	
64	--	00:55	02:42	21:13	23:06	--	
62	--	01:44	03:02	20:53	22:13	--	
60	--	02:14	03:19	20:36	21:42	--	
58	00:49	02:36	03:32	20:22	21:19	23:11	
56	01:34	02:54	03:44	20:10	21:01	22:22	
54	02:01	03:08	03:55	19:59	20:46	21:54	
52	02:22	03:21	04:04	19:50	20:33	21:33	
50	02:39	03:32	04:12	19:42	20:22	21:15	
45	03:11	03:55	04:29	19:24	19:59	20:43	
40	03:34	04:13	04:43	19:10	19:41	20:19	
35	03:53	04:27	04:55	18:58	19:26	20:01	
30	04:08	04:39	05:06	18:47	19:14	19:45	
20	04:32	04:60	05:23	18:30	18:53	19:21	
10	04:50	05:16	05:39	18:14	18:37	19:03	
0	05:06	05:31	05:53	17:60	18:22	18:47	
-10	05:19	05:45	06:07	17:46	18:08	18:34	
-20	05:32	05:59	06:22	17:31	17:54	18:21	
-30	05:44	06:13	06:39	17:14	17:39	18:08	
-35	05:51	06:22	06:49	17:04	17:31	18:02	
-40	05:58	06:31	06:60	16:53	17:22	17:55	
-45	06:05	06:41	07:13	16:39	17:11	17:47	
-50	06:13	06:53	07:29	16:23	16:59	17:39	
-52	06:17	06:59	07:37	16:16	16:54	17:35	
-54	06:21	07:05	07:45	16:07	16:48	17:31	
-56	06:25	07:11	07:54	15:58	16:41	17:27	
-58	06:30	07:19	08:05	15:47	16:34	17:23	
-60	06:35	07:27	08:17	15:35	16:25	17:18	
Moonrise		Moonset					
Lat.	Tue	Wed	Thu	Tue	Wed	Thu	
72	02:41	02:05	01:16	16:51	19:21	--	
70	02:44	02:17	01:42	16:42	18:56	21:44	
68	02:47	02:27	02:03	16:34	18:37	20:56	
66	02:49	02:35	02:20	16:28	18:22	20:25	
64	02:50	02:42	02:33	16:23	18:10	20:03	
62	02:52	02:48	02:45	16:19	18:00	19:45	
60	02:53	02:54	02:54	16:15	17:51	19:30	
58	02:55	02:58	03:03	16:12	17:44	19:18	
56	02:56	03:03	03:11	16:09	17:37	19:07	
54	02:57	03:06	03:18	16:06	17:31	18:57	
52	02:58	03:10	03:24	16:03	17:26	18:49	
50	02:58	03:13	03:29	16:01	17:21	18:41	
45	03:00	03:20	03:42	15:57	17:11	18:26	
40	03:02	03:26	03:52	15:53	17:02	18:12	
35	03:03	03:31	04:00	15:49	16:55	18:01	
30	03:04	03:35	04:08	15:46	16:49	17:52	
20	03:07	03:43	04:21	15:41	16:38	17:35	
10	03:08	03:50	04:33	15:37	16:28	17:21	
0	03:10	03:57	04:44	15:32	16:19	17:08	
-10	03:12	04:03	04:56	15:28	16:10	16:54	
-20	03:14	04:11	05:08	15:24	16:01	16:40	
-30	03:16	04:19	05:22	15:18	15:50	16:24	
-35	03:18	04:24	05:30	15:16	15:44	16:15	
-40	03:19	04:29	05:39	15:12	15:37	16:04	
-45	03:21	04:35	05:50	15:08	15:29	15:52	
-50	03:23	04:43	06:03	15:04	15:19	15:37	
-52	03:24	04:47	06:09	15:02	15:15	15:30	
-54	03:25	04:51	06:16	14:60	15:10	15:22	
-56	03:26	04:55	06:24	14:57	15:04	15:14	
-58	03:28	04:60	06:33	14:54	14:58	15:04	
-60	03:29	05:05	06:43	14:51	14:52	14:53	
Sun		Moon					
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer.Pass.	Upper	Lower	Age	
16	03:38	03:38	11:56	09:21	21:44	26(11%)	
17	03:37	03:36	11:56	10:07	22:31	27(5%)	
18	03:35	03:34	11:56	10:55	23:20	28(2%)	

May 19, 20 ,21 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec				
0	236°24.5	132°45.9	25°39.1	114°51.0	21°54.2	207°37.2	10°39.0	257°36.7	-10°29.8	Alpheratz	357°36.4	29°12.9					
1	251°26.9	147°45.5	25°38.9	129°52.0	21°53.9	222°39.1	10°39.1	272°39.0	-10°29.8	Ankaa	353°08.8	-42°10.7					
2	266°29.4	162°45.0	25°38.6	144°53.0	21°53.6	237°41.0	10°39.3	287°41.4	-10°29.8	Schedar	349°33.0	56°39.6					
3	281°31.9	177°44.6	25°38.4	159°54.0	21°53.3	252°43.0	10°39.5	302°43.7	-10°29.7	Diphda	348°48.8	-17°51.6					
4	296°34.3	192°44.1	25°38.1	174°54.9	21°52.9	267°44.9	10°39.7	317°46.1	-10°29.7	Achernar	335°21.7	-57°07.0					
5	311°36.8	207°43.7	25°37.9	189°55.9	21°52.6	282°46.8	10°39.9	332°48.4	-10°29.7	Hamal	327°53.1	23°34.2					
6	326°39.3	222°43.2	25°37.7	204°56.9	21°52.3	297°48.7	10°40.1	347°50.8	-10°29.6	Polaris	315°11.5	89°21.6					
7	341°41.7	237°42.8	25°37.4	219°57.8	21°52.0	312°50.7	10°40.3	2°53.1	-10°29.6	Akamar	315°13.2	-40°12.7					
8	356°44.2	252°42.4	25°37.2	234°58.8	21°51.6	327°52.6	10°40.5	17°55.5	-10°29.5	Menkar	314°07.9	4°10.8					
9	11°46.7	267°41.9	25°36.9	249°59.8	21°51.3	342°54.5	10°40.7	32°57.8	-10°29.5	Mirfak	308°30.8	49°56.5					
10	26°49.1	282°41.5	25°36.7	265°00.8	21°51.0	357°56.4	10°40.9	48°00.2	-10°29.5	Aldebaran	290°41.6	16°33.3					
11	41°51.6	297°41.0	25°36.4	280°01.7	21°50.7	12°58.3	10°41.1	63°02.5	-10°29.4	Rigel	281°05.5	-8°10.6					
12	56°54.1	312°40.6	25°36.2	295°02.7	21°50.4	28°00.3	10°41.3	78°04.9	-10°29.4	Capella	280°24.4	46°01.4					
13	71°56.5	327°40.2	25°35.9	310°03.7	21°50.0	43°02.2	10°41.5	93°07.2	-10°29.4	Bellatrix	278°24.7	6°22.2					
14	86°59.0	342°39.7	25°35.7	325°04.6	21°49.7	58°04.1	10°41.7	108°09.6	-10°29.3	Elnath	278°04.0	28°37.6					
15	102°01.4	357°39.3	25°35.4	340°05.6	21°49.4	73°06.0	10°41.9	123°11.9	-10°29.3	Alnilam	275°39.4	-1°11.3					
16	117°03.9	12°38.9	25°35.2	355°06.6	21°49.1	88°08.0	10°42.1	138°14.3	-10°29.3	Betelgeuse	270°53.9	7°24.6					
17	132°06.4	27°38.4	25°34.9	10°07.6	21°48.8	103°09.9	10°42.3	153°16.6	-10°29.2	Canopus	263°53.5	-52°42.6					
18	147°08.8	42°38.0	25°34.7	25°08.5	21°48.4	118°11.8	10°42.5	168°19.0	-10°29.2	Sirius	258°27.6	-16°44.8					
19	162°11.3	57°37.6	25°34.4	40°09.5	21°48.1	133°13.7	10°42.7	183°21.3	-10°29.2	Adara	255°07.2	-29°00.4					
20	177°13.8	72°37.1	25°34.2	55°10.5	21°47.8	148°15.7	10°42.9	198°23.7	-10°29.1	Procyon	244°52.4	5°10.0					
21	192°16.2	87°36.7	25°33.9	70°11.4	21°47.5	163°17.6	10°43.1	213°26.0	-10°29.1	Pollux	243°19.1	27°58.3					
22	207°18.7	102°36.3	25°33.7	85°12.4	21°47.1	178°19.5	10°43.2	228°28.4	-10°29.1	Avior	234°15.6	-59°35.3					
23	222°21.2	117°35.8	25°33.4	100°13.4	21°46.8	193°21.4	10°43.4	243°30.7	-10°29.0	Suhail	222°47.4	-43°31.8					
Mer.pass.:8:13:			v-0.4 d-0.2 m-4.1			v1.0 d-0.3 m1.5			v1.9 d0.2 m-1.9			v2.3 d0.0 m1.0					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	237°23.6	132°35.4	25°33.1	115°14.4	21°46.5	208°23.4	10°43.6	258°33.1	-10°29.0	Alphard	217°49.2	-8°45.7					
1	252°26.1	147°35.0	25°32.9	130°15.3	21°46.2	223°25.3	10°43.8	273°35.4	-10°29.0	Regulus	207°35.9	11°51.2					
2	267°28.5	162°34.5	25°32.6	145°16.3	21°45.8	238°27.2	10°44.0	288°37.8	-10°28.9	Dubhe	193°42.5	61°37.8					
3	282°31.0	177°34.1	25°32.3	160°17.3	21°45.5	253°29.1	10°44.2	303°40.1	-10°28.9	Denebola	182°26.1	14°26.6					
4	297°33.5	192°33.7	25°32.1	175°18.2	21°45.2	268°31.0	10°44.4	318°42.5	-10°28.8	Gienah	175°44.8	-17°40.4					
5	312°35.9	207°33.3	25°31.8	190°19.2	21°44.9	283°33.0	10°44.6	333°44.8	-10°28.8	Acrux	173°01.2	-63°13.9					
6	327°38.4	222°32.8	25°31.5	205°20.2	21°44.5	298°34.9	10°44.8	348°47.2	-10°28.8	Gacrux	171°52.8	-57°14.8					
7	342°40.9	237°32.4	25°31.3	220°21.2	21°44.2	313°36.8	10°45.0	3°49.5	-10°28.7	Alioth	166°13.8	55°50.2					
8	357°43.3	252°32.0	25°31.0	235°22.1	21°43.9	328°38.7	10°45.2	18°51.9	-10°28.7	Spica	158°23.5	-11°17.0					
9	12°45.8	267°31.6	25°30.7	250°23.1	21°43.6	343°40.7	10°45.4	33°54.2	-10°28.7	Alcaid	152°52.7	49°11.9					
10	27°48.3	282°31.1	25°30.5	265°24.1	21°43.2	358°42.6	10°45.6	48°56.6	-10°28.6	Hadar	148°37.4	-60°29.3					
11	42°50.7	297°30.7	25°30.2	280°25.0	21°42.9	13°44.5	10°45.8	63°58.9	-10°28.6	Menkent	147°58.9	-36°29.2					
12	57°53.2	312°30.3	25°29.9	295°26.0	21°42.6	28°46.4	10°46.0	79°01.3	-10°28.6	Arcturus	145°48.7	19°03.9					
13	72°55.7	327°29.9	25°29.7	310°27.0	21°42.3	43°48.4	10°46.2	94°03.7	-10°28.5	Rigel Kent.	139°41.6	-60°56.0					
14	87°58.1	342°29.5	25°29.4	325°28.0	21°41.9	58°50.3	10°46.4	109°06.0	-10°28.5	Zubenelg.	136°57.2	-16°08.4					
15	103°00.6	357°29.0	25°29.1	340°28.9	21°41.6	73°52.2	10°46.6	124°08.4	-10°28.5	Kochab	137°18.6	74°03.6					
16	118°03.0	12°28.6	25°28.8	355°29.9	21°41.3	88°54.1	10°46.7	139°10.7	-10°28.4	Alphecca	126°04.6	26°38.1					
17	133°05.5	27°28.2	25°28.5	10°30.9	21°40.9	103°56.1	10°46.9	154°13.1	-10°28.4	Antares	112°17.2	-26°29.0					
18	148°08.0	42°27.8	25°28.3	25°31.8	21°40.6	118°58.0	10°47.1	169°15.4	-10°28.4	Atria	107°12.1	-69°04.1					
19	163°10.4	57°27.4	25°28.0	40°32.8	21°40.3	133°59.9	10°47.3	184°17.8	-10°28.3	Sabik	102°04.0	-15°45.3					
20	178°12.9	72°27.0	25°27.7	55°33.8	21°40.0	149°01.8	10°47.5	199°20.1	-10°28.3	Shaula	96°11.9	-37°07.2					
21	193°15.4	87°26.5	25°27.4	70°34.8	21°39.6	164°03.8	10°47.7	214°22.5	-10°28.3	Rasalhague	95°59.5	12°32.5					
22	208°17.8	102°26.1	25°27.1	85°35.7	21°39.3	179°05.7	10°47.9	229°24.8	-10°28.2	Etamin	90°42.3	51°28.9					
23	223°20.3	117°25.7	25°26.9	100°36.7	21°39.0	194°07.6	10°48.1	244°27.2	-10°28.2	Kaus Aust.	83°34.0	-34°22.3					
Mer.pass.:8:09:			v-0.4 d-0.3 m-4.1			v1.0 d-0.3 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	238°22.8	132°25.3	25°26.6	115°37.7	21°38.6	209°09.5	10°48.3	259°29.6	-10°28.2	Nunki	75°49.2	-26°16.0					
1	253°25.2	147°24.9	25°26.3	130°38.6	21°38.3	224°11.5	10°48.5	274°31.9	-10°28.1	Altair	62°01.2	8°55.6					
2	268°27.7	162°24.5	25°26.0	145°39.6	21°38.0	239°13.4	10°48.7	289°34.3	-10°28.1	Peacock	53°07.7	-56°39.4					
3	283°30.2	177°24.1	25°25.7	160°40.6	21°37.7	254°15.3	10°48.9	304°36.6	-10°28.1	Deneb	49°26.6	45°21.5					
4	298°32.6	192°23.7	25°25.4	175°41.6	21°37.3	269°17.2	10°49.1	319°39.0	-10°28.0	Enif	33°40.1	9°58.7					
5	313°35.1	207°23.3	25°25.1	190°42.5	21°37.0	284°19.2	10°49.3	334°41.3	-10°28.0	Alnair	27°34.7	-46°50.7					
6	328°37.5	222°22.9	25°24.8	205°43.5	21°36.7	299°21.1	10°49.5	349°43.7	-10°28.0	Fomalhaut	15°16.2	-29°29.9					
7	343°40.0	237°22.4	25°24.6	220°44.5	21°36.3	314°23.0	10°49.6	4°46.1	-10°27.9	Scheat	13°46.7	28°12.3					
8	358°42.5	252°22.0	25°24.3	235°45.4	21°36.0	329°25.0	10°49.8	19°48.4	-10°27.9	Markab	13°31.4	15°19.6					
9	13°44.9	267°21.6	25°24.0	250°46.4	21°35.7	344°26.9	10°50.0	34°50.8	-10°27.9	2023/5/1	SHA	Mer.pass					
10	28°47.4	282°21.2	25°23.7	265°47.4	21°35.3	359°28.8	10°50.2	49°53.1	-10°27.8	Venus	256°21.4	15:09					
11	43°49.9	297°20.8	25°23.4	280°48.4	21°35.0	14°30.0	10°50.4	64°55.5	-10°27.8	Mars	238°26.6	16:20					
12	58°52.3	312°20.4	25°23.1	295°49.3	21°34.7	29°32.7	10°50.6	79°57.8	-10°27.8	Jupiter	331°12.7	10:08					
13	73°54.8	327°20.0	25°22.8	310°50.3	21°34.3	44°34.6	10°50.8	95°00.2	-10°27.7	Saturn	21°12.2	06:48					
14	88°57.3	342°19.6	25°22.5	325°51.3	21°34.0	59°36.5	10°51.0	110°02.6	-10°27.7	2023/5/2	SHA	Mer.pass					
15	103°59.7	357°19.2	25°22.2	340°52.2	21°33.7	74°38.4	10°51.2	125°04.9	-10°27.7	Venus	255°11.8	15:10					
16	119°02.2	12°18.8	25°21.9	355°53.2	21°33.3	89°40.4	10°51.4	140°07.3	-10°27.7	Mars	237°50.7	16:18					
17	134°04.7	27°18.4	25°21.6	10°54.2	21°33.0	104°42.3	10°51.6	155°09.6	-10°27.6	Jupiter	330°59.7	10:05					
18	149°07.1	42°18.0	25°21.3	25°55.2	21°32.7	119°44.2	10°51.8	170°12.0	-10°27.6	Saturn	21°09.4	06:45					
19	164°09.6	57°17.6	25°21.0	40°56.1	21°32.3	134°46.1	10°52.0	185°14.3	-10°27.6	2023/5/2	SHA	Mer.pass					
20	179°12.0	72°17.2	25°20.7	55°57.1	21°32.0	149°48.1	10°52.2	200°16.7	-10°27.5	Venus	254°02.5	15:11					
21	194°14.5	87°16.8	25°20.4	70°58.1	21°31.7	164°50.0	10°52.3	215°19.1	-10°27.5	Mars	237°14.9	16:16					
22	209°17.0	102°16.5	25°20.1	85°59.0	21°31.3	179°51.9	10°52.5	230°21.4	-10°27.5	Jupiter	330°46.8	10:02					
23	224°19.4	117°16.1	25°19.7	101°00.0	21°31.0	194°53.9	10°52.7	245°23.8	-10°27.4	Saturn	21°06.8	06:41					
Mer.pass.:8:05:			v-0.4 d-0.3 m-4.1			v1.0 d-0.3 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
												Horizontal parallax					
												Venus:	0.2				
												Mars:	0.1				

h Sun Moon

Fri	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight		
0	180°53.2	19°40.0	189°30.4	10.8	19°02.8	11.7	57.0	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	195°53.1	19°40.5	204°00.2	10.7	19°14.5	11.6	57.0	72	--	--	--	--	--	--
2	210°53.1	19°41.0	218°29.9	10.7	19°26.1	11.5	57.0	70	--	--	--	--	--	--
3	225°53.1	19°41.6	232°59.5	10.6	19°37.5	11.4	57.0	68	--	--	01:19	22:41	--	--
4	240°53.1	19°42.1	247°29.1	10.6	19°48.9	11.3	56.9	66	--	--	02:03	21:53	--	--
5	255°53.0	19°42.7	261°58.6	10.5	20°00.2	11.2	56.9	64	--	00:20	02:32	21:23	--	--
6	270°53.0	19°43.2	276°28.1	10.5	20°11.3	11.1	56.9	62	--	01:30	02:54	21:01	22:27	--
7	285°53.0	19°43.7	290°57.6	10.4	20°22.3	11.0	56.9	60	--	02:04	03:12	20:43	21:52	--
8	300°52.9	19°44.3	305°27.0	10.4	20°33.3	10.9	56.9	58	00:17	02:28	03:27	20:28	21:27	--
9	315°52.9	19°44.8	319°56.3	10.3	20°44.1	10.8	56.8	56	01:22	02:47	03:39	20:15	21:08	22:35
10	330°52.9	19°45.3	334°25.6	10.3	20°54.8	10.6	56.8	54	01:53	03:03	03:50	20:04	20:52	22:03
11	345°52.9	19°45.9	348°54.8	10.2	21°05.3	10.5	56.8	52	02:15	03:16	03:60	19:54	20:38	21:40
12	0°52.8	19°46.4	3°24.0	10.2	21°15.8	10.4	56.8	50	02:33	03:28	04:08	19:46	20:26	21:21
13	15°52.8	19°47.0	17°53.1	10.1	21°26.1	10.3	56.7	45	03:07	03:51	04:26	19:28	20:03	20:47
14	30°52.8	19°47.5	32°22.2	10.1	21°36.4	10.2	56.7	40	03:31	04:10	04:41	19:13	19:44	20:23
15	45°52.7	19°48.0	46°51.2	10.0	21°46.5	10.0	56.7	35	03:50	04:25	04:53	19:00	19:29	20:03
16	60°52.7	19°48.6	61°20.2	10.0	21°56.5	9.9	56.7	30	04:06	04:38	05:04	18:49	19:16	19:48
17	75°52.7	19°49.1	75°49.1	9.9	22°06.3	9.8	56.6	20	04:30	04:59	05:22	18:31	18:55	19:23
18	90°52.6	19°49.6	90°18.0	9.9	22°16.1	9.7	56.6	10	04:49	05:16	05:38	18:15	18:37	19:04
19	105°52.6	19°50.2	104°46.9	9.8	22°25.7	9.6	56.6	0	05:05	05:31	05:53	18:00	18:22	18:48
20	120°52.6	19°50.7	119°15.6	9.8	22°35.2	9.4	56.6	-10	05:20	05:45	06:08	17:45	18:08	18:33
21	135°52.5	19°51.2	133°44.4	9.7	22°44.5	9.3	56.5	-20	05:33	05:60	06:23	17:30	17:53	18:20
22	150°52.5	19°51.7	148°13.0	9.7	22°53.8	9.2	56.5	-30	05:46	06:15	06:41	17:12	17:38	18:07
23	165°52.5	19°52.3	162°41.7	9.6	23°02.9	9.1	56.5	-35	05:53	06:24	06:51	17:02	17:29	17:60
SD.=15.8 d=0.5 S.D.=15.6								-40	06:00	06:33	07:03	16:50	17:20	17:53
								-45	06:08	06:44	07:16	16:36	17:09	17:45
								-50	06:17	06:57	07:33	16:20	16:56	17:36
								-52	06:21	07:02	07:41	16:12	16:50	17:32
								-54	06:25	07:09	07:50	16:03	16:44	17:28
								-56	06:29	07:16	07:59	15:53	16:37	17:23
								-58	06:34	07:24	08:11	15:42	16:29	17:18
								-60	06:39	07:32	08:23	15:29	16:20	17:13
								Lat.	Moonrise			Moonset		
								72	--	--	--	--	--	--
								70	00:37	--	--	--	--	--
								68	01:27	--	--	--	--	--
								66	01:58	01:14	--	22:56	--	--
								64	02:22	02:06	--	22:05	--	--
								62	02:41	02:38	02:36	21:34	23:26	--
								60	02:57	03:02	03:14	21:10	22:49	--
								58	03:10	03:21	03:41	20:52	22:22	23:40
								56	03:22	03:37	04:02	20:36	22:01	23:15
								54	03:32	03:51	04:20	20:23	21:44	22:55
								52	03:41	04:03	04:34	20:11	21:30	22:39
								50	03:49	04:14	04:48	20:01	21:17	22:24
								45	04:06	04:37	05:14	19:40	20:51	21:55
								40	04:21	04:55	05:36	19:22	20:30	21:32
								35	04:33	05:10	05:54	19:08	20:13	21:14
								30	04:44	05:24	06:09	18:55	19:58	20:57
								20	05:02	05:47	06:35	18:34	19:33	20:30
								10	05:18	06:07	06:58	18:15	19:11	20:07
								0	05:34	06:25	07:19	17:58	18:51	19:45
								-10	05:49	06:44	07:40	17:41	18:31	19:23
								-20	06:06	07:04	08:03	17:23	18:09	18:59
								-30	06:25	07:28	08:29	17:02	17:44	18:32
								-35	06:36	07:42	08:45	16:50	17:30	18:16
								-40	06:49	07:58	09:03	16:36	17:13	17:57
								-45	07:04	08:17	09:25	16:19	16:53	17:35
								-50	07:23	08:42	09:54	15:59	16:28	17:06
								-52	07:32	08:53	10:08	15:49	16:16	16:52
								-54	07:43	09:07	10:24	15:39	16:02	16:36
								-56	07:54	09:22	10:43	15:26	15:46	16:16
								-58	08:07	09:41	11:07	15:12	15:27	15:52
								-60	08:23	10:04	11:38	14:56	15:03	15:21
								Day	Sun		Mer.	Moon		Age
									Eqn. of Time	12 ^h	Pass	Upper	Lower	
								19	03:33	03:31	11:56	11:45	00:11	29(0%)
								20	03:30	03:28	11:56	12:38	00:11	1(1%)
								21	03:26	03:24	11:56	13:31	01:04	2(4%)
SD.=15.8 d=0.5 S.D.=15.3														

May 22, 23 ,24 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	239°21.9	132°15.7	25°19.4	116°01.0	21°30.7	209°55.8	10°52.9	260°26.1	-10°27.4				Alpheratz	357°36.4	29°12.9		
1	254°24.4	147°15.3	25°19.1	131°02.0	21°30.3	224°57.7	10°53.1	275°28.5	-10°27.4				Ankaa	353°08.7	-42°10.7		
2	269°26.8	162°14.9	25°18.8	146°02.9	21°30.0	239°59.6	10°53.3	290°30.9	-10°27.3				Schedar	349°33.0	56°39.6		
3	284°29.3	177°14.5	25°18.5	161°03.9	21°29.7	255°01.6	10°53.5	305°33.2	-10°27.3				Diphda	348°48.8	-17°51.5		
4	299°31.8	192°14.1	25°18.2	176°04.9	21°29.3	270°03.5	10°53.7	320°35.6	-10°27.3				Achernar	335°21.7	-57°07.0		
5	314°34.2	207°13.7	25°17.9	191°05.9	21°29.0	285°05.4	10°53.9	335°37.9	-10°27.2				Hamal	327°53.1	23°34.2		
6	329°36.7	222°13.3	25°17.6	206°06.8	21°28.6	300°07.3	10°54.1	350°40.3	-10°27.2				Polaris	315°10.8	89°21.6		
7	344°39.2	237°12.9	25°17.3	221°07.8	21°28.3	315°09.3	10°54.3	5°42.7	-10°27.2				Akamar	315°13.2	-40°12.7		
8	359°41.6	252°12.6	25°16.9	236°08.8	21°28.0	330°11.2	10°54.5	20°45.0	-10°27.1				Menkar	314°07.9	4°10.8		
9	14°44.1	267°12.2	25°16.6	251°09.7	21°27.6	345°13.1	10°54.7	35°47.4	-10°27.1				Mirfak	308°30.7	49°56.5		
10	29°46.5	282°11.8	25°16.3	266°10.7	21°27.3	0°15.1	10°54.8	50°49.7	-10°27.1				Aldebaran	290°41.6	16°33.3		
11	44°49.0	297°11.4	25°16.0	281°11.7	21°27.0	15°17.0	10°55.0	65°52.1	-10°27.1				Rigel	281°05.5	-8°10.6		
12	59°51.5	312°11.0	25°15.7	296°12.7	21°26.6	30°18.9	10°55.2	80°54.5	-10°27.0				Capella	280°24.4	46°01.4		
13	74°53.9	327°10.6	25°15.3	311°13.6	21°26.3	45°20.8	10°55.4	95°56.8	-10°27.0				Bellatrix	278°24.7	6°22.2		
14	89°56.4	342°10.3	25°15.0	326°14.6	21°25.9	60°22.8	10°55.6	110°59.2	-10°27.0				Elnath	278°04.0	28°37.6		
15	104°58.9	357°09.9	25°14.7	341°15.6	21°25.6	75°24.7	10°55.8	126°01.5	-10°26.9				Alnilam	275°39.4	-1°11.3		
16	120°01.3	12°09.5	25°14.4	356°16.5	21°25.3	90°26.6	10°56.0	141°03.9	-10°26.9				Betelgeuse	270°53.9	7°24.6		
17	135°03.8	27°09.1	25°14.0	11°17.5	21°24.9	105°28.6	10°56.2	156°06.3	-10°26.9				Canopus	263°53.5	-52°42.6		
18	150°06.3	42°08.7	25°13.7	26°18.5	21°24.6	120°30.5	10°56.4	171°08.6	-10°26.8				Sirius	258°27.6	-16°44.8		
19	165°08.7	57°08.4	25°13.4	41°19.5	21°24.3	135°32.4	10°56.6	186°11.0	-10°26.8				Adara	255°07.2	-29°00.4		
20	180°11.2	72°08.0	25°13.1	56°20.4	21°23.9	150°34.3	10°56.8	201°13.4	-10°26.8				Procyon	244°52.4	5°10.0		
21	195°13.7	87°07.6	25°12.7	71°21.4	21°23.6	165°36.3	10°57.0	216°15.7	-10°26.7				Pollux	243°19.1	27°58.3		
22	210°16.1	102°07.2	25°12.4	86°22.4	21°23.2	180°38.2	10°57.1	231°18.1	-10°26.7				Avior	234°15.6	-59°35.3		
23	225°18.6	117°06.9	25°12.1	101°23.3	21°22.9	195°40.1	10°57.3	246°20.4	-10°26.7				Suhail	222°47.4	-43°31.8		
Mer.pass.:8:01:			v-0.4 d-0.3 m-4.2			v1.0 d-0.3 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	240°21.0	132°06.5	25°11.7	116°24.3	21°22.6	210°42.1	10°57.5	261°22.8	-10°26.7				Dubhe	193°42.5	61°37.8		
1	255°23.5	147°06.1	25°11.4	131°25.3	21°22.2	225°44.0	10°57.7	276°25.2	-10°26.6				Denebola	182°26.1	14°26.6		
2	270°26.0	162°05.8	25°11.1	146°26.3	21°21.9	240°45.9	10°57.9	291°27.5	-10°26.6				Gienah	175°44.8	-17°40.4		
3	285°28.4	177°05.4	25°10.7	161°27.2	21°21.5	255°47.8	10°58.1	306°29.9	-10°26.6				Acrux	173°01.2	-63°13.9		
4	300°30.9	192°05.0	25°10.4	176°28.2	21°21.2	270°49.8	10°58.3	321°32.3	-10°26.5				Gacrux	171°52.8	-57°14.9		
5	315°33.4	207°04.7	25°10.1	191°29.2	21°20.8	285°51.7	10°58.5	336°34.6	-10°26.5				Alioth	166°13.8	55°50.2		
6	330°35.8	222°04.3	25°09.7	206°30.1	21°20.5	300°53.6	10°58.7	351°37.0	-10°26.5				Spica	158°23.5	-11°17.0		
7	345°38.3	237°03.9	25°09.4	221°31.1	21°20.2	315°55.6	10°58.9	6°39.3	-10°26.4				Alcaid	152°52.7	49°11.9		
8	0°40.8	252°03.6	25°09.0	236°32.1	21°19.8	330°57.5	10°59.1	21°41.7	-10°26.4				Hadar	148°37.4	-60°29.3		
9	15°43.2	267°03.2	25°08.7	251°33.1	21°19.5	345°59.4	10°59.2	36°44.1	-10°26.4				Menkent	147°58.9	-36°29.2		
10	30°45.7	282°02.8	25°08.4	266°34.0	21°19.1	1°01.3	10°59.4	51°46.4	-10°26.4				Arcturus	145°48.7	19°04.0		
11	45°48.1	297°02.5	25°08.0	281°35.0	21°18.8	16°03.3	10°59.6	66°48.8	-10°26.3				Rigel Kent.	139°41.6	-60°56.0		
12	60°50.6	312°02.1	25°07.7	296°36.0	21°18.5	31°05.2	10°59.8	81°51.2	-10°26.3				Zubenelg.	136°57.2	-16°08.4		
13	75°53.1	327°01.7	25°07.3	311°37.0	21°18.1	46°07.1	11°00.0	96°53.5	-10°26.3				Kochab	137°18.6	74°03.7		
14	90°55.5	342°01.4	25°07.0	326°37.9	21°17.8	61°09.1	11°00.2	111°55.9	-10°26.2				Alphecca	126°04.6	26°38.2		
15	105°58.0	357°01.0	25°06.6	341°38.9	21°17.4	76°11.0	11°00.4	126°58.3	-10°26.2				Antares	112°17.1	-26°29.0		
16	121°00.5	12°00.7	25°06.3	356°39.9	21°17.1	91°12.9	11°00.6	142°00.6	-10°26.2				Atria	107°12.1	-69°04.1		
17	136°02.9	27°00.3	25°05.9	11°40.8	21°16.7	106°14.9	11°00.8	157°03.0	-10°26.1				Sabik	102°04.0	-15°45.3		
18	151°05.4	41°59.9	25°05.6	26°41.8	21°16.4	121°16.8	11°01.0	172°05.4	-10°26.1				Shaula	96°11.8	-37°07.2		
19	166°07.9	56°59.6	25°05.2	41°42.8	21°16.0	136°18.7	11°01.1	187°07.7	-10°26.1				Rasalhague	95°59.5	12°32.5		
20	181°10.3	71°59.2	25°04.9	56°43.8	21°15.7	151°20.6	11°01.3	202°10.1	-10°26.1				Etamin	90°42.3	51°28.9		
21	196°12.8	86°58.9	25°04.5	71°44.7	21°15.4	166°22.6	11°01.5	217°12.5	-10°26.0				Kaus Aust.	83°34.0	-34°22.3		
22	211°15.3	101°58.5	25°04.2	86°45.7	21°15.0	181°24.5	11°01.7	232°14.8	-10°26.0				Vega	80°33.8	38°48.1		
23	226°17.7	116°58.2	25°03.8	101°46.7	21°14.7	196°26.4	11°01.9	247°17.2	-10°26.0				Nunki	75°49.2	-26°16.0		
Mer.pass.:7:57:			v-0.4 d-0.3 m-4.2			v1.0 d-0.3 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	241°20.2	131°57.8	25°03.5	116°47.6	21°14.3	211°28.4	11°02.1	262°19.6	-10°25.9				2023/5/2	SHA	Mer.pass		
1	256°22.6	146°57.5	25°03.1	131°48.6	21°14.0	226°30.3	11°02.3	277°21.9	-10°25.9				Venus	252°53.8	15:11		
2	271°25.1	161°57.1	25°02.8	146°49.6	21°13.6	241°32.2	11°02.5	292°24.3	-10°25.9				Mars	236°39.1	16:15		
3	286°27.6	176°56.8	25°02.4	161°50.6	21°13.3	256°34.2	11°02.7	307°26.7	-10°25.9				Jupiter	330°33.9	09:59		
4	301°30.0	191°56.4	25°02.0	176°51.5	21°12.9	271°36.1	11°02.9	322°29.0	-10°25.8				Saturn	21°04.2	06:37		
5	316°32.5	206°56.1	25°01.7	191°52.5	21°12.6	286°38.0	11°03.0	337°31.4	-10°25.8				2023/5/2	SHA	Mer.pass		
6	331°35.0	221°55.7	25°01.3	206°53.5	21°12.2	301°40.0	11°03.2	352°33.8	-10°25.8				Venus	251°45.5	15:12		
7	346°37.4	236°55.4	25°01.0	221°54.5	21°11.9	316°41.9	11°03.4	7°36.1	-10°25.7				Mars	236°03.3	16:13		
8	1°39.9	251°55.0	25°00.6	236°55.4	21°11.5	331°43.8	11°03.6	22°38.5	-10°25.7				Jupiter	330°21.0	09:56		
9	16°42.4	266°54.7	25°00.2	251°56.4	21°11.2	346°45.7	11°03.8	37°40.9	-10°25.7				Saturn				

Sun			Moon											
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180° 50.5	20° 17.5	151° 23.6	8.4	27° 39.9	2.1	55.4	72	—:—	—:—	—:—	—:—	—:—	—:—
1	195° 50.5	20° 18.0	165° 51.0	8.4	27° 41.9	1.9	55.4	70	—:—	—:—	—:—	—:—	—:—	—:—
2	210° 50.4	20° 18.5	180° 18.4	8.4	27° 43.8	1.8	55.3	68	—:—	—:—	00:56	23:06	—:—	—:—
3	225° 50.4	20° 19.0	194° 45.9	8.5	27° 45.5	1.6	55.3	66	—:—	—:—	01:51	22:06	—:—	—:—
4	240° 50.3	20° 19.5	209° 13.3	8.5	27° 47.1	1.5	55.3	64	—:—	—:—	02:23	21:33	—:—	—:—
5	255° 50.3	20° 20.0	223° 40.8	8.5	27° 48.5	1.3	55.3	62	—:—	01:16	02:47	21:08	22:42	—:—
6	270° 50.3	20° 20.5	238° 08.3	8.5	27° 49.7	1.2	55.3	60	—:—	01:54	03:06	20:49	22:02	—:—
7	285° 50.2	20° 21.0	252° 35.8	8.5	27° 50.9	1.0	55.2	58	—:—	02:21	03:21	20:34	21:35	—:—
8	300° 50.2	20° 21.5	267° 03.3	8.5	27° 51.8	0.9	55.2	56	01:09	02:41	03:34	20:20	21:14	22:49
9	315° 50.1	20° 22.0	281° 30.9	8.5	27° 52.7	0.8	55.2	54	01:44	02:57	03:46	20:09	20:57	22:12
10	330° 50.1	20° 22.5	295° 58.4	8.6	27° 53.3	0.6	55.2	52	02:09	03:11	03:56	19:59	20:43	21:47
12	0° 50.0	20° 23.4	324° 53.6	8.6	27° 54.2	0.3	55.1	50	02:28	03:24	04:05	19:50	20:31	21:27
13	15° 49.9	20° 23.9	339° 21.2	8.6	27° 54.5	0.2	55.1	45	03:03	03:48	04:23	19:31	20:06	20:52
14	30° 49.9	20° 24.4	353° 48.9	8.7	27° 54.6	0.0	55.1	40	03:28	04:07	04:39	19:15	19:47	20:26
15	45° 49.8	20° 24.9	8° 16.6	8.7	27° 54.5	-0.1	55.1	35	03:48	04:23	04:51	19:02	19:31	20:06
16	60° 49.8	20° 25.4	22° 44.3	8.7	27° 54.3	-0.3	55.1	30	04:04	04:36	05:03	18:51	19:18	19:50
17	75° 49.7	20° 25.9	37° 12.0	8.8	27° 54.0	-0.4	55.0	20	04:29	04:58	05:22	18:32	18:56	19:25
18	90° 49.7	20° 26.4	51° 39.8	8.8	27° 53.5	-0.6	55.0	10	04:49	05:15	05:38	18:16	18:38	19:05
19	105° 49.6	20° 26.9	66° 07.6	8.8	27° 52.8	-0.7	55.0	0	05:05	05:31	05:53	18:00	18:22	18:48
20	120° 49.6	20° 27.4	80° 35.4	8.9	27° 52.1	-0.9	55.0	-10	05:20	05:46	06:08	17:45	18:08	18:33
21	135° 49.5	20° 27.8	95° 03.3	8.9	27° 51.1	-1.0	55.0	-20	05:34	06:01	06:24	17:29	17:53	18:20
22	150° 49.5	20° 28.3	109° 31.2	8.9	27° 50.1	-1.1	54.9	-30	05:48	06:17	06:43	17:11	17:36	18:06
23	165° 49.4	20° 28.8	123° 59.1	9.0	27° 48.9	-1.3	54.9	-35	05:55	06:26	06:53	17:00	17:28	17:58
SD.=15.8 d=0.5 S.D.=15.1								-40	06:02	06:36	07:05	16:48	17:18	17:51
								-45	06:11	06:47	07:19	16:34	17:06	17:42
								-50	06:20	07:00	07:37	16:16	16:53	17:33
								-52	06:24	07:06	07:45	16:08	16:47	17:29
								-54	06:28	07:13	07:54	15:59	16:40	17:25
								-56	06:33	07:20	08:04	15:49	16:33	17:20
								-58	06:38	07:28	08:16	15:37	16:25	17:15
								-60	06:44	07:38	08:30	15:23	16:15	17:09
								Lat.	Moonrise			Moonset		
								72	—:—	—:—	—:—	—:—	—:—	—:—
								70	—:—	—:—	—:—	—:—	—:—	—:—
								68	—:—	—:—	—:—	—:—	—:—	—:—
								66	Naut.	—:—	—:—	—:—	—:—	—:—
								64	—:—	—:—	—:—	—:—	—:—	—:—
								62	02:40	03:36	05:20	01:15	02:11	02:14
								60	03:41	04:37	05:58	00:14	01:10	01:36
								58	04:15	05:11	06:25	—:—	00:36	01:09
								56	04:40	05:36	06:46	—:—	00:11	00:48
								54	05:00	05:56	07:03	23:51	—:—	00:30
								52	05:17	06:12	07:18	23:34	—:—	00:15
								50	05:31	06:27	07:31	23:20	—:—	00:02
								45	06:01	06:56	07:57	22:50	23:35	—:—
								40	06:24	07:18	08:18	22:27	23:14	23:52
								35	06:43	07:37	08:35	22:08	22:56	23:36
								30	06:59	07:53	08:50	21:52	22:41	23:23
								20	07:27	08:21	09:15	21:25	22:15	22:60
								10	07:51	08:44	09:37	21:01	21:52	22:40
								0	08:13	09:06	09:57	20:39	21:31	22:21
								-10	08:35	09:28	10:17	20:16	21:10	22:02
								-20	08:59	09:51	10:39	19:52	20:47	21:41
								-30	09:27	10:18	11:04	19:25	20:20	21:18
								-35	09:43	10:34	11:18	19:08	20:05	21:04
								-40	10:02	10:53	11:35	18:49	19:46	20:47
								-45	10:26	11:15	11:55	18:26	19:24	20:28
								-50	10:55	11:44	12:20	17:56	18:56	20:04
								-52	11:10	11:58	12:33	17:41	18:42	19:52
								-54	11:28	12:14	12:46	17:24	18:26	19:38
								-56	11:48	12:34	13:03	17:03	18:07	19:22
								-58	12:14	12:58	13:22	16:37	17:43	19:04
								-60	12:51	13:29	13:46	16:01	17:12	18:40
								Day	Sun		Mer.	Moon		Age
									Eqn.of Time			Mer.Pass.		
									00 ^h	12 ^h	Pass	Upper	Lower	
								22	03:22	03:20	11:56	14:25	01:58	3(8%)
								23	03:18	03:15	11:56	15:18	02:52	4(15%)
								24	03:12	03:10	11:56	16:08	03:44	5(22%)
								SD.=15.8 d=0.5 S.D.=14.9						

May 25, 26 ,27 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	242°19.3	131°49.7	24°54.7	117°11.0	21°06.0	212°14.7	11°06.6	263°16.4	-10°25.3	Alpheratz	357°36.4	29°12.9					
1	257°21.8	146°49.3	24°54.3	132°12.0	21°05.6	227°16.7	11°06.8	278°18.8	-10°25.2	Ankaa	353°08.7	-42°10.6					
2	272°24.3	161°49.0	24°53.9	147°12.9	21°05.3	242°18.6	11°07.0	293°21.1	-10°25.2	Schedar	349°33.0	56°39.6					
3	287°26.7	176°48.7	24°53.5	162°13.9	21°04.9	257°20.5	11°07.2	308°23.5	-10°25.2	Diphda	348°48.8	-17°51.5					
4	302°29.2	191°48.4	24°53.1	177°14.9	21°04.5	272°22.5	11°07.4	323°25.9	-10°25.2	Achernar	335°21.7	-57°07.0					
5	317°31.6	206°48.0	24°52.7	192°15.9	21°04.2	287°24.4	11°07.6	338°28.2	-10°25.1	Hamal	327°53.1	23°34.2					
6	332°34.1	221°47.7	24°52.4	207°16.8	21°03.8	302°26.3	11°07.8	353°30.6	-10°25.1	Polaris	315°10.2	89°21.6					
7	347°36.6	236°47.4	24°52.0	222°17.8	21°03.5	317°28.3	11°08.0	8°33.0	-10°25.1	Akamar	315°13.2	-40°12.6					
8	2°39.0	251°47.1	24°51.6	237°18.8	21°03.1	332°30.2	11°08.1	23°35.4	-10°25.1	Menkar	314°07.9	4°10.8					
9	17°41.5	266°46.7	24°51.2	252°19.7	21°02.8	347°32.1	11°08.3	38°37.7	-10°25.0	Mirfak	308°30.7	49°56.5					
10	32°44.0	281°46.4	24°50.8	267°20.7	21°02.4	2°34.1	11°08.5	53°40.1	-10°25.0	Aldebaran	290°41.5	16°33.3					
11	47°46.4	296°46.1	24°50.4	282°21.7	21°02.1	17°36.0	11°08.7	68°42.5	-10°25.0	Rigel	281°05.5	-8°10.5					
12	62°48.9	311°45.8	24°50.0	297°22.7	21°01.7	32°37.9	11°08.9	83°44.8	-10°24.9	Capella	280°24.4	46°01.3					
13	77°51.4	326°45.5	24°49.6	312°23.6	21°01.4	47°39.9	11°09.1	98°47.2	-10°24.9	Bellatrix	278°24.7	6°22.2					
14	92°53.8	341°45.1	24°49.3	327°24.6	21°01.0	62°41.8	11°09.3	113°49.6	-10°24.9	Elnath	278°04.0	28°37.6					
15	107°56.3	356°44.8	24°48.9	342°25.6	21°00.7	77°43.7	11°09.5	128°52.0	-10°24.9	Alnilam	275°39.4	-1°11.3					
16	122°58.8	11°44.5	24°48.5	357°26.6	21°00.3	92°45.7	11°09.7	143°54.3	-10°24.8	Betelgeuse	270°53.9	7°24.6					
17	138°01.2	26°44.2	24°48.1	12°27.5	20°60.0	107°47.6	11°09.8	158°56.7	-10°24.8	Canopus	263°53.5	-52°42.6					
18	153°03.7	41°43.9	24°47.7	27°28.5	20°59.6	122°49.5	11°10.0	173°59.1	-10°24.8	Sirius	258°27.6	-16°44.8					
19	168°06.1	56°43.6	24°47.3	42°29.5	20°59.2	137°51.5	11°10.2	189°01.5	-10°24.8	Adara	255°07.2	-29°00.3					
20	183°08.6	71°43.3	24°46.9	57°30.4	20°58.9	152°53.4	11°10.4	204°03.8	-10°24.7	Procyon	244°52.4	5°10.0					
21	198°11.1	86°43.0	24°46.5	72°31.4	20°58.5	167°55.3	11°10.6	219°06.2	-10°24.7	Pollux	243°19.1	27°58.3					
22	213°13.5	101°42.6	24°46.1	87°32.4	20°58.2	182°57.3	11°10.8	234°08.6	-10°24.7	Avior	234°15.6	-59°35.3					
23	228°16.0	116°42.3	24°45.7	102°33.4	20°57.8	197°59.2	11°11.0	249°10.9	-10°24.7	Suhail	222°47.5	-43°31.8					
Mer.pass.:7:49:			v-0.3 d-0.4 m-4.2			v1.0 d-0.4 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	243°18.5	131°42.0	24°45.3	117°34.3	20°57.5	213°01.1	11°11.2	264°13.3	-10°24.6	Dubhe	193°42.5	61°37.8					
1	258°20.9	146°41.7	24°44.9	132°35.3	20°57.1	228°03.1	11°11.3	279°15.7	-10°24.6	Denebola	182°26.1	14°26.6					
2	273°23.4	161°41.4	24°44.5	147°36.3	20°56.7	243°05.0	11°11.5	294°18.1	-10°24.6	Gienah	175°44.8	-17°40.4					
3	288°25.9	176°41.1	24°44.1	162°37.3	20°56.4	258°06.9	11°11.7	309°20.4	-10°24.6	Acrux	173°01.2	-63°13.9					
4	303°28.3	191°40.8	24°43.7	177°38.2	20°56.0	273°08.9	11°11.9	324°22.8	-10°24.5	Gacrux	171°52.8	-57°14.9					
5	318°30.8	206°40.5	24°43.3	192°39.2	20°55.7	288°10.8	11°12.1	339°25.2	-10°24.5	Alioth	166°13.8	55°50.2					
6	333°33.2	221°40.2	24°42.9	207°40.2	20°55.3	303°12.7	11°12.3	354°27.6	-10°24.5	Spica	158°23.5	-11°17.0					
7	348°35.7	236°39.9	24°42.5	222°41.2	20°55.0	318°14.7	11°12.5	9°29.9	-10°24.5	Alcaid	152°52.7	49°11.9					
8	3°38.2	251°39.6	24°42.1	237°42.1	20°54.6	333°16.6	11°12.6	24°32.3	-10°24.4	Hadar	148°37.4	-60°29.3					
9	18°40.6	266°39.3	24°41.6	252°43.1	20°54.2	348°18.5	11°12.8	39°34.7	-10°24.4	Menkent	147°58.9	-36°29.2					
10	33°43.1	281°39.0	24°41.2	267°44.1	20°53.9	3°20.5	11°13.0	54°37.1	-10°24.4	Arcturus	145°48.7	19°04.0					
11	48°45.6	296°38.7	24°40.8	282°45.0	20°53.5	18°22.4	11°13.2	69°39.4	-10°24.4	Rigel Kent.	139°41.6	-60°56.0					
12	63°48.0	311°38.4	24°40.4	297°46.0	20°53.2	33°24.3	11°13.4	84°41.8	-10°24.3	Zubenelg.	136°57.2	-16°08.4					
13	78°50.5	326°38.1	24°40.0	312°47.0	20°52.8	48°26.3	11°13.6	99°44.2	-10°24.3	Kochab	137°18.6	74°03.7					
14	93°53.0	341°37.8	24°39.6	327°48.0	20°52.4	63°28.2	11°13.8	114°46.6	-10°24.3	Alphecca	126°04.5	26°38.2					
15	108°55.4	356°37.5	24°39.2	342°48.9	20°52.1	78°30.2	11°14.0	129°48.9	-10°24.3	Antares	112°17.1	-26°29.0					
16	123°57.9	11°37.2	24°38.8	357°49.9	20°51.7	93°32.1	11°14.1	144°51.3	-10°24.2	Atria	107°12.0	-69°04.1					
17	139°00.4	26°36.9	24°38.3	12°50.9	20°51.4	108°34.0	11°14.3	159°53.7	-10°24.2	Sabik	102°04.0	-15°45.3					
18	154°02.8	41°36.7	24°37.9	27°51.9	20°51.0	123°36.0	11°14.5	174°56.1	-10°24.2	Shaula	96°11.8	-37°07.2					
19	169°05.3	56°36.4	24°37.5	42°52.8	20°50.6	138°37.9	11°14.7	189°58.5	-10°24.2	Rasalhague	95°59.5	12°32.5					
20	184°07.7	71°36.1	24°37.1	57°53.8	20°50.3	153°39.8	11°14.9	205°00.8	-10°24.1	Etamin	90°42.3	51°29.0					
21	199°10.2	86°35.8	24°36.7	72°54.8	20°49.9	168°41.8	11°15.1	220°03.2	-10°24.1	Kaus Aust.	83°34.0	-34°22.3					
22	214°12.7	101°35.5	24°36.2	87°55.8	20°49.6	183°43.7	11°15.3	235°05.6	-10°24.1	Vega	80°33.8	38°48.1					
23	229°15.1	116°35.2	24°35.8	102°56.7	20°49.2	198°45.6	11°15.4	250°08.0	-10°24.1	Nunki	75°49.2	-26°16.0					
Mer.pass.:7:45:			v-0.3 d-0.4 m-4.2			v1.0 d-0.4 m1.5			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	244°17.6	131°34.9	24°35.4	117°57.7	20°48.8	213°47.6	11°15.6	265°10.3	-10°24.0	Alnair	27°34.6	-46°50.7					
1	259°20.1	146°34.7	24°35.0	132°58.7	20°48.5	228°49.5	11°15.8	280°12.7	-10°24.0	Fomalhaut	15°16.1	-29°29.8					
2	274°22.5	161°34.4	24°34.6	147°59.7	20°48.1	243°51.5	11°16.0	295°15.1	-10°24.0	Scheat	13°46.6	28°12.3					
3	289°25.0	176°34.1	24°34.1	163°00.6	20°47.8	258°53.4	11°16.2	310°17.5	-10°24.0	Markab	13°31.3	15°19.7					
4	304°27.5	191°33.8	24°33.7	178°01.6	20°47.4	273°55.3	11°16.4	325°19.8	-10°23.9								
5	319°29.9	206°33.5	24°33.3	193°02.6	20°47.0	288°57.3	11°16.6	340°22.2	-10°23.9								
6	334°32.4	221°33.3	24°32.9	208°03.5	20°46.7	303°59.2	11°16.7	355°24.6	-10°23.9								
7	349°34.9	236°33.0	24°32.4	223°04.5	20°46.3	319°01.1	11°16.9	10°27.0	-10°23.9								
8	4°37.3	251°32.7	24°32.0	238°05.5	20°45.9	334°03.1	11°17.1	25°29.4	-10°23.8								
9	19°39.8	266°32.4	24°31.6	253°06.5	20°45.6	349°05.0	11°17.3	40°31.7	-10°23.8								
10	34°42.2	281°32.2	24°31.1	268°07.4	<												

Sun				Moon												
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Twilight				Twilight			
0	180°46.7	20°51.9		113°55.2	11.9	24°08.2	-7.4	54.3	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	195°46.6	20°52.3		128°26.2	12.0	24°00.7	-7.5	54.3	72	--	--	--	--	--	--	
2	210°46.6	20°52.8		142°57.2	12.1	23°53.1	-7.6	54.3	70	--	--	--	--	--	--	
3	225°46.5	20°53.2		157°28.3	12.1	23°45.4	-7.7	54.3	68	--	--	00:23	--	--	--	
4	240°46.5	20°53.7		171°59.5	12.2	23°37.6	-7.8	54.3	66	--	--	01:39	22:19	--	--	
5	255°46.4	20°54.2		186°30.7	12.3	23°29.7	-7.9	54.3	64	--	--	02:15	21:42	--	--	
6	270°46.3	20°54.6		201°02.0	12.4	23°21.7	-8.0	54.3	62	--	01:00	02:40	21:16	22:59	--	
7	285°46.3	20°55.1		215°33.4	12.4	23°13.6	-8.1	54.3	60	--	01:45	02:60	20:56	22:12	--	
8	300°46.2	20°55.5		230°04.9	12.5	23°05.5	-8.2	54.2	58	--	02:14	03:16	20:39	21:42	--	
9	315°46.2	20°56.0		244°36.4	12.6	22°57.2	-8.3	54.2	56	00:54	02:35	03:30	20:25	21:20	23:05	
10	330°46.1	20°56.4		259°08.0	12.6	22°48.8	-8.4	54.2	54	01:36	02:53	03:42	20:13	21:03	22:21	
11	345°46.0	20°56.9		273°39.7	12.7	22°40.3	-8.5	54.2	52	02:02	03:07	03:52	20:03	20:48	21:54	
12	0°46.0	20°57.3		288°11.4	12.8	22°31.7	-8.6	54.2	50	02:22	03:20	04:01	19:53	20:35	21:33	
13	15°45.9	20°57.7		302°43.2	12.8	22°23.0	-8.7	54.2	45	02:59	03:45	04:21	19:34	20:09	20:56	
14	30°45.8	20°58.2		317°15.1	12.9	22°14.3	-8.8	54.2	40	03:25	04:05	04:37	19:18	19:50	20:29	
15	45°45.8	20°58.6		331°47.1	13.0	22°05.4	-8.9	54.2	35	03:46	04:21	04:50	19:05	19:33	20:09	
16	60°45.7	20°59.1		346°19.1	13.1	21°56.4	-9.0	54.2	30	04:02	04:35	05:01	18:53	19:20	19:52	
17	75°45.6	20°59.5		0°51.2	13.1	21°47.4	-9.1	54.2	20	04:28	04:57	05:21	18:33	18:57	19:26	
18	90°45.6	20°60.0		15°23.3	13.2	21°38.2	-9.2	54.2	10	04:49	05:15	05:38	18:16	18:39	19:06	
19	105°45.5	21°00.4		29°55.6	13.3	21°29.0	-9.3	54.2	0	05:06	05:31	05:53	18:01	18:23	18:49	
20	120°45.5	21°00.9		44°27.9	13.3	21°19.7	-9.4	54.2	-10	05:21	05:47	06:09	17:45	18:07	18:33	
21	135°45.4	21°01.3		59°00.2	13.4	21°10.3	-9.5	54.2	-20	05:35	06:02	06:25	17:28	17:52	18:19	
22	150°45.3	21°01.7		73°32.7	13.5	21°00.8	-9.5	54.2	-30	05:49	06:18	06:44	17:10	17:35	18:05	
23	165°45.3	21°02.2		88°05.2	13.5	20°51.2	-9.6	54.2	-35	05:57	06:28	06:55	16:59	17:26	17:57	
SD.=15.8 d=0.5 S.D.=14.8								-40	06:05	06:38	07:08	16:46	17:16	17:49		
								-45	06:13	06:50	07:22	16:31	17:04	17:41		
								-50	06:23	07:03	07:40	16:13	16:50	17:31		
								-52	06:27	07:10	07:49	16:05	16:44	17:26		
								-54	06:32	07:17	07:58	15:55	16:37	17:22		
								-56	06:37	07:24	08:09	15:45	16:29	17:17		
								-58	06:42	07:33	08:21	15:32	16:21	17:11		
								-60	06:48	07:43	08:35	15:18	16:11	17:05		
								Lat.	Thu	Fri	Sat	Thu	Fri	Sat		
								72	--	--	08:32	--	--	03:55		
								70	--	06:10	09:06	--	04:46	03:20		
								68	--	07:21	09:30	--	03:34	02:55		
								66	05:32	07:57	09:48	03:45	02:56	02:35		
								64	06:31	08:22	10:03	02:46	02:30	02:19		
								62	07:04	08:42	10:15	02:12	02:09	02:06		
								60	07:29	08:58	10:26	01:47	01:52	01:54		
								58	07:48	09:12	10:34	01:27	01:38	01:44		
								56	08:04	09:24	10:42	01:11	01:26	01:36		
								54	08:18	09:34	10:49	00:57	01:15	01:28		
								52	08:30	09:43	10:56	00:44	01:05	01:21		
								50	08:40	09:51	11:01	00:33	00:57	01:15		
								45	09:02	10:08	11:13	00:10	00:38	01:01		
								40	09:20	10:22	11:23	--	00:23	00:50		
								35	09:34	10:34	11:32	--	00:11	00:40		
								30	09:47	10:44	11:39	23:59	--	00:32		
								20	10:09	11:01	11:52	23:40	--	00:17		
								10	10:28	11:16	12:03	23:23	--	00:04		
								0	10:45	11:31	12:13	23:07	23:52	--		
								-10	11:03	11:45	12:24	22:52	23:39	--		
								-20	11:21	11:60	12:35	22:34	23:26	--		
								-30	11:43	12:17	12:47	22:15	23:11	--		
								-35	11:55	12:27	12:55	22:03	23:02	23:60		
								-40	12:09	12:38	13:03	21:50	22:52	23:53		
								-45	12:26	12:51	13:12	21:34	22:40	23:45		
								-50	12:47	13:07	13:24	21:14	22:25	23:35		
								-52	12:57	13:15	13:29	21:05	22:18	23:30		
								-54	13:08	13:23	13:35	20:54	22:10	23:25		
								-56	13:21	13:33	13:41	20:42	22:02	23:20		
								-58	13:35	13:43	13:48	20:28	21:52	23:14		
								-60	13:52	13:55	13:56	20:12	21:40	23:06		
								Day	Sun		Mer.	Moon				
									Eqn.of Time	12 ^h	Pass	Mer.Pass.		Age		
								25	03:07	03:04	11:56	16:56	04:33	6(30%)		
								26	03:01	02:58	11:57	17:41	05:19	7(39%)		
								27	02:54	02:51	11:57	18:23	06:02	8(49%)		
SD.=15.8 d=0.4 S.D.=14.8																

May 28, 29 ,30 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	245°16.7	131°28.4	24°25.0	118°21.1	20°40.1	214°34.1	11°20.1	266°07.4	-10°23.5				Alpheratz	357°36.4	29°12.9		
1	260°19.2	146°28.2	24°24.6	133°22.1	20°39.7	229°36.0	11°20.3	281°09.8	-10°23.4				Ankaa	353°08.7	-42°10.6		
2	275°21.7	161°27.9	24°24.1	148°23.0	20°39.4	244°38.0	11°20.4	296°12.2	-10°23.4				Schedar	349°32.9	56°39.6		
3	290°24.1	176°27.6	24°23.7	163°24.0	20°39.0	259°39.9	11°20.6	311°14.6	-10°23.4				Diphda	348°48.7	-17°51.5		
4	305°26.6	191°27.4	24°23.2	178°25.0	20°38.6	274°41.8	11°20.8	326°17.0	-10°23.4				Achernar	335°21.7	-57°06.9		
5	320°29.1	206°27.1	24°22.8	193°26.0	20°38.3	289°43.8	11°21.0	341°19.3	-10°23.3				Hamal	327°53.1	23°34.2		
6	335°31.5	221°26.9	24°22.3	208°26.9	20°37.9	304°45.7	11°21.2	356°21.7	-10°23.3				Polaris	315°09.7	89°21.6		
7	350°34.0	236°26.6	24°21.9	223°27.9	20°37.5	319°47.6	11°21.4	11°24.1	-10°23.3				Akamar	315°13.2	-40°12.6		
8	5°36.5	251°26.4	24°21.4	238°28.9	20°37.2	334°49.6	11°21.6	26°26.5	-10°23.3				Menkar	314°07.9	4°10.8		
9	20°38.9	266°26.1	24°21.0	253°29.9	20°36.8	349°51.5	11°21.7	41°28.9	-10°23.3				Mirfak	308°30.7	49°56.5		
10	35°41.4	281°25.9	24°20.5	268°30.8	20°36.4	4°53.5	11°21.9	56°31.3	-10°23.2				Aldebaran	290°41.5	16°33.3		
11	50°43.8	296°25.6	24°20.1	283°31.8	20°36.0	19°55.4	11°22.1	71°33.6	-10°23.2				Rigel	281°05.5	-8°10.5		
12	65°46.3	311°25.4	24°19.6	298°32.8	20°35.7	34°57.3	11°22.3	86°36.0	-10°23.2				Capella	280°24.4	46°01.3		
13	80°48.8	326°25.1	24°19.2	313°33.7	20°35.3	49°59.3	11°22.5	101°38.4	-10°23.2				Bellatrix	278°24.7	6°22.2		
14	95°51.2	341°24.9	24°18.7	328°34.7	20°34.9	65°01.2	11°22.7	116°40.8	-10°23.1				Elnath	278°04.0	28°37.6		
15	110°53.7	356°24.6	24°18.2	343°35.7	20°34.6	80°03.2	11°22.8	131°43.2	-10°23.1				Alnilam	275°39.4	-1°11.3		
16	125°56.2	11°24.4	24°17.8	358°36.7	20°34.2	95°05.1	11°23.0	146°45.6	-10°23.1				Betelgeuse	270°53.9	7°24.6		
17	140°58.6	26°24.2	24°17.3	13°37.6	20°33.8	110°07.0	11°23.2	161°47.9	-10°23.1				Canopus	263°53.5	-52°42.6		
18	156°01.1	41°23.9	24°16.9	28°38.6	20°33.5	125°09.0	11°23.4	176°50.3	-10°23.1				Sirius	258°27.6	-16°44.8		
19	171°03.6	56°23.7	24°16.4	43°39.6	20°33.1	140°10.9	11°23.6	191°52.7	-10°23.0				Adara	255°07.2	-29°00.3		
20	186°06.0	71°23.4	24°15.9	58°40.6	20°32.7	155°12.9	11°23.8	206°55.1	-10°23.0				Procyon	244°52.4	5°10.1		
21	201°08.5	86°23.2	24°15.5	73°41.5	20°32.3	170°14.8	11°23.9	221°57.5	-10°23.0				Pollux	243°19.1	27°58.3		
22	216°11.0	101°23.0	24°15.0	88°42.5	20°32.0	185°16.7	11°24.1	236°59.9	-10°23.0				Avior	234°15.7	-59°35.3		
23	231°13.4	116°22.7	24°14.6	103°43.5	20°31.6	200°18.7	11°24.3	252°02.2	-10°23.0				Suhail	222°47.5	-43°31.8		
Mer.pass.:7:37:			v-0.3 d-0.4 m-4.2			v1.0 d-0.4 m1.6			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	246°15.9	131°22.5	24°14.1	118°44.5	20°31.2	215°20.6	11°24.5	267°04.6	-10°22.9				Dubhe	193°42.5	61°37.8		
1	261°18.3	146°22.3	24°13.6	133°45.4	20°30.9	230°22.6	11°24.7	282°07.0	-10°22.9				Denebola	182°26.1	14°26.6		
2	276°20.8	161°22.0	24°13.2	148°46.4	20°30.5	245°24.5	11°24.9	297°09.4	-10°22.9				Gienah	175°44.8	-17°40.4		
3	291°23.3	176°21.8	24°12.7	163°47.4	20°30.1	260°26.4	11°25.0	312°11.8	-10°22.9				Acrux	173°01.3	-63°13.9		
4	306°25.7	191°21.6	24°12.2	178°48.4	20°29.7	275°28.4	11°25.2	327°14.2	-10°22.8				Gacrux	171°52.9	-57°14.9		
5	321°28.2	206°21.3	24°11.8	193°49.3	20°29.4	290°30.3	11°25.4	342°16.6	-10°22.8				Alioth	166°13.8	55°50.2		
6	336°30.7	221°21.1	24°11.3	208°50.3	20°29.0	305°32.3	11°25.6	357°18.9	-10°22.8				Spica	158°23.5	-11°17.0		
7	351°33.1	236°20.9	24°10.8	223°51.3	20°28.6	320°34.2	11°25.8	12°21.3	-10°22.8				Alcaid	152°52.7	49°12.0		
8	6°35.6	251°20.6	24°10.3	238°52.3	20°28.2	335°36.1	11°26.0	27°23.7	-10°22.8				Hadar	148°37.4	-60°29.3		
9	21°38.1	266°20.4	24°09.9	253°53.2	20°27.9	350°38.1	11°26.1	42°26.1	-10°22.7				Menkent	147°58.9	-36°29.2		
10	36°40.5	281°20.2	24°09.4	268°54.2	20°27.5	5°40.0	11°26.3	57°28.5	-10°22.7				Arcturus	145°48.7	19°04.0		
11	51°43.0	296°20.0	24°08.9	283°55.2	20°27.1	20°42.0	11°26.5	72°30.9	-10°22.7				Rigil Kent.	139°41.6	-60°56.0		
12	66°45.4	311°19.7	24°08.4	298°56.2	20°26.7	35°43.9	11°26.7	87°33.3	-10°22.7				Zubenelg.	136°57.2	-16°08.4		
13	81°47.9	326°19.5	24°08.0	313°57.2	20°26.4	50°45.8	11°26.9	102°35.7	-10°22.7				Kochab	137°18.6	74°03.7		
14	96°50.4	341°19.3	24°07.5	328°58.1	20°26.0	65°47.8	11°27.1	117°38.0	-10°22.6				Alphecca	126°04.5	26°38.2		
15	111°52.8	356°19.1	24°07.0	343°59.1	20°25.6	80°49.7	11°27.2	132°40.4	-10°22.6				Antares	112°17.1	-26°29.1		
16	126°55.3	11°18.9	24°06.5	359°00.1	20°25.2	95°51.7	11°27.4	147°42.8	-10°22.6				Atria	107°12.0	-69°04.1		
17	141°57.8	26°18.6	24°06.1	14°01.1	20°24.9	110°53.6	11°27.6	162°45.2	-10°22.6				Sabik	102°04.0	-15°45.3		
18	157°00.2	41°18.4	24°05.6	29°02.0	20°24.5	125°55.6	11°27.8	177°47.6	-10°22.6				Shaula	96°11.8	-37°07.2		
19	172°02.7	56°18.2	24°05.1	44°03.0	20°24.1	140°57.5	11°28.0	192°50.0	-10°22.5				Rasalhague	95°59.5	12°32.5		
20	187°05.2	71°18.0	24°04.6	59°04.0	20°23.7	155°59.4	11°28.2	207°52.4	-10°22.5				Etamin	90°42.3	51°29.0		
21	202°07.6	86°17.8	24°04.1	74°05.0	20°23.4	171°01.4	11°28.3	222°54.8	-10°22.5				Kaus Aust.	83°33.9	-34°22.4		
22	217°10.1	101°17.6	24°03.6	89°05.9	20°23.0	186°03.3	11°28.5	237°57.1	-10°22.5				Vega	80°33.8	38°48.1		
23	232°12.6	116°17.4	24°03.2	104°06.9	20°22.6	201°05.3	11°28.7	252°59.5	-10°22.5				Nunki	75°49.1	-26°16.0		
Mer.pass.:7:33:			v-0.2 d-0.5 m-4.2			v1.0 d-0.4 m1.6			v1.9 d0.2 m-1.9			v2.4 d0.0 m1.0					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	247°15.0	131°17.2	24°02.7	119°07.9	20°22.2	216°07.2	11°28.9	268°01.9	-10°22.4				2023/5/2	SHA	Mer.pass		
1	262°17.5	146°16.9	24°02.2	134°08.9	20°21.9	231°09.1	11°29.1	283°04.3	-10°22.4				Venus	246°11.7	15:14		
2	277°19.9	161°16.7	24°01.7	149°09.8	20°21.5	246°11.1	11°29.2	298°06.7	-10°22.4				Mars	233°04.3	16:06		
3	292°22.4	176°16.5	24°01.2	164°10.8	20°21.1	261°13.0	11°29.4	313°09.1	-10°22.4				Jupiter	329°17.3	09:40		
4	307°24.9	191°16.3	24°00.7	179°11.8	20°20.7	276°15.0	11°29.6	328°11.5	-10°22.4				Saturn	20°50.7	06:15		
5	322°27.3	206°16.1	24°00.2	194°12.8	20°20.3	291°16.9	11°29.8	343°13.9	-10°22.3				2023/5/2	SHA	Mer.pass		
6	337°29.8	221°15.9	23°59.8	209°13.7	20°20.0	306°18.9	11°30.0	358°16.3	-10°22.3				Venus	245°06.6	15:15		
7	352°32.3	236°15.7	23°59.3	224°14.7	20°19.6	321°20.8	11°30.2	13°18.6	-10°22.3				Mars	232°28.6	16:04		
8	7°34.7	251°15.5	23°58.8	239°15.7	20°19.2	336°22.7	11°30.3	28°21.0	-10°22.3				Jupiter	329°04.7	09:37		
9	22°37.2	266°15.3	23°58.3	254°16.7	20°18.8	351°24.7	11°30.5	43°23.4	-10°22.3				Sat				

h		Sun		Moon			
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	180°41.8	21°23.0	81°46.1	15.9	11°31.6	-12.9	54.5
1	195°41.7	21°23.4	96°21.0	16.0	11°18.6	-13.0	54.5
2	210°41.7	21°23.9	110°56.0	16.0	11°05.7	-13.0	54.6
3	225°41.6	21°24.3	125°31.0	16.0	10°52.6	-13.1	54.6
4	240°41.5	21°24.7	140°06.1	16.0	10°39.5	-13.1	54.6
5	255°41.4	21°25.1	154°41.1	16.1	10°26.4	-13.2	54.6
6	270°41.3	21°25.5	169°16.2	16.1	10°13.2	-13.2	54.6
7	285°41.3	21°25.9	183°51.3	16.1	9°60.0	-13.3	54.6
8	300°41.2	21°26.3	198°26.4	16.1	9°46.7	-13.3	54.6
9	315°41.1	21°26.7	213°01.6	16.2	9°33.4	-13.3	54.7
10	330°41.0	21°27.1	227°36.8	16.2	9°20.0	-13.4	54.7
11	345°41.0	21°27.5	242°11.9	16.2	9°06.6	-13.4	54.7
12	0°40.9	21°27.9	256°47.1	16.2	8°53.1	-13.5	54.7
13	15°40.8	21°28.3	271°22.3	16.2	8°39.7	-13.5	54.7
14	30°40.7	21°28.7	285°57.6	16.2	8°26.1	-13.6	54.7
15	45°40.7	21°29.1	300°32.8	16.2	8°12.6	-13.6	54.8
16	60°40.6	21°29.5	315°08.1	16.3	7°58.9	-13.6	54.8
17	75°40.5	21°29.9	329°43.3	16.3	7°45.3	-13.7	54.8
18	90°40.4	21°30.3	344°18.6	16.3	7°31.6	-13.7	54.8
19	105°40.3	21°30.7	358°53.9	16.3	7°17.9	-13.7	54.8
20	120°40.3	21°31.1	13°29.2	16.3	7°04.1	-13.8	54.9
21	135°40.2	21°31.5	28°04.5	16.3	6°50.3	-13.8	54.9
22	150°40.1	21°31.9	42°39.8	16.3	6°36.5	-13.9	54.9
23	165°40.0	21°32.3	57°15.1	16.3	6°22.6	-13.9	54.9
SD.=15.8		d=0.4	S.D.=14.9				
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	180°39.9	21°32.7	71°50.4	16.3	6°08.7	-13.9	54.9
1	195°39.9	21°33.1	86°25.7	16.3	5°54.7	-14.0	55.0
2	210°39.8	21°33.5	101°01.0	16.3	5°40.8	-14.0	55.0
3	225°39.7	21°33.9	115°36.4	16.3	5°26.8	-14.0	55.0
4	240°39.6	21°34.3	130°11.7	16.3	5°12.7	-14.1	55.0
5	255°39.5	21°34.6	144°47.0	16.3	4°58.7	-14.1	55.0
6	270°39.5	21°35.0	159°22.3	16.3	4°44.6	-14.1	55.1
7	285°39.4	21°35.4	173°57.6	16.3	4°30.4	-14.1	55.1
8	300°39.3	21°35.8	188°32.9	16.3	4°16.3	-14.2	55.1
9	315°39.2	21°36.2	203°08.2	16.3	4°02.1	-14.2	55.1
10	330°39.1	21°36.6	217°43.5	16.3	3°47.9	-14.2	55.2
11	345°39.1	21°37.0	232°18.7	16.3	3°33.6	-14.3	55.2
12	0°39.0	21°37.4	246°54.0	16.3	3°19.4	-14.3	55.2
13	15°38.9	21°37.7	261°29.3	16.2	3°05.1	-14.3	55.2
14	30°38.8	21°38.1	276°04.5	16.2	2°50.8	-14.3	55.2
15	45°38.7	21°38.5	290°39.7	16.2	2°36.4	-14.4	55.3
16	60°38.6	21°38.9	305°14.9	16.2	2°22.1	-14.4	55.3
17	75°38.6	21°39.3	319°50.1	16.2	2°07.7	-14.4	55.3
18	90°38.5	21°39.7	334°25.3	16.2	1°53.3	-14.4	55.3
19	105°38.4	21°40.0	349°00.4	16.1	1°38.8	-14.4	55.4
20	120°38.3	21°40.4	3°35.6	16.1	1°24.4	-14.5	55.4
21	135°38.2	21°40.8	18°10.7	16.1	1°09.9	-14.5	55.4
22	150°38.1	21°41.2	32°45.8	16.1	0°55.4	-14.5	55.4
23	165°38.1	21°41.6	47°20.9	16.1	0°40.9	-14.5	55.5
SD.=15.8		d=0.4	S.D.=15.0				
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	180°38.0	21°42.0	61°55.9	16.0	0°26.4	-14.5	55.5
1	195°37.9	21°42.3	76°30.9	16.0	0°11.9	-14.5	55.5
2	210°37.8	21°42.7	91°05.9	16.0	-0°02.7	-14.6	55.6
3	225°37.7	21°43.1	105°40.9	15.9	-0°17.2	-14.6	55.6
4	240°37.6	21°43.5	120°15.8	15.9	-0°31.8	-14.6	55.6
5	255°37.5	21°43.8	134°50.7	15.9	-0°46.4	-14.6	55.6
6	270°37.5	21°44.2	149°25.6	15.9	-1°01.0	-14.6	55.7
7	285°37.4	21°44.6	164°00.4	15.8	-1°15.7	-14.6	55.7
8	300°37.3	21°45.0	178°35.2	15.8	-1°30.3	-14.6	55.7
9	315°37.2	21°45.3	193°10.0	15.7	-1°44.9	-14.6	55.7
10	330°37.1	21°45.7	207°44.7	15.7	-1°59.6	-14.7	55.8
11	345°37.0	21°46.1	222°19.4	15.7	-2°14.2	-14.7	55.8
12	0°36.9	21°46.4	236°54.0	15.6	-2°28.9	-14.7	55.8
13	15°36.9	21°46.8	251°28.6	15.6	-2°43.6	-14.7	55.9
14	30°36.8	21°47.2	266°03.2	15.5	-2°58.2	-14.7	55.9
15	45°36.7	21°47.6	280°37.7	15.5	-3°12.9	-14.7	55.9
16	60°36.6	21°47.9	295°12.2	15.5	-3°27.6	-14.7	56.0
17	75°36.5	21°48.3	309°46.6	15.4	-3°42.3	-14.7	56.0
18	90°36.4	21°48.7	324°21.0	15.4	-3°57.0	-14.7	56.0
19	105°36.3	21°49.0	338°55.3	15.3	-4°11.7	-14.7	56.0
20	120°36.2	21°49.4	353°29.6	15.3	-4°26.4	-14.7	56.1
21	135°36.2	21°49.8	8°03.9	15.2	-4°41.0	-14.7	56.1
22	150°36.1	21°50.1	22°38.0	15.2	-4°55.7	-14.7	56.1
23	165°36.0	21°50.5	37°12.2	15.1	-5°10.4	-14.7	56.2
SD.=15.8		d=0.4	S.D.=15.1				
Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	01:26	22:32	—:—	—:—	
64	—:—	—:—	02:06	21:51	—:—	—:—	
62	—:—	00:41	02:34	21:23	23:22	—:—	
60	—:—	01:36	02:55	21:02	22:22	—:—	
58	—:—	02:07	03:12	20:44	21:50	—:—	
56	00:37	02:30	03:26	20:30	21:26	23:25	
54	01:27	02:48	03:38	20:17	21:08	22:30	
52	01:56	03:03	03:49	20:07	20:52	22:00	
50	02:18	03:16	03:59	19:57	20:39	21:39	
45	02:56	03:43	04:19	19:37	20:13	20:60	
40	03:23	04:03	04:35	19:20	19:52	20:32	
35	03:44	04:20	04:49	19:07	19:36	20:11	
30	04:01	04:33	05:00	18:55	19:22	19:54	
20	04:28	04:56	05:20	18:35	18:59	19:27	
10	04:48	05:15	05:38	18:17	18:40	19:07	
0	05:06	05:32	05:54	18:01	18:23	18:49	
-10	05:21	05:47	06:10	17:45	18:08	18:34	
-20	05:36	06:03	06:27	17:28	17:52	18:19	
-30	05:51	06:20	06:46	17:09	17:35	18:04	
-35	05:58	06:30	06:57	16:57	17:25	17:56	
-40	06:07	06:40	07:10	16:45	17:14	17:48	
-45	06:16	06:52	07:25	16:29	17:02	17:39	
-50	06:26	07:06	07:44	16:11	16:48	17:29	
-52	06:30	07:13	07:52	16:02	16:41	17:24	
-54	06:35	07:20	08:02	15:52	16:34	17:19	
-56	06:40	07:28	08:13	15:41	16:26	17:14	
-58	06:46	07:37	08:26	15:28	16:17	17:08	
-60	06:53	07:47	08:41	15:13	16:07	17:02	
Moonrise		Moonset					
Lat.	Sun	Mon	Tue	Sun	Mon	Tue	
72	10:54	12:57	14:59	03:01	02:25	01:54	
70	11:09	13:01	14:54	02:44	02:18	01:54	
68	11:20	13:05	14:50	02:31	02:12	01:54	
66	11:30	13:08	14:47	02:20	02:07	01:54	
64	11:38	13:10	14:44	02:10	02:02	01:54	
62	11:44	13:12	14:42	02:02	01:58	01:54	
60	11:50	13:14	14:40	01:55	01:55	01:54	
58	11:55	13:16	14:38	01:49	01:52	01:55	
56	11:60	13:17	14:36	01:43	01:49	01:55	
54	12:04	13:19	14:35	01:38	01:47	01:55	
52	12:08	13:20	14:33	01:34	01:44	01:55	
50	12:11	13:21	14:32	01:29	01:42	01:55	
45	12:18	13:23	14:30	01:20	01:38	01:55	
40	12:24	13:25	14:27	01:13	01:34	01:55	
35	12:29	13:27	14:26	01:06	01:31	01:55	
30	12:34	13:28	14:24	01:01	01:28	01:55	
20	12:42	13:31	14:21	00:51	01:23	01:55	
10	12:48	13:33	14:19	00:42	01:19	01:55	
0	12:55	13:35	14:17	00:33	01:14	01:55	
-10	13:01	13:38	14:15	00:25	01:10	01:55	
-20	13:08	13:40	14:12	00:16	01:05	01:55	
-30	13:15	13:42	14:10	00:06	01:00	01:55	
-35	13:20	13:44	14:08	—:—	00:57	01:55	
-40	13:25	13:46	14:06	—:—	00:54	01:55	
-45	13:30	13:48	14:05	—:—	00:49	01:55	
-50	13:37	13:50	14:02	—:—	00:45	01:55	
-52	13:40	13:51	14:01	—:—	00:42	01:55	
-54	13:44	13:52	14:00	—:—	00:40	01:55	
-56	13:48	13:53	13:59	—:—	00:37	01:55	
-58	13:52	13:55	13:58	—:—	00:34	01:55	
-60	13:56	13:56	13:56	—:—	00:31	01:55	
Sun		Moon					
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer.	Mer.Pass.	Age		
28	02:47	02:44	11:57	19:04	06:44	9(58%)	
29	02:40	02:36	11:57	19:45	07:24	10(68%)	
30	02:32	02:28	11:57	20:26	08:05	11(77%)	

May 31, 01 ,02 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars			
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	248°14.2	131°12.4	23°50.8	119°31.3	20°13.1	216°53.8	11°33.2	268°59.3	-10°22.0					Alpheratz	357°36.3	29°12.9		
1	263°16.6	146°12.3	23°50.3	134°32.3	20°12.7	231°55.8	11°33.4	284°01.7	-10°22.0					Ankaa	353°08.7	-42°10.6		
2	278°19.1	161°12.1	23°49.8	149°33.3	20°12.4	246°57.7	11°33.6	299°04.1	-10°21.9					Schedar	349°32.9	56°39.6		
3	293°21.5	176°11.9	23°49.3	164°34.2	20°12.0	261°59.7	11°33.8	314°06.5	-10°21.9					Diphda	348°48.7	-17°51.5		
4	308°24.0	191°11.7	23°48.8	179°35.2	20°11.6	277°01.6	11°34.0	329°08.9	-10°21.9					Achernar	335°21.6	-57°06.9		
5	323°26.5	206°11.5	23°48.2	194°36.2	20°11.2	292°03.6	11°34.1	344°11.3	-10°21.9					Hamal	327°53.0	23°34.2		
6	338°28.9	221°11.4	23°47.7	209°37.2	20°10.8	307°05.5	11°34.3	359°13.6	-10°21.9					Polaris	315°09.0	89°21.6		
7	353°31.4	236°11.2	23°47.2	224°38.1	20°10.4	322°07.5	11°34.5	14°16.0	-10°21.9					Akamar	315°13.2	-40°12.6		
8	8°33.9	251°11.0	23°46.7	239°39.1	20°10.0	337°09.4	11°34.7	29°18.4	-10°21.8					Menkar	314°07.9	4°10.8		
9	23°36.3	266°10.8	23°46.2	254°40.1	20°09.7	352°11.4	11°34.9	44°20.8	-10°21.8					Mirfak	308°30.7	49°56.5		
10	38°38.8	281°10.7	23°45.7	269°41.1	20°09.3	7°13.3	11°35.0	59°23.2	-10°21.8					Aldebaran	290°41.5	16°33.3		
11	53°41.3	296°10.5	23°45.2	284°42.1	20°08.9	22°15.2	11°35.2	74°25.6	-10°21.8					Rigel	281°05.5	-8°10.5		
12	68°43.7	311°10.3	23°44.7	299°43.0	20°08.5	37°17.2	11°35.4	89°28.0	-10°21.8					Capella	280°24.4	46°01.3		
13	83°46.2	326°10.2	23°44.1	314°44.0	20°08.1	52°19.1	11°35.6	104°30.4	-10°21.7					Bellatrix	278°24.7	6°22.2		
14	98°48.7	341°10.0	23°43.6	329°45.0	20°07.7	67°21.1	11°35.8	119°32.8	-10°21.7					Elnath	278°04.0	28°37.6		
15	113°51.1	356°09.8	23°43.1	344°46.0	20°07.4	82°23.0	11°35.9	134°35.2	-10°21.7					Alnilam	275°39.4	-1°11.3		
16	128°53.6	11°09.7	23°42.6	359°46.9	20°07.0	97°25.0	11°36.1	149°37.6	-10°21.7					Betelgeuse	270°53.9	7°24.7		
17	143°56.0	26°09.5	23°42.1	14°47.9	20°06.6	112°26.9	11°36.3	164°40.0	-10°21.7					Canopus	263°53.5	-52°42.6		
18	158°58.5	41°09.3	23°41.6	29°48.9	20°06.2	127°28.9	11°36.5	179°42.4	-10°21.7					Sirius	258°27.6	-16°44.8		
19	174°01.0	56°09.2	23°41.0	44°49.9	20°05.8	142°30.8	11°36.7	194°44.8	-10°21.6					Adara	255°07.2	-29°00.3		
20	189°03.4	71°09.0	23°40.5	59°50.8	20°05.4	157°32.8	11°36.8	209°47.2	-10°21.6					Procyon	244°52.4	5°10.1		
21	204°05.9	86°08.8	23°40.0	74°51.8	20°05.0	172°34.7	11°37.0	224°49.6	-10°21.6					Pollux	243°19.1	27°58.3		
22	219°08.4	101°08.7	23°39.5	89°52.8	20°04.6	187°36.6	11°37.2	239°52.0	-10°21.6					Avior	234°15.7	-59°35.2		
23	234°10.8	116°08.5	23°38.9	104°53.8	20°04.3	202°38.6	11°37.4	254°54.4	-10°21.6					Suhail	222°47.5	-43°31.8		
Mer.pass.:7:25:			v-0.2 d-0.5 m-4.2			v1.0 d-0.4 m1.6			v1.9 d0.2 m-1.9			v2.4 d0.0 m0.9			Miaplacidus	221°39.0	-69°49.0	
															Alphard	217°49.2	-8°45.6	
															Regulus	207°35.9	11°51.3	
															Dubhe	193°42.6	61°37.8	
															Denebola	182°26.2	14°26.6	
															Gienah	175°44.8	-17°40.4	
															Acrux	173°01.3	-63°14.0	
															Gacrux	171°52.9	-57°14.9	
															Alioth	166°13.9	55°50.2	
															Spica	158°23.5	-11°17.0	
															Alcaid	152°52.7	49°12.0	
															Hadar	148°37.4	-60°29.3	
															Menkent	147°58.9	-36°29.2	
															Arcturus	145°48.7	19°04.0	
															Rigel Kent.	139°41.6	-60°56.0	
															Zubenelg.	136°57.2	-16°08.4	
															Kochab	137°18.7	74°03.7	
															Alphecca	126°04.5	26°38.2	
															Antares	112°17.1	-26°29.1	
															Atria	107°12.0	-69°04.1	
															Sabik	102°04.0	-15°45.3	
															Shaula	96°11.8	-37°07.2	
															Rasalhague	95°59.5	12°32.5	
															Etamin	90°42.3	51°29.0	
															Kaus Aust.	83°33.9	-34°22.4	
															Vega	80°33.8	38°48.1	
															Nunki	75°49.1	-26°16.0	
															Altair	62°01.1	8°55.6	
															Peacock	53°07.5	-56°39.4	
															Deneb	49°26.5	45°21.5	
															Enif	33°40.1	9°58.8	
															Alnair	27°34.6	-46°50.7	
															Fomalhaut	15°16.1	-29°29.8	
															Scheat	13°46.6	28°12.3	
															Markab	13°31.3	15°19.7	
															2023/5/3	SHA	Mer.pass	
															Venus	242°58.3	15:15	
															Mars	231°17.2	16:01	
															Jupiter	328°39.7	09:31	
															Saturn	20°45.1	06:03	
															2023/6/1	SHA	Mer.pass	
															Venus	241°55.1	15:16	
															Mars	230°41.5	15:59	
															Jupiter	328°27.2	09:28	
															Saturn	20°43.5	05:59	
															2023/6/2	SHA	Mer.pass	
															Venus	240°52.5	15:16	
															Mars	230°05.8	15:58	
															Jupiter	328°14.9	09:25	
															Saturn	20°41.9	05:55	
															Horizontal paralax			
															Venus:			0.2
															Mars:			0.1

Sun			Moon				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	180°35.9	21°50.8	51°46.2	15.0	-5°25.1	-14.7	56.2
1	195°35.8	21°51.2	66°20.3	15.0	-5°39.8	-14.7	56.2
2	210°35.7	21°51.6	80°54.2	14.9	-5°54.4	-14.7	56.3
3	225°35.6	21°51.9	95°28.1	14.9	-6°09.1	-14.7	56.3
4	240°35.5	21°52.3	110°01.9	14.8	-6°23.7	-14.6	56.3
5	255°35.5	21°52.6	124°35.7	14.7	-6°38.4	-14.6	56.3
6	270°35.4	21°53.0	139°09.4	14.7	-6°53.0	-14.6	56.4
7	285°35.3	21°53.4	153°43.1	14.6	-7°07.6	-14.6	56.4
8	300°35.2	21°53.7	168°16.7	14.5	-7°22.3	-14.6	56.4
9	315°35.1	21°54.1	182°50.2	14.5	-7°36.9	-14.6	56.5
10	330°35.0	21°54.4	197°23.6	14.4	-7°51.4	-14.6	56.5
11	345°34.9	21°54.8	211°57.0	14.3	-8°06.0	-14.6	56.5
12	0°34.8	21°55.1	226°30.3	14.3	-8°20.5	-14.5	56.6
13	15°34.7	21°55.5	241°03.6	14.2	-8°35.1	-14.5	56.6
14	30°34.6	21°55.9	255°36.7	14.1	-8°49.6	-14.5	56.6
15	45°34.5	21°56.2	270°09.8	14.1	-9°04.1	-14.5	56.7
16	60°34.5	21°56.6	284°42.8	14.0	-9°18.6	-14.5	56.7
17	75°34.4	21°56.9	299°15.8	13.9	-9°33.0	-14.4	56.7
18	90°34.3	21°57.3	313°48.6	13.8	-9°47.4	-14.4	56.8
19	105°34.2	21°57.6	328°21.4	13.7	-10°01.8	-14.4	56.8
20	120°34.1	21°58.0	342°54.1	13.7	-10°16.2	-14.4	56.8
21	135°34.0	21°58.3	357°26.7	13.6	-10°30.5	-14.3	56.9
22	150°33.9	21°58.7	11°59.2	13.5	-10°44.8	-14.3	56.9
23	165°33.8	21°59.0	26°31.7	13.4	-10°59.1	-14.3	56.9
	SD.=15.8	d=0.4	S.D.=15.3				

Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°33.7	21°59.4	41°04.0	13.3	-11°13.4	-14.2	57.0
1	195°33.6	21°59.7	55°36.3	13.2	-11°27.6	-14.2	57.0
2	210°33.5	22°00.0	70°08.5	13.1	-11°41.8	-14.2	57.0
3	225°33.4	22°00.4	84°40.6	13.1	-11°55.9	-14.1	57.1
4	240°33.3	22°00.7	99°12.6	13.0	-12°10.0	-14.1	57.1
5	255°33.3	22°01.1	113°44.5	12.9	-12°24.1	-14.1	57.1
6	270°33.2	22°01.4	128°16.3	12.8	-12°38.2	-14.0	57.2
7	285°33.1	22°01.8	142°48.1	12.7	-12°52.1	-14.0	57.2
8	300°33.0	22°02.1	157°19.7	12.6	-13°06.1	-13.9	57.2
9	315°32.9	22°02.4	171°51.2	12.5	-13°20.0	-13.9	57.3
10	330°32.8	22°02.8	186°22.7	12.4	-13°33.9	-13.8	57.3
11	345°32.7	22°03.1	200°54.0	12.3	-13°47.7	-13.8	57.3
12	0°32.6	22°03.5	215°25.3	12.2	-14°01.4	-13.7	57.4
13	15°32.5	22°03.8	229°56.4	12.1	-14°15.2	-13.7	57.4
14	30°32.4	22°04.1	244°27.4	12.0	-14°28.8	-13.6	57.4
15	45°32.3	22°04.5	258°58.4	11.9	-14°42.4	-13.6	57.5
16	60°32.2	22°04.8	273°29.2	11.8	-14°56.0	-13.5	57.5
17	75°32.1	22°05.2	287°59.9	11.7	-15°09.5	-13.5	57.5
18	90°32.0	22°05.5	302°30.5	11.6	-15°22.9	-13.4	57.6
19	105°31.9	22°05.8	317°01.0	11.5	-15°36.3	-13.4	57.6
20	120°31.8	22°06.2	331°31.4	11.3	-15°49.6	-13.3	57.6
21	135°31.7	22°06.5	346°01.7	11.2	-16°02.9	-13.2	57.7
22	150°31.6	22°06.8	0°31.9	11.1	-16°16.1	-13.2	57.7
23	165°31.5	22°07.2	15°02.0	11.0	-16°29.2	-13.1	57.7
	SD.=15.8	d=0.3	S.D.=15.5				

Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	180°31.4	22°07.5	29°31.9	10.9	-16°42.3	-13.0	57.8
1	195°31.4	22°07.8	44°01.8	10.8	-16°55.2	-13.0	57.8
2	210°31.3	22°08.1	58°31.5	10.7	-17°08.2	-12.9	57.8
3	225°31.2	22°08.5	73°01.1	10.6	-17°21.0	-12.8	57.9
4	240°31.1	22°08.8	87°30.6	10.4	-17°33.8	-12.7	57.9
5	255°31.0	22°09.1	101°60.0	10.3	-17°46.5	-12.7	57.9
6	270°30.9	22°09.5	116°29.2	10.2	-17°59.1	-12.6	58.0
7	285°30.8	22°09.8	130°58.4	10.1	-18°11.6	-12.5	58.0
8	300°30.7	22°10.1	145°27.4	10.0	-18°24.1	-12.4	58.0
9	315°30.6	22°10.4	159°56.3	9.8	-18°36.5	-12.3	58.1
10	330°30.5	22°10.8	174°25.1	9.7	-18°48.7	-12.2	58.1
11	345°30.4	22°11.1	188°53.7	9.6	-19°00.9	-12.2	58.1
12	0°30.3	22°11.4	203°22.3	9.5	-19°13.0	-12.1	58.2
13	15°30.2	22°11.7	217°50.7	9.4	-19°25.1	-12.0	58.2
14	30°30.1	22°12.0	232°19.0	9.2	-19°37.0	-11.9	58.2
15	45°30.0	22°12.4	246°47.2	9.1	-19°48.8	-11.8	58.2
16	60°29.9	22°12.7	261°15.2	9.0	-20°00.6	-11.7	58.3
17	75°29.8	22°13.0	275°43.1	8.9	-20°12.2	-11.6	58.3
18	90°29.7	22°13.3	290°10.9	8.7	-20°23.7	-11.5	58.3
19	105°29.6	22°13.6	304°38.6	8.6	-20°35.2	-11.4	58.4
20	120°29.5	22°14.0	319°06.2	8.5	-20°46.5	-11.3	58.4
21	135°29.4	22°14.3	333°33.6	8.4	-20°57.7	-11.2	58.4
22	150°29.3	22°14.6	348°00.9	8.2	-21°08.8	-11.1	58.5
23	165°29.2	22°14.9	2°28.1	8.1	-21°19.8	-11.0	58.5
	SD.=15.8	d=0.3	S.D.=15.8				

Twilight				Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	--	--	--	--	--	--	
70	--	--	--	--	--	--	
68	--	--	--	--	--	--	
66	--	--	01:14	22:46	--	--	
64	--	--	01:59	21:59	--	--	
62	--	00:05	02:28	21:29	--	--	
60	--	01:27	02:50	21:07	22:31	--	
58	--	02:01	03:08	20:49	21:57	--	
56	00:04	02:25	03:22	20:34	21:32	--	
54	01:19	02:44	03:35	20:21	21:13	22:39	
52	01:51	02:60	03:46	20:10	20:57	22:07	
50	02:13	03:13	03:56	20:00	20:43	21:44	
45	02:53	03:41	04:17	19:39	20:16	21:03	
40	03:21	04:01	04:33	19:23	19:55	20:35	
35	03:42	04:18	04:47	19:08	19:38	20:14	
30	03:60	04:32	04:60	18:56	19:23	19:56	
20	04:27	04:56	05:20	18:36	18:60	19:29	
10	04:48	05:15	05:38	18:18	18:41	19:08	
0	05:06	05:32	05:54	18:01	18:24	18:50	
-10	05:22	05:48	06:11	17:45	18:08	18:34	
-20	05:37	06:04	06:28	17:28	17:52	18:19	
-30	05:52	06:22	06:48	17:08	17:34	18:04	
-35	05:60	06:31	06:59	16:56	17:24	17:55	
-40	06:09	06:42	07:12	16:43	17:13	17:47	
-45	06:18	06:55	07:28	16:28	17:01	17:38	
-50	06:28	07:09	07:47	16:09	16:46	17:27	
-52	06:33	07:16	07:56	15:59	16:39	17:22	
-54	06:38	07:23	08:06	15:49	16:32	17:17	
-56	06:44	07:32	08:17	15:38	16:24	17:12	
-58	06:50	07:41	08:31	15:25	16:14	17:06	
-60	06:56	07:51	08:46	15:09	16:04	16:59	

Moonrise			Moonset			
Lat.	Wed	Fri	Wed	Thu	Fri	
72	17:10	20:01	--	01:22	00:42	--
70	16:54	19:17	--	01:30	01:00	00:16
68	16:41	18:48	21:44	01:36	01:15	00:47
66	16:31	18:26	20:45	01:42	01:28	01:09
64	16:22	18:09	20:11	01:46	01:38	01:28
62	16:15	17:56	19:46	01:51	01:47	01:43
60	16:09	17:44	19:27	01:54	01:54	01:55
58	16:03	17:34	19:11	01:57	02:01	02:06
56	15:58	17:25	18:58	02:00	02:07	02:16
54	15:54	17:18	18:46	02:03	02:12	02:25
52	15:50	17:11	18:36	02:05	02:17	02:32
50	15:46	17:04	18:27	02:07	02:22	02:39
45	15:39	16:51	18:08	02:12	02:31	02:54
40	15:32	16:40	17:52	02:16	02:39	03:07
35	15:27	16:31	17:39	02:20	02:46	03:17
30	15:22	16:23	17:28	02:23	02:53	03:26
20	15:14	16:09	17:09	02:28	03:03	03:42
10	15:07	15:57	16:52	02:33	03:13	03:56
0	14:60	15:46	16:37	02:37	03:21	04:10
-10	14:53	15:35	16:22	02:41	03:30	04:23
-20	14:46	15:23	16:05	02:46	03:40	04:37
-30	14:38	15:10	15:47	0		

June 03, 04 ,05 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec	
0	251°11.6	131°02.2	23°12.3	120°41.7	19°45.0	219°14.1	11°46.1	271°51.9	-10°20.8						Alpheratz	357°36.3	29°13.0
1	266°14.0	146°02.1	23°11.8	135°42.7	19°44.6	234°16.0	11°46.3	286°54.4	-10°20.8						Ankaa	353°08.6	-42°10.6
2	281°16.5	161°02.0	23°11.2	150°43.7	19°44.2	249°18.0	11°46.5	301°56.8	-10°20.8						Schedar	349°32.9	56°39.6
3	296°19.0	176°01.9	23°10.7	165°44.6	19°43.8	264°19.9	11°46.6	316°59.2	-10°20.8						Diphda	348°48.7	-17°51.5
4	311°21.4	191°01.8	23°10.1	180°45.6	19°43.4	279°21.9	11°46.8	332°01.6	-10°20.8						Achernar	335°21.6	-57°06.9
5	326°23.9	206°01.7	23°09.5	195°46.6	19°43.0	294°23.8	11°47.0	347°04.0	-10°20.7						Hamal	327°53.0	23°34.2
6	341°26.4	221°01.6	23°09.0	210°47.6	19°42.6	309°25.8	11°47.2	2°06.4	-10°20.7						Polaris	315°07.9	89°21.6
7	356°28.8	236°01.5	23°08.4	225°48.6	19°42.2	324°27.7	11°47.3	17°08.8	-10°20.7						Akamar	315°13.2	-40°12.6
8	11°31.3	251°01.4	23°07.8	240°49.5	19°41.8	339°29.7	11°47.5	32°11.2	-10°20.7						Menkar	314°07.9	4°10.8
9	26°33.7	266°01.4	23°07.3	255°50.5	19°41.4	354°31.6	11°47.7	47°13.6	-10°20.7						Mirfak	308°30.7	49°56.5
10	41°36.2	281°01.3	23°06.7	270°51.5	19°41.0	9°33.6	11°47.9	62°16.0	-10°20.7						Aldebaran	290°41.5	16°33.3
11	56°38.7	296°01.2	23°06.1	285°52.5	19°40.6	24°35.6	11°48.0	77°18.4	-10°20.7						Rigel	281°05.5	-8°10.5
12	71°41.1	311°01.1	23°05.5	300°53.5	19°40.2	39°37.5	11°48.2	92°20.8	-10°20.7						Capella	280°24.4	46°01.3
13	86°43.6	326°01.0	23°05.0	315°54.4	19°39.8	54°39.5	11°48.4	107°23.2	-10°20.6						Bellatrix	278°24.7	6°22.2
14	101°46.1	341°00.9	23°04.4	330°55.4	19°39.4	69°41.4	11°48.6	122°25.6	-10°20.6						Elnath	278°04.0	28°37.6
15	116°48.5	356°00.8	23°03.8	345°56.4	19°39.0	84°43.4	11°48.7	137°28.0	-10°20.6						Alnilam	275°39.4	-1°11.3
16	131°51.0	11°00.8	23°03.3	0°57.4	19°38.6	99°45.3	11°48.9	152°30.4	-10°20.6						Betelgeuse	270°53.9	7°24.7
17	146°53.5	26°00.7	23°02.7	15°58.4	19°38.2	114°47.3	11°49.1	167°32.8	-10°20.6						Canopus	263°53.5	-52°42.6
18	161°55.9	41°00.6	23°02.1	30°59.3	19°37.8	129°49.2	11°49.3	182°35.2	-10°20.6						Sirius	258°27.6	-16°44.8
19	176°58.4	56°00.5	23°01.5	46°00.3	19°37.4	144°51.2	11°49.4	197°37.6	-10°20.6						Adara	255°07.2	-29°00.3
20	192°00.9	71°00.4	23°01.0	61°01.3	19°37.0	159°53.1	11°49.6	212°40.1	-10°20.6						Procyon	244°52.4	5°10.1
21	207°03.3	86°00.4	23°00.4	76°02.3	19°36.6	174°55.1	11°49.8	227°42.5	-10°20.5						Pollux	243°19.1	27°58.3
22	222°05.8	101°00.3	22°59.8	91°03.3	19°36.2	189°57.0	11°50.0	242°44.9	-10°20.5						Avior	234°15.7	-59°35.2
23	237°08.2	116°00.2	22°59.2	106°04.2	19°35.8	204°59.0	11°50.1	257°47.3	-10°20.5						Suhail	222°47.5	-43°31.8
Mer.pass.:7:14:			v-0.1 d-0.6 m-4.2			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9					
Sun	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	252°10.7	131°00.2	22°58.6	121°05.2	19°35.4	220°00.9	11°50.3	272°49.7	-10°20.5						Dubhe	193°42.6	61°37.8
1	267°13.2	146°00.1	22°58.1	136°06.2	19°35.0	235°02.9	11°50.5	287°52.1	-10°20.5						Denebola	182°26.2	14°26.6
2	282°15.6	161°00.0	22°57.5	151°07.2	19°34.6	250°04.8	11°50.7	302°54.5	-10°20.5						Gienah	175°44.8	-17°40.4
3	297°18.1	175°59.9	22°56.9	166°08.2	19°34.2	265°06.8	11°50.8	317°56.9	-10°20.5						Acrux	173°01.3	-63°14.0
4	312°20.6	190°59.9	22°56.3	181°09.1	19°33.8	280°08.7	11°51.0	332°59.3	-10°20.5						Gacrux	171°52.9	-57°14.9
5	327°23.0	205°59.8	22°55.7	196°10.1	19°33.4	295°10.7	11°51.2	348°01.7	-10°20.4						Alioth	166°13.9	55°50.2
6	342°25.5	220°59.7	22°55.2	211°11.1	19°33.0	310°12.7	11°51.4	3°04.1	-10°20.4						Spica	158°23.5	-11°17.0
7	357°28.0	235°59.7	22°54.6	226°12.1	19°32.6	325°14.6	11°51.5	18°06.5	-10°20.4						Alcaid	152°52.7	49°12.0
8	12°30.4	250°59.6	22°54.0	241°13.1	19°32.2	340°16.6	11°51.7	33°08.9	-10°20.4						Hadar	148°37.4	-60°29.3
9	27°32.9	265°59.6	22°53.4	256°14.0	19°31.8	355°18.5	11°51.9	48°11.4	-10°20.4						Menkent	147°58.9	-36°29.2
10	42°35.4	280°59.5	22°52.8	271°15.0	19°31.4	10°20.5	11°52.1	63°13.8	-10°20.4						Arcturus	145°48.7	19°04.0
11	57°37.8	295°59.4	22°52.2	286°16.0	19°31.0	25°22.4	11°52.2	78°16.2	-10°20.4						Rigel Kent.	139°41.6	-60°56.0
12	72°40.3	310°59.4	22°51.6	301°17.0	19°30.6	40°24.4	11°52.4	93°18.6	-10°20.4						Zubenelg.	136°57.2	-16°08.4
13	87°42.7	325°59.3	22°51.0	316°18.0	19°30.2	55°26.3	11°52.6	108°21.0	-10°20.3						Kochab	137°18.7	74°03.7
14	102°45.2	340°59.3	22°50.5	331°18.9	19°29.8	70°28.3	11°52.8	123°23.4	-10°20.3						Alphecca	126°04.5	26°38.2
15	117°47.7	355°59.2	22°49.9	346°19.9	19°29.4	85°30.2	11°52.9	138°25.8	-10°20.3						Antares	112°17.1	-26°29.1
16	132°50.1	10°59.2	22°49.3	1°20.9	19°29.0	100°32.2	11°53.1	153°28.2	-10°20.3						Atria	107°12.0	-69°04.1
17	147°52.6	25°59.1	22°48.7	16°21.9	19°28.5	115°34.2	11°53.3	168°30.6	-10°20.3						Sabik	102°04.0	-15°45.3
18	162°55.1	40°59.1	22°48.1	31°22.9	19°28.1	130°36.1	11°53.5	183°33.0	-10°20.3						Shaula	96°11.8	-37°07.2
19	177°57.5	55°59.0	22°47.5	46°23.8	19°27.7	145°38.1	11°53.6	198°35.5	-10°20.3						Rasalhague	95°59.5	12°32.5
20	192°60.0	70°59.0	22°46.9	61°24.8	19°27.3	160°40.0	11°53.8	213°37.9	-10°20.3						Etamin	90°42.3	51°29.0
21	208°02.5	85°58.9	22°46.3	76°25.8	19°26.9	175°42.0	11°54.0	228°40.3	-10°20.3						Kaus Aust.	83°33.9	-34°22.4
22	223°04.9	100°58.9	22°45.7	91°26.8	19°26.5	190°43.9	11°54.2	243°42.7	-10°20.2						Vega	80°33.8	38°48.1
23	238°07.4	115°58.8	22°45.1	106°27.8	19°26.1	205°45.9	11°54.3	258°45.1	-10°20.2						Nunki	75°49.1	-26°16.0
Mer.pass.:7:10:			v-0.1 d-0.6 m-4.2			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9					
Mon	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	253°09.9	130°58.8	22°44.5	121°28.7	19°25.7	220°47.8	11°54.5	273°47.5	-10°20.2						2023/6/3	SHA	Mer.pass
1	268°12.3	145°58.8	22°43.9	136°29.7	19°25.3	235°49.8	11°54.7	288°49.9	-10°20.2						Venus	239°50.6	15:16
2	283°14.8	160°58.7	22°43.3	151°30.7	19°24.9	250°51.8	11°54.9	303°52.3	-10°20.2						Mars	229°30.1	15:56
3	298°17.2	175°58.7	22°42.7	166°31.7	19°24.5	265°53.7	11°55.0	318°54.7	-10°20.2						Jupiter	328°02.5	09:22
4	313°19.7	190°58.6	22°42.1	181°32.7	19°24.1	280°55.7	11°55.2	333°57.2	-10°20.2						Saturn	20°40.4	05:52
5	328°22.2	205°58.6	22°41.5	196°33.7	19°23.7	295°57.6	11°55.4	348°59.6	-10°20.2						2023/6/4	SHA	Mer.pass
6	343°24.6	220°58.6	22°40.9	211°34.6	19°23.3	310°59.6	11°55.6	4°02.0	-10°20.2						Venus	238°49.4	15:16
7	358°27.1	235°58.5	22°40.3	226°35.6	19°22.8	326°01.5	11°55.7	19°04.4	-10°20.1						Mars	228°54.5	15:55
8	13°29.6	250°58.5	22°39.7	241°36.6	19°22.4	341°03.5	11°55.9	34°06.8	-10°20.1								

h		Sun		Moon			
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	180°29.1	22°15.2	16°55.1	8.0	-21°30.7	-10.8	58.5
1	195°29.0	22°15.5	31°22.0	7.9	-21°41.5	-10.7	58.6
2	210°28.9	22°15.9	45°48.8	7.7	-21°52.2	-10.6	58.6
3	225°28.8	22°16.2	60°15.5	7.6	-22°02.7	-10.5	58.6
4	240°28.7	22°16.5	74°42.0	7.5	-22°13.2	-10.4	58.6
5	255°28.6	22°16.8	89°08.4	7.4	-22°23.5	-10.2	58.7
6	270°28.5	22°17.1	103°34.7	7.2	-22°33.7	-10.1	58.7
7	285°28.4	22°17.4	118°00.9	7.1	-22°43.7	-10.0	58.7
8	300°28.3	22°17.7	132°26.9	7.0	-22°53.6	-9.9	58.8
9	315°28.2	22°18.0	146°52.8	6.9	-23°03.5	-9.7	58.8
10	330°28.1	22°18.3	161°18.6	6.7	-23°13.1	-9.6	58.8
11	345°28.0	22°18.6	175°44.3	6.6	-23°22.7	-9.5	58.8
12	0°27.9	22°19.0	190°09.8	6.5	-23°32.1	-9.3	58.9
13	15°27.8	22°19.3	204°35.3	6.4	-23°41.3	-9.2	58.9
14	30°27.7	22°19.6	219°00.6	6.2	-23°50.5	-9.1	58.9
15	45°27.6	22°19.9	233°25.7	6.1	-23°59.4	-8.9	59.0
16	60°27.5	22°20.2	247°50.8	6.0	-24°08.3	-8.8	59.0
17	75°27.4	22°20.5	262°15.7	5.9	-24°17.0	-8.6	59.0
18	90°27.2	22°20.8	276°40.5	5.8	-24°25.5	-8.5	59.0
19	105°27.1	22°21.1	291°05.2	5.6	-24°33.9	-8.3	59.1
20	120°27.0	22°21.4	305°29.8	5.5	-24°42.2	-8.2	59.1
21	135°26.9	22°21.7	319°54.3	5.4	-24°50.3	-8.0	59.1
22	150°26.8	22°22.0	334°18.6	5.3	-24°58.3	-7.9	59.1
23	165°26.7	22°22.3	348°42.8	5.2	-25°06.0	-7.7	59.2
SD.=15.8		d=0.3	S.D.=16.0				
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	180°26.6	22°22.6	3°06.9	5.1	-25°13.7	-7.6	59.2
1	195°26.5	22°22.9	17°31.0	5.0	-25°21.2	-7.4	59.2
2	210°26.4	22°23.2	31°54.8	4.8	-25°28.5	-7.2	59.2
3	225°26.3	22°23.5	46°18.6	4.7	-25°35.6	-7.1	59.3
4	240°26.2	22°23.8	60°42.3	4.6	-25°42.6	-6.9	59.3
5	255°26.1	22°24.1	75°05.9	4.5	-25°49.4	-6.7	59.3
6	270°26.0	22°24.4	89°29.4	4.4	-25°56.1	-6.6	59.3
7	285°25.9	22°24.7	103°52.7	4.3	-26°02.6	-6.4	59.4
8	300°25.8	22°24.9	118°16.0	4.2	-26°08.9	-6.2	59.4
9	315°25.7	22°25.2	132°39.2	4.1	-26°15.0	-6.1	59.4
10	330°25.6	22°25.5	147°02.2	4.0	-26°21.0	-5.9	59.4
11	345°25.5	22°25.8	161°25.2	3.9	-26°26.8	-5.7	59.4
12	0°25.4	22°26.1	175°48.1	3.8	-26°32.4	-5.5	59.5
13	15°25.3	22°26.4	190°10.9	3.7	-26°37.8	-5.3	59.5
14	30°25.1	22°26.7	204°33.6	3.7	-26°43.1	-5.2	59.5
15	45°25.0	22°27.0	218°56.2	3.6	-26°48.1	-5.0	59.5
16	60°24.9	22°27.3	233°18.7	3.5	-26°53.0	-4.8	59.5
17	75°24.8	22°27.6	247°41.2	3.4	-26°57.7	-4.6	59.6
18	90°24.7	22°27.8	262°03.5	3.3	-27°02.2	-4.4	59.6
19	105°24.6	22°28.1	276°25.8	3.3	-27°06.6	-4.2	59.6
20	120°24.5	22°28.4	290°48.0	3.2	-27°10.7	-4.0	59.6
21	135°24.4	22°28.7	305°10.2	3.1	-27°14.6	-3.9	59.6
22	150°24.3	22°29.0	319°32.2	3.0	-27°18.4	-3.7	59.7
23	165°24.2	22°29.3	333°54.2	3.0	-27°22.0	-3.5	59.7
SD.=15.8		d=0.3	S.D.=16.1				
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	180°24.1	22°29.5	348°16.2	2.9	-27°25.3	-3.3	59.7
1	195°24.0	22°29.8	2°38.0	2.8	-27°28.5	-3.1	59.7
2	210°23.9	22°30.1	16°59.9	2.8	-27°31.5	-2.9	59.7
3	225°23.8	22°30.4	31°21.6	2.7	-27°34.3	-2.7	59.7
4	240°23.6	22°30.7	45°43.3	2.7	-27°36.9	-2.5	59.8
5	255°23.5	22°30.9	60°05.0	2.6	-27°39.3	-2.3	59.8
6	270°23.4	22°31.2	74°26.6	2.6	-27°41.5	-2.1	59.8
7	285°23.3	22°31.5	88°48.2	2.5	-27°43.5	-1.9	59.8
8	300°23.2	22°31.8	103°09.7	2.5	-27°45.3	-1.7	59.8
9	315°23.1	22°32.1	117°31.1	2.5	-27°46.9	-1.5	59.8
10	330°23.0	22°32.3	131°52.6	2.4	-27°48.3	-1.3	59.8
11	345°22.9	22°32.6	146°14.0	2.4	-27°49.4	-1.1	59.9
12	0°22.8	22°32.9	160°35.4	2.4	-27°50.4	-0.9	59.9
13	15°22.7	22°33.2	174°56.7	2.3	-27°51.2	-0.7	59.9
14	30°22.6	22°33.4	189°18.1	2.3	-27°51.8	-0.5	59.9
15	45°22.4	22°33.7	203°39.4	2.3	-27°52.2	-0.3	59.9
16	60°22.3	22°34.0	218°00.7	2.3	-27°52.4	-0.1	59.9
17	75°22.2	22°34.2	232°21.9	2.3	-27°52.3	0.1	59.9
18	90°22.1	22°34.5	246°43.2	2.3	-27°52.1	0.3	59.9
19	105°22.0	22°34.8	261°04.5	2.3	-27°51.7	0.5	60.0
20	120°21.9	22°35.0	275°25.7	2.2	-27°51.0	0.7	60.0
21	135°21.8	22°35.3	289°47.0	2.2	-27°50.2	0.9	60.0
22	150°21.7	22°35.6	304°08.2	2.3	-27°49.1	1.2	60.0
23	165°21.6	22°35.8	318°29.5	2.3	-27°47.9	1.4	60.0
SD.=15.8		d=0.3	S.D.=16.3				
Twilight		Twilight		Twilight		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	--	--	--	--	--	--	
70	--	--	--	--	--	--	
68	--	--	--	--	--	--	
66	--	--	01:01	23:00	--	--	
64	--	--	01:52	22:07	--	--	
62	--	--	02:23	21:35	--	--	
60	--	01:19	02:46	21:12	22:41	--	
58	--	01:55	03:04	20:53	22:03	--	
56	--	02:21	03:19	20:38	21:37	--	
54	01:12	02:41	03:33	20:25	21:17	22:47	
52	01:46	02:57	03:44	20:13	21:00	22:13	
50	02:09	03:11	03:54	20:03	20:46	21:48	
45	02:51	03:39	04:15	19:42	20:18	21:07	
40	03:19	04:00	04:32	19:25	19:57	20:38	
35	03:41	04:17	04:47	19:10	19:40	20:16	
30	03:59	04:32	04:59	18:58	19:25	19:58	
20	04:27	04:56	05:20	18:37	19:01	19:30	
10	04:48	05:15	05:38	18:19	18:42	19:09	
0	05:06	05:32	05:55	18:02	18:24	18:50	
-10	05:22	05:49	06:11	17:45	18:08	18:34	
-20	05:38	06:05	06:29	17:28	17:51	18:19	
-30	05:53	06:23	06:49	17:07	17:34	18:03	
-35	06:02	06:33	07:01	16:56	17:24	17:55	
-40	06:10	06:44	07:14	16:42	17:12	17:46	
-45	06:20	06:57	07:30	16:26	16:60	17:36	
-50	06:31	07:12	07:50	16:07	16:44	17:26	
-52	06:36	07:19	07:59	15:57	16:38	17:21	
-54	06:41	07:26	08:09	15:47	16:30	17:15	
-56	06:47	07:35	08:21	15:35	16:21	17:10	
-58	06:53	07:44	08:35	15:22	16:12	17:03	
-60	06:60	07:55	08:51	15:06	16:01	16:57	
Moonrise		Moonset		Moonrise		Moonset	
Lat.	Sat	Sun	Mon	Sat	Sun	Mon	
72	--	--	--	--	--	--	
70	--	--	--	--	--	--	
68	--	--	--	--	--	--	
66	--	--	--	00:39	--	--	
64	22:44	--	--	01:13	00:39	--	
62	21:49	--	00:04	01:39	01:35	01:30	
60	21:17	23:03	--	01:59	02:08	02:32	
58	20:53	22:29	23:40	02:16	02:32	03:06	
56	20:34	22:04	23:14	02:30	02:52	03:31	
54	20:18	21:44	22:54	02:42	03:08	03:51	
52	20:04	21:27	22:36	02:53	03:23	04:08	
50	19:52	21:13	22:22	03:03	03:35	04:22	
45	19:27	20:44	21:52	03:23	04:01	04:52	
40	19:07	20:21	21:28	03:40	04:22	05:15	
35	18:51	20:02	21:09	03:54	04:39	05:34	
30	18:37	19:46	20:52	04:06	04:54	05:50	
20	18:13	19:19	20:24	04:27	05:19	06:18	
10	17:52	18:56	20:00	04:46	05:41	06:42	
0	17:33	18:34	19:38	05:03	06:01	07:04	
-10	17:14	18:12	19:16	05:20	06:22	07:26	
-20	16:54	17:49	18:52	05:39	06:44	07:50	
-30	16:30	17:23	18:24	06:00	07:10	08:18	
-35	16:17	17:07	18:07	06:13	07:25	08:34	
-40	16:01	16:49	17:48	06:28	07:42	08:54	
-45	15:43	16:27	17:25	06:45	08:04	09:17	
-50	15:20	15:59	16:55	07:07	08:31	09:46	
-52	15:09	15:46	16:41	07:17	08:44	10:01	
-54	14:56	15:31	16:24	07:29	08:59	10:18	
-56	14:42	15:12	16:04	07:43	09:17	10:38	
-58	14:26	14:50	15:38	07:59	09:38	11:03	
-60	14:06	14:22	15:04	08:18	10:06	11:38	
Sun		Moon		Sun		Moon	
Day	Eqn.of Time 00 ^h	12 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age	
3	01:56	01:51	11:58	23:47	11:17	15(99%)	
4	01:47	01:41	11:58	00:49	12:17	16(100%)	
5	01:36	01:31	11:58	00:49	13:21	17(97%)	

June 06, 07 ,08 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	254°09.0	130°58.2	22°30.0	121°52.3	19°15.9	221°34.8	11°58.7	274°45.4	-10°20.0				Alpheratz	357°36.3	29°13.0		
1	269°11.5	145°58.2	22°29.4	136°53.3	19°15.4	236°36.8	11°58.8	289°47.8	-10°20.0				Ankaa	353°08.6	-42°10.6		
2	284°13.9	160°58.1	22°28.8	151°54.3	19°15.0	251°38.7	11°59.0	304°50.3	-10°20.0				Schedar	349°32.8	56°39.6		
3	299°16.4	175°58.1	22°28.2	166°55.2	19°14.6	266°40.7	11°59.2	319°52.7	-10°19.9				Diphda	348°48.7	-17°51.5		
4	314°18.9	190°58.1	22°27.6	181°56.2	19°14.2	281°42.6	11°59.4	334°55.1	-10°19.9				Achernar	335°21.6	-57°06.9		
5	329°21.3	205°58.1	22°26.9	196°57.2	19°13.8	296°44.6	11°59.5	349°57.5	-10°19.9				Hamal	327°53.0	23°34.2		
6	344°23.8	220°58.1	22°26.3	211°58.2	19°13.4	311°46.6	11°59.7	4°59.9	-10°19.9				Polaris	315°06.8	89°21.6		
7	359°26.2	235°58.1	22°25.7	226°59.2	19°13.0	326°48.5	11°59.9	20°02.3	-10°19.9				Akamar	315°13.2	-40°12.6		
8	14°28.7	250°58.1	22°25.1	242°00.2	19°12.6	341°50.5	12°00.0	35°04.8	-10°19.9				Menkar	314°07.8	4°10.8		
9	29°31.2	265°58.1	22°24.5	257°01.1	19°12.1	356°52.4	12°00.2	50°07.2	-10°19.9				Mirfak	308°30.6	49°56.5		
10	44°33.6	280°58.1	22°23.8	272°02.1	19°11.7	11°54.4	12°00.4	65°09.6	-10°19.9				Aldebaran	290°41.5	16°33.3		
11	59°36.1	295°58.1	22°23.2	287°03.1	19°11.3	26°56.4	12°00.6	80°12.0	-10°19.9				Rigel	281°05.5	-8°10.5		
12	74°38.6	310°58.1	22°22.6	302°04.1	19°10.9	41°58.3	12°00.7	95°14.4	-10°19.9				Capella	280°24.4	46°01.3		
13	89°41.0	325°58.1	22°22.0	317°05.1	19°10.5	57°00.3	12°00.9	110°16.8	-10°19.9				Bellatrix	278°24.6	6°22.2		
14	104°43.5	340°58.1	22°21.4	332°06.0	19°10.1	72°02.2	12°01.1	125°19.3	-10°19.9				Elnath	278°03.9	28°37.6		
15	119°46.0	355°58.1	22°20.7	347°07.0	19°09.7	87°04.2	12°01.3	140°21.7	-10°19.8				Alnilam	275°39.4	-1°11.2		
16	134°48.4	10°58.2	22°20.1	2°08.0	19°09.2	102°06.2	12°01.4	155°24.1	-10°19.8				Betelgeuse	270°53.9	7°24.7		
17	149°50.9	25°58.2	22°19.5	17°09.0	19°08.8	117°08.1	12°01.6	170°26.5	-10°19.8				Canopus	263°53.5	-52°42.6		
18	164°53.4	40°58.2	22°18.9	32°10.0	19°08.4	132°10.1	12°01.8	185°28.9	-10°19.8				Sirius	258°27.6	-16°44.8		
19	179°55.8	55°58.2	22°18.2	47°11.0	19°08.0	147°12.0	12°01.9	200°31.3	-10°19.8				Adara	255°07.2	-29°00.3		
20	194°58.3	70°58.2	22°17.6	62°11.9	19°07.6	162°14.0	12°02.1	215°33.8	-10°19.8				Procyon	244°52.4	5°10.1		
21	210°00.7	85°58.2	22°17.0	77°12.9	19°07.2	177°16.0	12°02.3	230°36.2	-10°19.8				Pollux	243°19.1	27°58.3		
22	225°03.2	100°58.2	22°16.4	92°13.9	19°06.7	192°17.9	12°02.5	245°38.6	-10°19.8				Avior	234°15.7	-59°35.2		
23	240°05.7	115°58.3	22°15.7	107°14.9	19°06.3	207°19.9	12°02.6	260°41.0	-10°19.8				Suhail	222°47.5	-43°31.8		
Mer.pass.:7:02:			v-0.0 d-0.6 m-4.2			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	255°08.1	130°58.3	22°15.1	122°15.9	19°05.9	222°21.8	12°02.8	275°43.4	-10°19.8				Regulus	207°35.9	11°51.3		
1	270°10.6	145°58.3	22°14.5	137°16.9	19°05.5	237°23.8	12°03.0	290°45.9	-10°19.8				Dubhe	193°42.6	61°37.8		
2	285°13.1	160°58.3	22°13.8	152°17.8	19°05.1	252°25.8	12°03.1	305°48.3	-10°19.8				Denebola	182°26.2	14°26.6		
3	300°15.5	175°58.3	22°13.2	167°18.8	19°04.7	267°27.7	12°03.3	320°50.7	-10°19.7				Gienah	175°44.8	-17°40.4		
4	315°18.0	190°58.4	22°12.6	182°19.8	19°04.2	282°29.7	12°03.5	335°53.1	-10°19.7				Acrux	173°01.3	-63°14.0		
5	330°20.5	205°58.4	22°12.0	197°20.8	19°03.8	297°31.6	12°03.6	350°55.5	-10°19.7				Gacrux	171°52.9	-57°14.9		
6	345°22.9	220°58.4	22°11.3	212°21.8	19°03.4	312°33.6	12°03.8	5°58.0	-10°19.7				Alioth	166°13.9	55°50.2		
7	0°25.4	235°58.4	22°10.7	227°22.8	19°03.0	327°35.6	12°04.0	21°00.4	-10°19.7				Spica	158°23.5	-11°17.0		
8	15°27.9	250°58.5	22°10.1	242°23.7	19°02.6	342°37.5	12°04.2	36°02.8	-10°19.7				Alcaid	152°52.7	49°12.0		
9	30°30.3	265°58.5	22°09.4	257°24.7	19°02.1	357°39.5	12°04.3	51°05.2	-10°19.7				Hadar	148°37.4	-60°29.3		
10	45°32.8	280°58.5	22°08.8	272°25.7	19°01.7	12°41.4	12°04.5	66°07.6	-10°19.7				Menkent	147°58.9	-36°29.2		
11	60°35.2	295°58.6	22°08.1	287°26.7	19°01.3	27°43.4	12°04.7	81°10.1	-10°19.7				Arcturus	145°48.7	19°04.0		
12	75°37.7	310°58.6	22°07.5	302°27.7	19°00.9	42°45.4	12°04.8	96°12.5	-10°19.7				Rigel Kent.	139°41.6	-60°56.1		
13	90°40.2	325°58.6	22°06.9	317°28.7	19°00.5	57°47.3	12°05.0	111°14.9	-10°19.7				Zubenelg.	136°57.2	-16°08.4		
14	105°42.6	340°58.7	22°06.2	332°29.6	19°00.0	72°49.3	12°05.2	126°17.3	-10°19.7				Kochab	137°18.7	74°03.7		
15	120°45.1	355°58.7	22°05.6	347°30.6	18°59.6	87°51.3	12°05.4	141°19.7	-10°19.7				Alphecca	126°04.5	26°38.2		
16	135°47.6	10°58.8	22°05.0	2°31.6	18°59.2	102°53.2	12°05.5	156°22.2	-10°19.7				Antares	112°17.1	-26°29.1		
17	150°50.0	25°58.8	22°04.3	17°32.6	18°58.8	117°55.2	12°05.7	171°24.6	-10°19.6				Atria	107°11.9	-69°04.2		
18	165°52.5	40°58.8	22°03.7	32°33.6	18°58.4	132°57.1	12°05.9	186°27.0	-10°19.6				Sabik	102°04.0	-15°45.3		
19	180°55.0	55°58.9	22°03.0	47°34.6	18°57.9	147°59.1	12°06.0	201°29.4	-10°19.6				Shaula	96°11.8	-37°07.2		
20	195°57.4	70°58.9	22°02.4	62°35.5	18°57.5	163°01.1	12°06.2	216°31.8	-10°19.6				Rasalhague	95°59.5	12°32.6		
21	210°59.9	85°59.0	22°01.8	77°36.5	18°57.1	178°03.0	12°06.4	231°34.3	-10°19.6				Etamin	90°42.3	51°29.0		
22	226°02.3	100°59.0	22°01.1	92°37.5	18°56.7	193°05.0	12°06.5	246°36.7	-10°19.6				Kaus Aust.	83°33.9	-34°22.4		
23	241°04.8	115°59.1	22°00.5	107°38.5	18°56.3	208°07.0	12°06.7	261°39.1	-10°19.6				Vega	80°33.8	38°48.1		
Mer.pass.:6:58:			v0.0 d-0.6 m-4.3			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	256°07.3	130°59.1	21°59.8	122°39.5	18°55.8	223°08.9	12°06.9	276°41.5	-10°19.6				Enif	33°40.0	9°58.8		
1	271°09.7	145°59.2	21°59.2	137°40.5	18°55.4	238°10.9	12°07.1	291°44.0	-10°19.6				Alnair	27°34.5	-46°50.7		
2	286°12.2	160°59.2	21°58.5	152°41.4	18°55.0	253°12.8	12°07.2	306°46.4	-10°19.6				Fomalhaut	15°16.0	-29°29.8		
3	301°14.7	175°59.3	21°57.9	167°42.4	18°54.6	268°14.8	12°07.4	321°48.8	-10°19.6				Scheat	13°46.5	28°12.3		
4	316°17.1	190°59.3	21°57.2	182°43.4	18°54.1	283°16.8	12°07.6	336°51.2	-10°19.6				Markab	13°31.2	15°19.7		
5	331°19.6	205°59.4	21°56.6	197°44.4	18°53.7	298°18.7	12°07.7	351°53.7	-10°19.6								
6	346°22.1	220°59.5	21°55.9	212°45.4	18°53.3	313°20.7	12°07.9	6°56.1	-10°19.6				2023/6/6	SHA	Mer.pass		
7	1°24.5	235°59.5	21°55.3	227°46.4	18°52.9	328°22.7	12°08.1	21°58.5	-10°19.6				Venus	236°49.2	15:16		
8	16°27.0	250°59.6	21°54.6	242°47.3	18°52.4	343°24.6	12°08.2	37°00.9	-10°19.6				Mars	227°43.3	15:51		
9	31°29.5	265°59.6	21°54.0	257°48.3	18°52.0	358°26.6	12°08.4	52°03.3	-10°19.5				Jupiter	327°25.8	09:12		
10	46°31.9	280°59.7	21°53.3	272°49.3	18°51.6	13°28.6	12°08.6	67°05.8	-10°19.5				Saturn	20°36.4	05:40		
11	61°34.4	295°59.8	21°52.7	287°50.3	18°51.2	28°30.5	12°08.7	82°08.2	-10°19.5				2023/6/7	SHA	Mer.pass		
12	76°36.8	310°59.8	21°52.0	302°51.3	18°50.7	43°32.5	12°08.9	97°10.6	-10°19.5								

Sun				Moon																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat. 72 70 68 66 64 62 60 58 56 54 52 50 45 40 35 30 20 10 0 -10 -20 -30 -35 -40 -45 -50 -52 -54 -56 -58 -60 <tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th colspan="3">Twilight</th><th colspan="3">Twilight</th></tr> <tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Naut.</th><th>Civil</th><th>Sunrise</th><th>Sunset</th><th>Civil</th><th>Naut.</th></tr> <tr><td>0</td><td>180°21.4</td><td>22°36.1</td><td></td><td>332°50.7</td><td>2.3</td><td>-27°46.4</td><td>1.6</td><td>60.0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>195°21.3</td><td>22°36.4</td><td></td><td>347°12.0</td><td>2.3</td><td>-27°44.7</td><td>1.8</td><td>60.0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td>210°21.2</td><td>22°36.6</td><td></td><td>1°33.3</td><td>2.3</td><td>-27°42.9</td><td>2.0</td><td>60.0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>225°21.1</td><td>22°36.9</td><td></td><td>15°54.6</td><td>2.3</td><td>-27°40.8</td><td>2.2</td><td>60.0</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>240°21.0</td><td>22°37.2</td><td></td><td>30°15.9</td><td>2.3</td><td>-27°38.5</td><td>2.4</td><td>60.0</td><td></td><td></td><td>00:47</td><td>23:16</td><td></td><td></td></tr> <tr><td>5</td><td>255°20.9</td><td>22°37.4</td><td></td><td>44°37.3</td><td>2.4</td><td>-27°36.1</td><td>2.6</td><td>60.0</td><td></td><td></td><td>01:45</td><td>22:14</td><td></td><td></td></tr> <tr><td>6</td><td>270°20.8</td><td>22°37.7</td><td></td><td>58°58.6</td><td>2.4</td><td>-27°33.4</td><td>2.8</td><td>60.0</td><td></td><td></td><td>02:18</td><td>21:41</td><td></td><td></td></tr> <tr><td>7</td><td>285°20.7</td><td>22°38.0</td><td></td><td>73°20.0</td><td>2.4</td><td>-27°30.5</td><td>3.0</td><td>60.0</td><td></td><td>01:10</td><td>02:42</td><td>21:16</td><td>22:50</td><td></td></tr> <tr><td>8</td><td>300°20.6</td><td>22°38.2</td><td></td><td>87°41.5</td><td>2.4</td><td>-27°27.4</td><td>3.2</td><td>60.1</td><td></td><td>01:50</td><td>03:01</td><td>20:57</td><td>22:09</td><td></td></tr> <tr><td>9</td><td>315°20.4</td><td>22°38.5</td><td></td><td>102°02.9</td><td>2.5</td><td>-27°24.1</td><td>3.4</td><td>60.1</td><td></td><td>02:17</td><td>03:17</td><td>20:41</td><td>21:42</td><td></td></tr> <tr><td>10</td><td>330°20.3</td><td>22°38.7</td><td></td><td>116°24.4</td><td>2.5</td><td>-27°20.6</td><td>3.6</td><td>60.1</td><td>54</td><td>01:04</td><td>02:38</td><td>03:30</td><td>20:28</td><td>21:21</td></tr> <tr><td>11</td><td>345°20.2</td><td>22°39.0</td><td></td><td>130°46.0</td><td>2.6</td><td>-27°17.0</td><td>3.8</td><td>60.1</td><td>52</td><td>01:41</td><td>02:55</td><td>03:42</td><td>20:16</td><td>21:04</td></tr> <tr><td>12</td><td>0°20.1</td><td>22°39.3</td><td></td><td>145°07.5</td><td>2.6</td><td>-27°13.1</td><td>4.0</td><td>60.1</td><td>50</td><td>02:06</td><td>03:09</td><td>03:53</td><td>20:06</td><td>20:49</td></tr> <tr><td>13</td><td>15°20.0</td><td>22°39.5</td><td></td><td>159°29.2</td><td>2.7</td><td>-27°09.0</td><td>4.2</td><td>60.1</td><td>45</td><td>02:49</td><td>03:37</td><td>04:14</td><td>19:44</td><td>20:21</td></tr> <tr><td>14</td><td>30°19.9</td><td>22°39.8</td><td></td><td>173°50.9</td><td>2.7</td><td>-27°04.7</td><td>4.4</td><td>60.1</td><td>40</td><td>03:18</td><td>03:59</td><td>04:31</td><td>19:26</td><td>19:59</td></tr> <tr><td>15</td><td>45°19.8</td><td>22°40.0</td><td></td><td>188°12.6</td><td>2.8</td><td>-27°00.2</td><td>4.6</td><td>60.1</td><td>35</td><td>03:40</td><td>04:17</td><td>04:46</td><td>19:12</td><td>19:41</td></tr> <tr><td>16</td><td>60°19.6</td><td>22°40.3</td><td></td><td>202°34.4</td><td>2.8</td><td>-26°55.6</td><td>4.8</td><td>60.1</td><td>30</td><td>03:58</td><td>04:31</td><td>04:59</td><td>18:59</td><td>19:27</td></tr> <tr><td>17</td><td>75°19.5</td><td>22°40.5</td><td></td><td>216°56.2</td><td>2.9</td><td>-26°50.7</td><td>5.0</td><td>60.1</td><td>20</td><td>04:26</td><td>04:55</td><td>05:20</td><td>18:38</td><td>19:02</td></tr> <tr><td>18</td><td>90°19.4</td><td>22°40.8</td><td></td><td>231°18.1</td><td>2.9</td><td>-26°45.6</td><td>5.2</td><td>60.1</td><td>10</td><td>04:48</td><td>05:15</td><td>05:38</td><td>18:20</td><td>18:43</td></tr> <tr><td>19</td><td>105°19.3</td><td>22°41.0</td><td></td><td>245°40.1</td><td>3.0</td><td>-26°40.4</td><td>5.3</td><td>60.1</td><td>0</td><td>05:07</td><td>05:33</td><td>05:55</td><td>18:02</td><td>18:25</td></tr> <tr><td>20</td><td>120°19.2</td><td>22°41.3</td><td></td><td>260°02.1</td><td>3.1</td><td>-26°35.0</td><td>5.5</td><td>60.1</td><td>-10</td><td>05:23</td><td>05:49</td><td>06:12</td><td>17:46</td><td>18:08</td></tr> <tr><td>21</td><td>135°19.1</td><td>22°41.5</td><td></td><td>274°24.2</td><td>3.1</td><td>-26°29.3</td><td>5.7</td><td>60.1</td><td>-20</td><td>05:39</td><td>06:06</td><td>06:30</td><td>17:28</td><td>17:52</td></tr> <tr><td>22</td><td>150°19.0</td><td>22°41.8</td><td></td><td>288°46.4</td><td>3.2</td><td>-26°23.5</td><td>5.9</td><td>60.1</td><td>-30</td><td>05:55</td><td>06:24</td><td>06:51</td><td>17:07</td><td>17:33</td></tr> 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Civil	Sunrise	Sunset	Civil	Naut.	0	180°21.4	22°36.1		332°50.7	2.3	-27°46.4	1.6	60.0							1	195°21.3	22°36.4		347°12.0	2.3	-27°44.7	1.8	60.0							2	210°21.2	22°36.6		1°33.3	2.3	-27°42.9	2.0	60.0							3	225°21.1	22°36.9		15°54.6	2.3	-27°40.8	2.2	60.0							4	240°21.0	22°37.2		30°15.9	2.3	-27°38.5	2.4	60.0			00:47	23:16			5	255°20.9	22°37.4		44°37.3	2.4	-27°36.1	2.6	60.0			01:45	22:14			6	270°20.8	22°37.7		58°58.6	2.4	-27°33.4	2.8	60.0			02:18	21:41			7	285°20.7	22°38.0		73°20.0	2.4	-27°30.5	3.0	60.0		01:10	02:42	21:16	22:50		8	300°20.6	22°38.2		87°41.5	2.4	-27°27.4	3.2	60.1		01:50	03:01	20:57	22:09		9	315°20.4	22°38.5		102°02.9	2.5	-27°24.1	3.4	60.1		02:17	03:17	20:41	21:42		10	330°20.3	22°38.7		116°24.4	2.5	-27°20.6	3.6	60.1	54	01:04	02:38	03:30	20:28	21:21	11	345°20.2	22°39.0		130°46.0	2.6	-27°17.0	3.8	60.1	52	01:41	02:55	03:42	20:16	21:04	12	0°20.1	22°39.3		145°07.5	2.6	-27°13.1	4.0	60.1	50	02:06	03:09	03:53	20:06	20:49	13	15°20.0	22°39.5		159°29.2	2.7	-27°09.0	4.2	60.1	45	02:49	03:37	04:14	19:44	20:21	14	30°19.9	22°39.8		173°50.9	2.7	-27°04.7	4.4	60.1	40	03:18	03:59	04:31	19:26	19:59	15	45°19.8	22°40.0		188°12.6	2.8	-27°00.2	4.6	60.1	35	03:40	04:17	04:46	19:12	19:41	16	60°19.6	22°40.3		202°34.4	2.8	-26°55.6	4.8	60.1	30	03:58	04:31	04:59	18:59	19:27	17	75°19.5	22°40.5		216°56.2	2.9	-26°50.7	5.0	60.1	20	04:26	04:55	05:20	18:38	19:02	18	90°19.4	22°40.8		231°18.1	2.9	-26°45.6	5.2	60.1	10	04:48	05:15	05:38	18:20	18:43	19	105°19.3	22°41.0		245°40.1	3.0	-26°40.4	5.3	60.1	0	05:07	05:33	05:55	18:02	18:25	20	120°19.2	22°41.3		260°02.1	3.1	-26°35.0	5.5	60.1	-10	05:23	05:49	06:12	17:46	18:08	21	135°19.1	22°41.5		274°24.2	3.1	-26°29.3	5.7	60.1	-20	05:39	06:06	06:30	17:28	17:52	22	150°19.0	22°41.8		288°46.4	3.2	-26°23.5	5.9	60.1	-30	05:55	06:24	06:51	17:07	17:33	23	165°18.9	22°42.0		303°08.6	3.3	-26°17.5	6.1	60.1	-35	06:03	06:34	07:02	16:55	17:23	SD.=15.8			d=0.3	S.D.=16.4																				-40	06:12	06:46	07:16	16:41	17:12										-45	06:22	06:59	07:32	16:25	16:59										-50	06:33	07:14	07:52	16:05	16:43										-52	06:38	07:21	08:02	15:56	16:36										-54	06:43	07:29	08:12	15:45	16:28										-56	06:49	07:38	08:24	15:33	16:20										-58	06:56	07:48	08:38	15:19	16:10										-60	07:03	07:59	08:55	15:03	15:59																									Lat.	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6	270°20.8	22°37.7		58°58.6	2.4	-27°33.4	2.8	60.0				02:18	21:41																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
7	285°20.7	22°38.0		73°20.0	2.4	-27°30.5	3.0	60.0			01:10	02:42	21:16	22:50																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
8	300°20.6	22°38.2		87°41.5	2.4	-27°27.4	3.2	60.1			01:50	03:01	20:57	22:09																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
9	315°20.4	22°38.5		102°02.9	2.5	-27°24.1	3.4	60.1			02:17	03:17	20:41	21:42																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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11	345°20.2	22°39.0		130°46.0	2.6	-27°17.0	3.8	60.1		52	01:41	02:55	03:42	20:16	21:04																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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15	45°19.8	22°40.0		188°12.6	2.8	-27°00.2	4.6	60.1		35	03:40	04:17	04:46	19:12	19:41																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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June 09, 10 ,11 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	257°06.4	131°00.7	21°44.2	123°03.1	18°45.6	223°56.1	12°10.9	277°39.7	-10°19.5	Alpheratz	357°36.2	29°13.0					
1	272°08.9	146°00.8	21°43.5	138°04.1	18°45.2	238°58.0	12°11.1	292°42.8	-10°19.5	Ankaa	353°08.6	-42°10.6					
2	287°11.3	161°00.9	21°42.9	153°05.1	18°44.8	253°60.0	12°11.3	307°44.6	-10°19.5	Schedar	349°32.8	56°39.6					
3	302°13.8	176°01.0	21°42.2	168°06.0	18°44.4	269°02.0	12°11.4	322°47.0	-10°19.5	Diphda	348°48.7	-17°51.5					
4	317°16.3	191°01.1	21°41.5	183°07.0	18°43.9	284°03.9	12°11.6	337°49.4	-10°19.5	Achernar	335°21.6	-57°06.9					
5	332°18.7	206°01.2	21°40.9	198°08.0	18°43.5	299°05.9	12°11.8	352°51.9	-10°19.4	Hamal	327°53.0	23°34.2					
6	347°21.2	221°01.3	21°40.2	213°09.0	18°43.1	314°07.9	12°11.9	7°54.3	-10°19.4	Polaris	315°06.0	89°21.6					
7	2°23.7	236°01.4	21°39.5	228°10.0	18°42.6	329°09.8	12°12.1	22°56.7	-10°19.4	Akamar	315°13.1	-40°12.6					
8	17°26.1	251°01.5	21°38.9	243°11.0	18°42.2	344°11.8	12°12.3	37°59.1	-10°19.4	Menkar	314°07.8	4°10.8					
9	32°28.6	266°01.6	21°38.2	258°12.0	18°41.8	359°13.8	12°12.4	53°01.6	-10°19.4	Mirfak	308°30.6	49°56.5					
10	47°31.1	281°01.6	21°37.6	273°12.9	18°41.4	14°15.7	12°12.6	68°04.0	-10°19.4	Aldebaran	290°41.5	16°33.3					
11	62°33.5	296°01.7	21°36.9	288°13.9	18°40.9	29°17.7	12°12.8	83°06.4	-10°19.4	Rigel	281°05.5	-8°10.5					
12	77°36.0	311°01.8	21°36.2	303°14.9	18°40.5	44°19.7	12°12.9	98°08.9	-10°19.4	Capella	280°24.4	46°01.3					
13	92°38.5	326°01.9	21°35.6	318°15.9	18°40.1	59°21.6	12°13.1	113°31.8	-10°19.4	Bellatrix	278°24.6	6°22.2					
14	107°40.9	341°02.0	21°34.9	333°16.9	18°39.6	74°23.6	12°13.3	128°13.7	-10°19.4	Elnath	278°03.9	28°37.6					
15	122°43.4	356°02.1	21°34.2	348°17.9	18°39.2	89°25.6	12°13.5	143°16.1	-10°19.4	Alnilam	275°39.4	-1°11.2					
16	137°45.8	11°02.3	21°33.6	3°18.8	18°38.8	104°27.5	12°13.6	158°18.6	-10°19.4	Betelgeuse	270°53.9	7°24.7					
17	152°48.3	26°02.4	21°32.9	18°19.8	18°38.4	119°29.5	12°13.8	173°21.0	-10°19.4	Canopus	263°53.5	-52°42.5					
18	167°50.8	41°02.5	21°32.2	33°20.8	18°37.9	134°31.5	12°14.0	188°23.4	-10°19.4	Sirius	258°27.6	-16°44.7					
19	182°53.2	56°02.6	21°31.5	48°21.8	18°37.5	149°33.4	12°14.1	203°25.9	-10°19.4	Adara	255°07.2	-29°00.3					
20	197°55.7	71°02.7	21°30.9	63°22.8	18°37.1	164°35.4	12°14.3	218°28.3	-10°19.4	Procyon	244°52.4	5°10.1					
21	212°58.2	86°02.8	21°30.2	78°23.8	18°36.6	179°37.4	12°14.5	233°30.7	-10°19.4	Pollux	243°19.1	27°58.3					
22	228°00.6	101°02.9	21°29.5	93°24.8	18°36.2	194°39.3	12°14.6	248°33.2	-10°19.4	Avior	234°15.8	-59°35.2					
23	243°03.1	116°03.0	21°28.9	108°25.7	18°35.8	209°41.3	12°14.8	263°35.6	-10°19.4	Suhail	222°47.5	-43°31.8					
Mer. pass.:6:50:			v0.1 d-0.7 m-4.3			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9			Miaplacidus		
															221°39.1		
															-69°49.9		

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	258°05.6	131°03.1	21°28.2	123°26.7	18°35.3	224°43.3	12°15.0	278°38.0	-10°19.4
1	273°08.0	146°03.3	21°27.7	138°27.7	18°34.9	239°45.2	12°15.1	293°40.4	-10°19.4
2	288°10.5	161°03.4	21°26.8	153°28.7	18°34.5	254°47.2	12°15.3	308°42.9	-10°19.4
3	303°12.9	176°03.5	21°26.2	168°29.7	18°34.0	269°49.2	12°15.5	323°45.3	-10°19.4
4	318°15.4	191°03.6	21°25.5	183°30.7	18°33.6	284°51.1	12°15.6	338°47.7	-10°19.4
5	333°17.9	206°03.7	21°24.8	198°31.7	18°33.2	299°53.1	12°15.8	353°50.2	-10°19.4
6	348°20.3	221°03.9	21°24.1	213°32.6	18°32.7	314°55.1	12°16.0	8°52.6	-10°19.4
7	3°22.8	236°04.0	21°23.5	228°33.6	18°32.3	329°57.0	12°16.1	23°55.0	-10°19.4
8	18°25.3	251°04.1	21°22.8	243°34.6	18°31.9	344°59.0	12°16.3	38°57.5	-10°19.4
9	33°27.7	266°04.2	21°22.1	258°35.6	18°31.4	0°01.0	12°16.5	53°59.9	-10°19.3
10	48°30.2	281°04.4	21°21.4	273°36.6	18°31.0	15°03.0	12°16.6	69°02.3	-10°19.3
11	63°32.7	296°04.5	21°20.7	288°37.6	18°30.6	30°04.9	12°16.8	84°04.8	-10°19.3
12	78°35.1	311°04.6	21°20.1	303°38.6	18°30.1	45°06.9	12°16.9	99°07.2	-10°19.3
13	93°37.6	326°04.8	21°19.4	318°39.5	18°29.7	60°08.9	12°17.1	114°09.6	-10°19.3
14	108°40.1	341°04.9	21°18.7	333°40.5	18°29.3	75°10.8	12°17.3	129°12.1	-10°19.3
15	123°42.5	356°05.0	21°18.0	348°41.5	18°28.8	90°12.8	12°17.4	144°14.5	-10°19.3
16	138°45.0	11°05.2	21°17.3	3°42.5	18°28.4	105°14.8	12°17.6	159°16.9	-10°19.3
17	153°47.4	26°05.3	21°16.7	18°43.5	18°28.0	120°16.7	12°17.8	174°19.4	-10°19.3
18	168°49.9	41°05.5	21°16.0	33°44.5	18°27.5	135°18.7	12°17.9	189°21.8	-10°19.3
19	183°52.4	56°05.6	21°15.3	48°45.5	18°27.1	150°20.7	12°18.1	204°24.2	-10°19.3
20	198°54.8	71°05.7	21°14.6	63°46.5	18°26.7	165°22.7	12°18.3	219°26.7	-10°19.3
21	213°57.3	86°05.9	21°13.9	78°47.4	18°26.2	180°24.6	12°18.4	234°29.1	-10°19.3
22	228°59.8	101°06.0	21°13.2	93°48.4	18°25.8	195°26.6	12°18.6	249°31.5	-10°19.3
23	244°02.2	116°06.2	21°12.5	108°49.4	18°25.4	210°28.6	12°18.8	264°34.0	-10°19.3
Mer.pass.:6:46:		v0.1 d-0.7 m-4.3		v1.0 d-0.4 m1.6		v2.0 d0.2 m-2.0		v2.4 d0.0 m0.9	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	259°04.7	131°06.3	21°11.9	123°50.4	18°24.9	225°30.5	12°18.9	279°36.4	-10°19.3
1	274°07.2	146°06.5	21°11.2	138°51.4	18°24.5	240°32.5	12°19.1	294°38.8	-10°19.3
2	289°09.6	161°06.6	21°10.5	153°52.4	18°24.0	255°34.5	12°19.2	309°41.3	-10°19.3
3	304°12.1	176°06.8	21°09.8	168°53.4	18°23.6	270°36.5	12°19.4	324°43.7	-10°19.3
4	319°14.6	191°06.9	21°09.1	183°54.3	18°23.2	285°38.4	12°19.6	339°46.1	-10°19.3
5	334°17.0	206°07.1	21°08.4	198°55.3	18°22.7	300°40.4	12°19.8	354°48.6	-10°19.3
6	349°19.5	221°07.3	21°07.7	213°56.3	18°22.3	315°42.4	12°19.9	9°51.0	-10°19.3
7	4°21.9	236°07.4	21°07.0	228°57.3	18°21.9	330°44.3	12°20.1	24°53.4	-10°19.3
8	19°24.1	251°07.6	21°06.3	243°58.3	18°21.4	345°46.3	12°20.3	39°55.9	-10°19.3
9	34°26.9	266°07.7	21°05.6	258°59.3	18°21.0	0°48.3	12°20.4	54°58.3	-10°19.3
10	49°29.3	281°07.9	21°05.0	274°00.3	18°20.5	15°50.3	12°20.6	70°00.7	-10°19.3
11	64°31.8	296°08.1	21°04.3	289°01.3	18°20.1	30°52.2	12°20.7	85°03.2	-10°19.3
12	79°34.3	311°08.2	21°03.6	304°02.2	18°19.7	45°54.2	12°20.9	100°05.6	-10°19.3
13	94°36.7	326°08.4	21°02.9	319°03.2	18°19.2	60°56.2	12°21.1	115°08.1	-10°19.3
14	109°39.2	341°08.6	21°02.2	334°04.2	18°18.8	75°58.1	12°21.2	130°10.5	-10°19.3
15	124°41.7	356°08.7	21°01.5	349°05.2	18°18.3	91°00.1	12°21.4	145°12.9	-10°19.3
16	139°44.1	11°08.9	21°00.8	4°06.2	18°17.9	106°02.1	12°21.6	160°15.4	-10°19.3
17	154°46.6	26°09.1	21°00.1	19°07.2	18°17.5	121°04.1	12°21.7	175°17.8	-10°19.3
18	169°49.0	41°09.3	20°59.4	34°08.2	18°17.0	136°06.0	12°21.9	190°20.2	-10°19.3
19	184°51.5	56°09.4	20°58.7	49°09.1	18°16.6	151°08.0	12°22.1	205°22.7	-10°19.3
20	199°54.0	71°09.6	20°58.0	64°10.1	18°16.1	166°10.0	12°22.2	220°25.1	-10°19.3
21	214°56.4	86°09.8	20°57.3	79°11.1	18°15.7	181°12.0	12°22.4	235°27.5	-10°19.3
22	229°58.9	101°10.0	20°56.6	94°12.1	18°15.3	196°13.9	12°22.6	250°30.0	-10°19.3
23	245°01.4	116°10.2	20°55.9	109°13.1	18°14.8	211°15.9	12°22.7	265°32.4	-10°19.3
Mer.pass.:6:42:		v0.2 d-0.7 m-4.3		v1.0 d-0.4 m1.6		v2.0 d0.2 m-2.0		v2.4 d0.0 m0.9	

	SHA	Dec
Alpheratz	357° 36.2	29° 13.0
Ankaa	353° 08.6	-42° 10.6
Schedar	349° 32.8	56° 39.6
Diphda	348° 48.7	-17° 51.5
Achernar	335° 21.6	-57° 06.9
Hamal	327° 53.0	23° 34.2
Polaris	315° 06.0	89° 21.6
Akamar	315° 13.1	-40° 12.6
Menkar	314° 07.8	4° 10.8
Mirfak	308° 30.6	49° 56.8
Aldebaran	290° 41.5	16° 33.3
Rigel	281° 05.5	-8° 10.5
Capella	280° 24.4	46° 01.3
Bellatrix	278° 24.6	6° 22.2
Elnath	278° 03.9	28° 37.6
Alnilam	275° 39.4	-1° 11.2
Betelgeuse	270° 53.9	7° 24.7
Canopus	263° 53.5	-52° 42.5
Sirius	258° 27.6	-16° 44.7
Adara	255° 07.2	-29° 00.3
Procyon	244° 52.4	5° 10.1
Pollux	243° 19.1	27° 58.3
Avior	234° 15.8	-59° 35.2
Suhail	222° 47.5	-43° 31.8
Miaplacidus	221° 39.1	-69° 49.0
Alphard	217° 49.2	-8° 45.6
Regulus	207° 35.9	11° 51.3
Dubhe	193° 42.6	61° 37.8
Deneb	182° 26.2	14° 26.6
Genah	175° 44.8	-17° 40.4
Acrux	173° 01.4	-63° 14.0
Gacrux	171° 52.9	-57° 14.9
Alioth	166° 13.9	55° 50.2
Spica	158° 23.5	-11° 17.0
Alcaid	152° 52.7	49° 12.0
Hadar	148° 37.4	-60° 29.3
Menkent	147° 58.9	-36° 29.2
Arcturus	145° 48.7	19° 04.0
Rigel Kent.	139° 41.6	-60° 56.1
Zubenelg.	136° 57.2	-16° 08.4
Kochab	137° 18.7	74° 03.7
Alphecca	126° 04.5	26° 38.2
Antares	112° 17.1	-26° 29.1
Atria	107° 11.9	-69° 04.2
Sabik	102° 03.9	-15° 45.3
Shaula	96° 11.7	-37° 07.2
Rasalhague	95° 59.4	12° 32.6
Etamin	90° 42.2	51° 29.0
Kaus Aust.	83° 33.9	-34° 22.4
Vega	80° 33.7	38° 48.1
Nunki	75° 49.1	-26° 16.0
Altair	62° 01.0	8° 55.7
Peacock	53° 07.4	-56° 39.4
Deneb	49° 26.4	45° 21.6
Enif	33° 40.0	9° 58.8
Alnair	27° 34.4	-46° 50.7
Fomalhaut	15° 16.0	-29° 29.8
Scheat	13° 46.5	28° 12.3
Markab	13° 31.2	15° 19.7

2023/6/9	SHA	Mer.pass
Venus	233° 54.3	15:16
Mars	225° 56.7	15:47
Jupiter	326° 49.6	09:03
Saturn	20° 33.3	05:28

2023/6/1	SHA	Mer.pass
Venus	232° 57.6	15:16
Mars	225° 21.2	15:45
Jupiter	326° 37.7	08:60
Saturn	20° 32.5	05:25

2023/6/1	SHA	Mer.pass
Venus	232°01.6	15:15
Mars	224°45.7	15:44
Jupiter	326°25.8	08:57
Saturn	20°31.7	05:21

Horizontal parallax	
Venus:	0.2
Mars:	0.1

Sun							Moon							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
								Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
0	180°13.1	22°53.5	289°15.4	8.3	-18°06.0	13.2	59.7	72	—:—	—:—	—:—	—:—	—:—	
1	195°13.0	22°53.7	303°42.7	8.4	-17°52.8	13.3	59.7	70	—:—	—:—	—:—	—:—	—:—	
2	210°12.8	22°53.9	318°10.1	8.5	-17°39.4	13.4	59.7	68	—:—	—:—	—:—	—:—	—:—	
3	225°12.7	22°54.1	332°37.7	8.6	-17°25.9	13.5	59.7	66	—:—	—:—	00:30	23:35	—:—	
4	240°12.6	22°54.3	347°05.3	8.7	-17°12.3	13.6	59.7	64	—:—	—:—	01:40	22:20	—:—	
5	255°12.5	22°54.5	1°33.0	8.8	-16°58.7	13.7	59.6	62	—:—	—:—	02:15	21:45	—:—	
6	270°12.4	22°54.7	16°00.8	8.9	-16°44.9	13.8	59.6	60	—:—	01:03	02:39	21:20	22:58	
7	285°12.2	22°54.9	30°28.8	9.0	-16°31.1	13.9	59.6	58	—:—	01:46	02:59	21:01	22:14	
8	300°12.1	22°55.2	44°56.8	9.1	-16°17.1	14.0	59.6	56	—:—	02:14	03:15	20:44	21:45	
9	315°12.0	22°55.4	59°25.0	9.2	-16°03.1	14.1	59.6	54	00:58	02:35	03:29	20:30	21:24	
10	330°11.9	22°55.6	73°53.2	9.3	-15°49.0	14.1	59.6	52	01:38	02:53	03:41	20:18	21:07	
11	345°11.8	22°55.8	88°21.5	9.4	-15°34.9	14.2	59.6	50	02:04	03:07	03:51	20:08	20:52	
12	0°11.6	22°56.0	102°50.0	9.5	-15°20.6	14.3	59.5	45	02:47	03:36	04:13	19:46	20:23	
13	15°11.5	22°56.2	117°18.5	9.6	-15°06.3	14.4	59.5	40	03:17	03:58	04:31	19:28	20:01	
14	30°11.4	22°56.4	131°47.1	9.7	-14°51.9	14.4	59.5	35	03:40	04:16	04:46	19:13	19:43	
15	45°11.3	22°56.6	146°15.9	9.8	-14°37.4	14.5	59.5	30	03:58	04:31	04:58	19:01	19:28	
16	60°11.1	22°56.8	160°44.7	9.9	-14°22.8	14.6	59.5	20	04:26	04:55	05:20	18:39	19:03	
17	75°11.0	22°57.0	175°13.6	10.0	-14°08.2	14.7	59.5	10	04:49	05:16	05:39	18:20	18:43	
18	90°10.9	22°57.2	189°42.6	10.1	-13°53.5	14.7	59.4	0	05:07	05:33	05:56	18:03	18:26	
19	105°10.8	22°57.4	204°11.7	10.1	-13°38.7	14.8	59.4	-10	05:24	05:50	06:13	17:46	18:09	
20	120°10.6	22°57.6	218°40.9	10.2	-13°23.9	14.9	59.4	-20	05:40	06:07	06:31	17:28	17:52	
21	135°10.5	22°57.8	233°10.2	10.3	-13°09.0	14.9	59.4	-30	05:56	06:26	06:52	17:07	17:33	
22	150°10.4	22°58.0	247°39.5	10.4	-12°54.1	15.0	59.4	-35	06:04	06:36	07:04	16:55	17:23	
23	165°10.3	22°58.2	262°09.0	10.5	-12°39.1	15.0	59.4	-40	06:13	06:47	07:18	16:41	17:11	
SD.=15.8 d=0.2 S.D.=16.3							-45	06:23	07:01	07:34	16:24	16:58	17:35	
							-50	06:35	07:16	07:55	16:04	16:42	17:24	
							-52	06:40	07:24	08:04	15:55	16:35	17:19	
							-54	06:46	07:31	08:15	15:44	16:27	17:13	
							-56	06:51	07:40	08:27	15:31	16:18	17:07	
							-58	06:58	07:50	08:41	15:17	16:08	17:01	
							-60	07:05	08:02	08:58	15:00	15:57	16:53	
							Lat.	Moonrise			Moonset			
								Fri	Sat	Sun	Fri	Sat	Sun	
0	180°10.2	22°58.4	276°38.5	10.6	-12°24.0	15.1	59.3	72	03:50	02:21	01:38	06:23	09:40	
1	195°10.0	22°58.6	291°08.2	10.7	-12°08.9	15.2	59.3	70	02:52	02:01	01:30	07:19	09:57	
2	210°09.9	22°58.8	305°37.9	10.7	-11°53.7	15.2	59.3	68	02:18	01:45	01:23	07:52	10:11	
3	225°09.8	22°59.0	320°07.7	10.8	-11°38.5	15.3	59.3	66	01:52	01:32	01:17	08:15	10:22	
4	240°09.7	22°59.2	334°37.5	10.9	-11°23.2	15.3	59.3	64	01:32	01:22	01:13	08:34	10:31	
5	255°09.5	22°59.4	349°07.5	11.0	-11°07.8	15.4	59.2	62	01:16	01:12	01:09	08:49	10:39	
6	270°09.4	22°59.6	3°37.5	11.1	-10°52.5	15.4	59.2	60	01:03	01:04	01:05	09:01	10:45	
7	285°09.3	22°59.8	18°07.6	11.1	-10°37.0	15.5	59.2	58	00:51	00:57	01:02	09:12	10:51	
8	300°09.2	22°60.0	32°37.8	11.2	-10°21.5	15.5	59.2	56	00:41	00:51	00:59	09:21	10:56	
9	315°09.0	23°00.2	47°08.0	11.3	-10°06.0	15.5	59.2	54	00:32	00:45	00:56	09:30	11:01	
10	330°08.9	23°00.4	61°38.4	11.4	-9°50.5	15.6	59.1	52	00:23	00:40	00:54	09:37	11:05	
11	345°08.8	23°00.6	76°08.8	11.4	-9°34.9	15.6	59.1	50	00:16	00:36	00:52	09:44	11:09	
12	0°08.7	23°00.8	90°39.2	11.5	-9°19.2	15.7	59.1	45	00:00	00:26	00:47	09:58	11:17	
13	15°08.5	23°01.0	105°09.8	11.6	-9°03.6	15.7	59.1	40	—:—	00:17	00:43	10:09	11:23	
14	30°08.4	23°01.1	119°40.4	11.6	-8°47.9	15.7	59.1	35	—:—	00:10	00:39	10:19	11:29	
15	45°08.3	23°01.3	134°11.1	11.7	-8°32.1	15.8	59.1	30	—:—	00:03	00:36	10:27	11:34	
16	60°08.2	23°01.5	148°41.8	11.8	-8°16.3	15.8	59.0	20	23:52	—:—	00:31	10:42	11:42	
17	75°08.0	23°01.7	163°12.6	11.8	-8°00.5	15.8	59.0	10	23:42	—:—	00:26	10:54	11:50	
18	90°07.9	23°01.9	177°43.5	11.9	-7°44.7	15.8	59.0	0	23:33	—:—	00:22	11:06	11:57	
19	105°07.8	23°02.1	192°14.4	12.0	-7°28.8	15.9	59.0	-10	23:24	—:—	00:18	11:18	12:04	
20	120°07.7	23°02.3	206°45.4	12.0	-7°12.9	15.9	59.0	-20	23:14	—:—	00:13	11:30	12:11	
21	135°07.5	23°02.5	221°16.4	12.1	-6°57.0	15.9	58.9	-30	23:02	—:—	00:07	11:44	12:19	
22	150°07.4	23°02.6	235°47.5	12.1	-6°41.1	15.9	58.9	-35	22:56	—:—	00:04	11:52	12:24	
23	165°07.3	23°02.8	250°18.7	12.2	-6°25.1	16.0	58.9	-40	22:48	—:—	00:01	12:01	12:29	
SD.=15.8 d=0.2 S.D.=16.2							-45	22:39	23:57	—:—	12:12	12:35	12:55	
							-50	22:29	23:52	—:—	12:24	12:42	12:57	
							-52	22:24	23:49	—:—	12:30	12:45	12:58	
							-54	22:18	23:47	—:—	12:37	12:49	12:59	
							-56	22:12	23:44	—:—	12:44	12:53	13:00	
							-58	22:05	23:41	—:—	12:52	12:57	13:01	
							-60	21:57	23:37	—:—	13:01	13:02	13:03	
							Day	Sun			Moon			
								Eqn.of Time	Mer.		Mer.Pass.	Age		
								00 ^h	12 ^h	Pass	Upper	Lower		
0	180°07.2	23°03.0	264°49.9	12.2	-6°09.1	16.0	58.9	9	00:52	00:47	11:59	04:53	17:19	
1	195°07.0	23°03.2	279°21.2	12.3	-5°53.1	16.0	58.8	10	00:41	00:35	11:59	05:45	18:09	
2	210°06.9	23°03.4	293°52.5	12.3	-5°37.1	16.0	58.8	11	00:29	00:23	11:59	06:33	18:56	
3	225°06.8	23°03.5	308°23.9	12.4	-5°21.1	16.0	58.8							
4	240°06.7	23°03.7	322°55.3	12.4	-5°05.0	16.1	58.8							
5	255°06.5	23°03.9	337°26.8	12.5	-4°49.0	16.1	58.8							
6	270°06.4	23°04.1	351°58.3	12.5	-4°32.9	16.1	58.7							
7	285°06.3	23°04.3	6°29.8	12.6	-4°16.8	16.1	58.7							
8	300°06.2	23°04.4	21°01.4	12.6	-4°00.7	16.1	58.7							
9	315°06.0	23°04.6	35°33.1	12.7	-3°44.6	16.1	58.7							
10	330°05.9	23°04.8	50°04.7	12.7	-3°28.5	16.1	58.7							
11	345°05.8	23°05.0	64°36.5	12.7	-3°12.4	16.1	58.6							
12	0°05.6	23°05.1	79°08.2	12.8	-2°56.3	16.1	58.6							
13	15°05.5	23°05.3	93°40.0	12.8	-2°40.2	16.1	58.6							
14	30°05.4	23°05.5	108°11.8	12.8	-2°24.0	16.1	58.6							
15	45°05.3	23°05.7	122°43.7	12.9	-2°07.9	16.1	58.6							
16	60°05.1	23°05.8	137°15.6	12.9	-1°51.8	16.1	58.5							
17	75°05.0	23°06.0	151°47.5	12.9	-1°35.7	16.1	58.5							
18	90°04.9	23°06.2	166°19.5	13.0	-1°19.6	16.1	58.5							
19	105°04.7	23°06.3	180°51.5	13.0	-1°03.5	16.1	58.5							
20	120°04.6	23°06.5	195°23.5	13.0	-0°47.4	16.1	58.4							
21	135°04.5	23°06.7	209°55.5	13.0	-0°31.3	16.1	58.4							
22	150°04.4	23°06.8	224°27.6	13.1	-0°15.2	16.1	58.4							

June 12, 13 ,14 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec	
0	260°03.8	131°10.3	20°55.2	124°14.1	18°14.4	226°17.9	12°22.9	280°34.9	-10°19.3						Alpheratz	357°36.2	29°13.0
1	275°06.3	146°10.5	20°54.5	139°15.1	18°13.9	241°19.8	12°23.0	295°37.3	-10°19.3						Ankaa	353°08.6	-42°10.6
2	290°08.8	161°10.7	20°53.8	154°16.1	18°13.5	256°21.8	12°23.2	310°39.7	-10°19.3						Schedar	349°32.8	56°39.6
3	305°11.2	176°10.9	20°53.1	169°17.0	18°13.1	271°23.8	12°23.4	325°42.2	-10°19.3						Diphda	348°48.6	-17°51.5
4	320°13.7	191°11.1	20°52.4	184°18.0	18°12.6	286°25.8	12°23.5	340°44.6	-10°19.3						Achernar	335°21.5	-57°06.9
5	335°16.2	206°11.3	20°51.7	199°19.0	18°12.2	301°27.7	12°23.7	355°47.1	-10°19.3						Hamal	327°53.0	23°34.2
6	350°18.6	221°11.5	20°51.0	214°20.0	18°11.7	316°29.7	12°23.9	10°49.5	-10°19.3						Polaris	315°05.1	89°21.5
7	5°21.1	236°11.7	20°50.3	229°21.0	18°11.3	331°31.7	12°24.0	25°51.9	-10°19.3						Akamar	315°13.1	-40°12.5
8	20°23.5	251°11.9	20°49.6	244°22.0	18°10.8	346°33.7	12°24.2	40°54.4	-10°19.3						Menkar	314°07.8	4°10.8
9	35°26.0	266°12.1	20°48.9	259°23.0	18°10.4	1°35.6	12°24.4	55°56.8	-10°19.3						Mirfak	308°30.6	49°56.5
10	50°28.5	281°12.3	20°48.2	274°24.0	18°10.0	16°37.6	12°24.5	70°59.3	-10°19.3						Aldebaran	290°41.5	16°33.3
11	65°30.9	296°12.5	20°47.5	289°24.9	18°09.5	31°39.6	12°24.7	86°01.7	-10°19.3						Rigel	281°05.5	-8°10.5
12	80°33.4	311°12.7	20°46.8	304°25.9	18°09.1	46°41.6	12°24.8	101°04.1	-10°19.3						Capella	280°24.4	46°01.3
13	95°35.9	326°12.9	20°46.1	319°26.9	18°08.6	61°43.5	12°25.0	116°06.6	-10°19.3						Bellatrix	278°24.6	6°22.2
14	110°38.3	341°13.1	20°45.4	334°27.9	18°08.2	76°45.5	12°25.2	131°09.0	-10°19.3						Elnath	278°03.9	28°37.6
15	125°40.8	356°13.3	20°44.6	349°28.9	18°07.7	91°47.5	12°25.3	146°11.5	-10°19.3						Alnilam	275°39.4	-1°11.2
16	140°43.3	11°13.5	20°43.9	4°29.9	18°07.3	106°49.5	12°25.5	161°13.9	-10°19.3						Betelgeuse	270°53.9	7°24.7
17	155°45.7	26°13.7	20°43.2	19°30.9	18°06.9	121°51.4	12°25.7	176°16.3	-10°19.3						Canopus	263°53.5	-52°42.5
18	170°48.2	41°13.9	20°42.5	34°31.9	18°06.4	136°53.4	12°25.8	191°18.8	-10°19.3						Sirius	258°27.6	-16°44.7
19	185°50.7	56°14.1	20°41.8	49°32.9	18°06.0	151°55.4	12°26.0	206°21.2	-10°19.3						Adara	255°07.3	-29°00.3
20	200°53.1	71°14.3	20°41.1	64°33.8	18°05.5	166°57.4	12°26.1	221°23.7	-10°19.3						Procyon	244°52.4	5°10.1
21	215°55.6	86°14.5	20°40.4	79°34.8	18°05.1	181°59.3	12°26.3	236°26.1	-10°19.3						Pollux	243°19.1	27°58.3
22	230°58.0	101°14.7	20°39.7	94°35.8	18°04.6	197°01.3	12°26.5	251°28.5	-10°19.3						Avior	234°15.8	-59°35.2
23	246°00.5	116°15.0	20°39.0	109°36.8	18°04.2	212°03.3	12°26.6	266°31.0	-10°19.3						Suhail	222°47.5	-43°31.8
Mer.pass.:6:38:			v0.2 d-0.7 m-4.3			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d0.0 m0.9					
Tue	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	261°03.0	131°15.2	20°38.3	124°37.8	18°03.7	227°05.3	12°26.8	281°33.4	-10°19.3						Miaplacidus	221°39.1	-69°49.0
1	276°05.4	146°15.4	20°37.5	139°38.8	18°03.3	242°07.3	12°27.0	296°35.9	-10°19.3						Alphard	217°49.2	-8°45.6
2	291°07.9	161°15.6	20°36.8	154°39.8	18°02.8	257°09.2	12°27.1	311°38.3	-10°19.3						Regulus	207°35.9	11°51.3
3	306°10.4	176°15.8	20°36.1	169°40.8	18°02.4	272°11.2	12°27.3	326°40.8	-10°19.3						Dubhe	193°42.7	61°37.8
4	321°12.8	191°16.1	20°35.4	184°41.7	18°01.9	287°13.2	12°27.4	341°43.2	-10°19.3						Denebola	182°26.2	14°26.6
5	336°15.3	206°16.3	20°34.7	199°42.7	18°01.5	302°15.2	12°27.6	356°45.6	-10°19.3						Gienah	175°44.8	-17°40.4
6	351°17.8	221°16.5	20°34.0	214°43.7	18°01.1	317°17.1	12°27.8	11°48.1	-10°19.3						Acrux	173°01.4	-63°14.0
7	6°20.2	236°16.7	20°33.3	229°44.7	18°00.6	332°19.1	12°27.9	26°50.5	-10°19.3						Gacrux	171°53.0	-57°14.9
8	21°22.7	251°17.0	20°32.5	244°45.7	18°00.2	347°21.1	12°28.1	41°53.0	-10°19.3						Alioth	166°13.9	55°50.2
9	36°25.1	266°17.2	20°31.8	259°46.7	17°59.7	2°23.1	12°28.2	56°55.4	-10°19.3						Spica	158°23.5	-11°17.0
10	51°27.6	281°17.4	20°31.1	274°47.7	17°59.3	17°25.1	12°28.4	71°57.9	-10°19.3						Alcaid	152°52.7	49°12.0
11	66°30.1	296°17.7	20°30.4	289°48.7	17°58.8	32°27.0	12°28.6	87°00.3	-10°19.3						Hadar	148°37.4	-60°29.3
12	81°32.5	311°17.9	20°29.7	304°49.7	17°58.4	47°29.0	12°28.7	102°02.7	-10°19.3						Menkent	147°58.9	-36°29.2
13	96°35.0	326°18.2	20°28.9	319°50.6	17°57.9	62°31.0	12°28.9	117°05.2	-10°19.3						Arcturus	145°48.7	19°04.0
14	111°37.5	341°18.4	20°28.2	334°51.6	17°57.5	77°33.0	12°29.1	132°07.6	-10°19.3						Rigel Kent.	139°41.6	-60°56.1
15	126°39.9	356°18.6	20°27.5	349°52.6	17°57.0	92°34.9	12°29.2	147°10.1	-10°19.3						Zubenelg.	136°57.2	-16°08.4
16	141°42.4	11°18.9	20°26.8	4°53.6	17°56.6	107°36.9	12°29.4	162°12.5	-10°19.3						Kochab	137°18.8	74°03.7
17	156°44.9	26°19.1	20°26.1	19°54.6	17°56.1	122°38.9	12°29.5	177°15.0	-10°19.3						Alphecca	126°04.5	26°38.2
18	171°47.3	41°19.4	20°25.3	34°55.6	17°55.7	137°40.9	12°29.7	192°17.4	-10°19.3						Antares	112°17.1	-26°29.1
19	186°49.8	56°19.6	20°24.6	49°56.6	17°55.2	152°42.9	12°29.9	207°19.9	-10°19.3						Atria	107°11.9	-69°04.2
20	201°52.3	71°19.9	20°23.9	64°57.6	17°54.8	167°44.8	12°30.0	222°22.3	-10°19.4						Sabik	102°03.9	-15°45.3
21	216°54.7	86°20.1	20°23.2	79°58.6	17°54.3	182°46.8	12°30.2	237°24.8	-10°19.4						Shaula	96°11.7	-37°07.2
22	231°57.2	101°20.4	20°22.5	94°59.5	17°53.9	197°48.8	12°30.3	252°27.2	-10°19.4						Rasalhague	95°59.4	12°32.6
23	246°59.6	116°20.6	20°21.7	110°00.5	17°53.4	212°50.8	12°30.5	267°29.6	-10°19.4						Etamin	90°42.2	51°29.0
Mer.pass.:6:34:			v0.2 d-0.7 m-4.3			v1.0 d-0.4 m1.6			v2.0 d0.2 m-2.0			v2.4 d-0.0 m0.9					
Wed	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	262°02.1	131°20.9	20°21.0	125°01.5	17°53.0	227°52.8	12°30.7	282°32.1	-10°19.4						2023/6/1	SHA	Mer.pass
1	277°04.6	146°21.1	20°20.3	140°02.5	17°52.5	242°54.7	12°30.8	297°34.5	-10°19.4						Venus	231°06.5	15:15
2	292°07.0	161°21.4	20°19.6	155°03.5	17°52.1	257°56.7	12°31.0	312°37.0	-10°19.4						Mars	224°10.3	15:42
3	307°09.5	176°21.6	20°18.8	170°04.5	17°51.6	272°58.7	12°31.1	327°39.4	-10°19.4						Jupiter	326°14.0	08:54
4	322°12.0	191°21.9	20°18.1	185°05.5	17°51.2	288°00.7	12°31.3	342°41.9	-10°19.4						Saturn	20°31.0	05:17
5	337°14.4	206°22.2	20°17.4	200°06.5	17°50.7	303°02.6	12°31.5	357°44.3	-10°19.4						2023/6/1	SHA	Mer.pass
6	352°16.9	221°22.4	20°16.7	215°07.5	17°50.3	318°04.6	12°31.6	12°46.8	-10°19.4						Venus	230°12.2	15:15
7	7°19.4	236°22.7	20°15.9	230°08.4	17°49.8	333°06.6	12°31.8	27°49.2	-10°19.4						Mars	223°34.8	15:40
8	22°21.8	251°22.9	20°15.2	245°09.4	17°49.4	348°08.6	12°31.9	42°51.7	-10°19.4					</			

Sun				Moon												
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight				Twilight			
0	180°04.1	23°07.2	253°31.8	13.1	0°17.0	16.1	58.4	72	—:—	—:—	—:—	—:—	—:—	—:—	—:—	
1	195°04.0	23°07.3	268°03.9	13.1	0°33.0	16.0	58.3	70	—:—	—:—	—:—	—:—	—:—	—:—	—:—	
2	210°03.9	23°07.5	282°36.0	13.2	0°49.1	16.0	58.3	68	—:—	—:—	—:—	—:—	—:—	—:—	—:—	
3	225°03.7	23°07.7	297°08.2	13.2	1°05.1	16.0	58.3	66	—:—	—:—	—:—	—:—	—:—	—:—	—:—	
4	240°03.6	23°07.8	311°40.4	13.2	1°21.1	16.0	58.3	64	—:—	—:—	—:—	—:—	—:—	—:—	—:—	
5	255°03.5	23°08.0	326°12.6	13.2	1°37.1	16.0	58.2	62	—:—	—:—	01:36	22:26	—:—	—:—	—:—	
6	270°03.3	23°08.2	340°44.8	13.2	1°53.0	16.0	58.2	60	—:—	—:—	02:12	21:49	—:—	—:—	—:—	
7	285°03.2	23°08.3	355°17.0	13.2	2°09.0	15.9	58.2	58	—:—	00:57	02:37	21:23	23:05	—:—	—:—	
8	300°03.1	23°08.5	9°49.2	13.2	2°24.9	15.9	58.2	56	—:—	01:43	02:57	21:03	22:18	—:—	—:—	
9	315°03.0	23°08.6	24°21.4	13.2	2°40.8	15.9	58.2	54	—:—	02:12	03:14	20:47	21:49	—:—	—:—	
10	330°02.8	23°08.8	38°53.7	13.2	2°56.7	15.9	58.1	52	00:52	02:34	03:28	20:33	21:27	23:10	—:—	
11	345°02.7	23°08.9	53°25.9	13.3	3°12.5	15.8	58.1	50	01:35	02:51	03:40	20:20	21:09	22:26	—:—	
12	0°02.6	23°09.1	67°58.2	13.3	3°28.4	15.8	58.1	45	02:02	03:06	03:51	20:10	20:54	21:59	—:—	
13	15°02.4	23°09.3	82°30.5	13.3	3°44.2	15.8	58.1	40	02:46	03:36	04:13	19:47	20:25	21:14	—:—	
14	30°02.3	23°09.4	97°02.7	13.3	3°60.0	15.8	58.1	35	03:16	03:58	04:31	19:30	20:02	20:44	—:—	
15	45°02.2	23°09.6	111°35.0	13.3	4°15.7	15.7	58.0	30	03:39	04:16	04:46	19:15	19:44	20:21	—:—	
16	60°02.0	23°09.7	126°07.3	13.3	4°31.4	15.7	58.0	20	03:58	04:31	04:58	19:02	19:29	20:02	—:—	
17	75°01.9	23°09.9	140°39.5	13.3	4°47.1	15.7	58.0	10	04:27	04:56	05:20	18:40	19:04	19:34	—:—	
18	90°01.8	23°10.0	155°11.8	13.3	5°02.7	15.6	58.0	0	04:49	05:16	05:39	18:21	18:44	19:11	—:—	
19	105°01.7	23°10.2	169°44.1	13.3	5°18.4	15.6	57.9	-10	05:08	05:34	05:56	18:04	18:26	18:52	—:—	
20	120°01.5	23°10.3	184°16.3	13.3	5°33.9	15.6	57.9	-20	05:25	05:51	06:14	17:46	18:09	18:36	—:—	
21	135°01.4	23°10.5	198°48.6	13.3	5°49.5	15.5	57.9	-30	05:41	06:08	06:32	17:28	17:52	18:19	—:—	
22	150°01.3	23°10.6	213°20.8	13.2	6°05.0	15.5	57.9	-35	05:57	06:27	06:53	17:07	17:33	18:03	—:—	
23	165°01.1	23°10.8	227°53.1	13.2	6°20.4	15.4	57.9	-40	06:05	06:37	07:05	16:55	17:23	17:55	—:—	
	SD.=15.8	d=0.2	S.D.=15.9					-45	06:15	06:49	07:19	16:41	17:11	17:45	—:—	
								-45	06:25	07:02	07:36	16:24	16:58	17:35	—:—	
								-50	06:37	07:18	07:56	16:04	16:42	17:23	—:—	
								-52	06:42	07:25	08:06	15:54	16:35	17:18	—:—	
								-54	06:47	07:33	08:17	15:43	16:26	17:13	—:—	
								-56	06:53	07:42	08:30	15:30	16:18	17:07	—:—	
								-58	07:00	07:53	08:44	15:16	16:07	16:60	—:—	
								-60	07:07	08:04	09:01	14:59	15:56	16:52	—:—	
									Moonrise			Moonset				
								Lat.	Mon	Tue	Wed	Mon	Tue	Wed		
								72	01:03	00:28	22:23	14:22	16:43	19:46		
								70	01:03	00:37	00:06	14:16	16:24	18:51		
								68	01:04	00:45	00:23	14:11	16:10	18:18		
								66	01:04	00:51	00:37	14:07	15:58	17:55		
								64	01:04	00:56	00:48	14:04	15:48	17:36		
								62	01:05	01:01	00:57	14:01	15:40	17:21		
								60	01:05	01:05	01:06	13:58	15:33	17:09		
								58	01:05	01:09	01:13	13:56	15:27	16:58		
								56	01:05	01:12	01:20	13:54	15:21	16:49		
								54	01:06	01:15	01:26	13:53	15:16	16:41		
								52	01:06	01:18	01:31	13:51	15:12	16:33		
								50	01:06	01:20	01:36	13:50	15:08	16:27		
								45	01:06	01:26	01:46	13:46	14:60	16:13		
								40	01:07	01:30	01:55	13:44	14:52	16:01		
								35	01:07	01:34	02:02	13:42	14:46	15:51		
								30	01:07	01:38	02:09	13:40	14:41	15:43		
								20	01:08	01:44	02:21	13:36	14:32	15:28		
								10	01:08	01:49	02:31	13:33	14:24	15:15		
								0	01:09	01:54	02:41	13:30	14:16	15:03		
								-10	01:09	01:60	02:50	13:28	14:09	14:51		
								-20	01:09	02:05	03:01	13:25	14:01	14:39		
								-30	01:10	02:12	03:13	13:21	13:52	14:24		
								-35	01:10	02:15	03:20	13:19	13:47	14:16		
								-40	01:11	02:20	03:28	13:17	13:41	14:07		
								-45	01:11	02:25	03:38	13:14	13:34	13:56		
								-50	01:12	02:31	03:49	13:11	13:26	13:43		
								-52	01:12	02:33	03:55	13:10	13:22	13:36		
								-54	01:12	02:36	04:00	13:08	13:18	13:30		
								-56	01:13	02:40	04:07	13:07	13:14	13:22		
								-58	01:13	02:44	04:15	13:05	13:09	13:14		
								-60	01:13	02:48	04:23	13:03	13:03	13:04		
									Sun			Moon				
								Day	Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		
								14	00:09	00:15	12:00	08:51	21:15	26(14%)		
									Sun			Moon				
									Eqn.of Time	Mer.		Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								12	00:16	00:10	11:59	07:19	19:42	24(32%)		
								13	00:04	00:02	12:00	08:05	20:28	25(22%)		

June 15, 16 ,17 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec	
0	263°01.2	131°27.4	20°03.5	125°25.3	17°42.1	228°40.3	12°34.5	283°30.8	-10°19.5						Alpheratz	357°36.2	29°13.0
1	278°03.7	146°27.7	20°02.8	140°26.3	17°41.6	243°42.3	12°34.7	298°33.3	-10°19.5						Ankaa	353°08.5	-42°10.5
2	293°06.2	161°28.0	20°02.0	155°27.3	17°41.2	258°44.3	12°34.8	313°35.7	-10°19.5						Schedar	349°32.7	56°39.6
3	308°08.6	176°28.3	20°01.3	170°28.2	17°40.7	273°46.2	12°35.0	328°38.2	-10°19.5						Diphda	348°48.6	-17°51.4
4	323°11.1	191°28.6	20°00.5	185°29.2	17°40.3	288°48.2	12°35.1	343°40.6	-10°19.5						Achernar	335°21.5	-57°06.9
5	338°13.6	206°28.9	19°59.8	200°30.2	17°39.8	303°50.2	12°35.3	358°43.1	-10°19.5						Hamal	327°52.9	23°34.2
6	353°16.0	221°29.2	19°59.1	215°31.2	17°39.4	318°52.2	12°35.5	13°45.5	-10°19.5						Polaris	315°03.8	89°21.5
7	8°18.5	236°29.5	19°58.3	230°32.2	17°38.9	333°54.2	12°35.6	28°48.0	-10°19.5						Akamar	315°13.1	-40°12.5
8	23°21.0	251°29.8	19°57.6	245°33.2	17°38.5	348°56.2	12°35.8	43°50.4	-10°19.5						Menkar	314°07.8	4°10.9
9	38°23.4	266°30.1	19°56.9	260°34.2	17°38.0	3°58.1	12°35.9	58°52.9	-10°19.5						Mirfak	308°30.6	49°56.5
10	53°25.9	281°30.4	19°56.1	275°35.2	17°37.5	19°00.1	12°36.1	73°55.3	-10°19.5						Aldebaran	290°41.5	16°33.4
11	68°28.4	296°30.7	19°55.4	290°36.2	17°37.1	34°02.1	12°36.2	88°57.8	-10°19.5						Rigel	281°05.5	-8°10.5
12	83°30.8	311°31.0	19°54.6	305°37.2	17°36.6	49°04.1	12°36.4	104°00.3	-10°19.5						Capella	280°24.3	46°01.3
13	98°33.3	326°31.3	19°53.9	320°38.2	17°36.2	64°06.1	12°36.6	119°02.7	-10°19.5						Bellatrix	278°24.6	6°22.2
14	113°35.7	341°31.6	19°53.2	335°39.1	17°35.7	79°08.1	12°36.7	134°05.2	-10°19.5						Elnath	278°03.9	28°37.6
15	128°38.2	356°31.9	19°52.4	350°40.1	17°35.3	94°10.0	12°36.9	149°07.6	-10°19.5						Alnilam	275°39.4	-1°11.2
16	143°40.7	11°32.3	19°51.7	5°41.1	17°34.8	109°12.0	12°37.0	164°10.1	-10°19.5						Betelgeuse	270°53.9	7°24.7
17	158°43.1	26°32.6	19°50.9	20°42.1	17°34.3	124°14.0	12°37.2	179°12.5	-10°19.5						Canopus	263°53.5	-52°42.5
18	173°45.6	41°32.9	19°50.2	35°43.1	17°33.9	139°16.0	12°37.4	194°15.0	-10°19.5						Sirius	258°27.6	-16°44.7
19	188°48.1	56°33.2	19°49.4	50°44.1	17°33.4	154°18.0	12°37.5	209°17.4	-10°19.5						Adara	255°07.3	-29°00.3
20	203°50.5	71°33.5	19°48.7	65°45.1	17°33.0	169°20.0	12°37.7	224°19.9	-10°19.6						Procyon	244°52.4	5°10.1
21	218°53.0	86°33.9	19°47.9	80°46.1	17°32.5	184°22.0	12°37.8	239°22.3	-10°19.6						Pollux	243°19.1	27°58.3
22	233°55.5	101°34.2	19°47.2	95°47.1	17°32.0	199°23.9	12°38.0	254°24.8	-10°19.6						Avior	234°15.8	-59°35.2
23	248°57.9	116°34.5	19°46.5	110°48.1	17°31.6	214°25.9	12°38.1	269°27.2	-10°19.6						Suhail	222°47.6	-43°31.8
Mer.pass.:6:26:			v0.3 d-0.7 m-4.3			v1.0 d-0.5 m1.6			v2.0 d0.2 m-2.0			v2.5 d-0.0 m0.9					
Fri	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	264°00.4	131°34.8	19°45.7	125°49.1	17°31.1	229°27.9	12°38.3	284°29.7	-10°19.6						Miaplacidus	221°39.2	-69°49.0
1	279°02.9	146°35.2	19°45.0	140°50.0	17°30.7	244°29.9	12°38.5	299°32.1	-10°19.6						Alphard	217°49.2	-8°45.6
2	294°05.3	161°35.5	19°44.2	155°51.0	17°30.2	259°31.9	12°38.6	314°34.6	-10°19.6						Regulus	207°35.9	11°51.3
3	309°07.8	176°35.8	19°43.5	170°52.0	17°29.7	274°33.9	12°38.8	329°37.0	-10°19.6						Dubhe	193°42.7	61°37.8
4	324°10.2	191°36.2	19°42.7	185°53.0	17°29.3	289°35.9	12°38.9	344°39.5	-10°19.6						Denebola	182°26.2	14°26.6
5	339°12.7	206°36.5	19°42.0	200°54.0	17°28.8	304°37.8	12°39.1	359°42.0	-10°19.6						Gienah	175°44.8	-17°40.4
6	354°15.2	221°36.8	19°41.2	215°55.0	17°28.4	319°39.8	12°39.2	14°44.4	-10°19.6						Acrux	173°01.4	-63°14.0
7	9°17.6	236°37.2	19°40.5	230°56.0	17°27.9	334°41.8	12°39.4	29°46.9	-10°19.6						Gacrux	171°53.0	-57°14.9
8	24°20.1	251°37.5	19°39.7	245°57.0	17°27.4	349°43.8	12°39.6	44°49.3	-10°19.6						Alioth	166°14.0	55°50.3
9	39°22.6	266°37.9	19°39.0	260°58.0	17°27.0	4°45.8	12°39.7	59°51.8	-10°19.6						Spica	158°23.5	-11°17.0
10	54°25.0	281°38.2	19°38.2	275°59.0	17°26.5	19°47.8	12°39.9	74°54.2	-10°19.6						Alcaid	152°52.7	49°12.0
11	69°27.5	296°38.5	19°37.5	290°60.0	17°26.0	34°49.8	12°40.0	89°56.7	-10°19.6						Hadar	148°37.5	-60°29.4
12	84°30.0	311°38.9	19°36.7	306°00.9	17°25.6	49°51.7	12°40.2	104°59.1	-10°19.7						Menkent	147°58.9	-36°29.2
13	99°32.4	326°39.2	19°36.0	321°01.9	17°25.1	64°53.7	12°40.3	120°01.6	-10°19.7						Arcturus	145°48.7	19°04.0
14	114°34.9	341°39.6	19°35.2	336°02.9	17°24.7	79°55.7	12°40.5	135°04.1	-10°19.7						Rigel Kent.	139°41.6	-60°56.1
15	129°37.4	356°39.9	19°34.5	351°03.9	17°24.2	94°57.7	12°40.7	150°06.5	-10°19.7						Zubenelg.	136°57.2	-16°08.4
16	144°39.8	11°40.3	19°33.7	6°04.9	17°23.7	109°59.7	12°40.8	165°09.0	-10°19.7						Kochab	137°18.8	74°03.8
17	159°42.3	26°40.6	19°33.0	21°05.9	17°23.3	125°01.7	12°41.0	180°11.4	-10°19.7						Alphecca	126°04.5	26°38.2
18	174°44.7	41°41.0	19°32.2	36°06.9	17°22.8	140°03.7	12°41.1	195°13.9	-10°19.7						Antares	112°17.1	-26°29.1
19	189°47.2	56°41.4	19°31.5	51°07.9	17°22.3	155°05.7	12°41.3	210°16.3	-10°19.7						Atria	107°11.9	-69°04.2
20	204°49.7	71°41.7	19°30.7	66°08.9	17°21.9	170°07.6	12°41.4	225°18.8	-10°19.7						Sabik	102°03.9	-15°45.2
21	219°52.1	86°42.1	19°30.0	81°09.9	17°21.4	185°09.6	12°41.6	240°21.3	-10°19.7						Shaula	96°11.7	-37°07.2
22	234°54.6	101°42.4	19°29.2	96°10.9	17°21.0	200°11.6	12°41.7	255°23.7	-10°19.7						Rasalhague	95°59.4	12°32.6
23	249°57.1	116°42.8	19°28.4	111°11.9	17°20.5	215°13.6	12°41.9	270°26.2	-10°19.7						Etamin	90°42.2	51°29.1
Mer.pass.:6:22:			v0.3 d-0.7 m-4.3			v1.0 d-0.5 m1.6			v2.0 d0.2 m-2.0			v2.5 d-0.0 m0.9					
Sat	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec				
0	264°59.5	131°43.2	19°27.7	126°12.9	17°20.0	230°15.6	12°42.1	285°28.6	-10°19.7						2023/6/1	SHA	Mer.pass
1	280°02.0	146°43.5	19°26.9	141°13.8	17°19.6	245°17.6	12°42.2	300°31.1	-10°19.7						Venus	228°26.2	15:14
2	295°04.5	161°43.9	19°26.2	156°14.8	17°19.1	260°19.6	12°42.4	315°33.5	-10°19.8						Mars	222°24.0	15:37
3	310°06.9	176°44.3	19°25.4	171°15.8	17°18.6	275°21.6	12°42.5	330°36.0	-10°19.8						Jupiter	325°39.0	08:44
4	325°09.4	191°44.6	19°24.7	186°16.8	17°18.2	290°23.6	12°42.7	345°38.5	-10°19.8						Saturn	20°29.6	05:05
5	340°11.8	206°45.0	19°23.9	201°17.8	17°17.7	305°25.5	12°42.8	0°40.9	-10°19.8						2023/6/1	SHA	Mer.pass
6	355°14.3	221°45.4	19°23.2	216°18.8	17°17.2	320°27.5	12°43.0	15°43.4	-10°19.8						Venus	227°34.4	15:13
7	10°16.8	236°45.8	19°22.4	231°19.8	17°16.8	335°29.5	12°43.1	30°45.8	-10°19.8						Mars	221°48.7	15:36
8	25°19.2	251°46.2	19°21.6	246°20.8	17°16.3	350°31.5	12°43.3	45°48.3	-10°19.8								

h		Sun		Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	179°54.7	23°17.2	219°41.6	11.6	17°46.9	12.1	56.8
1	194°54.5	23°17.3	234°12.2	11.6	17°59.0	12.0	56.8
2	209°54.4	23°17.5	248°42.7	11.5	18°11.0	11.9	56.7
3	224°54.3	23°17.6	263°13.2	11.5	18°22.9	11.8	56.7
4	239°54.1	23°17.7	277°43.7	11.4	18°34.7	11.7	56.7
5	254°54.0	23°17.8	292°14.1	11.4	18°46.4	11.6	56.7
6	269°53.9	23°17.9	306°44.4	11.3	18°58.0	11.5	56.7
7	284°53.7	23°18.0	321°14.7	11.3	19°09.4	11.4	56.6
8	299°53.6	23°18.1	335°45.0	11.2	19°20.8	11.3	56.6
9	314°53.4	23°18.2	350°15.1	11.2	19°32.1	11.2	56.6
10	329°53.3	23°18.3	4°45.3	11.1	19°43.3	11.1	56.6
11	344°53.2	23°18.4	19°15.4	11.1	19°54.4	11.0	56.5
12	359°53.0	23°18.5	33°45.4	11.0	20°05.4	10.9	56.5
13	14°52.9	23°18.7	48°15.4	10.9	20°16.3	10.8	56.5
14	29°52.8	23°18.8	62°45.3	10.9	20°27.0	10.7	56.5
15	44°52.6	23°18.9	77°15.1	10.8	20°37.7	10.6	56.5
16	59°52.5	23°19.0	91°44.9	10.8	20°48.2	10.5	56.4
17	74°52.4	23°19.1	106°14.7	10.7	20°58.7	10.4	56.4
18	89°52.2	23°19.2	120°44.4	10.7	21°09.0	10.3	56.4
19	104°52.1	23°19.3	135°14.1	10.6	21°19.2	10.2	56.4
20	119°52.0	23°19.4	149°43.7	10.6	21°29.3	10.0	56.4
21	134°51.8	23°19.5	164°13.2	10.5	21°39.3	9.9	56.3
22	149°51.7	23°19.6	178°42.7	10.5	21°49.2	9.8	56.3
23	164°51.6	23°19.7	193°12.1	10.4	21°58.9	9.7	56.3
SD.=15.7		d=0.1	S.D.=15.5				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	179°51.4	23°19.8	207°41.5	10.4	22°08.6	9.6	56.3
1	194°51.3	23°19.9	222°10.8	10.3	22°18.1	9.5	56.3
2	209°51.2	23°20.0	236°40.1	10.3	22°27.5	9.3	56.2
3	224°51.0	23°20.0	251°09.3	10.2	22°36.7	9.2	56.2
4	239°50.9	23°20.1	265°38.5	10.1	22°45.9	9.1	56.2
5	254°50.8	23°20.2	280°07.6	10.1	22°54.9	9.0	56.2
6	269°50.6	23°20.3	294°36.7	10.0	23°03.9	8.9	56.1
7	284°50.5	23°20.4	309°05.7	10.0	23°12.6	8.7	56.1
8	299°50.3	23°20.5	323°34.7	9.9	23°21.3	8.6	56.1
9	314°50.2	23°20.6	338°03.6	9.9	23°29.9	8.5	56.1
10	329°50.1	23°20.7	352°32.5	9.8	23°38.3	8.4	56.1
11	344°49.9	23°20.8	7°01.3	9.8	23°46.6	8.2	56.0
12	359°49.8	23°20.9	21°30.1	9.7	23°54.7	8.1	56.0
13	14°49.7	23°21.0	35°58.8	9.7	24°02.8	8.0	56.0
14	29°49.5	23°21.0	50°27.5	9.7	24°10.7	7.8	56.0
15	44°49.4	23°21.1	64°56.1	9.6	24°18.4	7.7	56.0
16	59°49.3	23°21.2	79°24.7	9.6	24°26.1	7.6	55.9
17	74°49.1	23°21.3	93°53.3	9.5	24°33.6	7.4	55.9
18	89°49.0	23°21.4	108°21.7	9.5	24°41.0	7.3	55.9
19	104°48.9	23°21.5	122°50.2	9.4	24°48.2	7.2	55.9
20	119°48.7	23°21.6	137°18.6	9.4	24°55.3	7.0	55.9
21	134°48.6	23°21.6	151°47.0	9.3	25°02.3	6.9	55.8
22	149°48.4	23°21.7	166°15.3	9.3	25°09.2	6.8	55.8
23	164°48.3	23°21.8	180°43.6	9.3	25°15.9	6.6	55.8
SD.=15.7		d=0.1	S.D.=15.4				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	179°48.2	23°21.9	195°11.8	9.2	25°22.4	6.5	55.8
1	194°48.0	23°22.0	209°40.1	9.2	25°28.9	6.4	55.8
2	209°47.9	23°22.0	224°08.2	9.2	25°35.2	6.2	55.7
3	224°47.8	23°22.1	238°36.4	9.1	25°41.3	6.1	55.7
4	239°47.6	23°22.2	253°04.5	9.1	25°47.4	6.0	55.7
5	254°47.5	23°22.3	267°32.5	9.0	25°53.2	5.8	55.7
6	269°47.4	23°22.3	282°00.6	9.0	25°59.0	5.7	55.7
7	284°47.2	23°22.4	296°28.6	9.0	26°04.6	5.5	55.6
8	299°47.1	23°22.5	310°56.5	9.0	26°10.0	5.4	55.6
9	314°46.9	23°22.6	325°24.5	8.9	26°15.4	5.3	55.6
10	329°46.8	23°22.6	339°52.4	8.9	26°20.6	5.1	55.6
11	344°46.7	23°22.7	354°20.2	8.9	26°25.6	5.0	55.6
12	359°46.5	23°22.8	8°48.1	8.8	26°30.5	4.8	55.6
13	14°46.4	23°22.9	23°15.9	8.8	26°35.2	4.7	55.5
14	29°46.3	23°22.9	37°43.7	8.8	26°39.8	4.5	55.5
15	44°46.1	23°23.0	52°11.5	8.8	26°44.3	4.4	55.5
16	59°46.0	23°23.1	66°39.3	8.7	26°48.6	4.3	55.5
17	74°45.9	23°23.1	81°07.0	8.7	26°52.8	4.1	55.5
18	89°45.7	23°23.2	95°34.7	8.7	26°56.9	4.0	55.4
19	104°45.6	23°23.3	110°02.4	8.7	27°00.7	3.8	55.4
20	119°45.4	23°23.3	124°30.1	8.7	27°04.5	3.7	55.4
21	134°45.3	23°23.4	138°57.8	8.7	27°08.1	3.5	55.4
22	149°45.2	23°23.5	153°25.4	8.6	27°11.5	3.4	55.4
23	164°45.0	23°23.5	167°53.1	8.6	27°14.8	3.2	55.3
SD.=15.7		d=0.1	S.D.=15.2				

Lat.	Twilight			Sunset	Twilight	
	Naut.	Civil	Sunrise		Civil	Naut.
72	--	--	--	--	--	--
70	--	--	--	--	--	--
68	--	--	--	--	--	--
66	--	--	--	--	--	--
64	--	--	01:33	22:29	--	--
62	--	--	02:10	21:52	--	--
60	--	00:52	02:36	21:26	23:10	--
58	--	01:41	02:56	21:05	22:21	--
56	--	02:11	03:13	20:49	21:51	--
54	00:48	02:33	03:27	20:34	21:29	23:15
52	01:33	02:51	03:39	20:22	21:11	22:29
50	02:00	03:06	03:50	20:11	20:56	22:01
45	02:46	03:35	04:13	19:49	20:26	21:16
40	03:16	03:58	04:31	19:31	20:04	20:45
35	03:39	04:16	04:46	19:16	19:46	20:22
30	03:58	04:31	04:59	19:03	19:30	20:04
20	04:27	04:56	05:21	18:41	19:05	19:35
10	04:49	05:16	05:39	18:22	18:45	19:12
0	05:08	05:34	05:57	18:04	18:27	18:53
-10	05:25	05:52	06:14	17:47	18:10	18:36
-20	05:41	06:09	06:33	17:28	17:52	18:20
-30	05:58	06:28	06:54	17:07	17:34	18:04
-35	06:07	06:38	07:06	16:55	17:23	17:55
-40	06:16	06:50	07:21	16:41	17:11	17:45
-45	06:26	07:03	07:37	16:24	16:58	17:35
-50	06:38	07:19	07:58	16:03	16:42	17:23
-52	06:43	07:27	08:08	15:53	16:34	17:18
-54	06:49	07:35	08:19	15:42	16:26	17:12
-56	06:55	07:44	08:31	15:30	16:17	17:06
-58	07:02	07:54	08:46	15:15	16:07	16:60
-60	07:09	08:06	09:04	14:58	15:55	16:52

Lat.	Moonrise			Moonset		
	Thu	Fri	Sat	Thu	Fri	Sat
72	--	--	--	--	--	--
70	--	--	--	--	--	--
68	22:38	--	--	21:17	--	--
66	00:18	--	--	20:08	--	--
64	00:38	00:25	--	19:32	21:47	--
62	00:54	00:51	00:49	19:07	20:56	22:46
60	01:08	01:12	01:21	18:47	20:25	21:55
58	01:19	01:29	01:45	18:31	20:02	21:24
56	01:29	01:43	02:04	18:17	19:43	21:01
54	01:38	01:56	02:20	18:05	19:27	20:42
52	01:46	02:07	02:34	17:55	19:13	20:26
50	01:54	02:16	02:46	17:45	19:02	20:12
45	02:09	02:37	03:12	17:26	18:37	19:44
40	02:22	02:54	03:32	17:10	18:17	19:21
35	02:33	03:08	03:49	16:57	18:01	19:03
30	02:43	03:21	04:04	16:45	17:47	18:47
20	02:60	03:42	04:29	16:25	17:23	18:21
10	03:15	04:01	04:50	16:08	17:03	17:58
0	03:29	04:19	05:11	15:52	16:43	17:36
-10	03:43	04:36	05:31	15:36	16:24	17:15
-20	03:58	04:55	05:53	15:20	16:04	16:52
-30	04:15	05:17	06:19	15:00	15:40	16:26
-35	04:25	05:30	06:34	14:49	15:27	16:10
-40	04:37	05:45	06:51	14:36	15:11	15:52
-45	04:51	06:03	07:13	14:21	14:52	15:30
-50	05:08	06:26	07:40	14:03	14:28	15:03
-52	05:16	06:36	07:53	13:54	14:17	14:49
-54	05:25	06:49	08:08	13:44	14:05	14:34
-56	05:35	07:03	08:26	13:33	13:50	14:16
-58	05:47	07:19	08:48	13:21	13:33	13:54
-60	06:00	07:39	09:16	13:07	13:12	13:25

Day	Sun			Moon		Age
	Eqn.of Time	Mer. Pass		Mer.Pass.		
	00 ^h	12 ^h		Upper	Lower	
15	00:21	00:28	12:00	09:40	22:05	27(7%)
16	00:34	00:41	12:00	10:30	22:56	28(3%)
17	00:47	00:54	12:00	11:23	23:50	29(1%)

June 18, 19 ,20 (Sun., Mon., Tue.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	265°58.7	131°52.4	19°09.4	126°36.7	17°08.8	231°03.4	12°45.8	286°27.7	-10°19.9	Alpheratz	357°36.2	29°13.0
1	281°01.1	146°52.8	19°08.7	141°37.7	17°08.4	246°05.4	12°45.9	301°30.1	-10°19.9	Ankaa	353°08.5	-42°10.5
2	296°03.6	161°53.2	19°07.9	156°38.7	17°07.9	261°07.3	12°46.1	316°32.6	-10°20.0	Schedar	349°32.7	56°39.6
3	311°06.1	176°53.7	19°07.1	171°39.7	17°07.4	276°09.3	12°46.2	331°35.0	-10°20.0	Diphda	348°48.6	-17°51.4
4	326°08.5	191°54.1	19°06.4	186°40.6	17°07.0	291°11.3	12°46.4	346°37.5	-10°20.0	Achernar	335°21.5	-57°06.8
5	341°11.0	206°54.5	19°05.6	201°41.6	17°06.5	306°13.3	12°46.6	1°40.0	-10°20.0	Hamal	327°52.9	23°34.3
6	356°13.5	221°54.9	19°04.9	216°42.6	17°06.0	321°15.3	12°46.7	16°42.4	-10°20.0	Polaris	315°02.5	89°21.5
7	11°15.9	236°55.3	19°04.1	231°43.6	17°05.5	336°17.3	12°46.9	31°44.9	-10°20.0	Akamar	315°13.1	-40°12.5
8	26°18.4	251°55.7	19°03.3	246°44.6	17°05.1	351°19.3	12°47.0	46°47.4	-10°20.0	Menkar	314°07.8	4°10.9
9	41°20.8	266°56.1	19°02.5	261°45.6	17°04.6	6°21.3	12°47.2	61°49.8	-10°20.0	Mirfak	308°30.5	49°56.5
10	56°23.3	281°56.6	19°01.8	276°46.6	17°04.1	21°23.3	12°47.3	76°52.3	-10°20.0	Aldebaran	290°41.5	16°33.4
11	71°25.8	296°57.0	19°01.0	291°47.6	17°03.7	36°25.3	12°47.5	91°54.8	-10°20.0	Rigel	281°05.5	-8°10.5
12	86°28.2	311°57.4	19°00.2	306°48.6	17°03.2	51°27.3	12°47.6	106°57.2	-10°20.1	Capella	280°24.3	46°01.3
13	101°30.7	326°57.8	18°59.5	321°49.6	17°02.7	66°29.3	12°47.8	121°59.7	-10°20.1	Bellatrix	278°24.6	6°22.2
14	116°33.2	341°58.3	18°58.7	336°50.6	17°02.2	81°31.3	12°47.9	137°02.1	-10°20.1	Elnath	278°03.9	28°37.6
15	131°35.6	356°58.7	18°57.9	351°51.6	17°01.8	96°33.3	12°48.1	152°04.6	-10°20.1	Alnilam	275°39.4	-1°11.2
16	146°38.1	11°59.1	18°57.2	6°52.6	17°01.3	111°35.2	12°48.2	167°07.1	-10°20.1	Betelgeuse	270°53.8	7°24.7
17	161°40.6	26°59.6	18°56.4	21°53.6	17°00.8	126°37.2	12°48.4	182°09.5	-10°20.1	Canopus	263°53.5	-52°42.5
18	176°43.0	41°60.0	18°55.6	36°54.6	17°00.4	141°39.2	12°48.5	197°12.0	-10°20.1	Sirius	258°27.6	-16°44.7
19	191°45.5	57°00.4	18°54.8	51°55.5	16°59.9	156°41.2	12°48.7	212°14.5	-10°20.1	Adara	255°07.3	-29°00.3
20	206°48.0	72°00.9	18°54.1	66°56.5	16°59.4	171°43.2	12°48.9	227°16.9	-10°20.1	Procyon	244°52.4	5°10.1
21	221°50.4	87°01.3	18°53.3	81°57.5	16°58.9	186°45.2	12°49.0	242°19.4	-10°20.1	Pollux	243°19.1	27°58.3
22	236°52.9	102°01.8	18°52.5	96°58.5	16°58.5	201°47.2	12°49.2	257°21.9	-10°20.2	Avior	234°15.8	-59°35.2
23	251°55.3	117°02.2	18°51.8	111°59.5	16°58.0	216°49.2	12°49.3	272°24.3	-10°20.2	Suhail	222°47.6	-43°31.8
Mer.pass.:6:15:		v0.4 d-0.8 m-4.3		v1.0 d-0.5 m1.7		v2.0 d0.2 m-2.0		v2.5 d-0.0 m0.9		Miaplacidus	221°39.2	-69°49.0
										Alphard	217°49.2	-8°45.6
										Regulus	207°35.9	11°51.3
										Dubhe	193°42.7	61°37.8
										Denebola	182°26.2	14°26.6
										Gienah	175°44.9	-17°40.4
										Acrux	173°01.4	-63°14.0
										Gacrux	171°53.0	-57°14.9
										Alioth	166°14.0	55°50.3
										Spica	158°23.5	-11°17.0
										Alcaid	152°52.8	49°12.0
										Hadar	148°37.5	-60°29.4
										Menkent	147°58.9	-36°29.2
										Arcturus	145°48.7	19°04.0
										Rigel Kent.	139°41.6	-60°56.1
										Zubenelg.	136°57.2	-16°08.4
										Kochab	137°18.9	74°03.8
										Alphecca	126°04.5	26°38.3
										Antares	112°17.1	-26°29.1
										Atria	107°11.9	-69°04.2
										Sabik	102°03.9	-15°45.2
										Shaula	96°11.7	-37°07.2
										Rasalhague	95°59.4	12°32.6
										Etamin	90°42.2	51°29.1
										Kaus Aust.	83°33.8	-34°22.4
										Vega	80°33.7	38°48.2
										Nunki	75°49.0	-26°16.0
										Altair	62°01.0	8°55.7
										Peacock	53°07.3	-56°39.4
										Deneb	49°26.3	45°21.6
										Enif	33°39.9	9°58.8
										Alnair	27°34.4	-46°50.6
										Fomalhaut	15°15.9	-29°29.8
										Scheat	13°46.4	28°12.4
										Markab	13°31.1	15°19.7
										2023/6/1	SHA	Mer.pass
										Venus	225°53.8	15:12
										Mars	220°38.0	15:33
										Jupiter	325°04.7	08:35
										Saturn	20°29.0	04:53
										2023/6/1	SHA	Mer.pass
										Venus	225°04.8	15:11
										Mars	220°02.7	15:31
										Jupiter	324°53.4	08:31
										Saturn	20°29.0	04:49
										2023/6/2	SHA	Mer.pass
										Venus	224°16.9	15:11
										Mars	219°27.4	15:29
										Jupiter	324°42.2	08:28
										Saturn	20°29.1	04:45
										Horizontal parallax		
										Venus:	0.3	
										Mars:	0.1	
Mer.pass.:6:07:		v0.5 d-0.8 m-4.3		v1.0 d-0.5 m1.7		v2.0 d0.2 m-2.0		v2.5 d-0.0 m0.9				

h Sun Moon

Sun	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight		
0	179°44.9	23°23.6	182°20.7	8.6	27°18.0	3.1	55.3	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	194°44.8	23°23.7	196°48.3	8.6	27°21.0	2.9	55.3	72	—:—	—:—	—:—	—:—	—:—	—:—
2	209°44.6	23°23.7	211°16.0	8.6	27°23.9	2.8	55.3	70	—:—	—:—	—:—	—:—	—:—	—:—
3	224°44.5	23°23.8	225°43.6	8.6	27°26.6	2.6	55.3	68	—:—	—:—	—:—	—:—	—:—	—:—
4	239°44.4	23°23.8	240°11.2	8.6	27°29.2	2.5	55.3	66	—:—	—:—	—:—	—:—	—:—	—:—
5	254°44.2	23°23.9	254°38.8	8.6	27°31.6	2.4	55.2	64	—:—	—:—	01:31	22:32	—:—	—:—
6	269°44.1	23°24.0	269°06.4	8.6	27°33.9	2.2	55.2	62	—:—	—:—	02:09	21:54	—:—	—:—
7	284°43.9	23°24.0	283°34.0	8.6	27°36.0	2.1	55.2	60	—:—	00:50	02:36	21:27	23:14	—:—
8	299°43.8	23°24.1	298°01.6	8.6	27°38.0	1.9	55.2	58	—:—	01:40	02:56	21:07	22:23	—:—
9	314°43.7	23°24.1	312°29.2	8.6	27°39.9	1.8	55.2	56	—:—	02:10	03:13	20:50	21:53	—:—
10	329°43.5	23°24.2	326°56.8	8.6	27°41.5	1.6	55.1	54	00:45	02:33	03:27	20:36	21:30	23:18
11	344°43.4	23°24.2	341°24.4	8.6	27°43.1	1.5	55.1	52	01:32	02:51	03:39	20:23	21:12	22:31
12	359°43.3	23°24.3	355°52.0	8.6	27°44.5	1.3	55.1	50	02:00	03:06	03:50	20:12	20:57	22:03
13	14°43.1	23°24.3	10°19.6	8.6	27°45.7	1.2	55.1	45	02:46	03:35	04:13	19:50	20:27	21:17
14	29°43.0	23°24.4	24°47.2	8.6	27°46.9	1.0	55.1	40	03:16	03:58	04:31	19:32	20:05	20:46
15	44°42.8	23°24.4	39°14.9	8.6	27°47.8	0.9	55.1	35	03:40	04:16	04:46	19:17	19:46	20:23
16	59°42.7	23°24.5	53°42.5	8.7	27°48.6	0.7	55.0	30	03:58	04:32	04:59	19:04	19:31	20:05
17	74°42.6	23°24.5	68°10.2	8.7	27°49.3	0.6	55.0	20	04:27	04:57	05:21	18:42	19:06	19:35
18	89°42.4	23°24.6	82°37.9	8.7	27°49.8	0.4	55.0	10	04:50	05:17	05:40	18:23	18:46	19:13
19	104°42.3	23°24.6	97°05.6	8.7	27°50.2	0.3	55.0	0	05:09	05:35	05:58	18:05	18:28	18:54
20	119°42.2	23°24.7	111°33.3	8.7	27°50.4	0.2	55.0	-10	05:26	05:52	06:15	17:48	18:10	18:37
21	134°42.0	23°24.7	126°01.1	8.8	27°50.5	0.0	55.0	-20	05:42	06:10	06:34	17:29	17:53	18:21
22	149°41.9	23°24.8	140°28.8	8.8	27°50.4	-0.1	54.9	-30	05:59	06:29	06:55	17:08	17:34	18:04
23	164°41.7	23°24.8	154°56.6	8.8	27°50.2	-0.3	54.9	-35	06:07	06:39	07:07	16:55	17:24	17:55
	SD.=15.7	d=0.1			S.D.=15.1			-40	06:17	06:51	07:22	16:41	17:12	17:46
								-45	06:27	07:04	07:38	16:24	16:58	17:35
								-50	06:39	07:21	07:59	16:04	16:42	17:24
								-52	06:44	07:28	08:09	15:54	16:35	17:18
								-54	06:50	07:36	08:20	15:42	16:26	17:13
								-56	06:56	07:45	08:33	15:30	16:17	17:06
								-58	07:03	07:56	08:48	15:15	16:07	16:60
								-60	07:10	08:07	09:05	14:57	15:55	16:52
									Moonrise			Moonset		
								Lat.	Sun	Mon	Tue	Sun	Mon	Tue
								72	—:—	—:—	—:—	—:—	—:—	—:—
								70	—:—	—:—	—:—	—:—	—:—	—:—
								68	—:—	—:—	—:—	—:—	—:—	—:—
								66	—:—	—:—	—:—	—:—	—:—	—:—
								64	—:—	—:—	—:—	—:—	—:—	—:—
								62	00:50	01:20	02:55	—:—	00:08	00:23
								60	01:41	02:26	03:39	23:03	23:39	23:54
								58	02:13	03:00	04:09	22:28	23:09	23:32
								56	02:36	03:25	04:31	22:03	22:46	23:14
								54	02:56	03:46	04:49	21:43	22:28	22:59
								52	03:12	04:02	05:05	21:26	22:12	22:45
								50	03:26	04:17	05:18	21:11	21:59	22:34
								45	03:54	04:46	05:46	20:42	21:31	22:09
								40	04:17	05:09	06:07	20:19	21:09	21:50
								35	04:36	05:28	06:25	20:00	20:50	21:33
								30	04:52	05:44	06:40	19:44	20:35	21:19
								20	05:19	06:12	07:06	19:16	20:08	20:55
								10	05:42	06:36	07:29	18:52	19:45	20:34
								0	06:04	06:58	07:50	18:30	19:23	20:14
								-10	06:26	07:20	08:11	18:08	19:01	19:54
								-20	06:50	07:43	08:33	17:44	18:38	19:33
								-30	07:17	08:11	08:59	17:16	18:11	19:08
								-35	07:34	08:27	09:14	16:60	17:55	18:53
								-40	07:53	08:46	09:31	16:41	17:36	18:36
								-45	08:16	09:09	09:52	16:18	17:14	18:16
								-50	08:45	09:38	10:19	15:48	16:45	17:50
								-52	08:60	09:53	10:32	15:33	16:30	17:37
								-54	09:17	10:10	10:47	15:16	16:14	17:23
								-56	09:37	10:30	11:04	14:56	15:54	17:06
								-58	10:02	10:54	11:25	14:30	15:29	16:45
								-60	10:38	11:28	11:51	13:55	14:55	16:19
								Day	Sun		Mer.	Moon		Age
									Eqn.of Time	12 ^h	Pass	Upper	Lower	
								18	01:00	01:07	12:01	12:17	00:43	0(0%)
								19	01:14	01:20	12:01	13:10	00:43	1(2%)
								20	01:27	01:33	12:01	14:01	01:36	2(5%)

June 21, 22 ,23 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	268°56.1	132°26.0	18°13.5	127°48.3	16°34.6	233°27.1	12°56.7	289°25.3	-10°20.8	Alpheratz Ankaa Schedar Diphda Achernar Hamal Polaris Akamar Menkar Mirfak Aldebaran Rigel Capella Bellatrix Elnath Alnilam Betelgeuse Canopus Sirius Adara Procyon Pollux Avior Suhail Miaplacidus Alphard Regulus Dubhe Denebola Gienah Acrux Gacrux Alioth Spica Alcaid Hadar Menkent Arcturus Rigel Kent. Zubenelg. Kochab Alphecca Antares Atria Sabik Shaula Rasalhague Etamin Kaus Aust. Vega Nunki Altair Peacock Deneb Enif Alnair Fomalhaut Scheat Markab 2023/6/2 Venus Mars Jupiter Saturn 2023/6/2 Venus Mars Jupiter Saturn 2023/6/2 Venus Mars Jupiter Saturn Horizontal parallax Venus: Mars:	357°36.1	29°13.0					
1	283°58.6	147°26.5	18°12.7	142°49.3	16°34.1	248°29.1	12°56.9	304°27.8	-10°20.8		353°08.5	-42°10.5					
2	299°01.0	162°27.0	18°11.9	157°50.3	16°33.6	263°31.1	12°57.0	319°30.3	-10°20.8		349°32.6	56°39.6					
3	314°03.5	177°27.6	18°11.1	172°51.3	16°33.1	278°33.1	12°57.2	334°32.7	-10°20.8		348°48.6	-17°51.4					
4	329°05.9	192°28.1	18°10.4	187°52.3	16°32.7	293°35.1	12°57.3	349°35.2	-10°20.8		335°21.4	-57°06.8					
5	344°08.4	207°28.6	18°09.6	202°53.3	16°32.2	308°37.1	12°57.5	4°37.7	-10°20.8		327°52.9	23°34.3					
6	359°10.9	222°29.2	18°08.8	217°54.3	16°31.7	323°39.1	12°57.6	19°40.2	-10°20.8		315°01.3	89°21.5					
7	14°13.3	237°29.7	18°08.0	232°55.3	16°31.2	338°41.1	12°57.8	34°42.6	-10°20.9		315°13.1	-40°12.5					
8	29°15.8	252°30.3	18°07.2	247°56.3	16°30.7	353°43.1	12°57.9	49°45.1	-10°20.9		314°07.7	4°10.9					
9	44°18.3	267°30.8	18°06.4	262°57.3	16°30.2	8°45.1	12°58.1	64°47.6	-10°20.9		308°30.5	49°56.5					
10	59°20.7	282°31.4	18°05.6	277°58.2	16°29.8	23°47.1	12°58.2	79°50.1	-10°20.9		290°41.4	16°33.4					
11	74°23.2	297°31.9	18°04.8	292°59.2	16°29.3	38°49.2	12°58.4	94°52.5	-10°20.9		281°05.4	-8°10.5					
12	89°25.7	312°32.5	18°04.0	308°00.2	16°28.8	53°51.2	12°58.5	109°55.0	-10°20.9		280°24.3	46°01.3					
13	104°28.1	327°33.0	18°03.2	323°01.2	16°28.3	68°53.2	12°58.7	124°57.5	-10°20.9		278°24.6	6°22.3					
14	119°30.6	342°33.6	18°02.5	338°02.2	16°27.8	83°55.2	12°58.8	139°60.0	-10°21.0		278°03.9	28°37.6					
15	134°33.1	357°34.1	18°01.7	353°03.2	16°27.3	98°57.2	12°58.9	155°02.4	-10°21.0		275°39.4	-1°11.2					
16	149°35.5	12°34.7	18°00.9	8°04.2	16°26.9	113°59.2	12°59.1	170°04.9	-10°21.0		270°53.8	7°24.7					
17	164°38.0	27°35.2	18°00.1	23°05.2	16°26.4	129°01.2	12°59.2	185°07.4	-10°21.0		263°53.5	-52°42.5					
18	179°40.4	42°35.8	17°59.3	38°06.2	16°25.9	144°03.2	12°59.4	200°09.9	-10°21.0		258°27.6	-16°44.7					
19	194°42.9	57°36.3	17°58.5	53°07.2	16°25.4	159°05.2	12°59.5	215°12.4	-10°21.0		255°07.2	-29°00.2					
20	209°45.4	72°36.9	17°57.7	68°08.2	16°24.9	174°07.2	12°59.7	230°14.8	-10°21.0		244°52.4	5°10.1					
21	224°47.8	87°37.5	17°56.9	83°09.2	16°24.4	189°09.2	12°59.8	245°17.3	-10°21.1		243°19.1	27°58.3					
22	239°50.3	102°38.0	17°56.1	98°10.2	16°23.9	204°11.2	12°60.0	260°19.8	-10°21.1		234°15.8	-59°35.2					
23	254°52.8	117°38.6	17°55.3	113°11.2	16°23.5	219°13.2	13°00.1	275°22.3	-10°21.1	222°47.6	-43°31.7						
Mer.pass.:6:03:			v0.5 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.0			v2.5 d-0.0 m0.9					
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	269°55.2	132°39.2	17°54.5	128°12.2	16°23.0	234°15.2	13°00.3	290°24.7	-10°21.1								
1	284°57.7	147°39.7	17°53.7	143°13.2	16°22.5	249°17.2	13°00.4	305°27.2	-10°21.1								
2	300°00.2	162°40.3	17°52.9	158°14.2	16°22.0	264°19.2	13°00.6	320°29.7	-10°21.1								
3	315°02.6	177°40.9	17°52.1	173°15.2	16°21.5	279°21.2	13°00.7	335°32.2	-10°21.2								
4	330°05.1	192°41.5	17°51.4	188°16.2	16°21.0	294°23.2	13°00.9	350°34.6	-10°21.2								
5	345°07.6	207°42.1	17°50.6	203°17.2	16°20.5	309°25.2	13°01.0	5°37.1	-10°21.2								
6	0°10.0	222°42.6	17°49.8	218°18.2	16°20.0	324°27.2	13°01.2	20°39.6	-10°21.2								
7	15°12.5	237°43.2	17°49.0	233°19.2	16°19.6	339°29.2	13°01.3	35°42.1	-10°21.2								
8	30°14.9	252°43.8	17°48.2	248°20.2	16°19.1	354°31.3	13°01.5	50°44.6	-10°21.2								
9	45°17.4	267°44.4	17°47.4	263°21.2	16°18.6	9°33.3	13°01.6	65°47.0	-10°21.2								
10	60°19.9	282°45.0	17°46.6	278°22.2	16°18.1	24°35.3	13°01.8	80°49.5	-10°21.3								
11	75°22.3	297°45.6	17°45.8	293°23.2	16°17.6	39°37.3	13°01.9	95°52.0	-10°21.3								
12	90°24.8	312°46.2	17°45.0	308°24.2	16°17.1	54°39.3	13°02.0	110°54.5	-10°21.3								
13	105°27.3	327°46.8	17°44.2	323°25.2	16°16.6	69°41.3	13°02.2	125°57.0	-10°21.3								
14	120°29.7	342°47.4	17°43.4	338°26.2	16°16.1	84°43.3	13°02.3	140°59.4	-10°21.3								
15	135°32.2	357°48.0	17°42.6	353°27.2	16°15.7	99°45.3	13°02.5	155°01.9	-10°21.3								
16	150°34.7	12°48.5	17°41.8	8°28.2	16°15.2	114°47.3	13°02.6	171°04.4	-10°21.4								
17	165°37.1	27°49.2	17°41.0	23°29.2	16°14.7	129°49.3	13°02.8	186°06.9	-10°21.4								
18	180°39.6	42°49.8	17°40.2	38°30.2	16°14.2	144°51.3	13°02.9	201°09.4	-10°21.4								
19	195°42.1	57°50.4	17°39.4	53°31.2	16°13.7	159°53.3	13°03.1	216°11.8	-10°21.4								
20	210°44.5	72°51.0	17°38.6	68°32.2	16°13.2	174°55.3	13°03.2	231°14.3	-10°21.4								
21	225°47.0	87°51.6	17°37.8	83°33.2	16°12.7	189°57.3	13°03.4	246°16.8	-10°21.4								
22	240°49.4	102°52.2	17°37.0	98°34.2	16°12.2	204°59.4	13°03.5	261°19.3	-10°21.5								
23	255°51.9	117°52.8	17°36.2	113°35.2	16°11.7	220°01.4	13°03.7	276°21.8	-10°21.5								
Mer.pass.:5:59:			v0.6 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.0			v2.5 d-0.0 m0.8					
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	270°54.4	132°53.4	17°35.4	128°36.2	16°11.2	235°03.4	13°03.8	291°24.2	-10°21.5								
1	285°56.8	147°54.0	17°34.6	143°37.2	16°10.8	250°05.4	13°04.0	306°26.7	-10°21.5								
2	300°59.3	162°54.6	17°33.8	158°38.1	16°10.3	265°07.4	13°04.1	321°29.2	-10°21.5								
3	316°01.8	177°55.3	17°33.0	173°39.1	16°09.8	280°09.4	13°04.2	336°31.7	-10°21.5								
4	331°04.2	192°55.9	17°32.2	188°40.1	16°09.3	295°11.4	13°04.4	351°34.2	-10°21.6								
5	346°06.7	207°56.5	17°31.4	203°41.1	16°08.8	310°13.4	13°04.5	6°36.6	-10°21.6								
6	1°09.2	222°57.1	17°30.6	218°42.1	16°08.3	325°15.4	13°04.7	21°39.1	-10°21.6								
7	16°11.6	237°57.8	17°29.8	233°43.1	16°07.8	340°17.4	13°04.8	36°41.6	-10°21.6								
8	31°14.1	252°58.4	17°29.0	248°44.1	16°07.3	355°19.4	13°05.0	51°44.1	-10°21.6								
9	46°16.5	267°59.0	17°28.2	263°45.1	16°06.8	10°21.5	13°05.1	66°46.6	-10°21.6								
10	61°19.0	282°59.7	17°27.4	278°46.1	16°06.3	25°23.5	13°05.3	81°49.1	-10°21.7								
11	76°21.5	298°00.3	17°26.6	293°47.1	16°05.8	40°25.5	13°05.4	96°51.5	-10°21.7								
12	91°23.9	313°00.9	17°25.8	308°48.1	16°05.3	55°27.5	13°05.6	111°54.0	-10°21.7								
13	106°26.4	328°01.6	17°25.0	323°49.1	16°04.9	70°29.5	13°05.7	126°56.5	-10°21.7								
14	121°28.9	343°02.2	17°24.2	338°50.1	16°04.4	85°31.5	13°05.8	141°59.0	-10°21.7								
15	136°31.3	358°02.9	17°23.4	353°51.1	16°03.9	100°33.5	13°06.0	157°01.5	-10°21.7								
16	151°33.8	13°03.5	17°22.6	8°52.1	16°03.4	115°35.5	13°06.1	172°04.0	-10°21.8								
17	166°36.3	28°04.1	17°21.8	23°53.1	16°02.9	130°37.5	13°06.3	187°06.4	-10°21.8								
18	181°38.7	43°04.8	17°21.0	38°54.1	16°02.4	145°39.6	13°06.4	202°08.9	-10°21.8								
19	196°41.2	58°05.4	17°20.2	53°55.1	16°01.9	160°41.6	13°06.6	217°11.4	-10°21.8								
20	211°43.7	73°06.1	17°19.4	68°56.1	16°01.4	175°43.6	13°06.7	232°13.9	-10°21.8								
21	226°46.1	88°06.7	17°18.6	83°57.1	16°00.9	190°45.6	13°06.9	247°16.4	-10°21.9								
22	241°48.6	103°07.4	17°17.8	98°58.1	16°00.4	205°47.6	13°07.0	262°18.9	-10°21.9								
23	256°51.0	118°08.1	17°17.0	113°59.1	15°59.9	220°49.6	13°07.1	277°21.3	-10°21.9								
Mer.pass.:5:55:			v0.6 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.0			v2.5 d-0.0 m0.8					

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	179°35.0	23°26.2	144°32.1	11.4	24°53.1	-6.7	54.3
1	194°34.9	23°26.2	159°02.5	11.4	24°46.4	-6.8	54.3
2	209°34.7	23°26.2	173°32.9	11.5	24°39.5	-6.9	54.3
3	224°34.6	23°26.3	188°03.5	11.6	24°32.6	-7.0	54.3
4	239°34.5	23°26.3	202°34.1	11.7	24°25.5	-7.1	54.3
5	254°34.3	23°26.3	217°04.8	11.7	24°18.3	-7.2	54.2
6	269°34.2	23°26.3	231°35.6	11.8	24°11.1	-7.3	54.2
7	284°34.1	23°26.3	246°06.4	11.9	24°03.7	-7.4	54.2
8	299°33.9	23°26.3	260°37.3	11.9	23°56.2	-7.5	54.2
9	314°33.8	23°26.3	275°08.3	12.0	23°48.6	-7.7	54.2
10	329°33.6	23°26.3	289°39.3	12.1	23°40.9	-7.8	54.2
11	344°33.5	23°26.3	304°10.5	12.2	23°33.1	-7.9	54.2
12	359°33.4	23°26.3	318°41.7	12.2	23°25.2	-8.0	54.2
13	14°33.2	23°26.3	333°12.9	12.3	23°17.2	-8.1	54.2
14	29°33.1	23°26.3	347°44.3	12.4	23°09.1	-8.2	54.2
15	44°33.0	23°26.3	2°15.7	12.5	23°00.8	-8.3	54.2
16	59°32.8	23°26.3	16°47.2	12.5	22°52.5	-8.4	54.2
17	74°32.7	23°26.3	31°18.8	12.6	22°44.1	-8.5	54.2
18	89°32.6	23°26.3	45°50.4	12.7	22°35.6	-8.5	54.2
19	104°32.4	23°26.3	60°22.1	12.7	22°27.0	-8.6	54.2
20	119°32.3	23°26.3	74°53.9	12.8	22°18.3	-8.7	54.1
21	134°32.1	23°26.3	89°25.7	12.9	22°09.6	-8.8	54.1
22	149°32.0	23°26.3	103°57.7	13.0	22°00.7	-8.9	54.1
23	164°31.9	23°26.3	118°29.7	13.0	21°51.7	-9.0	54.1
SD.=15.7		d=0.0	S.D.=14.8				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	179°31.7	23°26.3	133°01.8	13.1	21°42.7	-9.1	54.1
1	194°31.6	23°26.3	147°33.9	13.2	21°33.5	-9.2	54.1
2	209°31.5	23°26.3	162°06.1	13.3	21°24.3	-9.3	54.1
3	224°31.3	23°26.3	176°38.4	13.3	21°14.9	-9.4	54.1
4	239°31.2	23°26.2	191°10.8	13.4	21°05.5	-9.5	54.1
5	254°31.0	23°26.2	205°43.2	13.5	20°56.0	-9.5	54.1
6	269°30.9	23°26.2	220°15.7	13.5	20°46.4	-9.6	54.1
7	284°30.8	23°26.2	234°48.2	13.6	20°36.8	-9.7	54.1
8	299°30.6	23°26.2	249°20.9	13.7	20°27.0	-9.8	54.1
9	314°30.5	23°26.2	263°53.6	13.7	20°17.2	-9.9	54.1
10	329°30.4	23°26.2	278°26.4	13.8	20°07.2	-10.0	54.1
11	344°30.2	23°26.2	292°59.2	13.9	19°57.2	-10.0	54.1
12	359°30.1	23°26.1	307°32.1	13.9	19°47.2	-10.1	54.1
13	14°30.0	23°26.1	322°05.1	14.0	19°37.0	-10.2	54.1
14	29°29.8	23°26.1	336°38.1	14.1	19°26.7	-10.3	54.1
15	44°29.7	23°26.1	351°11.2	14.1	19°16.4	-10.4	54.1
16	59°29.5	23°26.1	5°44.4	14.2	19°06.0	-10.4	54.1
17	74°29.4	23°26.1	20°17.6	14.3	18°55.6	-10.5	54.1
18	89°29.3	23°26.0	34°50.9	14.3	18°45.0	-10.6	54.1
19	104°29.1	23°26.0	49°24.3	14.4	18°34.4	-10.7	54.1
20	119°29.0	23°26.0	63°57.7	14.5	18°23.7	-10.7	54.1
21	134°28.9	23°26.0	78°31.2	14.5	18°12.9	-10.8	54.1
22	149°28.7	23°26.0	93°04.8	14.6	18°02.1	-10.9	54.1
23	164°28.6	23°25.9	107°38.4	14.6	17°51.2	-10.9	54.1
SD.=15.7		d=0.0	S.D.=14.8				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	179°28.5	23°25.9	122°12.1	14.7	17°40.2	-11.0	54.1
1	194°28.3	23°25.9	136°45.8	14.8	17°29.1	-11.1	54.1
2	209°28.2	23°25.9	151°19.6	14.8	17°18.0	-11.2	54.1
3	224°28.0	23°25.8	165°53.4	14.9	17°06.8	-11.2	54.1
4	239°27.9	23°25.8	180°27.3	14.9	16°55.6	-11.3	54.1
5	254°27.8	23°25.8	195°01.3	15.0	16°44.3	-11.4	54.1
6	269°27.6	23°25.8	209°35.3	15.0	16°32.9	-11.4	54.1
7	284°27.5	23°25.7	224°09.4	15.1	16°21.4	-11.5	54.1
8	299°27.4	23°25.7	238°43.5	15.2	16°09.9	-11.5	54.1
9	314°27.2	23°25.7	253°17.7	15.2	15°58.3	-11.6	54.1
10	329°27.1	23°25.6	267°52.0	15.3	15°46.7	-11.7	54.1
11	344°27.0	23°25.6	282°26.3	15.3	15°35.0	-11.7	54.1
12	359°26.8	23°25.6	297°00.6	15.4	15°23.2	-11.8	54.1
13	14°26.7	23°25.5	311°35.0	15.4	15°11.4	-11.9	54.1
14	29°26.6	23°25.5	326°09.4	15.5	14°59.5	-11.9	54.1
15	44°26.4	23°25.5	340°43.9	15.5	14°47.6	-12.0	54.1
16	59°26.3	23°25.4	355°18.5	15.6	14°35.6	-12.0	54.1
17	74°26.2	23°25.4	9°53.0	15.6	14°23.5	-12.1	54.2
18	89°26.0	23°25.4	24°27.7	15.7	14°11.4	-12.1	54.2
19	104°25.9	23°25.3	39°02.4	15.7	13°59.2	-12.2	54.2
20	119°25.7	23°25.3	53°37.1	15.7	13°47.0	-12.2	54.2
21	134°25.6	23°25.3	68°11.8	15.8	13°34.7	-12.3	54.2
22	149°25.5	23°25.2	82°46.6	15.8	13°22.4	-12.4	54.2
23	164°25.3	23°25.2	97°21.5	15.9	13°10.0	-12.4	54.2
SD.=15.7		d=0.0	S.D.=14.8				
		Twilight		Twilight			
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	--	--	--	--	--	--	
70	--	--	--	--	--	--	
68	--	--	--	--	--	--	
66	--	--	--	--	--	--	
64	--	--	01:31	22:32	--	--	
62	--	--	02:10	21:54	--	--	
60	--	00:49	02:36	21:28	23:14	--	
58	--	01:41	02:57	21:07	22:23	--	
56	--	02:11	03:13	20:51	21:53	--	
54	00:45	02:33	03:28	20:36	21:31	23:19	
52	01:32	02:51	03:40	20:24	21:13	22:31	
50	02:00	03:06	03:51	20:13	20:58	22:03	
45	02:46	03:36	04:13	19:50	20:28	21:18	
40	03:17	03:59	04:32	19:32	20:05	20:47	
35	03:40	04:17	04:47	19:17	19:47	20:24	
30	03:59	04:32	04:60	19:04	19:32	20:05	
20	04:28	04:57	05:22	18:42	19:07	19:36	
10	04:51	05:18	05:41	18:23	18:46	19:13	
0	05:10	05:36	05:58	18:06	18:28	18:54	
-10	05:27	05:53	06:16	17:48	18:11	18:37	
-20	05:43	06:10	06:34	17:30	17:54	18:21	
-30	05:59	06:29	06:56	17:08	17:35	18:05	
-35	06:08	06:40	07:08	16:56	17:24	17:56	
-40	06:18	06:52	07:22	16:42	17:12	17:46	
-45	06:28	07:05	07:39	16:25	16:59	17:36	
-50	06:40	07:21	07:60	16:04	16:43	17:24	
-52	06:45	07:29	08:10	15:54	16:35	17:19	
-54	06:51	07:37	08:21	15:43	16:27	17:13	
-56	06:57	07:46	08:34	15:30	16:18	17:07	
-58	07:04	07:56	08:48	15:16	16:08	17:00	
-60	07:11	08:08	09:06	14:58	15:56	16:53	
		Moonrise		Moonset			
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	--	--	05:37	--	--	02:40	
70	--	--	06:27	--	--	01:49	
68	--	04:32	06:58	--	02:11	01:16	
66	--	05:24	07:21	--	01:18	00:52	
64	03:57	05:56	07:39	01:05	00:45	00:33	
62	04:39	06:19	07:53	00:23	00:21	00:17	
60	05:07	06:38	08:06	--	00:01	00:04	
58	05:29	06:53	08:16	23:45	23:53	23:58	
56	05:47	07:06	08:25	23:31	23:43	23:51	
54	06:02	07:18	08:33	23:20	23:34	23:45	
52	06:15	07:28	08:41	23:09	23:26	23:40	
50	06:26	07:37	08:47	22:60	23:19	23:35	
45	06:50	07:55	09:01	22:40	23:04	23:24	
40	07:08	08:11	09:12	22:23	22:52	23:16	
35	07:24	08:23	09:22	22:10	22:41	23:08	
30	07:38	08:35	09:30	21:58	22:31	23:01	
20	08:01	08:54	09:45	21:37	22:15	22:49	
10	08:21	09:10	09:57	21:19	22:00	22:39	
0	08:39	09:26	10:09	21:02	21:47	22:29	
-10	08:58	09:41	10:21	20:45	21:33	22:19	
-20	09:17	09:57	10:33	20:27	21:19	22:09	
-30	09:40	10:16	10:47	20:05	21:02	21:57	
-35	09:53	10:27	10:56	19:53	20:52	21:50	
-40	10:08	10:39	11:05	19:38	20:40	21:42	
-45	10:27	10:54	11:16	19:21	20:27	21:32	
-50	10:49	11:11	11:29	18:60	20:11	21:21	
-52	10:60	11:20	11:35	18:50	20:03	21:15	
-54	11:12	11:29	11:42	18:38	19:54	21:09	
-56	11:26	11:39	11:49	18:25	19:44	21:03	
-58	11:42	11:51	11:57	18:09	19:33	20:55	
-60	12:01	12:05	12:07	17:51	19:20	20:47	
		Sun		Moon			
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer. Pass	Mer.Pass. Upper	Mer.Pass. Lower	Age	
21	01:40	01:47	12:01	14:50	02:26	3(10%)	
22	01:53	02:00	12:02	15:36	03:13	4(17%)	
23	02:06	02:13	12:02	16:19	03:58	5(24%)	

June 24, 25 ,26 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	271°53.5	133°08.7	17°16.2	129°00.1	15°59.4	235°51.6	13°07.3	292°23.8	-10°21.9	Alpheratz	357°36.1	29°13.0					
1	286°56.0	148°09.4	17°15.4	144°01.1	15°58.9	250°53.6	13°07.4	307°26.3	-10°21.9	Ankaa	353°08.4	-42°10.5					
2	301°58.4	163°10.0	17°14.6	159°02.1	15°58.4	265°55.6	13°07.6	322°28.8	-10°21.9	Schedar	349°32.6	56°39.6					
3	317°00.9	178°10.7	17°13.7	174°03.1	15°57.9	280°57.7	13°07.7	337°31.3	-10°22.0	Diphda	348°48.5	-17°51.4					
4	332°03.4	193°11.4	17°12.9	189°04.1	15°57.4	295°59.7	13°07.9	352°33.8	-10°22.0	Achernar	335°21.4	-57°06.8					
5	347°05.8	208°12.0	17°12.1	204°05.1	15°56.9	311°01.7	13°08.0	7°36.3	-10°22.0	Hamal	327°52.9	23°34.3					
6	2°08.3	223°12.7	17°11.3	219°06.1	15°56.4	326°03.7	13°08.2	22°38.7	-10°22.0	Polaris	315°00.2	89°21.5					
7	17°10.8	238°13.4	17°10.5	234°07.1	15°55.9	341°05.7	13°08.3	37°41.2	-10°22.0	Akamar	315°13.0	-40°12.5					
8	32°13.2	253°14.1	17°09.7	249°08.1	15°55.5	356°07.7	13°08.4	52°43.7	-10°22.1	Menkar	314°07.7	4°10.9					
9	47°15.7	268°14.7	17°08.9	264°09.1	15°55.0	11°09.7	13°08.6	67°46.2	-10°22.1	Mirfak	308°30.5	49°56.5					
10	62°18.2	283°15.4	17°08.1	279°10.1	15°54.5	26°11.8	13°08.7	82°48.7	-10°22.1	Aldebaran	290°41.4	16°33.4					
11	77°20.6	298°16.1	17°07.3	294°11.1	15°54.0	41°13.8	13°08.9	97°51.2	-10°22.1	Rigel	281°05.4	-8°10.4					
12	92°23.1	313°16.8	17°06.5	309°12.1	15°53.5	56°15.8	13°09.0	112°53.7	-10°22.1	Capella	280°24.3	46°01.3					
13	107°25.5	328°17.5	17°05.7	324°13.1	15°53.0	71°17.8	13°09.2	127°56.2	-10°22.2	Bellatrix	278°24.6	6°22.3					
14	122°28.0	343°18.2	17°04.9	339°14.1	15°52.5	86°19.8	13°09.3	142°58.6	-10°22.2	Elnath	278°03.9	28°37.6					
15	137°30.5	358°18.8	17°04.1	354°15.1	15°52.0	101°21.8	13°09.4	158°01.1	-10°22.2	Alnilam	275°39.4	-1°11.2					
16	152°32.9	13°19.5	17°03.3	9°16.1	15°51.5	116°23.8	13°09.6	173°03.6	-10°22.2	Betelgeuse	270°53.8	7°24.7					
17	167°35.4	28°20.2	17°02.5	24°17.1	15°51.0	131°25.9	13°09.7	188°06.1	-10°22.2	Canopus	263°53.5	-52°42.5					
18	182°37.9	43°20.9	17°01.7	39°18.1	15°50.5	146°27.9	13°09.9	203°08.6	-10°22.2	Sirius	258°27.6	-16°44.7					
19	197°40.3	58°21.6	17°00.8	54°19.1	15°50.0	161°29.9	13°10.0	218°11.1	-10°22.3	Adara	255°07.2	-29°00.2					
20	212°42.8	73°22.3	17°00.0	69°20.1	15°49.5	176°31.9	13°10.2	233°13.6	-10°22.3	Procyon	244°52.4	5°10.1					
21	227°45.3	88°23.0	16°59.2	84°21.1	15°49.0	191°33.9	13°10.3	248°16.1	-10°22.3	Pollux	243°19.1	27°58.3					
22	242°47.7	103°23.7	16°58.4	99°22.1	15°48.5	206°35.9	13°10.4	263°18.5	-10°22.3	Avior	234°15.8	-59°35.2					
23	257°50.2	118°24.4	16°57.6	114°23.1	15°48.0	221°37.9	13°10.6	278°21.0	-10°22.3	Suhail	222°47.6	-43°31.7					
Mer.pass.:5:51:			v0.7 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.0			v2.5 d-0.0 m0.8					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	272°52.6	133°25.1	16°56.8	129°24.1	15°47.5	236°40.0	13°10.7	293°23.5	-10°22.4	Alphard	217°49.2	-8°45.6					
1	287°55.1	148°25.8	16°56.0	144°25.1	15°47.0	251°42.0	13°10.9	308°26.0	-10°22.4	Regulus	207°35.9	11°51.3					
2	302°57.6	163°26.5	16°55.2	159°26.1	15°46.5	266°44.0	13°11.0	323°28.5	-10°22.4	Dubhe	193°42.8	61°37.8					
3	318°00.0	178°27.3	16°54.4	174°27.1	15°46.0	281°46.0	13°11.2	338°31.0	-10°22.4	Denebola	182°26.2	14°26.6					
4	333°02.5	193°28.0	16°53.6	189°28.1	15°45.5	296°48.0	13°11.3	353°33.5	-10°22.4	Gienah	175°44.9	-17°40.4					
5	348°05.0	208°28.7	16°52.8	204°29.1	15°45.0	311°50.0	13°11.4	8°36.0	-10°22.5	Acrux	173°01.5	-63°14.0					
6	3°07.4	223°29.4	16°52.0	219°30.1	15°44.5	326°52.1	13°11.6	23°38.5	-10°22.5	Gacrux	171°53.0	-57°14.9					
7	18°09.9	238°30.1	16°51.2	234°31.1	15°44.0	341°54.1	13°11.7	38°40.9	-10°22.5	Alioth	166°14.0	55°50.3					
8	33°12.4	253°30.8	16°50.3	249°32.1	15°43.5	356°56.1	13°11.9	53°43.4	-10°22.5	Spica	158°23.5	-11°17.0					
9	48°14.8	268°31.6	16°49.5	264°33.1	15°43.0	11°58.1	13°12.0	68°45.9	-10°22.5	Alcaid	152°52.8	49°12.0					
10	63°17.3	283°32.3	16°48.7	279°34.1	15°42.5	27°00.1	13°12.2	83°48.4	-10°22.6	Hadar	148°37.5	-60°29.4					
11	78°19.8	298°33.0	16°47.9	294°35.1	15°42.0	42°02.1	13°12.3	98°50.9	-10°22.6	Menkent	147°58.9	-36°29.3					
12	93°22.2	313°33.8	16°47.1	309°36.1	15°41.5	57°04.2	13°12.4	113°53.4	-10°22.6	Arcturus	145°48.7	19°04.0					
13	108°24.7	328°34.5	16°46.3	324°37.1	15°41.0	72°06.2	13°12.6	128°55.9	-10°22.6	Rigil Kent.	139°41.6	-60°56.1					
14	123°27.1	343°35.2	16°45.5	339°38.1	15°40.5	87°08.2	13°12.7	143°58.4	-10°22.6	Zubenelg.	136°57.2	-16°08.4					
15	138°29.6	358°36.0	16°44.7	354°39.1	15°40.0	102°10.2	13°12.9	159°00.9	-10°22.7	Kochab	137°18.9	74°03.8					
16	153°32.1	13°36.7	16°43.9	9°40.1	15°39.5	117°12.2	13°13.0	174°03.4	-10°22.7	Alphecca	126°04.5	26°38.3					
17	168°34.5	28°37.4	16°43.1	24°41.1	15°39.0	132°14.3	13°13.1	189°05.9	-10°22.7	Antares	112°17.1	-26°29.1					
18	183°37.0	43°38.2	16°42.2	39°42.1	15°38.5	147°16.3	13°13.3	204°08.3	-10°22.7	Atria	107°11.9	-69°04.2					
19	198°39.5	58°38.9	16°41.4	54°43.1	15°38.0	162°18.3	13°13.4	219°10.8	-10°22.8	Sabik	102°03.9	-15°45.2					
20	213°41.9	73°39.7	16°40.6	69°44.1	15°37.5	177°20.3	13°13.6	234°13.3	-10°22.8	Shaula	96°11.7	-37°07.2					
21	228°44.4	88°40.4	16°39.8	84°45.1	15°37.0	192°22.3	13°13.7	249°15.8	-10°22.8	Rasalhague	95°59.4	12°32.6					
22	243°46.9	103°41.2	16°39.0	99°46.1	15°36.5	207°24.4	13°13.9	264°18.3	-10°22.8	Etamin	90°42.2	51°29.1					
23	258°49.3	118°41.9	16°38.2	114°47.1	15°36.0	222°26.4	13°14.0	279°20.8	-10°22.8	Kaus Aust.	83°33.8	-34°22.4					
Mer.pass.:5:47:			v0.7 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.0			v2.5 d-0.0 m0.8					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	273°51.8	133°42.7	16°37.4	129°48.2	15°35.5	237°28.4	13°14.1	294°23.3	-10°22.9	Nunki	75°49.0	-26°16.0					
1	288°54.3	148°43.4	16°36.6	144°49.2	15°35.0	252°30.4	13°14.3	309°25.8	-10°22.9	Altair	62°01.0	8°55.7					
2	303°56.7	163°44.2	16°35.8	159°50.2	15°34.5	267°32.4	13°14.4	324°28.3	-10°22.9	Peacock	53°07.2	-56°39.4					
3	318°59.2	178°44.9	16°34.9	174°51.2	15°34.0	282°34.5	13°14.6	339°30.8	-10°22.9	Deneb	49°26.3	45°21.6					
4	334°01.6	193°45.7	16°34.1	189°52.2	15°33.5	297°36.5	13°14.7	354°33.3	-10°22.9	Enif	33°39.9	9°58.9					
5	349°04.1	208°46.5	16°33.3	204°53.2	15°32.9	312°38.5	13°14.8	9°35.8	-10°23.0	Alnair	27°34.3	-46°50.6					
6	4°06.6	223°47.2	16°32.5	219°54.2	15°32.4	327°40.5	13°15.0	24°38.3	-10°23.0	Fomalhaut	15°15.9	-29°29.7					
7	19°09.0	238°48.0	16°31.7	234°55.2	15°31.9	342°42.5	13°15.1	39°40.8	-10°23.0	Scheat	13°46.4	28°12.4					
8	34°11.5	253°48.8	16°30.9	249°56.2	15°31.4	357°44.6	13°15.3	54°43.2	-10°23.0	Markab	13°31.1	15°19.8					
9	49°14.0	268°49.5	16°30.1	264°57.2	15°30.9	12°46.6	13°15.4	69°45.7	-10°23.1								
10	64°16.4	283°50.3	16°29.3	279°58.2	15°30.4	27°48.6	13°15.5	84°48.2	-10°23.1								
11	79°18.9	298°51.1	16°28.4	294°59.2	15°29.9	42°50.6	13°15.7	99°50.7	-10°23.1								
12	94°21.4	313°51.9	16°27.6	310°00.2	15°29.4	57°52.6	13°15.8	114°53.2	-10°23.1								
13	109°23.8	328°52.6	16°26.8	325°01.2	15°28.9	72°54.7	13°16.0	129°55.7	-10°23.1								
14	124°26.3	343°53.4	16°26.0	340°02.2	15°28.4	87°56.7	13°16.1	144°58.2	-10°23.2								
15	139°28.7	358°54.2	16°25.2	355°03.2	15°27.9	102°58.7	13°16.2	160°00.7	-10°23.2								
16	154°31.2	13°55.0	16°24.4	10°04.2	15°27.4	118°00.7	13°16.4	175°03.2	-10°23.2								

Sun				Moon												
Sat	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
									Naut.	Civil	Sunrise	Sunset	Civil	Naut.		
0	179°25.2	23°25.1		111°56.4	15.9	12°57.6	-12.5	54.2	72	--	--	--	--	--		
1	194°25.1	23°25.1		126°31.3	16.0	12°45.1	-12.5	54.2	70	--	--	--	--	--		
2	209°24.9	23°25.1		141°06.3	16.0	12°32.6	-12.6	54.2	68	--	--	--	--	--		
3	224°24.8	23°25.0		155°41.3	16.0	12°20.0	-12.6	54.2	66	--	--	--	--	--		
4	239°24.7	23°25.0		170°16.3	16.1	12°07.4	-12.7	54.2	64	--	--	--	--	--		
5	254°24.5	23°24.9		184°51.4	16.1	11°54.7	-12.7	54.2	62	--	--	01:33	22:32	--		
6	269°24.4	23°24.9		199°26.5	16.1	11°41.9	-12.8	54.3	60	--	--	02:11	21:54	--		
7	284°24.3	23°24.8		214°01.7	16.2	11°29.2	-12.8	54.3	58	--	00:52	02:37	21:28	23:13		
8	299°24.1	23°24.8		228°36.9	16.2	11°16.3	-12.8	54.3	56	--	01:42	02:58	21:07	22:23		
9	314°24.0	23°24.7		243°12.1	16.2	11°03.5	-12.9	54.3	54	--	02:12	03:14	20:51	21:53		
10	329°23.9	23°24.7		257°47.3	16.3	10°50.6	-12.9	54.3	52	00:47	02:34	03:29	20:36	21:31		
11	344°23.7	23°24.6		272°22.6	16.3	10°37.6	-13.0	54.3	50	01:34	02:52	03:41	20:24	21:13		
12	359°23.6	23°24.6		286°57.9	16.3	10°24.6	-13.0	54.3	48	02:02	03:07	03:52	20:13	20:58		
13	14°23.5	23°24.5		301°33.3	16.3	10°11.6	-13.1	54.3	45	02:47	03:37	04:14	19:51	20:28		
14	29°23.3	23°24.5		316°08.6	16.4	9°58.5	-13.1	54.3	40	03:18	03:59	04:32	19:33	20:06		
15	44°23.2	23°24.4		330°44.0	16.4	9°45.3	-13.1	54.3	35	03:41	04:18	04:47	19:18	19:48		
16	59°23.0	23°24.4		345°19.4	16.4	9°32.2	-13.2	54.4	30	03:60	04:33	05:00	19:05	19:32		
17	74°22.9	23°24.3		359°54.9	16.4	9°19.0	-13.2	54.4	20	04:29	04:58	05:22	18:43	19:07		
18	89°22.8	23°24.3		14°30.3	16.5	9°05.7	-13.3	54.4	10	04:51	05:18	05:41	18:24	18:47		
19	104°22.6	23°24.2		29°05.8	16.5	8°52.4	-13.3	54.4	0	05:10	05:36	05:59	18:06	18:29		
20	119°22.5	23°24.2		43°41.3	16.5	8°39.1	-13.3	54.4	-10	05:27	05:54	06:16	17:49	18:12		
21	134°22.4	23°24.1		58°16.8	16.5	8°25.7	-13.4	54.4	-20	05:43	06:11	06:35	17:30	17:54		
22	149°22.2	23°24.1		72°52.4	16.6	8°12.3	-13.4	54.4	-30	05:60	06:30	06:56	17:09	17:36		
23	164°22.1	23°24.0		87°27.9	16.6	7°58.9	-13.5	54.5	-35	06:09	06:40	07:09	16:57	17:25		
	SD.=15.7	d=-0.0		S.D.=14.8					-40	06:18	06:52	07:23	16:43	17:13		
									-45	06:28	07:06	07:40	16:26	16:60		
									-50	06:40	07:22	08:00	16:05	16:44		
									-52	06:45	07:29	08:10	15:55	16:36		
									-54	06:51	07:37	08:21	15:44	16:28		
									-56	06:57	07:46	08:34	15:31	16:19		
									-58	07:04	07:57	08:49	15:17	16:09		
									-60	07:12	08:08	09:06	14:59	15:57		
										Lat.	Sat	Moonrise		Moonset		
											Sun	Mon	Sat	Sun	Mon	
0	179°22.0	23°24.0		102°03.5	16.6	7°45.4	-13.5	54.5	72	08:17	10:22	12:21	01:28	00:48	00:16	
1	194°21.8	23°23.9		116°39.1	16.6	7°31.9	-13.5	54.5	70	08:37	10:30	12:20	01:06	00:38	00:14	
2	209°21.7	23°23.8		131°14.7	16.6	7°18.4	-13.6	54.5	68	08:52	10:36	12:19	00:49	00:29	00:12	
3	224°21.6	23°23.8		145°50.3	16.6	7°04.8	-13.6	54.5	66	09:04	10:42	12:18	00:35	00:22	00:10	
4	239°21.4	23°23.7		160°26.0	16.6	6°51.2	-13.6	54.5	64	09:14	10:46	12:17	00:24	00:16	00:08	
5	254°21.3	23°23.7		175°01.6	16.6	6°37.6	-13.7	54.5	62	09:23	10:50	12:17	00:14	00:10	00:07	
6	269°21.2	23°23.6		189°37.3	16.7	6°23.9	-13.7	54.6	60	09:30	10:53	12:16	00:05	00:06	00:05	
7	284°21.0	23°23.5		204°12.9	16.7	6°10.2	-13.7	54.6	58	09:37	10:56	12:16	--	00:01	00:04	
8	299°20.9	23°23.5		218°48.6	16.7	5°56.5	-13.7	54.6	56	09:43	10:59	12:16	23:58	--	00:03	
9	314°20.8	23°23.4		233°24.3	16.7	5°42.7	-13.8	54.6	54	09:48	11:01	12:15	23:54	--	00:02	
10	329°20.6	23°23.3		247°00.0	16.7	5°28.9	-13.8	54.6	52	09:52	11:03	12:15	23:51	--	00:01	
11	344°20.5	23°23.3		262°35.6	16.7	5°15.1	-13.8	54.6	50	09:56	11:05	12:15	23:48	--	00:01	
12	359°20.4	23°23.2		277°11.3	16.7	5°01.3	-13.9	54.7	45	10:05	11:09	12:14	23:42	23:59	--	
13	14°20.2	23°23.1		291°47.0	16.7	4°47.4	-13.9	54.7	40	10:13	11:13	12:13	23:37	23:58	--	
14	29°20.1	23°23.1		306°22.7	16.7	4°33.5	-13.9	54.7	35	10:19	11:16	12:13	23:33	23:56	--	
15	44°20.0	23°23.0		320°58.4	16.7	4°19.6	-13.9	54.7	30	10:25	11:19	12:13	23:29	23:55	--	
16	59°19.8	23°22.9		335°34.1	16.7	4°05.6	-14.0	54.7	20	10:34	11:23	12:12	23:22	23:53	--	
17	74°19.7	23°22.9		350°09.8	16.7	3°51.6	-14.0	54.8	10	10:43	11:27	12:11	23:16	23:52	--	
18	89°19.6	23°22.8		4°45.5	16.7	3°37.6	-14.0	54.8	0	10:51	11:31	12:11	23:10	23:50	--	
19	104°19.4	23°22.7		19°21.2	16.7	3°23.6	-14.0	54.8	-10	10:58	11:35	12:11	23:04	23:48	--	
20	119°19.3	23°22.6		33°56.8	16.7	3°09.6	-14.1	54.8	-20	11:07	11:39	12:10	22:58	23:47	--	
21	134°19.2	23°22.6		48°32.5	16.7	2°55.5	-14.1	54.8	-30	11:16	11:43	12:09	22:51	23:45	--	
22	149°19.0	23°22.5		63°08.2	16.7	2°41.4	-14.1	54.9	-35	11:22	11:46	12:09	22:47	23:43	--	
23	164°18.9	23°22.4		77°43.8	16.6	2°27.3	-14.1	54.9	-40	11:28	11:48	12:09	22:42	23:42	--	
	SD.=15.7	d=-0.1		S.D.=14.9					-45	11:35	11:52	12:08	22:36	23:40	--	
									-50	11:43	11:56	12:08	22:30	23:39	--	
									-52	11:47	11:58	12:08	22:27	23:38	--	
									-54	11:51	11:60	12:08	22:23	23:37	--	
									-56	11:56	12:02	12:07	22:19	23:36	--	
									-58	12:01	12:04	12:07	22:15	23:34	--	
									-60	12:07	12:07	12:07	22:10	23:33	--	
										Day	Sun		Mer.	Moon		
											Eqn.of Time	Mer.	Mer.Pass.		Age	
											00 ^h	12 ^h	Pass	Upper	Lower	
0	179°18.8	23°22.4		92°19.4	16.6	2°13.2	-14.1	54.9	24	02:19	02:26	12:02	17:00	04:40	6(33%)	
1	194°18.7	23°22.3		106°55.1	16.6	1°59.0	-14.2	54.9	25	02:32	02:39	12:02	17:40	05:20	7(42%)	
2	209°18.5	23°22.2		121°30.7	16.6	1°44.9	-14.2	54.9	26	02:45	02:51	12:02	18:20	06:00	8(52%)	
3	224°18.4	23°22.1		136°06.3	16.6	1°30.7	-14.2	55.0								
4	239°18.3	23°22.0		150°41.9	16.6	1°16.5	-14.2	55.0								
5	254°18.1	23°22.0		165°17.4	16.6	1°02.3	-14.2	55.0								
6	269°18.0	23°21.9		179°53.0	16.5	0°48.0	-14.2	55.0								
7	284°17.9	23°21.8		194°28.5	16.5	0°33.8	-14.3	55.1								
8	299°17.7	23°21.7		209°04.0	16.5	0°19.5	-14.3	55.1								
9	314°17.6	23°21.6		223°39.5	16.5	0°05.3	-14.3	55.1								
10	329°17.5	23°21.6		238°15.0	16.4	-0°09.0	-14.3	55.1								
11	344°17.3	23°21.5		252°50.4	16.4	-0°23.3	-14.3	55.2								
12	359°17.2	23°21.4		267°25.8	16.4	-0°37.6	-14.3	55.2								
13	14°17.1	23°21.3		282°01.2	16.4	-0°51.9	-14.3	55.2								

June 27, 28 ,29 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	274°50.9	134°01.4	16°17.9	130°12.2	15°23.3	238°16.9	13°17.5	295°23.2	-10°23.4	Alpheratz	357°36.1	29°13.0
1	289°53.4	149°02.2	16°17.1	145°13.2	15°22.8	253°18.9	13°17.6	310°25.7	-10°23.4	Ankaa	353°08.4	-42°10.5
2	304°55.9	164°03.0	16°16.3	160°14.2	15°22.3	268°21.0	13°17.8	325°28.2	-10°23.4	Schedar	349°32.6	56°39.6
3	319°58.3	179°03.8	16°15.4	175°15.2	15°21.8	283°23.0	13°17.9	340°30.7	-10°23.5	Diphda	348°48.5	-17°51.4
4	335°00.8	194°04.6	16°14.6	190°16.2	15°21.3	298°25.0	13°18.1	355°33.2	-10°23.5	Achernar	335°21.4	-57°06.8
5	350°03.2	209°05.4	16°13.8	205°17.2	15°20.8	313°27.0	13°18.2	10°35.7	-10°23.5	Hamal	327°52.8	23°34.3
6	5°05.7	224°06.2	16°13.0	220°18.2	15°20.3	328°29.1	13°18.3	25°38.2	-10°23.5	Polaris	314°59.0	89°21.5
7	20°08.2	239°07.0	16°12.2	235°19.2	15°19.8	343°31.1	13°18.5	40°40.7	-10°23.5	Akamar	315°13.0	-40°12.5
8	35°10.6	254°07.9	16°11.4	250°20.2	15°19.3	358°33.1	13°18.6	55°43.1	-10°23.6	Menkar	314°07.7	4°10.9
9	50°13.1	269°08.7	16°10.6	265°21.2	15°18.8	13°35.1	13°18.7	70°45.6	-10°23.6	Mirfak	308°30.5	49°56.5
10	65°15.6	284°09.5	16°09.7	280°22.2	15°18.3	28°37.2	13°18.9	85°48.1	-10°23.6	Aldebaran	290°41.4	16°33.4
11	80°18.0	299°10.3	16°08.9	295°23.2	15°17.8	43°39.2	13°19.0	100°50.6	-10°23.6	Rigel	281°05.4	-8°10.4
12	95°20.5	314°11.1	16°08.1	310°24.2	15°17.2	58°41.2	13°19.2	115°53.1	-10°23.7	Capella	280°24.3	46°01.3
13	110°23.0	329°12.0	16°07.3	325°25.2	15°16.7	73°43.2	13°19.3	130°55.6	-10°23.7	Bellatrix	278°24.6	6°22.3
14	125°25.4	344°12.8	16°06.5	340°26.2	15°16.2	88°45.3	13°19.4	145°58.1	-10°23.7	Elnath	278°03.9	28°37.6
15	140°27.9	359°13.6	16°05.7	355°27.3	15°15.7	103°47.3	13°19.6	161°00.6	-10°23.7	Alnilam	275°39.4	-1°11.2
16	155°30.3	14°14.5	16°04.9	10°28.3	15°15.2	118°49.3	13°19.7	176°03.1	-10°23.8	Betelgeuse	270°53.8	7°24.7
17	170°32.8	29°15.3	16°04.0	25°29.3	15°14.7	133°51.3	13°19.9	191°05.6	-10°23.8	Canopus	263°53.5	-52°42.4
18	185°35.3	44°16.2	16°03.2	40°30.3	15°14.2	148°53.4	13°20.0	206°08.1	-10°23.8	Sirius	258°27.6	-16°44.7
19	200°37.7	59°17.0	16°02.4	55°31.3	15°13.7	163°55.4	13°20.1	221°10.6	-10°23.8	Adara	255°07.2	-29°00.2
20	215°40.2	74°17.8	16°01.6	70°32.3	15°13.2	178°57.4	13°20.3	236°13.1	-10°23.9	Procyon	244°52.4	5°10.1
21	230°42.7	89°18.7	16°00.8	85°33.3	15°12.7	193°59.4	13°20.4	251°15.6	-10°23.9	Pollux	243°19.1	27°58.3
22	245°45.1	104°19.5	15°60.0	100°34.3	15°12.1	209°01.5	13°20.5	266°18.1	-10°23.9	Avior	234°15.9	-59°35.1
23	260°47.6	119°20.4	15°59.2	115°35.3	15°11.6	224°03.5	13°20.7	281°20.6	-10°23.9	Suhail	222°47.6	-43°31.7
Mer.pass.:5:39:		v0.8 d-0.8 m-4.4		v1.0 d-0.5 m1.7		v2.0 d0.1 m-2.0		v2.5 d-0.0 m0.8		Miaplacidus	221°39.3	-69°48.9
										Alphard	217°49.2	-8°45.6
										Regulus	207°36.0	11°51.3
										Dubhe	193°42.8	61°37.8
										Denebola	182°26.2	14°26.6
										Gienah	175°44.9	-17°40.4
										Acrux	173°01.5	-63°14.0
										Gacrux	171°53.1	-57°14.9
										Alioth	166°14.0	55°50.3
										Spica	158°23.6	-11°17.0
										Alcaid	152°52.8	49°12.0
										Hadar	148°37.5	-60°29.4
										Menkent	147°59.0	-36°29.3
										Arcturus	145°48.8	19°04.0
										Rigel Kent.	139°41.7	-60°56.1
										Zubenelg.	136°57.2	-16°08.4
										Kochab	137°19.0	74°03.8
										Alphecca	126°04.6	26°38.3
										Antares	112°17.1	-26°29.1
										Atria	107°11.9	-69°04.3
										Sabik	102°03.9	-15°45.2
										Shaula	96°11.7	-37°07.2
										Rasalhague	95°59.4	12°32.6
										Etamin	90°42.2	51°29.1
										Kaus Aust.	83°33.8	-34°22.4
										Vega	80°33.7	38°48.2
										Nunki	75°49.0	-26°16.0
										Altair	62°01.0	8°55.7
										Peacock	53°07.2	-56°39.4
										Deneb	49°26.3	45°21.6
										Enif	33°39.8	9°58.9
										Alnair	27°34.3	-46°50.6
										Fomalhaut	15°15.8	-29°29.7
										Scheat	13°46.4	28°12.4
										Markab	13°31.1	15°19.8
2023/6/2		SHA		Mer.pass								
Venus		219°10.4		15:03								
Mars		215°21.3		15:18								
Jupiter		323°26.0		08:06								
Saturn		20°32.2		04:18								
2023/6/2		SHA		Mer.pass								
Venus		218°31.2		15:02								
Mars		214°46.2		15:17								
Jupiter		323°15.5		08:03								
Saturn		20°33.1		04:14								
2023/6/2		SHA		Mer.pass								
Venus		217°53.1		15:00								
Mars		214°11.2		15:15								
Jupiter		323°05.0		07:59								
Saturn		20°34.0		04:10								
Horizontal parallax												
Venus:				0.3								
Mars:				0.1								
Mer.pass.:5:31:		v0.9 d-0.8 m-4.4		v1.0 d-0.5 m1.7		v2.0 d0.1 m-2.0		v2.5 d-0.0 m0.8				

h		Sun		Moon			
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	179°15.6	23°20.3	82°28.3	16.0	-3°29.9	-14.4	55.5
1	194°15.5	23°20.2	97°03.3	15.9	-3°44.3	-14.4	55.5
2	209°15.4	23°20.2	111°38.2	15.9	-3°58.7	-14.4	55.5
3	224°15.2	23°20.1	126°13.0	15.9	-4°13.1	-14.4	55.6
4	239°15.1	23°20.0	140°47.9	15.8	-4°27.5	-14.4	55.6
5	254°15.0	23°19.9	155°22.7	15.8	-4°41.9	-14.4	55.6
6	269°14.8	23°19.8	169°57.4	15.7	-4°56.2	-14.4	55.7
7	284°14.7	23°19.7	184°32.1	15.7	-5°10.6	-14.4	55.7
8	299°14.6	23°19.6	199°06.7	15.6	-5°25.0	-14.4	55.7
9	314°14.5	23°19.5	213°41.3	15.6	-5°39.4	-14.4	55.8
10	329°14.3	23°19.4	228°15.8	15.5	-5°53.7	-14.4	55.8
11	344°14.2	23°19.3	242°50.3	15.4	-6°08.1	-14.3	55.8
12	359°14.1	23°19.2	257°24.7	15.4	-6°22.4	-14.3	55.8
13	14°13.9	23°19.1	271°59.0	15.3	-6°36.8	-14.3	55.9
14	29°13.8	23°19.0	286°33.3	15.3	-6°51.1	-14.3	55.9
15	44°13.7	23°18.9	301°07.5	15.2	-7°05.4	-14.3	55.9
16	59°13.5	23°18.8	315°41.7	15.1	-7°19.7	-14.3	56.0
17	74°13.4	23°18.7	330°15.8	15.1	-7°34.0	-14.3	56.0
18	89°13.3	23°18.6	344°49.9	15.0	-7°48.3	-14.3	56.0
19	104°13.2	23°18.5	359°23.8	14.9	-8°02.5	-14.3	56.1
20	119°13.0	23°18.3	13°57.7	14.9	-8°16.8	-14.2	56.1
21	134°12.9	23°18.2	28°31.6	14.8	-8°31.0	-14.2	56.1
22	149°12.8	23°18.1	43°05.4	14.7	-8°45.2	-14.2	56.2
23	164°12.6	23°18.0	57°39.1	14.7	-8°59.4	-14.2	56.2
SD.=15.7		d=-0.1	S.D.=15.1				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	179°12.5	23°17.9	72°12.7	14.6	-9°13.6	-14.2	56.2
1	194°12.4	23°17.8	86°46.2	14.5	-9°27.7	-14.1	56.3
2	209°12.3	23°17.7	101°19.7	14.4	-9°41.9	-14.1	56.3
3	224°12.1	23°17.6	115°53.1	14.4	-9°56.0	-14.1	56.3
4	239°12.0	23°17.5	130°26.4	14.3	-10°10.1	-14.1	56.4
5	254°11.9	23°17.4	144°59.6	14.2	-10°24.1	-14.0	56.4
6	269°11.7	23°17.2	159°32.8	14.1	-10°38.1	-14.0	56.4
7	284°11.6	23°17.1	174°05.9	14.0	-10°52.2	-14.0	56.5
8	299°11.5	23°17.0	188°38.9	13.9	-11°06.1	-14.0	56.5
9	314°11.4	23°16.9	203°11.8	13.9	-11°20.1	-13.9	56.5
10	329°11.2	23°16.8	217°44.6	13.8	-11°34.0	-13.9	56.6
11	344°11.1	23°16.7	232°17.3	13.7	-11°47.9	-13.9	56.6
12	359°11.0	23°16.5	246°50.0	13.6	-12°01.7	-13.8	56.6
13	14°10.9	23°16.4	261°22.5	13.5	-12°15.5	-13.8	56.7
14	29°10.7	23°16.3	275°55.0	13.4	-12°29.3	-13.8	56.7
15	44°10.6	23°16.2	290°27.3	13.3	-12°43.0	-13.7	56.7
16	59°10.5	23°16.1	304°59.6	13.2	-12°56.7	-13.7	56.8
17	74°10.3	23°15.9	319°31.8	13.1	-13°10.4	-13.6	56.8
18	89°10.2	23°15.8	334°03.9	13.0	-13°24.0	-13.6	56.9
19	104°10.1	23°15.7	348°35.9	12.9	-13°37.6	-13.6	56.9
20	119°10.0	23°15.6	3°07.7	12.8	-13°51.1	-13.5	56.9
21	134°09.8	23°15.5	17°39.5	12.7	-14°04.6	-13.5	57.0
22	149°09.7	23°15.3	32°11.2	12.6	-14°18.0	-13.4	57.0
23	164°09.6	23°15.2	46°42.8	12.5	-14°31.4	-13.4	57.0
SD.=15.7		d=-0.1	S.D.=15.3				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	179°09.5	23°15.1	61°14.2	12.4	-14°44.8	-13.3	57.1
1	194°09.3	23°15.0	75°45.6	12.3	-14°58.1	-13.3	57.1
2	209°09.2	23°14.8	90°16.9	12.2	-15°11.3	-13.2	57.2
3	224°09.1	23°14.7	104°48.0	12.1	-15°24.5	-13.2	57.2
4	239°09.0	23°14.6	119°19.1	12.0	-15°37.6	-13.1	57.2
5	254°08.8	23°14.4	133°50.0	11.9	-15°50.7	-13.0	57.3
6	269°08.7	23°14.3	148°20.8	11.8	-16°03.7	-13.0	57.3
7	284°08.6	23°14.2	162°51.5	11.6	-16°16.7	-12.9	57.3
8	299°08.4	23°14.0	177°22.1	11.5	-16°29.5	-12.9	57.4
9	314°08.3	23°13.9	191°52.6	11.4	-16°42.4	-12.8	57.4
10	329°08.2	23°13.8	206°22.9	11.3	-16°55.1	-12.7	57.5
11	344°08.1	23°13.6	220°53.2	11.2	-17°07.8	-12.7	57.5
12	359°07.9	23°13.5	235°23.3	11.1	-17°20.5	-12.6	57.5
13	14°07.8	23°13.4	249°53.3	10.9	-17°33.0	-12.5	57.6
14	29°07.7	23°13.2	264°23.2	10.8	-17°45.5	-12.5	57.6
15	44°07.6	23°13.1	278°53.0	10.7	-17°57.9	-12.4	57.6
16	59°07.4	23°13.0	293°22.6	10.6	-18°10.3	-12.3	57.7
17	74°07.3	23°12.8	307°52.1	10.5	-18°22.5	-12.2	57.7
18	89°07.2	23°12.7	322°21.5	10.3	-18°34.7	-12.1	57.8
19	104°07.1	23°12.5	336°50.8	10.2	-18°46.8	-12.1	57.8
20	119°06.9	23°12.4	351°19.9	10.1	-18°58.9	-12.0	57.8
21	134°06.8	23°12.3	5°48.9	10.0	-19°10.8	-11.9	57.9
22	149°06.7	23°12.1	20°17.8	9.8	-19°22.7	-11.8	57.9
23	164°06.6	23°12.0	34°46.6	9.7	-19°34.4	-11.7	58.0
SD.=15.7		d=-0.1	S.D.=15.6				

Lat.	Twilight			Twilight		
	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
72	--	--	--	--	--	--
70	--	--	--	--	--	--
68	--	--	--	--	--	--
66	--	--	--	--	--	--
64	--	--	01:36	22:29	--	--
62	--	--	02:13	21:53	--	--
60	--	00:56	02:39	21:27	23:09	--
58	--	01:45	02:59	21:07	22:21	--
56	--	02:14	03:16	20:50	21:52	--
54	00:52	02:36	03:30	20:36	21:30	23:13
52	01:36	02:54	03:42	20:24	21:13	22:30
50	02:04	03:09	03:53	20:13	20:58	22:02
45	02:49	03:38	04:16	19:51	20:28	21:18
40	03:19	04:01	04:33	19:33	20:06	20:47
35	03:42	04:19	04:48	19:18	19:48	20:24
30	04:01	04:34	05:01	19:05	19:33	20:06
20	04:30	04:59	05:23	18:43	19:08	19:37
10	04:52	05:19	05:42	18:24	18:47	19:14
0	05:11	05:37	05:60	18:07	18:29	18:56
-10	05:28	05:54	06:17	17:50	18:12	18:39
-20	05:44	06:11	06:35	17:31	17:55	18:23
-30	06:00	06:30	06:56	17:10	17:36	18:06
-35	06:09	06:41	07:09	16:58	17:26	17:58
-40	06:18	06:52	07:23	16:44	17:14	17:48
-45	06:29	07:06	07:40	16:27	17:01	17:38
-50	06:40	07:22	08:00	16:06	16:45	17:26
-52	06:45	07:29	08:10	15:57	16:38	17:21
-54	06:51	07:37	08:21	15:46	16:29	17:16
-56	06:57	07:46	08:34	15:33	16:20	17:09
-58	07:04	07:56	08:48	15:19	16:10	17:03
-60	07:11	08:08	09:05	15:01	15:59	16:55

Lat.	Moonrise			Moonset		
	Tue	Wed	Thu	Tue	Wed	Thu
72	14:24	16:47	--	23:11	22:21	--
70	14:13	16:20	19:16	23:24	22:50	21:35
68	14:05	16:00	18:21	23:35	23:12	22:32
66	13:57	15:45	17:48	23:45	23:29	23:06
64	13:51	15:32	17:24	00:00	23:43	23:31
62	13:46	15:21	17:05	00:03	23:55	23:51
60	13:42	15:12	16:50	00:05	00:05	00:05
58	13:38	15:04	16:37	00:07	00:10	00:14
56	13:34	14:57	16:26	00:09	00:15	00:22
54	13:31	14:51	16:16	00:10	00:19	00:29
52	13:28	14:45	16:07	00:12	00:23	00:36
50	13:26	14:40	15:60	00:13	00:26	00:42
45	13:20	14:30	15:43	00:16	00:34	00:54
40	13:16	14:21	15:30	00:18	00:40	01:04
35	13:12	14:13	15:18	00:20	00:45	01:13
30	13:08	14:07	15:09	00:22	00:50	01:21
20	13:02	13:55	14:52	00:25	00:58	01:35
10	12:57	13:45	14:37	00:28	01:06	01:47
0	12:52	13:36	14:24	00:31	01:13	01:58
-10	12:48	13:27	14:10	00:33	01:20	02:10
-20	12:42	13:17	13:56	00:36	01:27	02:22
-30	12:37	13:06	13:40	00:39	01:36	02:36
-35	12:34	13:00	13:31	00:41	01:41	02:44
-40	12:30	12:53	13:20	00:43	01:46	02:53
-45	12:26	12:45	13:08	00:46	01:53	03:04
-50	12:21	12:35	12:53	00:48	02:01	03:18
-52	12:18	12:30	12:46	00:50	02:05	03:24
-54	12:16	12:25	12:38	00:51	02:09	03:31
-56	12:13	12:20	12:29	00:53	02:13	03:38
-58	12:10	12:14	12:20	00:55	02:18	03:47
-60	12:07	12:07	12:09	00:57	02:24	03:57

Day	Sun			Moon		
	Eqn.of Time 00 ^h	Time 12 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age
27	02:58	03:04	12:03	19:02	06:41	9(62%)
28	03:10	03:16	12:03	19:47	07:24	10(71%)
29	03:22	03:28	12:03	20:35	08:10	11(80%)

June 30, 01 ,02 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars			
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	277°48.3	135°04.7	15°19.2	131°24.5	14°46.4	240°43.0	13°27.3	298°23.3	-10°25.2	Alpheratz	357°36.1	29°13.0						
1	292°50.8	150°05.7	15°18.4	146°25.5	14°45.9	255°45.0	13°27.5	313°25.8	-10°25.2	Ankaa	353°08.4	-42°10.5						
2	307°53.3	165°06.6	15°17.6	161°26.5	14°45.4	270°47.1	13°27.6	328°28.3	-10°25.2	Schedar	349°32.5	56°39.7						
3	322°55.7	180°07.6	15°16.8	176°27.5	14°44.8	285°49.1	13°27.7	343°30.9	-10°25.3	Diphda	348°48.5	-17°51.4						
4	337°58.2	195°08.6	15°15.9	191°28.5	14°44.3	300°51.2	13°27.9	358°33.4	-10°25.3	Achernar	335°21.3	-57°06.8						
5	353°00.7	210°09.5	15°15.1	206°29.6	14°43.8	315°53.2	13°28.0	13°35.9	-10°25.3	Hamal	327°52.8	23°34.3						
6	8°03.1	225°10.5	15°14.3	221°30.6	14°43.3	330°55.2	13°28.1	28°38.4	-10°25.3	Polaris	314°57.5	89°21.5						
7	23°05.6	240°11.5	15°13.5	236°31.6	14°42.8	345°57.3	13°28.3	43°40.9	-10°25.4	Akamar	315°13.0	-40°12.5						
8	38°08.1	255°12.5	15°12.7	251°32.6	14°42.2	0°59.3	13°28.4	58°43.4	-10°25.4	Menkar	314°07.7	4°10.9						
9	53°10.5	270°13.4	15°11.9	266°33.6	14°41.7	16°01.3	13°28.5	73°45.9	-10°25.4	Mirfak	308°30.4	49°56.5						
10	68°13.0	285°14.4	15°11.1	281°34.6	14°41.2	31°03.4	13°28.7	88°48.4	-10°25.5	Aldebaran	290°41.4	16°33.4						
11	83°15.4	300°15.4	15°10.2	296°35.6	14°40.7	46°05.4	13°28.8	103°50.9	-10°25.5	Rigel	281°05.4	-8°10.4						
12	98°17.9	315°16.4	15°09.4	311°36.6	14°40.2	61°07.4	13°28.9	118°53.4	-10°25.5	Capella	280°24.3	46°01.3						
13	113°20.4	330°17.4	15°08.6	326°37.6	14°39.6	76°09.5	13°29.1	133°55.9	-10°25.5	Bellatrix	278°24.6	6°22.3						
14	128°22.8	345°18.4	15°07.8	341°38.6	14°39.1	91°11.5	13°29.2	148°58.5	-10°25.6	Elnath	278°03.9	28°37.6						
15	143°25.3	0°19.3	15°07.0	356°39.6	14°38.6	106°13.6	13°29.3	164°01.0	-10°25.6	Alnilam	275°39.4	-1°11.2						
16	158°27.8	15°20.3	15°06.2	11°40.6	14°38.1	121°15.6	13°29.5	179°03.5	-10°25.6	Betelgeuse	270°53.8	7°24.7						
17	173°30.2	30°21.3	15°05.3	26°41.6	14°37.6	136°17.6	13°29.6	194°06.0	-10°25.6	Canopus	263°53.5	-52°42.4						
18	188°32.7	45°22.3	15°04.5	41°42.6	14°37.0	151°19.7	13°29.7	209°08.5	-10°25.7	Sirius	258°27.6	-16°44.7						
19	203°35.2	60°23.3	15°03.7	56°43.6	14°36.5	166°21.7	13°29.9	224°11.0	-10°25.7	Adara	255°07.2	-29°00.2						
20	218°37.6	75°24.3	15°02.9	71°44.7	14°36.0	181°23.7	13°30.0	239°13.5	-10°25.7	Procyon	244°52.4	5°10.1						
21	233°40.1	90°25.3	15°02.1	86°45.7	14°35.5	196°25.8	13°30.1	254°16.0	-10°25.8	Pollux	243°19.1	27°58.3						
22	248°42.6	105°26.4	15°01.3	101°46.7	14°34.9	211°27.8	13°30.3	269°18.5	-10°25.8	Avior	234°15.9	-59°35.1						
23	263°45.0	120°27.4	15°00.5	116°47.7	14°34.4	226°29.9	13°30.4	284°21.0	-10°25.8	Suhail	222°47.6	-43°31.7						
Mer.pass.:5:27:			v1.0 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.1			v2.5 d-0.0 m0.8			Miaplacidus	221°39.3	-69°48.9	
															Alphard	217°49.2	-8°45.6	
															Regulus	207°36.0	11°51.3	
															Dubhe	193°42.8	61°37.8	
															Denebola	182°26.2	14°26.6	
															Gienah	175°44.9	-17°40.4	
															Acrux	173°01.5	-63°14.0	
															Gacrux	171°53.1	-57°14.9	
															Alioth	166°14.1	55°50.3	
															Spica	158°23.6	-11°17.0	
															Alcaid	152°52.8	49°12.1	
															Hadar	148°37.5	-60°29.4	
															Menkent	147°59.0	-36°29.3	
															Arcturus	145°48.8	19°04.0	
															Rigel Kent.	139°41.7	-60°56.1	
															Zubenelg.	136°57.2	-16°08.4	
															Kochab	137°19.0	74°03.8	
															Alphecca	126°04.6	26°38.3	
															Antares	112°17.1	-26°29.1	
															Atria	107°11.9	-69°04.3	
															Sabik	102°03.9	-15°45.2	
															Shaula	96°11.7	-37°07.3	
															Rasalhague	95°59.4	12°32.6	
															Etamin	90°42.2	51°29.2	
															Kaus Aust.	83°33.8	-34°22.4	
															Vega	80°33.7	38°48.3	
															Nunki	75°49.0	-26°16.0	
															Altair	62°00.9	8°55.7	
															Peacock	53°07.2	-56°39.4	
															Deneb	49°26.3	45°21.7	
															Enif	33°39.8	9°58.9	
															Alnair	27°34.2	-46°50.6	
															Fomalhaut	15°15.8	-29°29.7	
															Scheat	13°46.3	28°12.4	
															Markab	13°31.0	15°19.8	
															2023/6/3	SHA	Mer.pass	
															Venus	217°16.4	14:59	
															Mars	213°36.2	15:13	
															Jupiter	322°54.7	07:56	
															Saturn	20°35.0	04:06	
															2023/7/1	SHA	Mer.pass	
															Venus	216°40.9	14:57	
															Mars	213°01.2	15:12	
															Jupiter	322°44.4	07:53	
															Saturn	20°36.1	04:02	
															2023/7/2	SHA	Mer.pass	
															Venus	216°06.7	14:55	
															Mars	212°26.2	15:10	
															Jupiter	322°34.3	07:50	
															Saturn	20°37.3	03:58	
															Horizontal paralax			
															Venus:			0.3
															Mars:			0.1
Mer.pass.:5:20:			v1.1 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.1			v2.5 d-0.0 m0.8						

Sun				Moon											
Fri	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
									Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
0	179°06.5	23°11.8		49°15.2	9.6	-19°46.1	-11.6	58.0	72	—:—	—:—	—:—	—:—	—:—	
1	194°06.3	23°11.7		63°43.7	9.4	-19°57.7	-11.5	58.0	70	—:—	—:—	—:—	—:—	—:—	
2	209°06.2	23°11.6		78°12.1	9.3	-20°09.2	-11.5	58.1	68	—:—	—:—	—:—	—:—	—:—	
3	224°06.1	23°11.4		92°40.3	9.2	-20°20.6	-11.4	58.1	66	—:—	—:—	00:17	23:41	—:—	
4	239°06.0	23°11.3		107°08.4	9.0	-20°31.9	-11.3	58.1	64	—:—	—:—	01:41	22:26	—:—	
5	254°05.8	23°11.1		121°36.4	8.9	-20°43.1	-11.2	58.2	62	—:—	—:—	02:17	21:50	—:—	
6	269°05.7	23°11.0		136°04.2	8.8	-20°54.2	-11.1	58.2	60	—:—	01:03	02:42	21:25	23:03	
7	284°05.6	23°10.8		150°31.9	8.6	-21°05.3	-11.0	58.3	58	—:—	01:48	03:02	21:05	22:19	
8	299°05.5	23°10.7		164°59.5	8.5	-21°16.2	-10.9	58.3	56	—:—	02:17	03:18	20:49	21:50	
9	314°05.3	23°10.5		179°26.9	8.4	-21°27.0	-10.7	58.3	54	00:58	02:38	03:32	20:35	21:29	
10	329°05.2	23°10.4		193°54.2	8.2	-21°37.7	-10.6	58.4	52	01:40	02:56	03:44	20:23	21:11	
11	344°05.1	23°10.2		208°21.4	8.1	-21°48.2	-10.5	58.4	50	02:06	03:11	03:55	20:13	20:57	
12	359°05.0	23°10.1		222°48.4	8.0	-21°58.7	-10.4	58.4	45	02:51	03:40	04:17	19:50	20:28	
13	14°04.9	23°09.9		237°15.3	7.8	-22°09.1	-10.3	58.5	40	03:21	04:02	04:35	19:33	20:05	
14	29°04.7	23°09.8		251°42.1	7.7	-22°19.3	-10.2	58.5	35	03:43	04:20	04:50	19:18	19:48	
15	44°04.6	23°09.6		266°08.7	7.6	-22°29.5	-10.1	58.6	30	04:02	04:35	05:02	19:05	19:33	
16	59°04.5	23°09.5		280°35.2	7.4	-22°39.5	-9.9	58.6	20	04:30	04:60	05:24	18:43	19:08	
17	74°04.4	23°09.3		295°01.6	7.3	-22°49.3	-9.8	58.6	10	04:53	05:20	05:43	18:25	18:48	
18	89°04.2	23°09.1		309°27.8	7.2	-22°59.1	-9.7	58.7	0	05:12	05:38	06:00	18:08	18:30	
19	104°04.1	23°09.0		323°53.9	7.0	-23°08.8	-9.6	58.7	-10	05:28	05:55	06:17	17:50	18:13	
20	119°04.0	23°08.8		338°19.8	6.9	-23°18.3	-9.4	58.7	-20	05:44	06:12	06:36	17:32	17:56	
21	134°03.9	23°08.7		352°45.7	6.7	-23°27.6	-9.3	58.8	-30	06:00	06:30	06:57	17:11	17:38	
22	149°03.8	23°08.5		7°11.3	6.6	-23°36.9	-9.2	58.8	-35	06:09	06:41	07:09	16:59	17:27	
23	164°03.6	23°08.4		21°36.9	6.5	-23°46.0	-9.1	58.9	-40	06:18	06:52	07:23	16:45	17:16	
SD.=15.7 d=-0.1				S.D.=15.8											
								-45	06:28	07:06	07:39	16:29	17:02	17:39	
								-50	06:40	07:21	07:60	16:08	16:46	17:28	
								-52	06:45	07:29	08:09	15:58	16:39	17:23	
								-54	06:51	07:37	08:20	15:48	16:31	17:17	
								-56	06:57	07:46	08:33	15:35	16:22	17:11	
								-58	07:03	07:56	08:47	15:21	16:12	17:05	
								-60	07:11	08:07	09:04	15:04	16:01	16:57	
								Lat.	Moonrise			Moonset			
									Fri	Sat	Sun	Fri	Sat	Sun	
								72	—:—	—:—	—:—	—:—	—:—	—:—	
								70	—:—	—:—	—:—	—:—	—:—	—:—	
								68	—:—	—:—	—:—	—:—	—:—	—:—	
								66	20:41	—:—	—:—	22:05	—:—	—:—	
								64	19:36	—:—	—:—	23:12	—:—	—:—	
								62	19:01	21:10	—:—	23:47	23:43	—:—	
								60	18:36	20:25	21:58	00:08	00:13	00:28	
								58	18:16	19:56	21:22	00:21	00:34	00:58	
								56	17:59	19:33	20:55	00:33	00:51	01:21	
								54	17:45	19:15	20:34	00:44	01:05	01:39	
								52	17:33	18:60	20:17	00:53	01:18	01:55	
								50	17:23	18:46	20:02	01:02	01:29	02:09	
								45	17:00	18:19	19:32	01:19	01:52	02:37	
								40	16:43	17:57	19:09	01:34	02:11	02:59	
								35	16:28	17:39	18:49	01:47	02:27	03:17	
								30	16:15	17:24	18:33	01:58	02:41	03:33	
								20	15:53	16:58	18:05	02:16	03:04	04:00	
								10	15:34	16:36	17:41	02:33	03:25	04:23	
								0	15:17	16:15	17:19	02:48	03:44	04:45	
								-10	14:59	15:55	16:57	03:04	04:03	05:07	
								-20	14:41	15:33	16:33	03:21	04:24	05:30	
								-30	14:20	15:08	16:05	03:40	04:48	05:57	
								-35	14:07	14:53	15:49	03:51	05:02	06:13	
								-40	13:53	14:36	15:30	04:04	05:18	06:32	
								-45	13:37	14:15	15:07	04:20	05:38	06:54	
								-50	13:16	13:50	14:38	04:39	06:02	07:23	
								-52	13:07	13:37	14:24	04:48	06:14	07:37	
								-54	12:56	13:23	14:07	04:58	06:28	07:53	
								-56	12:44	13:07	13:48	05:09	06:44	08:13	
								-58	12:30	12:48	13:23	05:23	07:02	08:37	
								-60	12:13	12:24	12:51	05:38	07:26	09:09	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								30	03:34	03:40	12:03	21:30	09:02	12(88%)	
								1	03:46	03:52	12:03	22:29	09:59	13(94%)	
								2	03:58	04:03	12:04	23:34	11:01	14(98%)	
SD.=15.7 d=-0.2				S.D.=16.3											

July 03, 04 ,05 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	280°45.8	136°19.7	14°20.7	132°37.1	14°08.6	243°10.0	13°36.8	301°24.3	-10°27.3	Alpheratz	357°36.0	29°13.0					
1	295°48.2	151°20.8	14°19.9	147°38.1	14°08.1	258°12.0	13°36.9	316°26.8	-10°27.3	Ankaa	353°08.3	-42°10.5					
2	310°50.7	166°22.0	14°19.1	162°39.1	14°07.6	273°14.1	13°37.0	331°29.3	-10°27.3	Schedar	349°32.5	56°39.7					
3	325°53.2	181°23.1	14°18.3	177°40.1	14°07.0	288°16.1	13°37.2	346°31.8	-10°27.4	Diphda	348°48.5	-17°51.4					
4	340°55.6	196°24.2	14°17.4	192°41.1	14°06.5	303°18.2	13°37.3	1°34.4	-10°27.4	Achernar	335°21.3	-57°06.8					
5	355°58.1	211°25.4	14°16.6	207°42.1	14°06.0	318°20.2	13°37.4	16°36.9	-10°27.4	Hamal	327°52.8	23°34.3					
6	11°00.6	226°26.5	14°15.8	222°43.1	14°05.4	333°22.3	13°37.6	31°39.4	-10°27.5	Polaris	314°55.8	89°21.5					
7	26°03.0	241°27.6	14°15.0	237°44.1	14°04.9	348°24.3	13°37.7	46°41.9	-10°27.5	Akamar	315°13.0	-40°12.4					
8	41°05.5	256°28.8	14°14.2	252°45.2	14°04.4	3°26.4	13°37.8	61°44.4	-10°27.5	Menkar	314°07.7	4°10.9					
9	56°07.9	271°29.9	14°13.4	267°46.2	14°03.8	18°28.4	13°37.9	76°47.0	-10°27.6	Mirfak	308°30.4	49°56.5					
10	71°10.4	286°31.1	14°12.6	282°47.2	14°03.3	33°30.5	13°38.1	91°49.5	-10°27.6	Aldebaran	290°41.4	16°33.4					
11	86°12.9	301°32.2	14°11.8	297°48.2	14°02.8	48°32.5	13°38.2	106°52.0	-10°27.6	Rigel	281°05.4	-8°10.4					
12	101°15.3	316°33.4	14°11.0	312°49.2	14°02.2	63°34.6	13°38.3	121°54.5	-10°27.7	Capella	280°24.2	46°01.3					
13	116°17.8	331°34.6	14°10.2	327°50.2	14°01.7	78°36.6	13°38.4	136°57.1	-10°27.7	Bellatrix	278°24.5	6°22.3					
14	131°20.3	346°35.7	14°09.4	342°51.2	14°01.2	93°38.7	13°38.6	151°59.6	-10°27.7	Elnath	278°03.8	28°37.6					
15	146°22.7	1°36.9	14°08.6	357°52.2	14°00.6	108°40.7	13°38.7	167°02.1	-10°27.7	Anilam	275°39.3	-1°11.2					
16	161°25.2	16°38.0	14°07.8	12°53.2	14°00.1	123°42.8	13°38.8	182°04.6	-10°27.8	Betelgeuse	270°53.8	7°24.7					
17	176°27.7	31°39.2	14°06.9	27°54.2	13°59.6	138°44.8	13°39.0	197°07.1	-10°27.8	Canopus	263°53.5	-52°42.4					
18	191°30.1	46°40.4	14°06.1	42°55.3	13°59.0	153°46.9	13°39.1	212°09.7	-10°27.8	Sirius	258°27.6	-16°44.7					
19	206°32.6	61°41.6	14°05.3	57°56.3	13°58.5	168°48.9	13°39.2	227°12.2	-10°27.9	Adara	255°07.2	-29°00.2					
20	221°35.0	76°42.7	14°04.5	72°57.3	13°58.0	183°51.0	13°39.3	242°14.7	-10°27.9	Procyon	244°52.4	5°10.1					
21	236°37.5	91°43.9	14°03.7	87°58.3	13°57.4	198°53.0	13°39.5	257°17.2	-10°27.9	Pollux	243°19.1	27°58.3					
22	251°40.0	106°45.1	14°02.9	102°59.3	13°56.9	213°55.1	13°39.6	272°19.7	-10°28.0	Avior	234°15.9	-59°35.1					
23	266°42.4	121°46.3	14°02.1	118°00.3	13°56.4	228°57.1	13°39.7	287°22.3	-10°28.0	Suhail	222°47.6	-43°31.7					
Mer.pass.:5:16:			v1.1 d-0.8 m-4.4			v1.0 d-0.5 m1.7			v2.0 d0.1 m-2.1			v2.5 d-0.0 m0.8					
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Miaplacidus221°39.3-69°48.9 Alphard217°49.2-8°45.6 Regulus207°36.011°51.3 Dubhe193°42.861°37.8 Denebola182°26.214°26.6 Gienah175°44.9-17°40.4 Acrux173°01.6-63°14.0 Gacrux171°53.1-57°14.9 Alioth166°14.155°50.3 Spica158°23.6-11°17.0 Alcaid152°52.849°12.1 Hadar148°37.6-60°29.4 Menkent147°59.0-36°29.3 Arcturus145°48.819°04.0 Rigel Kent.139°41.7-60°56.1 Zubenelg.136°57.2-16°08.4 Kochab137°19.174°03.8 Alphecca126°04.626°38.3 Antares112°17.0-26°29.1 Atria107°11.9-69°04.3 Sabik102°03.9-15°45.2 Shaula96°11.7-37°07.3 Rasalhague95°59.412°32.6 Etamin90°42.251°29.2 Kaus Aust.83°33.7-34°22.4 Vega80°33.738°48.3 Nunki75°48.9-26°16.0 Altair62°00.98°55.7 Peacock53°07.1-56°39.4 Deneb49°26.245°21.7 Enif33°39.89°58.9 Alnair27°34.2-46°50.6 Fomalhaut15°15.8-29°29.7 Scheat13°46.328°12.4 Markab13°31.015°19.8							
0	281°44.9	136°47.4	14°01.3	133°01.3	13°55.8	243°59.2	13°39.8	302°24.8	-10°28.0								
1	296°47.4	151°48.6	14°00.5	148°02.3	13°55.3	259°01.2	13°40.0	317°27.3	-10°28.1								
2	311°49.8	166°49.8	13°59.7	163°03.3	13°54.8	274°03.3	13°40.1	332°29.8	-10°28.1								
3	326°52.3	181°51.0	13°58.9	178°04.4	13°54.2	289°05.3	13°40.2	347°32.4	-10°28.1								
4	341°54.8	196°52.2	13°58.1	193°05.4	13°53.7	304°07.4	13°40.4	2°34.9	-10°28.2								
5	356°57.2	211°53.4	13°57.3	208°06.4	13°53.2	319°09.4	13°40.5	17°37.4	-10°28.2								
6	11°59.7	226°54.6	13°56.5	223°07.4	13°52.6	334°11.5	13°40.6	32°39.9	-10°28.2								
7	27°02.2	241°55.8	13°55.7	238°08.4	13°52.1	349°13.5	13°40.7	47°42.5	-10°28.3								
8	42°04.6	256°57.0	13°54.9	253°09.4	13°51.6	4°15.6	13°40.9	62°45.0	-10°28.3								
9	57°07.1	271°58.2	13°54.1	268°10.4	13°51.0	19°17.6	13°41.0	77°47.5	-10°28.3								
10	72°09.5	286°59.4	13°53.3	283°11.4	13°50.5	34°19.7	13°41.1	92°50.0	-10°28.4								
11	87°12.0	302°00.6	13°52.5	298°12.4	13°50.0	49°21.7	13°41.2	107°52.5	-10°28.4								
12	102°14.5	317°01.9	13°51.7	313°13.4	13°49.4	64°23.8	13°41.4	122°55.1	-10°28.4								
13	117°16.9	332°03.1	13°50.9	328°14.5	13°48.9	79°25.9	13°41.5	137°57.6	-10°28.5								
14	132°19.4	347°04.3	13°50.1	343°15.5	13°48.4	94°27.9	13°41.6	153°00.1	-10°28.5								
15	147°21.9	2°05.5	13°49.3	358°16.5	13°47.8	109°30.0	13°41.7	168°02.6	-10°28.5								
16	162°24.3	17°06.7	13°48.5	13°17.5	13°47.3	124°32.0	13°41.9	183°05.2	-10°28.6								
17	177°26.8	32°08.0	13°47.6	28°18.5	13°46.7	139°34.1	13°42.0	198°07.7	-10°28.6								
18	192°29.3	47°09.2	13°46.8	43°19.5	13°46.2	154°36.1	13°42.1	213°10.2	-10°28.6								
19	207°31.7	62°10.4	13°46.0	58°20.5	13°45.7	169°38.2	13°42.2	228°12.7	-10°28.7								
20	222°34.2	77°11.7	13°45.2	73°21.5	13°45.1	184°40.2	13°42.4	243°15.3	-10°28.7								
21	237°36.7	92°12.9	13°44.4	88°22.5	13°44.6	199°42.3	13°42.5	258°17.8	-10°28.7								
22	252°39.1	107°14.1	13°43.6	103°23.6	13°44.1	214°44.3	13°42.6	273°20.3	-10°28.8								
23	267°41.6	122°15.4	13°42.8	118°24.6	13°43.5	229°46.4	13°42.7	288°22.8	-10°28.8								
Mer.pass.:5:12:			v1.2 d-0.8 m-4.5			v1.0 d-0.5 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.8					
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	2023/7/3 SHA Mer.pass Venus215°33.914:54 Mars211°51.315:09 Jupiter322°24.207:46 Saturn20°38.503:54 2023/7/4 SHA Mer.pass Venus215°02.514:52 Mars211°16.415:07 Jupiter322°14.307:43 Saturn20°39.903:50 2023/7/5 SHA Mer.pass Venus214°32.614:50 Mars210°41.515:05 Jupiter322°04.407:40 Saturn20°41.303:46 Horizontal parallax Venus:0.3 Mars:0.1							
0	282°44.0	137°16.6	13°42.0	133°25.6	13°43.0	244°48.5	13°42.9	303°25.4	-10°28.8								
1	297°46.5	152°17.9	13°41.2	148°26.6	13°42.4	259°50.5	13°43.0	318°27.9	-10°28.9								
2	312°49.0	167°19.1	13°40.4	163°27.6	13°41.9	274°52.6	13°43.1	333°30.4	-10°28.9								
3	327°51.4	182°20.4	13°39.6	178°28.6	13°41.4	289°54.6	13°43.2	348°33.0	-10°28.9								
4	342°53.9	197°21.6	13°38.8	193°29.6	13°40.8	304°56.7	13°43.4	3°35.5	-10°29.0								
5	357°56.4	212°22.9	13°38.0	208°30.6	13°40.3	319°58.7	13°43.5	18°38.0	-10°29.0								
6	12°58.8	227°24.2	13°37.2	223°31.6	13°39.8	335°00.8	13°43.6	33°40.5	-10°29.0								
7	28°01.3	242°25.4	13°36.4	238°32.7	13°39.2	350°02.9	13°43.7	48°43.1	-10°29.1								
8	43°03.8	257°26.7	13°35.6	253°33.7	13°38.7	5°04.9	13°43.9	63°45.6	-10°29.1								
9	58°06.2	272°28.0	13°34.9	268°34.7	13°38.1	20°07.0	13°44.0	78°48.1	-10°29.1								
10	73°08.7	287°29.2	13°34.1	283°35.7	13°37.6	35°09.0	13°44.1	93°50.6	-10°29.2								
11	88°11.2	302°30.5	13°33.3	298°36.7	13°37.1	50°11.1	13°44.2	108°53.2	-10°29.2								
12	103°13.6	317°31.8	13°32.5	313°37.7	13°36.5	65°13.1	13°44.4	123°55.7	-10°29.3								
13	118°16.1	332°33.1	13°31.7	328°38.7	13°36.0	80°15.2	13°44.5	138°58.2	-10°29.3								
14	133°18.5	347°34.3	13°30.9	343°39.7	13°35.4	95°17.3	13°44.6	154°00.8	-10°29.3								
15	148°21.0	2°35.6	13°30.1	358°40.8	13°34.9	110°19.3	13°44.7	169°03.3	-10°29.4								
16	163°23.5	17°36.9	13°29.3	13°41.8	13°34.4	125°21.4	13°44.9	184°05.8	-10°29.4								
17	178°25.9	32°38.2	13°28.5	28°42.8	13°33.8	140°23.4	13°45.0	199°08.3	-10°29.4								
18	193°28.4	47°39.5	13°27.7	43°43.8	13°33.3	155°25.5	13°45.1	214°10.9	-10°29.5								
19	208°30.9	62°40.8	13°26.9	58°44.8	13°32.7	170°27.6	13°45.2	229°13.4	-10°29.5								
20	223°33.3	77°42.1	13°26.1	73°45.8	13°32.2	185°29.6	13°45.4	244°15.9	-10°29.5								
21	238°35.8	92°43.4	13°25.3	88°46.8	13°31.7	200°31.7	13°45.5	259°18.5	-10°29.6								
22	253°38.3	107°44.7	13°24.5	103°47.8	13°31.1	215°33.7	13°45.6	274°21.0	-10°29.6								
23	268°40.7	122°46.0	13°23.7	118°48.9	13°30.6	230°35.8	13°45.7	289°23.5	-10°29.6								
Mer.pass.:5:08:			v1.2 d-0.8 m-4.5			v1.0 d-0.5 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.8					

Sun				Moon											
Mon	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	178°57.8	22°59.7		6°08.4	1.7	-27°50.6	-0.3	60.4	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	193°57.7	22°59.5		20°29.1	1.7	-27°50.8	-0.1	60.4	70						
2	208°57.6	22°59.3		34°49.7	1.6	-27°50.8	0.1	60.4	68						
3	223°57.5	22°59.1		49°10.4	1.6	-27°50.6	0.3	60.4	66						
4	238°57.4	22°58.9		63°31.0	1.6	-27°50.1	0.5	60.4	64			00:40	23:23		
5	253°57.2	22°58.7		77°51.6	1.6	-27°49.5	0.7	60.5	64			01:47	22:21		
6	268°57.1	22°58.5		92°12.1	1.6	-27°48.6	1.0	60.5	62			02:21	21:47		
7	283°57.0	22°58.3		106°32.7	1.5	-27°47.6	1.2	60.5	60		01:10	02:45	21:23	22:56	
8	298°56.9	22°58.1		120°53.2	1.5	-27°46.3	1.4	60.5	58		01:53	03:05	21:03	22:15	
9	313°56.8	22°57.9		135°13.7	1.5	-27°44.8	1.6	60.5	56		02:20	03:21	20:47	21:48	
10	328°56.7	22°57.7		149°34.3	1.5	-27°43.1	1.8	60.6	54	01:05	02:41	03:35	20:34	21:27	23:02
11	343°56.6	22°57.5		163°54.8	1.5	-27°41.2	2.0	60.6	52	01:44	02:58	03:46	20:22	21:10	22:24
12	358°56.4	22°57.3		178°15.3	1.5	-27°39.1	2.2	60.6	50	02:09	03:13	03:57	20:12	20:55	21:59
13	13°56.3	22°57.1		192°35.8	1.5	-27°36.7	2.4	60.6	45	02:53	03:42	04:19	19:50	20:27	21:15
14	28°56.2	22°56.9		206°56.4	1.5	-27°34.2	2.7	60.6	40	03:22	04:04	04:36	19:32	20:05	20:46
15	43°56.1	22°56.7		221°16.9	1.6	-27°31.4	2.9	60.6	35	03:45	04:21	04:51	19:18	19:47	20:24
16	58°56.0	22°56.5		235°37.5	1.6	-27°28.4	3.1	60.7	30	04:03	04:36	05:04	19:05	19:32	20:05
17	73°55.9	22°56.3		249°58.1	1.6	-27°25.2	3.3	60.7	20	04:32	05:01	05:25	18:44	19:08	19:37
18	88°55.8	22°56.1		264°18.7	1.6	-27°21.9	3.5	60.7	10	04:54	05:21	05:44	18:25	18:48	19:15
19	103°55.6	22°55.9		278°39.3	1.6	-27°18.3	3.7	60.7	0	05:12	05:38	06:01	18:08	18:31	18:57
20	118°55.5	22°55.7		292°60.0	1.7	-27°14.4	3.9	60.7	-10	05:29	05:55	06:18	17:51	18:14	18:40
21	133°55.4	22°55.5		307°20.7	1.7	-27°10.4	4.1	60.7	-20	05:45	06:12	06:36	17:33	17:57	18:24
22	148°55.3	22°55.3		321°41.4	1.7	-27°06.2	4.3	60.7	-30	06:01	06:30	06:57	17:12	17:39	18:08
23	163°55.2	22°55.1		336°02.2	1.8	-27°01.7	4.5	60.7	-35	06:09	06:41	07:09	17:00	17:28	17:60
	SD.=15.7	d=-0.2		S.D.=16.5					-40	06:18	06:52	07:22	16:47	17:17	17:51
									-45	06:28	07:05	07:39	16:30	17:04	17:41
									-50	06:39	07:21	07:59	16:10	16:48	17:30
									-52	06:44	07:28	08:08	16:01	16:41	17:25
									-54	06:50	07:36	08:19	15:50	16:33	17:19
									-56	06:56	07:44	08:31	15:38	16:25	17:13
									-58	07:02	07:54	08:45	15:24	16:15	17:07
									-60	07:09	08:06	09:02	15:07	16:04	16:60
										Moonrise			Moonset		
									Lat.	Mon	Tue	Wed	Mon	Tue	Wed
									72	--	--	--	--	--	--
									70	--	--	--	--	--	--
									68	--	--	--	--	--	--
									66	--	--	--	--	--	--
									64	--	--	00:10	--	--	03:32
									62	23:36	23:32	23:28	--	01:51	04:09
									60	22:47	23:05	23:12	01:10	02:39	04:35
									58	22:16	22:44	22:58	01:47	03:10	04:56
									56	21:53	22:26	22:46	02:13	03:33	05:13
									54	21:33	22:11	22:35	02:34	03:52	05:27
									52	21:17	21:58	22:26	02:51	04:08	05:39
									50	21:03	21:47	22:18	03:06	04:22	05:50
									45	20:34	21:23	21:60	03:36	04:50	06:13
									40	20:12	21:04	21:45	03:60	05:12	06:31
									35	19:53	20:48	21:32	04:19	05:30	06:47
									30	19:37	20:34	21:21	04:36	05:46	06:60
									20	19:10	20:10	21:02	05:04	06:12	07:22
									10	18:46	19:49	20:46	05:28	06:35	07:41
									0	18:25	19:29	20:30	05:50	06:56	07:59
									-10	18:03	19:10	20:15	06:12	07:17	08:16
									-20	17:39	18:49	19:58	06:36	07:39	08:35
									-30	17:12	18:24	19:38	07:04	08:05	08:57
									-35	16:56	18:10	19:27	07:20	08:20	09:09
									-40	16:37	17:53	19:14	07:39	08:37	09:23
									-45	16:14	17:33	18:58	08:02	08:58	09:40
									-50	15:45	17:08	18:39	08:32	09:24	10:01
									-52	15:31	16:56	18:30	08:46	09:37	10:11
									-54	15:14	16:42	18:20	09:03	09:51	10:22
									-56	14:54	16:26	18:08	09:23	10:08	10:34
									-58	14:30	16:06	17:54	09:48	10:28	10:48
									-60	13:57	15:42	17:38	10:21	10:53	11:05
										Sun			Moon		
									Day	Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									3	04:09	04:14	12:04	00:40	12:07	15(100%)
									4	04:20	04:25	12:04	00:40	13:12	16(98%)
									5	04:30	04:36	12:04	01:44	14:14	17(94%)
										Sun			Moon		
										Eqn.of Time		Mer.	Mer.Pass.		Age

July 06, 07 ,08 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	283°43.2	137°47.3	13°22.9	133°49.9	13°30.0	245°37.9	13°45.9	304°26.0	-10°29.7	Alpheratz	357°36.0	29°13.1					
1	298°45.7	152°48.6	13°22.1	148°50.9	13°29.5	260°39.9	13°46.0	319°28.6	-10°29.7	Ankaa	353°08.3	-42°10.5					
2	313°48.1	167°49.9	13°21.3	163°51.9	13°29.0	275°42.0	13°46.1	334°31.1	-10°29.7	Schedar	349°32.4	56°39.7					
3	328°50.6	182°51.2	13°20.5	178°52.9	13°28.4	290°44.0	13°46.2	349°33.6	-10°29.8	Diphda	348°48.4	-17°51.4					
4	343°53.0	197°52.5	13°19.7	193°53.9	13°27.9	305°46.1	13°46.3	4°36.2	-10°29.8	Achernar	335°21.2	-57°06.8					
5	358°55.5	212°53.9	13°18.9	208°54.9	13°27.3	320°48.2	13°46.5	19°38.7	-10°29.9	Hamal	327°52.8	23°34.3					
6	13°58.0	227°55.2	13°18.1	223°55.9	13°26.8	335°50.2	13°46.6	34°41.2	-10°29.9	Polaris	314°54.5	89°21.5					
7	29°00.4	242°56.5	13°17.4	238°57.0	13°26.2	350°52.3	13°46.7	49°43.8	-10°29.9	Akamar	315°12.9	-40°12.4					
8	44°02.9	257°57.8	13°16.6	253°58.0	13°25.7	5°54.3	13°46.8	64°46.3	-10°30.0	Menkar	314°07.6	4°10.9					
9	59°05.4	272°59.2	13°15.8	268°59.0	13°25.2	20°56.4	13°47.0	79°48.8	-10°30.0	Mirfak	308°30.4	49°56.5					
10	74°07.8	288°00.5	13°15.0	283°60.0	13°24.6	35°58.5	13°47.1	94°51.4	-10°30.0	Aldebaran	290°41.4	16°33.4					
11	89°10.3	303°01.8	13°14.2	299°01.0	13°24.1	51°00.5	13°47.2	109°53.9	-10°30.1	Rigel	281°05.4	-8°10.4					
12	104°12.8	318°03.2	13°13.4	314°02.0	13°23.5	66°02.6	13°47.3	124°56.4	-10°30.1	Capella	280°24.2	46°01.3					
13	119°15.2	333°04.5	13°12.6	329°03.0	13°23.0	81°04.6	13°47.5	139°58.9	-10°30.1	Bellatrix	278°24.5	6°22.3					
14	134°17.7	348°05.9	13°11.8	344°04.0	13°22.4	96°06.7	13°47.6	155°01.5	-10°30.2	Elnath	278°03.8	28°37.6					
15	149°20.2	3°07.2	13°11.0	359°05.1	13°21.9	111°08.8	13°47.7	170°04.0	-10°30.2	Alnilam	275°39.3	-1°11.2					
16	164°22.6	18°08.6	13°10.2	14°06.1	13°21.4	126°10.8	13°47.8	185°06.5	-10°30.2	Betelgeuse	270°53.8	7°24.7					
17	179°25.1	33°09.9	13°09.4	29°07.1	13°20.8	141°12.9	13°47.9	200°09.1	-10°30.3	Canopus	263°53.5	-52°42.4					
18	194°27.5	48°11.3	13°08.6	44°08.1	13°20.3	156°15.0	13°48.1	215°11.6	-10°30.3	Sirius	258°27.6	-16°44.6					
19	209°30.0	63°12.6	13°07.9	59°09.1	13°19.7	171°17.0	13°48.2	230°14.1	-10°30.4	Adara	255°07.2	-29°00.2					
20	224°32.5	78°14.0	13°07.1	74°10.1	13°19.2	186°19.1	13°48.3	245°16.7	-10°30.4	Procyon	244°52.4	5°10.1					
21	239°34.9	93°15.4	13°06.3	89°11.1	13°18.6	201°21.2	13°48.4	260°19.2	-10°30.4	Pollux	243°19.1	27°58.3					
22	254°37.4	108°16.7	13°05.5	104°12.1	13°18.1	216°23.2	13°48.5	275°21.7	-10°30.5	Avior	234°15.9	-59°35.1					
23	269°39.9	123°18.1	13°04.7	119°13.2	13°17.5	231°25.3	13°48.7	290°24.3	-10°30.5	Suhail	222°47.6	-43°31.7					
Mer.pass.:5:04:			v1.3 d-0.8 m-4.5			v1.0 d-0.5 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.8					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	284°42.3	138°19.5	13°03.9	134°14.2	13°17.0	246°27.3	13°48.8	305°26.8	-10°30.5	Dubhe	193°42.8	61°37.8					
1	299°44.8	153°20.8	13°03.1	149°15.2	13°16.5	261°29.4	13°48.9	320°29.3	-10°30.6	Denebola	182°26.2	14°26.6					
2	314°47.3	168°22.2	13°02.3	164°16.2	13°15.9	276°31.5	13°49.0	335°31.9	-10°30.6	Gienah	175°44.9	-17°40.4					
3	329°49.7	183°23.6	13°01.6	179°17.2	13°15.4	291°33.5	13°49.2	350°34.4	-10°30.7	Acrux	173°01.6	-63°14.0					
4	344°52.2	198°25.0	13°00.8	194°18.2	13°14.8	306°35.6	13°49.3	5°36.9	-10°30.7	Gacrux	171°53.1	-57°14.9					
5	359°54.6	213°26.4	12°60.0	209°19.2	13°14.3	321°37.7	13°49.4	20°39.5	-10°30.7	Alioth	166°14.1	55°50.3					
6	14°57.1	228°27.8	12°59.2	224°20.2	13°13.7	336°39.7	13°49.5	35°42.0	-10°30.8	Spica	158°23.6	-11°17.0					
7	29°59.6	243°29.1	12°58.4	239°21.3	13°13.2	351°41.8	13°49.6	50°44.5	-10°30.8	Alcaid	152°52.8	49°12.1					
8	45°02.0	258°30.5	12°57.6	254°22.3	13°12.6	6°43.9	13°49.8	65°47.1	-10°30.8	Hadar	148°37.6	-60°29.4					
9	60°04.5	273°31.9	12°56.8	269°23.3	13°12.1	21°45.9	13°49.9	80°49.6	-10°30.9	Menkent	147°59.0	-36°29.3					
10	75°07.0	288°33.3	12°56.1	284°24.3	13°11.5	36°48.0	13°50.0	95°52.1	-10°30.9	Arcturus	145°48.8	19°04.1					
11	90°09.4	303°34.7	12°55.3	299°25.3	13°11.0	51°50.1	13°50.1	110°54.7	-10°30.9	Rigel Kent.	139°41.7	-60°56.1					
12	105°11.9	318°36.1	12°54.5	314°26.3	13°10.5	66°52.1	13°50.2	125°57.2	-10°31.0	Zubenelg.	136°57.2	-16°08.4					
13	120°14.4	333°37.5	12°53.7	329°27.3	13°09.9	81°54.2	13°50.4	140°59.8	-10°31.0	Kochab	137°19.1	74°03.8					
14	135°16.8	348°39.0	12°52.9	344°28.4	13°09.4	96°56.3	13°50.5	156°02.3	-10°31.1	Alphecca	126°04.6	26°38.3					
15	150°19.3	3°40.4	12°52.1	359°29.4	13°08.8	111°58.3	13°50.6	171°04.8	-10°31.1	Antares	112°17.0	-26°29.1					
16	165°21.8	18°41.8	12°51.4	14°30.4	13°08.3	127°00.4	13°50.7	186°07.4	-10°31.1	Atria	107°11.9	-69°04.3					
17	180°24.2	33°43.2	12°50.6	29°31.4	13°07.7	142°02.5	13°50.8	201°09.9	-10°31.2	Sabik	102°03.9	-15°45.2					
18	195°26.7	48°44.6	12°49.8	44°32.4	13°07.2	157°04.5	13°51.0	216°12.4	-10°31.2	Shaula	96°11.7	-37°07.3					
19	210°29.1	63°46.0	12°49.0	59°33.4	13°06.6	172°06.6	13°51.1	231°15.0	-10°31.2	Rasalhague	95°59.4	12°32.6					
20	225°31.6	78°47.5	12°48.2	74°34.4	13°06.1	187°08.7	13°51.2	246°17.5	-10°31.3	Etamin	90°42.2	51°29.2					
21	240°34.1	93°48.9	12°47.4	89°35.5	13°05.5	202°10.7	13°51.3	261°20.0	-10°31.3	Kaus Aust.	83°33.7	-34°22.4					
22	255°36.5	108°50.3	12°46.7	104°36.5	13°05.0	217°12.8	13°51.4	276°22.6	-10°31.4	Vega	80°33.7	38°48.3					
23	270°39.0	123°51.8	12°45.9	119°37.5	13°04.4	232°14.9	13°51.6	291°25.1	-10°31.4	Nunki	75°48.9	-26°16.0					
Mer.pass.:5:00:			v1.4 d-0.8 m-4.5			v1.0 d-0.5 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.8					
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	285°41.5	138°53.2	12°45.1	134°38.5	13°03.9	247°17.0	13°51.7	306°27.7	-10°31.4	Alnair	27°34.2	-46°50.6					
1	300°43.9	153°54.6	12°44.3	149°39.5	13°03.3	262°19.0	13°51.8	321°30.2	-10°31.5	Fomalhaut	15°15.8	-29°29.7					
2	315°46.4	168°56.1	12°43.5	164°40.5	13°02.8	277°21.1	13°51.9	336°32.7	-10°31.5	Scheat	13°46.3	28°12.4					
3	330°48.9	183°57.5	12°42.8	179°41.5	13°02.2	292°23.2	13°52.0	351°35.3	-10°31.6	Markab	13°31.0	15°19.8					
4	345°51.3	198°59.0	12°42.0	194°42.6	13°01.7	307°25.2	13°52.2	6°37.8	-10°31.6	2023/7/6			SHA	Mer.pass			
5	0°53.8	214°00.4	12°41.2	209°43.6	13°01.1	322°27.3	13°52.3	21°40.3	-10°31.6	Venus	214°04.1	14:48					
6	15°56.3	229°01.9	12°40.4	224°44.6	13°00.6	337°29.4	13°52.4	36°42.9	-10°31.7	Mars	210°06.7	15:04					
7	30°58.7	244°03.3	12°39.7	239°45.6	13°00.0	352°31.4	13°52.5	51°45.4	-10°31.7	Jupiter	321°54.7	07:36					
8	46°01.2	259°04.8	12°38.9	254°46.6	12°59.5	7°33.5	13°52.6	66°48.0	-10°31.7	Saturn	20°42.9	03:42					
9	61°03.6	274°06.3	12°38.1	269°47.6	12°58.9	22°35.6	13°52.8	81°50.5	-10°31.8	2023/7/7			SHA	Mer.pass			
10	76°06.1	289°07.7	12°37.3	284°48.6	12°58.4	37°37.7	13°52.9	96°									

Sun								Moon							
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	178°49.8	22°43.9	320°35.9	6.3	-19°37.8	12.9	60.7	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	193°49.7	22°43.7	335°01.2	6.4	-19°24.8	13.0	60.7	70							
2	208°49.6	22°43.5	349°26.7	6.5	-19°11.8	13.1	60.7	70							
3	223°49.5	22°43.2	3°52.3	6.6	-18°58.6	13.2	60.7	68							
4	238°49.4	22°43.0	18°17.9	6.8	-18°45.3	13.3	60.7	66			00:57	23:09			
5	253°49.3	22°42.7	32°43.8	6.9	-18°31.9	13.4	60.7	64			01:53	22:15			
6	268°49.2	22°42.5	47°09.7	7.0	-18°18.4	13.6	60.6	62			02:26	21:43			
7	283°49.1	22°42.2	61°35.7	7.1	-18°04.8	13.7	60.6	60		01:19	02:49	21:19	22:48		
8	298°49.0	22°42.0	76°01.9	7.2	-17°51.1	13.8	60.6	58		01:58	03:08	21:01	22:10		
9	313°48.9	22°41.7	90°28.2	7.3	-17°37.3	13.9	60.6	56		02:24	03:24	20:45	21:44		
10	328°48.8	22°41.5	104°54.6	7.4	-17°23.4	14.0	60.6	54	01:12	02:45	03:37	20:32	21:24	22:55	
11	343°48.7	22°41.2	119°21.1	7.6	-17°09.3	14.1	60.6	52	01:49	03:02	03:49	20:20	21:08	22:20	
12	358°48.6	22°41.0	133°47.7	7.7	-16°55.2	14.2	60.6	50	02:13	03:16	03:59	20:10	20:53	21:56	
13	13°48.5	22°40.7	148°14.4	7.8	-16°41.0	14.3	60.5	45	02:56	03:44	04:21	19:49	20:25	21:14	
14	28°48.4	22°40.5	162°41.2	7.9	-16°26.7	14.4	60.5	40	03:25	04:06	04:38	19:32	20:04	20:45	
15	43°48.3	22°40.2	177°08.2	8.0	-16°12.3	14.4	60.5	35	03:47	04:23	04:52	19:17	19:47	20:23	
16	58°48.2	22°40.0	191°35.2	8.1	-15°57.8	14.5	60.5	30	04:05	04:38	05:05	19:05	19:32	20:05	
17	73°48.1	22°39.7	206°02.4	8.2	-15°43.2	14.6	60.5	20	04:33	05:02	05:26	18:44	19:08	19:37	
18	88°48.0	22°39.5	220°29.7	8.3	-15°28.6	14.7	60.4	10	04:55	05:21	05:44	18:25	18:48	19:15	
19	103°47.9	22°39.2	234°57.1	8.4	-15°13.8	14.8	60.4	0	05:13	05:39	06:01	18:09	18:31	18:57	
20	118°47.8	22°38.9	249°24.5	8.5	-14°59.0	14.9	60.4	-10	05:29	05:55	06:18	17:52	18:15	18:41	
21	133°47.7	22°38.7	263°52.1	8.6	-14°44.1	14.9	60.4	-20	05:45	06:12	06:36	17:34	17:58	18:25	
22	148°47.6	22°38.4	278°19.8	8.8	-14°29.1	15.0	60.4	-30	06:00	06:30	06:56	17:14	17:40	18:10	
23	163°47.5	22°38.2	292°47.7	8.9	-14°14.1	15.1	60.3	-35	06:09	06:40	07:08	17:02	17:30	18:01	
SD.=15.7 d=-0.2								-40	06:18	06:51	07:22	16:48	17:19	17:52	
S.D.=16.6								-45	06:27	07:04	07:38	16:32	17:06	17:43	
								-50	06:38	07:20	07:57	16:13	16:51	17:32	
S.D.=16.5								-52	06:43	07:27	08:07	16:03	16:44	17:27	
								-54	06:49	07:34	08:17	15:53	16:36	17:21	
S.D.=16.3								-56	06:54	07:43	08:29	15:41	16:27	17:16	
								-58	07:01	07:53	08:43	15:27	16:18	17:09	
S.D.=16.3								-60	07:08	08:03	08:59	15:11	16:07	17:02	
								Moonrise			Moonset				
								Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
								72	--	00:52	00:00	--	06:56	09:34	
								70	01:44	00:25	23:22	04:06	07:20	09:42	
								68	00:47	00:05	23:20	05:02	07:38	09:48	
								66	00:13	23:33	23:19	05:34	07:52	09:53	
								64	23:36	23:26	23:18	05:58	08:04	09:58	
								62	23:24	23:21	23:17	06:17	08:14	10:02	
								60	23:15	23:16	23:16	06:32	08:22	10:05	
								58	23:06	23:11	23:15	06:45	08:29	10:08	
								56	22:58	23:07	23:14	06:56	08:36	10:10	
								54	22:52	23:04	23:14	07:06	08:42	10:13	
								52	22:46	23:01	23:13	07:14	08:47	10:15	
								50	22:40	22:58	23:13	07:22	08:51	10:17	
								45	22:28	22:51	23:12	07:38	09:01	10:21	
								40	22:18	22:46	23:11	07:52	09:10	10:24	
								35	22:09	22:41	23:10	08:03	09:17	10:27	
								30	22:02	22:37	23:09	08:13	09:23	10:29	
								20	21:49	22:30	23:08	08:29	09:33	10:34	
								10	21:37	22:24	23:07	08:44	09:43	10:37	
								0	21:26	22:18	23:06	08:57	09:51	10:41	
								-10	21:15	22:12	23:05	09:11	09:59	10:44	
								-20	21:03	22:05	23:04	09:25	10:08	10:48	
								-30	20:50	21:58	23:03	09:41	10:18	10:52	
								-35	20:42	21:54	23:02	09:50	10:24	10:54	
								-40	20:33	21:49	23:01	10:00	10:31	10:57	
								-45	20:22	21:43	23:01	10:13	10:38	10:60	
								-50	20:10	21:37	22:60	10:27	10:47	11:03	
								-52	20:04	21:33	22:59	10:34	10:51	11:05	
								-54	19:57	21:30	22:59	10:42	10:56	11:07	
								-56	19:49	21:26	22:58	10:50	11:01	11:09	
								-58	19:41	21:22	22:57	10:60	11:06	11:11	
								-60	19:31	21:17	22:57	11:10	11:12	11:13	
								Sun			Moon				
								Day	Eqn.of Time	Mer.	Mer.Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower		
								6	04:41	04:46	12:04	02:43	15:11	18(87%)	
								7	04:51	04:55	12:04	03:38	16:04	19(78%)	
								8	05:00	05:05	12:05	04:29	16:53	20(68%)	

July 09, 10 ,11 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	286°40.6	139°28.5	12°26.5	135°02.8	12°50.7	248°06.7	13°54.5	307°28.6	-10°32.4	Alpheratz	357°36.0	29°13.1					
1	301°43.1	154°30.0	12°25.7	150°03.9	12°50.1	263°08.7	13°54.6	322°31.1	-10°32.4	Ankaa	353°08.3	-42°10.5					
2	316°45.5	169°31.5	12°24.9	165°04.9	12°49.6	278°10.8	13°54.8	337°33.7	-10°32.4	Schedar	349°32.4	56°39.7					
3	331°48.0	184°33.1	12°24.2	180°05.9	12°49.0	293°12.9	13°54.9	352°36.2	-10°32.5	Diphda	348°48.4	-17°51.4					
4	346°50.5	199°34.6	12°23.4	195°06.9	12°48.5	308°15.0	13°55.0	7°38.7	-10°32.5	Achernar	335°21.2	-57°06.8					
5	1°52.9	214°36.1	12°22.6	210°07.9	12°47.9	323°17.0	13°55.1	22°41.3	-10°32.6	Hamal	327°52.7	23°34.3					
6	16°55.4	229°37.6	12°21.9	225°08.9	12°47.4	338°19.1	13°55.2	37°43.8	-10°32.6	Polaris	314°53.2	89°21.5					
7	31°57.9	244°39.1	12°21.1	240°09.9	12°46.8	353°21.2	13°55.4	52°46.4	-10°32.6	Akamar	315°12.9	-40°12.4					
8	47°00.3	259°40.7	12°20.3	255°11.0	12°46.3	8°23.3	13°55.5	67°48.9	-10°32.7	Menkar	314°07.6	4°10.9					
9	62°02.8	274°42.2	12°19.6	270°12.0	12°45.7	23°25.3	13°55.6	82°51.5	-10°32.7	Mirfak	308°30.3	49°56.5					
10	77°05.2	289°43.7	12°18.8	285°13.0	12°45.2	38°27.4	13°55.7	97°54.0	-10°32.8	Aldebaran	290°41.3	16°33.4					
11	92°07.7	304°45.3	12°18.0	300°14.0	12°44.6	53°29.5	13°55.8	112°56.5	-10°32.8	Rigel	281°05.4	-8°10.4					
12	107°10.2	319°46.8	12°17.3	315°15.0	12°44.0	68°31.6	13°55.9	127°59.1	-10°32.8	Capella	280°24.2	46°01.3					
13	122°12.6	334°48.3	12°16.5	330°16.0	12°43.5	83°33.6	13°56.1	143°01.6	-10°32.9	Bellatrix	278°24.5	6°22.3					
14	137°15.1	349°49.9	12°15.7	345°17.1	12°42.9	98°35.7	13°56.2	158°04.2	-10°32.9	Elnath	278°03.8	28°37.6					
15	152°17.6	4°51.4	12°15.0	0°18.1	12°42.4	113°37.8	13°56.3	173°06.7	-10°33.0	Alnilam	275°39.3	-1°11.2					
16	167°20.0	19°53.0	12°14.2	15°19.1	12°41.8	128°39.9	13°56.4	188°09.3	-10°33.0	Betelgeuse	270°53.8	7°24.7					
17	182°22.5	34°54.5	12°13.4	30°20.1	12°41.3	143°41.9	13°56.5	203°11.8	-10°33.0	Canopus	263°53.5	-52°42.4					
18	197°25.0	49°56.1	12°12.7	45°21.1	12°40.7	158°44.0	13°56.6	218°14.3	-10°33.1	Sirius	258°27.6	-16°44.6					
19	212°27.4	64°57.7	12°11.9	60°22.1	12°40.2	173°46.1	13°56.8	233°16.9	-10°33.1	Adara	255°07.2	-29°00.2					
20	227°29.9	79°59.2	12°11.1	75°23.1	12°39.6	188°48.2	13°56.9	248°19.4	-10°33.2	Procyon	244°52.4	5°10.1					
21	242°32.3	95°00.8	12°10.4	90°24.2	12°39.1	203°50.3	13°57.0	263°22.0	-10°33.2	Pollux	243°19.1	27°58.3					
22	257°34.8	110°02.3	12°09.6	105°25.2	12°38.5	218°52.3	13°57.1	278°24.5	-10°33.3	Avior	234°15.9	-59°35.1					
23	272°37.3	125°03.9	12°08.9	120°26.2	12°37.9	233°54.4	13°57.2	293°27.1	-10°33.3	Suhail	222°47.6	-43°31.7					
Mer.pass.:4:52:			v1.5 d-0.8 m-4.5			v1.0 d-0.6 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.7					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	287°39.7	140°05.5	12°08.1	135°27.2	12°37.4	248°56.5	13°57.3	308°29.6	-10°33.3	Dubhe	193°42.9	61°37.8					
1	302°42.2	155°07.1	12°07.3	150°28.2	12°36.8	263°58.6	13°57.4	323°32.1	-10°33.4	Denebola	182°26.3	14°26.6					
2	317°44.7	170°08.7	12°06.6	165°29.2	12°36.3	279°00.6	13°57.6	338°34.7	-10°33.4	Gienah	175°44.9	-17°40.4					
3	332°47.1	185°10.2	12°05.8	180°30.3	12°35.7	294°02.7	13°57.7	353°37.2	-10°33.5	Acrux	173°01.6	-63°14.0					
4	347°49.6	200°11.8	12°05.1	195°31.3	12°35.2	309°04.8	13°57.8	8°39.8	-10°33.5	Gacrux	171°53.1	-57°14.9					
5	2°52.1	215°13.4	12°04.3	210°32.3	12°34.6	324°06.9	13°57.9	23°42.3	-10°33.5	Alioth	166°14.1	55°50.3					
6	17°54.5	230°15.0	12°03.5	225°33.3	12°34.1	339°09.0	13°58.0	38°44.9	-10°33.6	Spica	158°23.6	-11°17.0					
7	32°57.0	245°16.6	12°02.8	240°34.3	12°33.5	354°11.0	13°58.1	53°47.4	-10°33.6	Alcaid	152°52.9	49°12.1					
8	47°59.5	260°18.2	12°02.0	255°35.3	12°32.9	9°13.1	13°58.3	68°50.0	-10°33.7	Hadar	148°37.6	-60°29.4					
9	63°01.9	275°19.8	12°01.3	270°36.3	12°32.4	24°15.2	13°58.4	83°52.5	-10°33.7	Menkent	147°59.0	-36°29.3					
10	78°04.4	290°21.4	12°00.5	285°37.4	12°31.8	39°17.3	13°58.5	98°55.0	-10°33.7	Arcturus	145°48.8	19°04.1					
11	93°06.8	305°23.0	11°59.7	300°38.4	12°31.3	54°19.4	13°58.6	113°57.6	-10°33.8	Rigel Kent.	139°41.7	-60°56.2					
12	108°09.3	320°24.6	11°59.0	315°39.4	12°30.7	69°21.4	13°58.7	129°00.1	-10°33.8	Zubenelg.	136°57.2	-16°08.4					
13	123°11.8	335°26.2	11°58.2	330°40.4	12°30.2	84°23.5	13°58.8	144°02.7	-10°33.9	Kochab	137°19.2	74°03.8					
14	138°14.2	350°27.8	11°57.5	345°41.4	12°29.6	99°25.6	13°58.9	159°05.2	-10°33.9	Alphecca	126°04.6	26°38.3					
15	153°16.7	5°29.5	11°56.7	0°42.4	12°29.0	114°27.7	13°59.1	174°07.8	-10°33.9	Antares	112°17.1	-26°29.1					
16	168°19.2	20°31.1	11°56.0	15°43.5	12°28.5	129°29.8	13°59.2	189°10.3	-10°34.0	Atria	107°11.9	-69°04.3					
17	183°21.6	35°32.7	11°55.2	30°44.5	12°27.9	144°31.9	13°59.3	204°12.9	-10°34.0	Sabik	102°03.9	-15°45.2					
18	198°24.1	50°34.3	11°54.5	45°45.5	12°27.4	159°33.9	13°59.4	219°15.4	-10°34.1	Shaula	96°11.7	-37°07.3					
19	213°26.6	65°36.0	11°53.7	60°46.5	12°26.8	174°36.0	13°59.5	234°18.0	-10°34.1	Rasalhague	95°59.4	12°32.7					
20	228°29.0	80°37.6	11°53.0	75°47.5	12°26.3	189°38.1	13°59.6	249°20.5	-10°34.2	Etamin	90°42.2	51°29.2					
21	243°31.5	95°39.2	11°52.2	90°48.5	12°25.7	204°40.2	13°59.7	264°23.1	-10°34.2	Kaus Aust.	83°33.7	-34°22.4					
22	258°34.0	110°40.9	11°51.5	105°49.6	12°25.1	219°42.3	13°59.9	279°25.6	-10°34.2	Vega	80°33.7	38°48.3					
23	273°36.4	125°42.5	11°50.7	120°50.6	12°24.6	234°44.3	13°60.0	294°28.2	-10°34.3	Nunki	75°48.9	-26°16.0					
Mer.pass.:4:48:			v1.6 d-0.8 m-4.5			v1.0 d-0.6 m1.7			v2.1 d0.1 m-2.1			v2.5 d-0.0 m0.7					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	288°38.9	140°44.1	11°50.0	135°51.6	12°24.0	249°46.4	14°00.1	309°30.7	-10°34.3	Deneb	49°26.2	45°21.7					
1	303°41.3	155°45.8	11°49.2	150°52.6	12°23.5	264°48.5	14°00.2	324°33.2	-10°34.4	Enif	33°39.8	9°58.9					
2	318°43.8	170°47.4	11°48.5	165°53.6	12°22.9	279°50.6	14°00.3	339°35.8	-10°34.4	Alnair	27°34.1	-46°50.6					
3	333°46.3	185°49.1	11°47.7	180°54.6	12°22.3	294°52.7	14°00.4	354°38.3	-10°34.5	Fomalhaut	15°15.7	-29°29.7					
4	348°48.7	200°50.8	11°47.0	195°55.7	12°21.8	309°54.8	14°00.5	9°40.9	-10°34.5	Scheat	13°46.3	28°12.4					
5	3°51.2	215°52.4	11°46.2	210°56.7	12°21.2	324°56.8	14°00.7	24°43.4	-10°34.5	Markab	13°31.0	15°19.8					
6	18°53.7	230°54.1	11°45.5	225°57.7	12°20.7	339°58.9	14°00.8	39°46.0	-10°34.6	2023/7/9	SHA	Mer.pass					
7	33°56.1	245°55.7	11°44.7	240°58.7	12°20.1	355°01.0	14°00.9	54°48.5	-10°34.6	Venus	212°47.9	14:41					
8	48°58.6	260°57.4	11°44.0	255°59.7	12°19.5	10°03.1	14°01.0	69°51.1	-10°34.7	Mars	208°22.2	14:59					
9	64°01.1	275°59.1	11°43.2	271°00.7	12°19.0	25°05.2	14°01.1	84°53.6	-10°34.7	Jupiter	321°26.						

Sun				Moon											
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	178°42.6	22°24.7	283°12.9	12.4	-1°05.5	16.4	59.0	72	--	--	--	--	--	--	
1	193°42.5	22°24.4	297°44.3	12.4	-0°49.1	16.4	59.0	70	--	--	--	--	--	--	
2	208°42.4	22°24.1	312°15.8	12.5	-0°32.7	16.4	59.0	68	--	--	--	--	--	--	
3	223°42.4	22°23.8	326°47.3	12.5	-0°16.4	16.4	59.0	66	--	--	--	--	--	--	
4	238°42.3	22°23.5	341°18.8	12.6	0°00.0	16.4	58.9	64	--	--	01:11	22:55	--	--	
5	253°42.2	22°23.2	355°50.4	12.6	0°16.4	16.3	58.9	62	--	--	02:01	22:08	--	--	
6	268°42.1	22°22.9	10°22.0	12.6	0°32.7	16.3	58.9	60	--	--	02:31	21:38	--	--	
7	283°42.0	22°22.6	24°53.6	12.6	0°49.0	16.3	58.8	58	--	01:28	02:54	21:15	22:40	--	
8	298°41.9	22°22.3	39°25.3	12.7	1°05.3	16.3	58.8	56	--	02:04	03:12	20:57	22:05	--	
9	313°41.8	22°22.0	53°57.0	12.7	1°21.5	16.3	58.8	54	--	02:29	03:28	20:42	21:40	--	
10	328°41.7	22°21.7	68°28.7	12.7	1°37.8	16.2	58.7	52	01:21	02:49	03:41	20:29	21:21	22:48	
11	343°41.6	22°21.4	83°00.4	12.8	1°54.0	16.2	58.7	50	01:54	03:05	03:52	20:18	21:05	22:15	
12	358°41.5	22°21.1	97°32.2	12.8	2°10.2	16.2	58.7	45	02:18	03:19	04:02	20:08	20:51	21:52	
13	13°41.4	22°20.8	112°04.0	12.8	2°26.3	16.1	58.6	40	02:59	03:47	04:23	19:47	20:24	21:11	
14	28°41.3	22°20.5	126°35.8	12.8	2°42.5	16.1	58.6	35	03:27	04:08	04:40	19:30	20:03	20:43	
15	43°41.2	22°20.2	141°07.6	12.8	2°58.6	16.1	58.6	30	03:49	04:25	04:54	19:16	19:46	20:22	
16	58°41.1	22°19.9	155°39.4	12.9	3°14.7	16.1	58.6	20	04:06	04:39	05:06	19:04	19:31	20:04	
17	73°41.1	22°19.6	170°11.3	12.9	3°30.7	16.0	58.5	10	04:34	05:03	05:27	18:43	19:08	19:37	
18	88°41.0	22°19.3	184°43.2	12.9	3°46.7	16.0	58.5	0	04:55	05:22	05:45	18:26	18:48	19:15	
19	103°40.9	22°19.0	199°15.1	12.9	4°02.7	16.0	58.5	-10	05:13	05:39	06:02	18:09	18:31	18:57	
20	118°40.8	22°18.7	213°47.0	12.9	4°18.6	15.9	58.4	-20	05:29	05:56	06:18	17:53	18:15	18:41	
21	133°40.7	22°18.4	228°18.9	12.9	4°34.5	15.9	58.4	-30	05:45	06:12	06:36	17:35	17:59	18:26	
22	148°40.6	22°18.1	242°50.8	12.9	4°50.3	15.8	58.4	-35	06:00	06:30	06:56	17:15	17:41	18:11	
23	163°40.5	22°17.8	257°22.7	12.9	5°06.2	15.8	58.3	-40	06:08	06:40	07:07	17:04	17:31	18:03	
	SD.=15.7	d=-0.3	S.D.=16.1					-40	06:17	06:51	07:21	16:50	17:20	17:54	
								-45	06:26	07:03	07:36	16:35	17:08	17:45	
								-50	06:37	07:18	07:56	16:15	16:53	17:34	
								-52	06:42	07:25	08:05	16:06	16:46	17:29	
								-54	06:47	07:32	08:15	15:56	16:39	17:24	
								-56	06:53	07:41	08:27	15:44	16:30	17:18	
								-58	06:59	07:50	08:40	15:31	16:21	17:12	
								-60	07:06	08:01	08:56	15:15	16:10	17:06	
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
0	178°40.4	22°17.4	271°54.7	12.9	5°21.9	15.8	58.3	72	22:49	22:09	21:07	11:54	14:14	16:56	
1	193°40.3	22°17.1	286°26.6	12.9	5°37.7	15.7	58.3	70	22:55	22:26	21:46	11:51	13:60	16:19	
2	208°40.2	22°16.8	300°58.6	13.0	5°53.4	15.7	58.2	68	23:01	22:40	22:14	11:49	13:48	15:53	
3	223°40.1	22°16.5	315°30.5	13.0	6°09.0	15.6	58.2	66	23:06	22:52	22:35	11:47	13:39	15:33	
4	238°40.1	22°16.2	330°02.5	13.0	6°24.6	15.6	58.2	64	23:10	23:01	22:52	11:45	13:31	15:18	
5	253°40.0	22°15.9	344°34.5	13.0	6°40.2	15.5	58.2	62	23:13	23:09	23:06	11:44	13:24	15:05	
6	268°39.9	22°15.6	359°06.4	13.0	6°55.7	15.5	58.1	60	23:16	23:16	23:18	11:43	13:18	14:54	
7	283°39.8	22°15.3	13°38.4	13.0	7°11.1	15.4	58.1	58	23:19	23:23	23:28	11:42	13:13	14:45	
8	298°39.7	22°15.0	28°10.3	13.0	7°26.5	15.4	58.1	56	23:21	23:28	23:37	11:41	13:09	14:36	
9	313°39.6	22°14.6	42°42.3	13.0	7°41.9	15.3	58.0	54	23:23	23:33	23:45	11:40	13:05	14:29	
10	328°39.5	22°14.3	57°14.2	12.9	7°57.2	15.3	58.0	52	23:25	23:38	23:53	11:39	13:01	14:22	
11	343°39.4	22°14.0	71°46.2	12.9	8°12.5	15.2	58.0	50	23:27	23:42	23:59	11:38	12:58	14:17	
12	358°39.3	22°13.7	86°18.1	12.9	8°27.7	15.2	57.9	45	23:31	23:51	--	11:37	12:51	14:04	
13	13°39.3	22°13.4	100°50.0	12.9	8°42.8	15.1	57.9	40	23:35	23:59	--	11:35	12:45	13:54	
14	28°39.2	22°13.1	115°21.9	12.9	8°57.9	15.1	57.9	35	23:38	--	00:06	11:34	12:40	13:45	
15	43°39.1	22°12.7	129°53.9	12.9	9°12.9	15.0	57.8	30	23:40	--	00:11	11:33	12:35	13:37	
16	58°39.0	22°12.4	144°25.7	12.9	9°27.9	14.9	57.8	20	23:45	--	00:22	11:31	12:28	13:24	
17	73°38.9	22°12.1	158°57.6	12.9	9°42.8	14.9	57.8	10	23:49	--	00:31	11:30	12:21	13:12	
18	88°38.8	22°11.8	173°29.5	12.9	9°57.6	14.8	57.8	0	23:53	--	00:39	11:28	12:15	13:01	
19	103°38.7	22°11.5	188°01.4	12.8	10°12.4	14.8	57.7	-10	23:57	--	00:48	11:27	12:08	12:51	
20	118°38.6	22°11.1	202°33.2	12.8	10°27.2	14.7	57.7	-20	--	00:01	00:57	11:25	12:02	12:39	
21	133°38.6	22°10.8	217°05.0	12.8	10°41.8	14.6	57.7	-30	--	00:06	01:07	11:23	11:54	12:26	
22	148°38.5	22°10.5	231°36.8	12.8	10°56.4	14.6	57.6	-35	--	00:08	01:14	11:22	11:50	12:19	
23	163°38.4	22°10.2	246°08.6	12.8	11°10.9	14.5	57.6	-40	--	00:12	01:21	11:21	11:45	12:10	
	SD.=15.7	d=-0.3	S.D.=15.9					-45	--	00:15	01:29	11:20	11:40	12:01	
								-50	--	00:20	01:39	11:18	11:33	11:49	
								-52	--	00:22	01:44	11:17	11:30	11:43	
								-54	--	00:24	01:49	11:17	11:26	11:37	
								-56	--	00:27	01:55	11:16	11:23	11:31	
								-58	--	00:30	02:01	11:15	11:19	11:23	
								-60	--	00:33	02:08	11:14	11:14	11:15	
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon			
0	178°38.3	22°09.9	260°40.4	12.8	11°25.4	14.4	57.6	9	Eqn.of Time 00 ^h	12 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age	
1	193°38.2	22°09.5	275°12.1	12.7	11°39.8	14.4	57.5	10	05:10	05:14	12:05	05:17	17:40	21(57%)	
2	208°38.1	22°09.2	289°43.8	12.7	11°54.1	14.3	57.5	11	05:18	05:23	12:05	06:03	18:26	22(45%)	
3	223°38.0	22°08.9	304°15.5	12.7	12°08.4	14.2	57.5		05:27	05:31	12:05	06:50	19:13	23(35%)	
4	238°38.0	22°08.5	318°47.2	12.7	12°22.6	14.2	57.5								
5	253°37.9	22°08.2	333°18.8	12.6	12°36.7	14.1	57.4								
6	268°37.8	22°07.9	347°50.5	12.6	12°50.7	14.0	57.4								
7	283°37.7	22°07.6	2°22.1	12.6	13°04.7	13.9	57.4								
8	298°37.6	22°07.2	16°53.6	12.6	13°18.6	13.9	57.3								
9	313°37.5	22°06.9	31°25.2	12.5	13°32.4	13.8	57.3								
10	328°37.4	22°06.6	45°56.7	12.5	13°46.1	13.7	57.3								
11	343°37.4	22°06.2	60°28.1	12.5	13°59.8	13.6	57.2								
12	358°37.3	22°05.9	74°59.6	12.4	14°13.4	13.5	57.2								
13	13°37.2	22°05.6	89°31.0	12.4	14°26.9	13.5	57.2								
14	28°37.1	22°05.2	104°02.4	12.4	14°40.3	13.4	57.2								
15	43°37.0	22°04.9	118°33.7	12.3	14°53.7	13.3	57.1								
16	58°36.9	22°04.6	133°05.1	12.3	15°06.9	13.2	57.1								
17	73°36.9	22°04.2	147°36.3	12.3	15°20.1	13.1	57.1								
18	88°36.8	22°03.9	162°07.6	12.2	15°33.2	13.0	57.0								
19	103°36.7	22°03.6	176°38.8	12.2	15°46.2	13.0	57.0								
20	118°36.6	22°03.2	191°10.0	12.1	15°59.1	12.9	57.0								
21	133°36.5	22°02.9	205°41.1	12.1	16°11.9	12.8	57.0								
22	148°36.4	22°02.6	220°12.2	12.1	16°24.7	12.7	56.9								
23	163°36.4	22°02.2	234°43.2	12.0	16°37.3	12.6	56.9								
	SD.=15.7	d=-0.3	S.D.=15.7												

July 12, 13 ,14 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars																									
Wed	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec																								
0	289°38.0	141°24.5	11°32.1	136°16.0	12°10.6	250°36.5	14°02.8	310°31.9	-10°35.3						Alpheratz	357°36.0	29°13.1																							
1	304°40.5	156°26.3	11°31.3	151°17.0	12°10.0	265°38.6	14°02.9	325°34.4	-10°35.4						Ankaa	353°08.3	-42°10.5																							
2	319°42.9	171°28.0	11°30.6	166°18.0	12°09.4	280°40.7	14°03.0	340°37.0	-10°35.4						Schedar	349°32.4	56°39.7																							
3	334°45.4	186°29.7	11°29.9	181°19.0	12°08.9	295°42.7	14°03.1	355°39.5	-10°35.5						Diphda	348°48.4	-17°51.3																							
4	349°47.9	201°31.4	11°29.1	196°20.1	12°08.3	310°44.8	14°03.2	10°42.1	-10°35.5						Achernar	335°21.2	-57°06.8																							
5	4°50.3	216°33.2	11°28.4	211°21.1	12°07.8	325°46.9	14°03.4	25°44.6	-10°35.6						Hamal	327°52.7	23°34.3																							
6	19°52.8	231°34.9	11°27.7	226°22.1	12°07.2	340°49.0	14°03.5	40°47.2	-10°35.6						Polaris	314°51.6	89°21.5																							
7	34°55.3	246°36.6	11°26.9	241°23.1	12°06.6	355°51.1	14°03.6	55°49.7	-10°35.7						Akamar	315°12.9	-40°12.4																							
8	49°57.7	261°38.4	11°26.2	256°24.1	12°06.1	10°53.2	14°03.7	70°52.3	-10°35.7						Menkar	314°07.6	4°10.9																							
9	65°00.2	276°40.1	11°25.5	271°25.1	12°05.5	25°55.3	14°03.8	85°54.9	-10°35.7						Mirfak	308°30.3	49°56.5																							
10	80°02.7	291°41.9	11°24.7	286°26.2	12°04.9	40°57.4	14°03.9	100°57.4	-10°35.8						Aldebaran	290°41.3	16°33.4																							
11	95°05.1	306°43.6	11°24.0	301°27.2	12°04.4	55°59.5	14°04.0	115°60.0	-10°35.8						Rigel	281°05.3	-8°10.4																							
12	110°07.6	321°45.4	11°23.3	316°28.2	12°03.8	71°01.6	14°04.1	131°02.5	-10°35.9						Capella	280°24.2	46°01.3																							
13	125°10.1	336°47.1	11°22.5	331°29.2	12°03.2	86°03.6	14°04.2	146°05.1	-10°35.9						Bellatrix	278°24.5	6°22.3																							
14	140°12.5	351°48.9	11°21.8	346°30.2	12°02.7	101°05.7	14°04.4	161°07.6	-10°36.0						Elnath	278°03.8	28°37.6																							
15	155°15.0	6°50.7	11°21.1	1°31.2	12°02.1	116°07.8	14°04.5	176°10.2	-10°36.0						Alnilam	275°39.3	-1°11.2																							
16	170°17.4	21°52.4	11°20.3	16°32.3	12°01.6	131°09.9	14°04.6	191°12.7	-10°36.0						Betelgeuse	270°53.8	7°24.7																							
17	185°19.9	36°54.2	11°19.6	31°33.3	12°01.0	146°12.0	14°04.7	206°15.3	-10°36.1						Canopus	263°53.5	-52°42.4																							
18	200°22.4	51°56.0	11°18.9	46°34.3	12°00.4	161°14.1	14°04.8	221°17.8	-10°36.1						Sirius	258°27.6	-16°44.6																							
19	215°24.8	66°57.8	11°18.1	61°35.3	11°59.9	176°16.2	14°04.9	236°20.4	-10°36.2						Adara	255°07.2	-29°00.1																							
20	230°27.3	81°59.5	11°17.4	76°36.3	11°59.3	191°18.3	14°05.0	251°22.9	-10°36.2						Procyon	244°52.4	5°10.1																							
21	245°29.8	97°01.3	11°16.7	91°37.4	11°58.7	206°20.4	14°05.1	266°25.5	-10°36.3						Pollux	243°19.1	27°58.3																							
22	260°32.2	112°03.1	11°16.0	106°38.4	11°58.2	221°22.5	14°05.2	281°28.0	-10°36.3						Avior	234°15.9	-59°35.1																							
23	275°34.7	127°04.9	11°15.2	121°39.4	11°57.6	236°24.6	14°05.4	296°30.6	-10°36.4						Suhail	222°47.6	-43°31.7																							
Mer.pass.:4:40:			v1.7 d-0.7 m-4.5			v1.0 d-0.6 m1.7			v2.1 d0.1 m-2.1			v2.6 d-0.0 m0.7																												
															Miaplacidus			221°39.4	-69°48.9																					
																		Alphard			217°49.2	-8°45.6																		
																					Regulus			207°36.0	11°51.3															
																								Dubhe			193°42.9	61°37.8												
																											Denebola			182°26.3	14°26.6									
																														Gienah			175°44.9	-17°40.4						
																																	Acrux			173°01.7	-63°14.0			
																																	Gacrux			171°53.2	-57°14.9			
																																				Alioth			166°14.1	55°50.3
																																				Spica			158°23.6	-11°17.0
																																				Alcaid			152°52.9	49°12.1
																																				Hadar			148°37.6	-60°29.4
																																				Menkent			147°59.0	-36°29.3
																																				Arcturus			145°48.8	19°04.1
																																				Rigel Kent.			139°41.8	-60°56.2
																																				Zubenelg.			136°57.2	-16°08.4
																																				Kochab			137°19.2	74°03.8
																																				Alphecca			126°04.6	26°38.3
																																				Antares			112°17.1	-26°29.1
																																				Atria			107°11.9	-69°04.3
																																				Sabik			102°03.9	-15°45.2
																																				Shaula			96°11.7	-37°07.3
																																				Rasalhague			95°59.4	12°32.7
																																				Etamin			90°42.2	51°29.2
																																				Kaus Aust.			83°33.7	-34°22.4
																																				Vega			80°33.7	38°48.3
																																				Nunki			75°48.9	-26°16.0
																																				Altair			62°00.9	8°55.8
																																				Peacock			53°07.1	-56°39.5
																																				Deneb			49°26.2	45°21.7
																																				Enif			33°39.7	9°58.9
																																				Alnair			27°34.1	-46°50.6
																																				Fomalhaut			15°15.7	-29°29.7
																																				Scheat			13°46.2	28°12.5
																																				Markab			13°31.0	15°19.8
																																				2023/7/1			SHA	Mer.pass
																																				Venus			211°46.5	14:33
																																				Mars			206°38.0	14:54
																																				Jupiter			320°58.5	07:17
																																				Saturn			20°53.9	03:17
																																				2023/7/1			SHA	Mer.pass
																																				Venus			211°29.5	14:30
																																				Mars			206°03.2	14:52
																																				Jupiter			320°49.5	07:13
																																				Saturn			20°56.0	03:13
																																				2023/7/1			SHA	Mer.pass
																																				Venus			211°14.4	14:27
																																				Mars			205°28.5	14:51
																																				Jupiter			320°40.6	07:10
																																				Saturn			20°58.2	03:09
																																				Horizontal parallax				

Sun			Moon											
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	178°36.3	22°01.9	249°14.2	12.0	16°49.9	12.5	56.9	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	193°36.2	22°01.5	263°45.2	12.0	17°02.3	12.4	56.9	70	—	—	—	—	—	—
2	208°36.1	22°01.2	278°16.1	11.9	17°14.7	12.3	56.8	70	—	—	—	—	—	—
3	223°36.0	22°00.9	292°47.0	11.9	17°27.0	12.2	56.8	68	—	—	—	—	—	—
4	238°36.0	22°00.5	307°17.9	11.8	17°39.2	12.1	56.8	66	—	—	01:25	22:42	—	—
5	253°35.9	22°00.2	321°48.7	11.8	17°51.3	12.0	56.7	64	—	—	02:09	22:00	—	—
6	268°35.8	21°59.8	336°19.4	11.7	18°03.3	11.9	56.7	62	—	00:27	02:38	21:32	23:33	—
7	283°35.7	21°59.5	350°50.2	11.7	18°15.2	11.9	56.7	60	—	01:38	02:59	21:11	22:31	—
8	298°35.6	21°59.1	5°20.8	11.6	18°27.0	11.8	56.7	58	—	02:11	03:17	20:54	21:59	—
9	313°35.6	21°58.8	19°51.5	11.6	18°38.7	11.7	56.6	56	00:25	02:34	03:32	20:39	21:36	23:36
10	328°35.5	21°58.4	34°22.0	11.6	18°50.3	11.6	56.6	54	01:29	02:53	03:44	20:27	21:17	22:40
11	343°35.4	21°58.1	48°52.6	11.5	19°01.8	11.5	56.6	52	02:00	03:09	03:55	20:16	21:02	22:10
12	358°35.3	21°57.7	63°23.1	11.5	19°13.2	11.4	56.6	50	02:23	03:22	04:05	20:06	20:48	21:48
13	13°35.2	21°57.4	77°53.5	11.4	19°24.5	11.2	56.5	45	03:02	03:49	04:26	19:45	20:22	21:09
14	28°35.2	21°57.0	92°23.9	11.4	19°35.7	11.1	56.5	40	03:30	04:10	04:42	19:29	20:01	20:41
15	43°35.1	21°56.7	106°54.3	11.3	19°46.8	11.0	56.5	35	03:51	04:27	04:56	19:15	19:44	20:20
16	58°35.0	21°56.3	121°24.6	11.3	19°57.8	10.9	56.5	30	04:08	04:41	05:08	19:03	19:30	20:03
17	73°34.9	21°56.0	135°54.8	11.2	20°08.6	10.8	56.4	20	04:35	05:04	05:28	18:43	19:07	19:36
18	88°34.8	21°55.6	150°25.0	11.2	20°19.4	10.7	56.4	10	04:56	05:23	05:46	18:26	18:48	19:15
19	103°34.8	21°55.3	164°55.2	11.1	20°30.1	10.6	56.4	0	05:14	05:40	06:02	18:09	18:32	18:58
20	118°34.7	21°54.9	179°25.3	11.1	20°40.6	10.5	56.4	-10	05:30	05:56	06:18	17:53	18:16	18:42
21	133°34.6	21°54.6	193°55.4	11.0	20°51.1	10.4	56.3	-20	05:45	06:12	06:35	17:36	17:60	18:27
22	148°34.5	21°54.2	208°25.4	11.0	21°01.4	10.3	56.3	-30	05:60	06:29	06:55	17:17	17:43	18:12
23	163°34.5	21°53.9	222°55.3	10.9	21°11.6	10.2	56.3	-35	06:07	06:39	07:06	17:05	17:33	18:04
	SD.=15.7	d=-0.3	S.D.=15.5					-40	06:16	06:49	07:19	16:52	17:22	17:56
								-45	06:25	07:02	07:35	16:37	17:10	17:47
								-50	06:36	07:16	07:54	16:18	16:56	17:36
								-52	06:40	07:23	08:03	16:09	16:49	17:32
								-54	06:45	07:30	08:12	15:59	16:42	17:27
								-56	06:50	07:38	08:24	15:48	16:34	17:21
								-58	06:56	07:47	08:37	15:35	16:25	17:16
								-60	07:03	07:58	08:52	15:20	16:14	17:09

July 15, 16 ,17 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars			
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec				
0	292°35.4	143°36.5	10°40.4	137°29.3	11°29.7	253°07.3	14°10.7	313°35.9	-10°38.6	Alpheratz	357°35.9	29°13.1						
1	307°37.9	158°38.5	10°39.7	152°30.3	11°29.2	268°09.5	14°10.8	328°38.5	-10°38.6	Ankaa	353°08.2	-42°10.5						
2	322°40.4	173°40.5	10°39.0	167°31.3	11°28.6	283°11.6	14°10.9	343°41.1	-10°38.7	Schedar	349°32.3	56°39.7						
3	337°42.8	188°42.4	10°38.3	182°32.3	11°28.0	298°13.7	14°11.0	358°43.6	-10°38.7	Diphda	348°48.4	-17°51.3						
4	352°45.3	203°44.4	10°37.6	197°33.4	11°27.4	313°15.8	14°11.1	13°46.2	-10°38.8	Achernar	335°21.1	-57°06.7						
5	7°47.8	218°46.3	10°36.9	212°34.4	11°26.9	328°17.9	14°11.2	28°48.7	-10°38.8	Hamal	327°52.7	23°34.3						
6	22°50.2	233°48.3	10°36.2	227°35.4	11°26.3	343°20.0	14°11.3	43°51.3	-10°38.9	Polaris	314°49.9	89°21.5						
7	37°52.7	248°50.3	10°35.5	242°36.4	11°25.7	358°22.1	14°11.4	58°53.9	-10°38.9	Akamar	315°12.9	-40°12.4						
8	52°55.2	263°52.3	10°34.8	257°37.4	11°25.1	13°24.2	14°11.5	73°56.4	-10°39.0	Menkar	314°07.6	4°10.9						
9	67°57.6	278°54.2	10°34.2	272°38.4	11°24.6	28°26.3	14°11.6	88°59.0	-10°39.0	Mirfak	308°30.3	49°56.5						
10	83°00.1	293°56.2	10°33.5	287°39.5	11°24.0	43°28.4	14°11.7	104°01.5	-10°39.1	Aldebaran	290°41.3	16°33.4						
11	98°02.5	308°58.2	10°32.8	302°40.5	11°23.4	58°30.5	14°11.8	119°04.1	-10°39.1	Rigel	281°05.3	-8°10.4						
12	113°05.0	324°00.2	10°32.1	317°41.5	11°22.9	73°32.6	14°11.9	134°06.7	-10°39.2	Capella	280°24.1	46°01.3						
13	128°07.5	339°02.2	10°31.4	332°42.5	11°22.3	88°34.7	14°12.0	149°09.2	-10°39.2	Bellatrix	278°24.5	6°22.3						
14	143°09.9	354°04.2	10°30.7	347°43.5	11°21.7	103°36.8	14°12.1	164°11.8	-10°39.3	Elnath	278°03.8	28°37.6						
15	158°12.4	9°06.2	10°30.0	2°44.6	11°21.1	118°38.9	14°12.2	179°14.4	-10°39.3	Alnilam	275°39.3	-1°11.1						
16	173°14.9	24°08.2	10°29.3	17°45.6	11°20.6	133°41.0	14°12.3	194°16.9	-10°39.4	Betelgeuse	270°53.7	7°24.7						
17	188°17.3	39°10.2	10°28.7	32°46.6	11°20.0	148°43.1	14°12.5	209°19.5	-10°39.4	Canopus	263°53.5	-52°42.3						
18	203°19.8	54°12.2	10°28.0	47°47.6	11°19.4	163°45.2	14°12.6	224°22.1	-10°39.5	Sirius	258°27.6	-16°44.6						
19	218°22.3	69°14.2	10°27.3	62°48.6	11°18.8	178°47.3	14°12.7	239°24.6	-10°39.5	Adara	255°07.2	-29°00.1						
20	233°24.7	84°16.2	10°26.6	77°49.7	11°18.3	193°49.5	14°12.8	254°27.2	-10°39.6	Procyon	244°52.4	5°10.1						
21	248°27.2	99°18.2	10°25.9	92°50.7	11°17.7	208°51.6	14°12.9	269°29.7	-10°39.6	Pollux	243°19.1	27°58.3						
22	263°29.7	114°20.3	10°25.2	107°51.7	11°17.1	223°53.7	14°13.0	284°32.3	-10°39.6	Avior	234°15.9	-59°35.1						
23	278°32.1	129°22.3	10°24.6	122°52.7	11°16.5	238°55.8	14°13.1	299°34.9	-10°39.7	Suhail	222°47.6	-43°31.6						
Mer.pass.:4:28:			v2.0 d-0.7 m-4.5			v1.0 d-0.6 m1.7			v2.1 d0.1 m-2.1			v2.6 d-0.0 m0.7						
																Miaplacidus	221°39.4	-69°48.9
																Alphard	217°49.2	-8°45.6
																Regulus	207°36.0	11°51.3
																Dubhe	193°42.9	61°37.8
																Denebola	182°26.3	14°26.6
																Gienah	175°44.9	-17°40.4
																Acrux	173°01.7	-63°14.0
																Gacrux	171°53.2	-57°14.9
																Alioth	166°14.2	55°50.3
																Spica	158°23.6	-11°17.0
																Alcaid	152°52.9	49°12.1
																Hadar	148°37.6	-60°29.4
																Menkent	147°59.0	-36°29.3
																Arcturus	145°48.8	19°04.1
																Rigel Kent.	139°41.8	-60°56.2
																Zubenelg.	136°57.3	-16°08.4
																Kochab	137°19.3	74°03.8
																Alphecca	126°04.6	26°38.3
																Antares	112°17.1	-26°29.1
																Atria	107°11.9	-69°04.3
																Sabik	102°03.9	-15°45.2
																Shaula	96°11.7	-37°07.3
																Rasalhague	95°59.4	12°32.7
																Etamin	90°42.2	51°29.2
																Kaus Aust.	83°33.7	-34°22.4
																Vega	80°33.7	38°48.3
																Nunki	75°48.9	-26°16.0
																Altair	62°00.9	8°55.8
																Peacock	53°07.0	-56°39.5
																Deneb	49°26.2	45°21.8
																Enif	33°39.7	9°58.9
																Alnair	27°34.1	-46°50.6
																Fomalhaut	15°15.7	-29°29.7
																Scheat	13°46.2	28°12.5
																Markab	13°30.9	15°19.8
																2023/7/1	SHA	Mer.pass
																Venus	211°01.1	14:24
																Mars	204°53.8	14:49
																Jupiter	320°31.9	07:07
																Saturn	21°00.5	03:05
																2023/7/1	SHA	Mer.pass
																Venus	210°49.7	14:20
																Mars	204°19.2	14:47
																Jupiter	320°23.3	07:03
																Saturn	21°02.9	03:01
																2023/7/1	SHA	Mer.pass
																Venus	210°40.4	14:17
																Mars	203°44.5	14:46
																Jupiter	320°14.8	06:60
																Saturn	21°05.3	02:57
																Horizontal paralax		
																Venus:	0.4	
																Mars:	0.1	
Mer.pass.:4:21:			v2.1 d-0.7 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.1			v2.6 d-0.0 m0.7						

Sun								Moon							
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	178°30.9	21°35.7	212°29.9	9.0	27°00.6	3.8	55.2	72	--	--	--	--	--	--	
1	193°30.9	21°35.3	226°58.0	9.0	27°04.4	3.7	55.2	70	--	--	--	--	--	--	
2	208°30.8	21°34.9	241°26.0	9.0	27°08.0	3.5	55.2	68	--	--	--	--	--	--	
3	223°30.7	21°34.5	255°54.0	9.0	27°11.5	3.4	55.2	66	--	--	--	--	--	--	
4	238°30.7	21°34.1	270°22.0	9.0	27°14.8	3.3	55.1	64	--	--	01:39	22:30	--	--	
5	253°30.6	21°33.7	284°49.9	9.0	27°18.0	3.1	55.1	62	--	--	02:18	21:52	--	--	
6	268°30.5	21°33.4	299°17.9	9.0	27°21.0	3.0	55.1	60	--	00:55	02:44	21:26	23:11	--	
7	283°30.5	21°33.0	313°45.8	8.9	27°23.9	2.8	55.1	60	--	01:47	03:05	21:06	22:22	--	
8	298°30.4	21°32.6	328°13.8	8.9	27°26.7	2.7	55.1	58	--	02:18	03:22	20:49	21:53	--	
9	313°30.3	21°32.2	342°41.7	8.9	27°29.3	2.5	55.1	56	00:50	02:40	03:36	20:35	21:31	23:16	
10	328°30.3	21°31.8	357°09.6	8.9	27°31.7	2.4	55.0	54	01:38	02:58	03:48	20:23	21:13	22:31	
11	343°30.2	21°31.4	11°37.5	8.9	27°34.1	2.2	55.0	52	02:07	03:13	03:59	20:13	20:58	22:04	
12	358°30.1	21°31.0	26°05.5	8.9	27°36.2	2.1	55.0	50	02:28	03:26	04:08	20:03	20:45	21:43	
13	13°30.1	21°30.6	40°33.4	8.9	27°38.3	2.0	55.0	45	03:06	03:52	04:28	19:43	20:19	21:06	
14	28°30.0	21°30.2	55°01.3	8.9	27°40.2	1.8	55.0	40	03:33	04:12	04:44	19:27	19:59	20:39	
15	43°29.9	21°29.8	69°29.2	8.9	27°41.9	1.7	55.0	35	03:53	04:29	04:58	19:14	19:43	20:18	
16	58°29.9	21°29.4	83°57.1	8.9	27°43.5	1.5	54.9	30	04:10	04:43	05:10	19:02	19:29	20:02	
17	73°29.8	21°29.0	98°25.0	8.9	27°45.0	1.4	54.9	20	04:37	05:05	05:29	18:43	19:07	19:35	
18	88°29.7	21°28.6	112°52.9	8.9	27°46.3	1.2	54.9	10	04:57	05:24	05:47	18:26	18:48	19:15	
19	103°29.7	21°28.2	127°20.8	8.9	27°47.4	1.1	54.9	0	05:14	05:40	06:03	18:10	18:32	18:58	
20	118°29.6	21°27.8	141°48.7	8.9	27°48.5	1.0	54.9	-10	05:30	05:56	06:18	17:54	18:16	18:42	
21	133°29.6	21°27.4	156°16.7	8.9	27°49.3	0.8	54.9	-20	05:44	06:11	06:35	17:37	18:01	18:28	
22	148°29.5	21°27.0	170°44.6	8.9	27°50.1	0.7	54.8	-30	05:59	06:28	06:54	17:18	17:44	18:14	
23	163°29.4	21°26.6	185°12.6	9.0	27°50.7	0.5	54.8	-35	06:06	06:38	07:05	17:07	17:35	18:06	
	SD.=15.7	d=-0.4	S.D.=15.1					-40	06:15	06:48	07:18	16:55	17:24	17:58	
								-45	06:24	06:60	07:33	16:40	17:13	17:49	
								-50	06:34	07:14	07:51	16:21	16:59	17:39	
								-52	06:38	07:20	07:60	16:13	16:52	17:35	
								-54	06:43	07:28	08:09	16:03	16:45	17:30	
								-56	06:48	07:35	08:20	15:52	16:37	17:25	
								-58	06:54	07:44	08:33	15:40	16:29	17:19	
								-60	06:60	07:54	08:47	15:25	16:19	17:13	
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
0	178°29.4	21°26.2	199°40.5	9.0	27°51.1	0.4	54.8	72	--	--	--	--	--	--	
1	193°29.3	21°25.8	214°08.5	9.0	27°51.4	0.2	54.8	70	--	--	--	--	--	--	
2	208°29.2	21°25.4	228°36.5	9.0	27°51.6	0.1	54.8	68	--	--	--	--	--	--	
3	223°29.2	21°25.0	243°04.5	9.0	27°51.6	-0.1	54.8	66	--	--	--	--	--	--	
4	238°29.1	21°24.6	257°32.5	9.0	27°51.5	-0.2	54.8	64	--	--	--	--	--	23:31	
5	253°29.1	21°24.2	272°00.6	9.1	27°51.2	-0.3	54.7	62	23:13	--	00:32	22:03	22:34	22:35	
6	268°29.0	21°23.8	286°28.7	9.1	27°50.8	-0.5	54.7	60	--	00:19	01:24	20:57	21:42	22:02	
7	283°28.9	21°23.4	300°56.7	9.1	27°50.2	-0.6	54.7	58	00:13	00:54	01:56	20:22	21:10	21:37	
8	298°28.9	21°23.0	315°24.9	9.1	27°49.6	-0.8	54.7	56	00:36	01:19	02:19	19:57	20:46	21:18	
9	313°28.8	21°22.6	329°53.0	9.1	27°48.7	-0.9	54.7	54	00:54	01:39	02:39	19:37	20:27	21:01	
10	328°28.8	21°22.2	344°21.1	9.2	27°47.7	-1.0	54.7	52	01:10	01:56	02:55	19:20	20:10	20:47	
11	343°28.7	21°21.8	358°49.3	9.2	27°46.6	-1.2	54.7	50	01:24	02:11	03:09	19:06	19:56	20:35	
12	358°28.6	21°21.3	13°17.6	9.2	27°45.4	-1.3	54.6	45	01:51	02:40	03:37	18:36	19:28	20:09	
13	13°28.6	21°20.9	27°45.8	9.3	27°44.0	-1.5	54.6	40	02:13	03:03	03:59	18:13	19:05	19:48	
14	28°28.5	21°20.5	42°14.1	9.3	27°42.4	-1.6	54.6	35	02:32	03:22	04:18	17:54	18:46	19:31	
15	43°28.5	21°20.1	56°42.4	9.3	27°40.7	-1.7	54.6	30	02:48	03:39	04:33	17:38	18:30	19:17	
16	58°28.4	21°19.7	71°10.7	9.4	27°38.9	-1.9	54.6	20	03:14	04:06	05:00	17:10	18:03	18:51	
17	73°28.3	21°19.3	85°39.1	9.4	27°37.0	-2.0	54.6	10	03:37	04:30	05:23	16:47	17:39	18:29	
18	88°28.3	21°18.9	100°07.5	9.4	27°34.9	-2.2	54.6	0	03:59	04:52	05:44	16:25	17:18	18:09	
19	103°28.2	21°18.5	114°36.0	9.5	27°32.6	-2.3	54.5	-10	04:21	05:14	06:06	16:03	16:56	17:48	
20	118°28.2	21°18.0	129°04.5	9.5	27°30.3	-2.4	54.5	-20	04:44	05:38	06:29	15:39	16:32	17:26	
21	133°28.1	21°17.6	143°33.0	9.6	27°27.8	-2.6	54.5	-30	05:11	06:06	06:55	15:11	16:05	17:01	
22	148°28.1	21°17.2	158°01.6	9.6	27°25.1	-2.7	54.5	-35	05:27	06:22	07:11	14:55	15:48	16:46	
23	163°28.0	21°16.8	172°30.2	9.6	27°22.4	-2.8	54.5	-40	05:46	06:41	07:29	14:36	15:29	16:28	
	SD.=15.7	d=-0.4	S.D.=15.0					-45	06:08	07:05	07:51	14:13	15:06	16:06	
								-50	06:37	07:34	08:18	13:44	14:37	15:39	
								-52	06:52	07:49	08:32	13:29	14:22	15:21	
								-54	07:08	08:06	08:47	13:13	14:05	15:11	
								-56	07:28	08:26	09:06	12:53	13:45	14:53	
								-58	07:53	08:52	09:28	12:28	13:19	14:31	
								-60	08:27	09:27	09:57	11:54	12:44	14:02	
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		Age	
0	178°27.9	21°16.4	186°58.9	9.7	27°19.4	-3.0	54.5	15	05:56	06:00	12:06	10:11	22:38	27(5%)	
1	193°27.9	21°16.0	201°27.6	9.7	27°16.4	-3.1	54.5	16	06:03	06:05	12:06	11:04	23:31	28(2%)	
2	208°27.8	21°15.5	215°56.3	9.8	27°13.2	-3.2	54.5	17	06:08	06:11	12:06	11:56	00:21	29(0%)	
3	223°27.8	21°15.1	230°25.1	9.8	27°09.9	-3.4	54.4								
4	238°27.7	21°14.7	244°54.0	9.9	27°06.4	-3.5	54.4								
5	253°27.7	21°14.3	259°22.8	9.9	27°02.9	-3.6	54.4								
6	268°27.6	21°13.9	273°51.8	10.0	26°59.2	-3.8	54.4								
7	283°27.6	21°13.4	288°20.8	10.0	26°55.3	-3.9	54.4								
8	298°27.5	21°13.0	302°49.8	10.1	26°51.3	-4.0	54.4								
9	313°27.4	21°12.6	317°18.9	10.1	26°47.2	-4.2	54.4								
10	328°27.4	21°12.2	331°48.1	10.2	26°43.0	-4.3	54.4								
11	343°27.3	21°11.8	346°17.3	10.2	26°38.7	-4.4	54.4								
12	358°27.3	21°11.3	0°46.6	10.3	26°34.2	-4.5	54.3								
13	13°27.2	21°10.9	15°15.9	10.4	26°29.6	-4.7	54.3								
14	28°27.2	21°10.5	29°45.3	10.4	26°24.8	-4.8	54.3								
15	43°27.1	21°10.0	44°14.7	10.5	26°19.9	-4.9	54.3								
16	58°27.1	21°09.6	58°44.2	10.5	26°15.0	-5.1	54.3								
17	73°27.0	21°09.2	73°13.8	10.6	26°09.8	-5.2	54.3								
18	88°27.0	21°08.8	87°43.4	10.6	26°04.6	-5.3	54.3								
19	103°26.9	21°08.3	102°13.1	10.7	25°59.3	-5.4	54.3								
20	118°26.9	21°07.9	116°42.8	10.8	25°53.8	-5.5	54.3								
21	133°26.8	21°07.5	131°12.6	10.8	25°48.2	-5.7	54.3								
22	148°26.8	21°07.0	145°42.5	10.9	25°42.5	-5.8	54.2								
23	163°26.7	21°06.6	160°12.4	11.0	25°36.6	-5.9	54.2								
	SD.=15.7	d=-0.4	S.D.=14.9												

July 18, 19 ,20 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	295°32.9	146°05.9	9°52.2	138°42.7	10°48.2	255°39.3	14°18.1	316°40.7	-10°42.1	Alpheratz	357°35.9	29°13.1					
1	310°35.3	161°08.1	9°51.5	153°43.7	10°47.6	270°41.4	14°18.2	331°43.3	-10°42.2	Ankaa	353°08.2	-42°10.5					
2	325°37.8	176°10.3	9°50.9	168°44.7	10°47.0	285°43.6	14°18.3	346°45.8	-10°42.2	Schedar	349°32.3	56°39.7					
3	340°40.3	191°12.5	9°50.3	183°45.8	10°46.5	300°45.7	14°18.4	1°48.4	-10°42.3	Diphda	348°48.3	-17°51.3					
4	355°42.7	206°14.7	9°49.6	198°46.8	10°45.9	315°47.8	14°18.5	16°51.0	-10°42.3	Achernar	335°21.1	-57°06.7					
5	10°45.2	221°16.9	9°49.0	213°47.8	10°45.3	330°49.9	14°18.6	31°53.5	-10°42.4	Hamal	327°52.6	23°34.3					
6	25°47.6	236°19.1	9°48.4	228°48.8	10°44.7	345°52.0	14°18.7	46°56.1	-10°42.4	Polaris	314°48.3	89°21.5					
7	40°50.1	251°21.3	9°47.7	243°49.8	10°44.1	0°54.2	14°18.8	61°58.7	-10°42.5	Akamar	315°12.8	-40°12.4					
8	55°52.6	266°23.6	9°47.1	258°50.9	10°43.5	15°56.3	14°18.9	77°01.3	-10°42.5	Menkar	314°07.5	4°11.0					
9	70°55.0	281°25.8	9°46.5	273°51.9	10°43.0	30°58.4	14°19.0	92°03.8	-10°42.6	Mirfak	308°30.2	49°56.5					
10	85°57.5	296°28.0	9°45.8	288°52.9	10°42.4	46°00.5	14°19.1	107°06.4	-10°42.6	Aldebaran	290°41.3	16°33.4					
11	100°60.0	311°30.3	9°45.2	303°53.9	10°41.8	61°02.6	14°19.2	122°09.0	-10°42.7	Rigel	281°05.3	-8°10.0					
12	116°02.4	326°32.5	9°44.6	318°54.9	10°41.2	76°04.8	14°19.3	137°11.5	-10°42.7	Capella	280°24.1	46°01.2					
13	131°04.9	341°34.8	9°43.9	333°56.0	10°40.6	91°06.9	14°19.4	152°14.1	-10°42.8	Bellatrix	278°24.5	6°22.3					
14	146°07.4	356°37.0	9°43.3	348°57.0	10°40.0	106°09.0	14°19.5	167°16.7	-10°42.8	Elnath	278°03.7	28°37.6					
15	161°09.8	1°39.3	9°42.7	3°58.0	10°39.5	121°11.1	14°19.6	182°19.3	-10°42.9	Alnilam	275°39.3	-1°11.1					
16	176°12.3	26°41.5	9°42.0	18°59.0	10°38.9	136°13.3	14°19.7	197°21.8	-10°42.9	Betelgeuse	270°53.7	7°24.7					
17	191°14.8	41°43.8	9°41.4	34°00.0	10°38.3	151°15.4	14°19.8	212°24.4	-10°43.0	Canopus	263°53.5	-52°42.3					
18	206°17.2	56°46.0	9°40.8	49°01.1	10°37.7	166°17.5	14°19.9	227°27.0	-10°43.0	Sirius	258°27.6	-16°44.6					
19	221°19.7	71°48.3	9°40.2	64°02.1	10°37.1	181°19.6	14°20.0	242°29.6	-10°43.1	Adara	255°07.2	-29°00.1					
20	236°22.1	86°50.6	9°39.5	79°03.1	10°36.5	196°21.7	14°20.1	257°32.1	-10°43.1	Procyon	244°52.4	5°10.1					
21	251°24.6	101°52.9	9°38.9	94°04.1	10°36.0	211°23.9	14°20.2	272°34.7	-10°43.2	Pollux	243°19.1	27°58.2					
22	266°27.1	116°55.1	9°38.3	109°05.1	10°35.4	226°26.0	14°20.3	287°30.5	-10°43.2	Avior	234°15.9	-59°35.0					
23	281°29.5	131°57.4	9°37.7	124°06.2	10°34.8	241°28.1	14°20.4	302°39.9	-10°43.3	Suhail	222°47.6	-43°31.6					
Mer.pass.:4:17:			v2.2 d-0.6 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.1			v2.6 d-0.1 m0.7					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Alphard	217°49.2	-8°45.6				
0	296°32.0	146°59.7	9°37.0	139°07.2	10°34.2	256°30.2	14°20.5	317°42.4	-10°43.3	Regulus	207°36.0	11°51.3					
1	311°34.5	162°02.0	9°36.4	154°08.2	10°33.6	271°32.4	14°20.6	332°45.0	-10°43.4	Dubhe	193°42.9	61°37.8					
2	326°36.9	177°04.3	9°35.8	169°09.2	10°33.0	286°34.5	14°20.7	347°47.6	-10°43.4	Denebola	182°26.3	14°26.6					
3	341°39.4	192°06.6	9°35.2	184°10.3	10°32.5	301°36.6	14°20.8	2°50.1	-10°43.5	Gienah	175°44.9	-17°40.4					
4	356°41.9	207°08.9	9°34.6	199°11.3	10°31.9	316°38.7	14°20.9	17°52.7	-10°43.5	Acrux	173°01.7	-63°14.0					
5	11°44.3	222°11.2	9°34.0	214°12.3	10°31.3	331°40.9	14°21.0	32°55.3	-10°43.6	Gacrux	171°53.2	-57°14.9					
6	26°46.8	237°13.5	9°33.3	229°13.3	10°30.7	346°43.0	14°21.1	47°57.9	-10°43.7	Alioth	166°14.2	55°50.3					
7	41°49.3	252°15.8	9°32.7	244°14.3	10°30.1	1°45.1	14°21.2	63°00.4	-10°43.7	Spica	158°23.6	-11°17.0					
8	56°51.7	267°18.1	9°32.1	259°15.4	10°29.5	16°47.2	14°21.3	78°03.0	-10°43.8	Alcaid	152°52.9	49°12.1					
9	71°54.2	282°20.4	9°31.5	274°16.4	10°28.9	31°49.4	14°21.4	93°05.6	-10°43.8	Hadar	148°37.7	-60°29.4					
10	86°56.6	297°22.8	9°30.9	289°17.4	10°28.4	46°51.5	14°21.5	108°08.2	-10°43.9	Menkent	147°59.0	-36°29.3					
11	101°59.1	312°25.1	9°30.3	304°18.4	10°27.8	61°53.6	14°21.6	123°10.7	-10°43.9	Arcturus	145°48.8	19°04.1					
12	117°01.6	327°27.4	9°29.7	319°19.4	10°27.2	76°55.7	14°21.7	138°13.3	-10°44.0	Rigel Kent.	139°41.8	-60°56.2					
13	132°04.0	342°29.7	9°29.1	334°20.5	10°26.6	91°57.9	14°21.8	153°15.9	-10°44.0	Zubenelg.	136°57.3	-16°08.4					
14	147°06.5	357°32.1	9°28.5	349°21.5	10°26.0	106°60.0	14°21.8	168°18.5	-10°44.1	Kochab	137°19.4	74°03.8					
15	162°09.0	12°34.4	9°27.8	4°22.5	10°25.4	122°02.1	14°21.9	183°21.1	-10°44.1	Alphecca	126°04.6	26°38.3					
16	177°11.4	27°36.8	9°27.2	19°23.5	10°24.8	137°04.3	14°22.0	198°23.6	-10°44.2	Antares	112°17.1	-26°29.1					
17	192°13.9	42°39.1	9°26.6	34°24.5	10°24.3	152°06.4	14°22.1	213°26.2	-10°44.2	Atria	107°11.9	-69°04.3					
18	207°16.4	57°41.5	9°26.0	49°25.6	10°23.7	167°08.5	14°22.2	228°28.8	-10°44.3	Sabik	102°03.9	-15°45.2					
19	222°18.8	72°43.8	9°25.4	64°26.6	10°23.1	182°10.6	14°22.3	243°31.4	-10°44.3	Shaula	96°11.7	-37°07.3					
20	237°21.3	87°46.2	9°24.8	79°27.6	10°22.5	197°12.8	14°22.4	258°33.9	-10°44.4	Rasalhague	95°59.4	12°32.7					
21	252°23.7	102°48.5	9°24.2	94°28.6	10°21.9	212°14.9	14°22.5	273°36.5	-10°44.4	Etamin	90°42.2	51°29.2					
22	267°26.2	117°50.9	9°23.6	109°29.7	10°21.3	227°17.0	14°22.6	288°39.1	-10°44.5	Kaus Aust.	83°33.7	-34°22.4					
23	282°28.7	132°53.3	9°23.0	124°30.7	10°20.7	242°19.2	14°22.7	303°41.7	-10°44.5	Vega	80°33.7	38°48.3					
Mer.pass.:4:13:			v2.3 d-0.6 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.2			v2.6 d-0.1 m0.7					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Nunki	75°48.9	-26°16.0				
0	297°31.1	147°55.6	9°22.4	139°31.7	10°20.1	257°21.3	14°22.8	318°44.2	-10°44.6	Altair	62°00.9	8°55.8					
1	312°33.6	162°58.0	9°21.8	154°32.7	10°19.6	272°23.4	14°22.9	333°46.8	-10°44.6	Peacock	53°07.0	-56°39.5					
2	327°36.1	178°00.4	9°21.2	169°33.7	10°19.0	287°25.5	14°23.0	348°49.4	-10°44.7	Deneb	49°26.2	45°21.8					
3	342°38.5	193°02.8	9°20.6	184°34.8	10°18.4	302°27.7	14°23.1	3°52.0	-10°44.8	Enif	33°39.7	9°59.0					
4	357°41.0	208°05.2	9°20.0	199°35.8	10°17.8	317°29.8	14°23.2	18°54.6	-10°44.8	Alnair	27°34.1	-46°50.6					
5	12°43.5	223°07.6	9°19.4	214°36.8	10°17.2	332°31.9	14°23.3	33°57.1	-10°44.9	Fomalhaut	15°15.7	-29°29.7					
6	27°45.9	238°10.0	9°18.9	229°37.8	10°16.6	347°34.1	14°23.4	48°59.7	-10°44.9	Scheat	13°46.2	28°12.5					
7	42°48.4	253°12.4	9°18.3	244°38.8	10°16.0	2°36.2	14°23.5	64°02.3	-10°45.0	Markab	13°30.9	15°19.9					
8	57°50.9	268°14.8	9°17.7	259°39.9	10°15.4	17°38.3	14°23.6	79°04.9	-10°45.0	2023/7/1			SHA	Mer.pass			
9	72°53.3	283°17.2	9°17.1	274°40.9	10°14.9	32°40.5	14°23.7	94°07.4	-10°45.1	Venus	210°33.0	14:13					
10	87°55.8	298°19.6	9°16.5	289°41.9	10°14.3	47°42.6	14°23.8	109°10.0	-10°45.1	Mars	203°09.8	14:44					
11	102°58.2	313°22.0	9°15.9	304°42.9	10°13.7	62°44.7	14°23.9	124°12.6	-10°45.2	Jupiter	320°06.5	06:56					
12	118°00.7	328°24.4	9°15.3	319°44.0	10°13.1	77°46.9	14°24.0	139°15.2	-10°45.2	Saturn	21°07.8	02:53					
13	133°03.2	343°26.8	9°14.7	334°45.0	10°12.5	92°49.0	14°24.1	154°17.8	-10°45.3	2023/7/1			SHA	Mer.pass			
14	148°05.6	358°29.3	9°14.1	349°46.0	10°11.9	107°51.1	14°24.2	169°20.3	-10°45.3	Venus	210°27.7	14:10					
15	163°08.1	13°31.7	9°13.6	4°47.0	10°11.3	122°53.3	14°24.3	184°22.9	-10°45.4	Mars	202°35.2	14:43					
16	178°10.6	28°34.1	9°13.0	19°48.0	10°10.7	137°55.4	14°24.3	199°25.5	-10°45.4	Jupiter	319°58.2	06:53					
17	193°13.0	43°36.6	9°12.4	34°49.1	10°10.1	152°57.5	14°24.4	214°28.1	-10°45.5	Saturn	21°10.4	02:49					
18	208°15.5	58°39.0	9°11.8	49°50.1	10°09.6	167°59.7	14°24.5	229°30.7	-10°45.6	2023/7/2			SHA	Mer.pass			
19	223°18.0	73°41.5	9°11.2	64°51.1	10°09.0	183°01.8	14°24.6	244°33.2	-10°45.6	Venus	210°24.5	14:06					
20	238°20.4	88°43.9	9°10.7	79°52.1	10°08.4	198°03.9	14°24.7	259°35.8	-10°45.7	Mars	202°00.6	14:41					
21	253°22.9	103°46.4	9°10.1	94°53.2	10°07.8	213°06.1	14°24.8	274°38.4	-10°45.7	Jupiter	319°50.1	06:50					
22	268°25.4	118°48.8	9°09.5	109°54.2	10°07.2	228°08.2	14°24.9	289°41.0	-10°45.8	Saturn	21°13.1	02:45					
23	283°27.8	133°51.3	9°08.9	124°55.2	10°06.6	243°10.3	14°25.0	304°43.5	-10°45.8	Horizontal parallax							
Mer.pass.:4:09:			v2.4 d-0.6 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.2			v2.6 d-0.1 m0.7			Venus:	0.4	
															Mars:	0.1	

Sun			Moon				
Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	178°26.7	21°06.2	174°42.4	11.0	25°30.7	-6.0	54.2
1	193°26.6	21°05.8	189°12.4	11.1	25°24.6	-6.1	54.2
2	208°26.6	21°05.3	203°42.6	11.2	25°18.4	-6.2	54.2
3	223°26.5	21°04.9	218°12.8	11.2	25°12.1	-6.4	54.2
4	238°26.5	21°04.4	232°43.0	11.3	25°05.7	-6.5	54.2
5	253°26.4	21°04.0	247°13.4	11.4	24°59.1	-6.6	54.2
6	268°26.4	21°03.6	261°43.8	11.4	24°52.5	-6.7	54.2
7	283°26.3	21°03.1	276°14.2	11.5	24°45.7	-6.8	54.2
8	298°26.3	21°02.7	290°44.7	11.6	24°38.9	-6.9	54.2
9	313°26.2	21°02.3	305°15.3	11.6	24°31.9	-7.0	54.2
10	328°26.2	21°01.8	319°46.0	11.7	24°24.8	-7.1	54.1
11	343°26.1	21°01.4	334°16.8	11.8	24°17.6	-7.3	54.1
12	358°26.1	21°01.0	348°47.6	11.8	24°10.3	-7.4	54.1
13	13°26.0	21°00.5	3°18.4	11.9	24°02.9	-7.5	54.1
14	28°26.0	21°00.1	17°49.4	12.0	23°55.3	-7.6	54.1
15	43°25.9	20°59.6	32°20.4	12.1	23°47.7	-7.7	54.1
16	58°25.9	20°59.2	46°51.5	12.1	23°40.0	-7.8	54.1
17	73°25.8	20°58.7	61°22.7	12.2	23°32.1	-7.9	54.1
18	88°25.8	20°58.3	75°53.9	12.3	23°24.2	-8.0	54.1
19	103°25.7	20°57.9	90°25.2	12.3	23°16.2	-8.1	54.1
20	118°25.7	20°57.4	104°56.6	12.4	23°08.0	-8.2	54.1
21	133°25.6	20°57.0	119°28.0	12.5	22°59.8	-8.3	54.1
22	148°25.6	20°56.5	133°59.5	12.6	22°51.5	-8.4	54.1
23	163°25.5	20°56.1	148°31.1	12.6	22°43.0	-8.5	54.1
	SD.=15.7	d=-0.4	S.D.=14.8				

Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	178°25.5	20°55.6	163°02.8	12.7	22°34.5	-8.6	54.1
1	193°25.4	20°55.2	177°34.5	12.8	22°25.9	-8.7	54.0
2	208°25.4	20°54.7	192°06.3	12.8	22°17.1	-8.8	54.0
3	223°25.4	20°54.3	206°38.2	12.9	22°08.3	-8.9	54.0
4	238°25.3	20°53.8	221°10.1	13.0	21°59.4	-9.0	54.0
5	253°25.3	20°53.4	235°42.2	13.1	21°50.4	-9.0	54.0
6	268°25.2	20°52.9	250°14.2	13.1	21°41.3	-9.1	54.0
7	283°25.2	20°52.5	264°46.4	13.2	21°32.1	-9.2	54.0
8	298°25.1	20°52.0	279°18.6	13.3	21°22.9	-9.3	54.0
9	313°25.1	20°51.6	293°50.9	13.3	21°13.5	-9.4	54.0
10	328°25.1	20°51.1	308°23.3	13.4	21°04.0	-9.5	54.0
11	343°25.0	20°50.7	322°55.7	13.5	20°54.5	-9.6	54.0
12	358°25.0	20°50.2	337°28.2	13.5	20°44.9	-9.7	54.0
13	13°24.9	20°49.8	352°00.8	13.6	20°35.2	-9.7	54.0
14	28°24.9	20°49.3	6°33.5	13.7	20°25.4	-9.8	54.0
15	43°24.8	20°48.9	21°06.2	13.7	20°15.5	-9.9	54.0
16	58°24.8	20°48.4	35°39.0	13.8	20°05.6	-10.0	54.0
17	73°24.8	20°47.9	50°11.8	13.9	19°55.5	-10.1	54.0
18	88°24.7	20°47.5	64°44.7	14.0	19°45.4	-10.2	54.0
19	103°24.7	20°47.0	79°17.7	14.0	19°35.2	-10.2	54.0
20	118°24.6	20°46.6	93°50.8	14.1	19°24.9	-10.3	54.0
21	133°24.6	20°46.1	108°23.9	14.2	19°14.6	-10.4	54.0
22	148°24.6	20°45.6	122°57.1	14.2	19°04.1	-10.5	54.0
23	163°24.5	20°45.2	137°30.3	14.3	18°53.6	-10.5	54.0
	SD.=15.7	d=-0.4	S.D.=14.7				

Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	178°24.5	20°44.7	152°03.6	14.3	18°43.0	-10.6	54.0
1	193°24.4	20°44.3	166°37.0	14.4	18°32.4	-10.7	54.0
2	208°24.4	20°43.8	181°10.4	14.5	18°21.7	-10.8	54.0
3	223°24.4	20°43.3	195°44.0	14.5	18°10.9	-10.8	54.0
4	238°24.3	20°42.9	210°17.5	14.6	17°60.0	-10.9	54.0
5	253°24.3	20°42.4	224°51.2	14.7	17°49.0	-11.0	54.0
6	268°24.2	20°41.9	239°24.8	14.7	17°38.0	-11.0	54.0
7	283°24.2	20°41.5	253°58.6	14.8	17°26.9	-11.1	54.0
8	298°24.2	20°41.0	268°32.4	14.8	17°15.8	-11.2	54.0
9	313°24.1	20°40.5	283°06.3	14.9	17°04.6	-11.3	54.0
10	328°24.1	20°40.1	297°40.2	15.0	16°53.3	-11.3	54.0
11	343°24.1	20°39.6	312°14.2	15.0	16°41.9	-11.4	54.0
12	358°24.0	20°39.1	326°48.3	15.1	16°30.5	-11.4	54.0
13	13°24.0	20°38.7	341°22.4	15.1	16°19.0	-11.5	54.0
14	28°23.9	20°38.2	355°56.5	15.2	16°07.5	-11.6	54.0
15	43°23.9	20°37.7	10°30.7	15.2	15°55.9	-11.6	54.0
16	58°23.9	20°37.3	25°05.0	15.3	15°44.2	-11.7	54.0
17	73°23.8	20°36.8	39°39.3	15.4	15°32.5	-11.8	54.0
18	88°23.8	20°36.3	54°13.7	15.4	15°20.7	-11.8	54.0
19	103°23.8	20°35.8	68°48.2	15.5	15°08.9	-11.9	54.0
20	118°23.7	20°35.4	83°22.6	15.5	14°57.0	-11.9	54.0
21	133°23.7	20°34.9	97°57.2	15.6	14°45.0	-12.0	54.0
22	148°23.7	20°34.4	112°31.8	15.6	14°33.0	-12.0	54.0
23	163°23.6	20°33.9	127°06.4	15.7	14°20.9	-12.1	54.0
	SD.=15.7	d=-0.5	S.D.=14.7				

Twilight		Twilight	
Lat.	Naut. Civil Sunrise	Sunset	Civil Naut.
72	—:— —:— —:—	—:— —:—	—:— —:—
70	—:— —:— —:—	—:— —:—	—:— —:—
68	—:— —:— 00:43	23:19 —:—	—:— —:—
66	—:— —:— 01:52	22:17 —:—	—:— —:—
64	—:— —:— 02:27	21:44 —:—	—:— —:—
62	—:— 01:14 02:51	21:19 22:54	—:— —:—
60	—:— 01:57 03:11	21:00 22:13	—:— —:—
58	—:— 02:25 03:27	20:44 21:46	—:— —:—
56	01:07 02:46 03:41	20:31 21:25	23:01 —:—
54	01:47 03:03 03:52	20:19 21:08	22:23 —:—
52	02:13 03:18 04:03	20:09 20:54	21:58 —:—
50	02:33 03:30 04:12	20:00 20:41	21:38 —:—
45	03:10 03:56 04:31	19:41 20:16	21:02 —:—
40	03:36 04:15 04:47	19:26 19:57	20:36 —:—
35	03:56 04:31 04:60	19:12 19:41	20:16 —:—
30	04:12 04:44 05:11	19:01 19:28	19:60 —:—
20	04:38 05:07 05:31	18:42 19:06	19:34 —:—
10	04:58 05:25 05:47	18:25 18:48	19:14 —:—
0	05:15 05:41 06:03	18:10 18:32	18:58 —:—
-10	05:30 05:56 06:18	17:55 18:17	18:43 —:—
-20	05:44 06:11 06:34	17:38 18:02	18:29 —:—
-30	05:58 06:27 06:53	17:20 17:46	18:15 —:—
-35	06:05 06:36 07:04	17:09 17:37	18:08 —:—
-40	06:13 06:46 07:16	16:57 17:27	17:60 —:—
-45	06:22 06:58 07:31	16:42 17:15	17:51 —:—
-50	06:31 07:11 07:48	16:25 17:02	17:42 —:—
-52	06:35 07:18 07:57	16:16 16:55	17:38 —:—
-54	06:40 07:25 08:06	16:07 16:49	17:33 —:—
-56	06:45 07:32 08:16	15:57 16:41	17:28 —:—
-58	06:50 07:40 08:28	15:45 16:33	17:23 —:—
-60	06:56 07:50 08:42	15:31 16:23	17:17 —:—

Moonrise		Moonset	
Lat.	Tue Wed Thu	Tue Wed Thu	
72	—:— —:— —:—	—:— —:— —:—	—:—
70	—:— —:— 03:47	—:— —:—	00:22
68	—:— —:— 04:29	—:— —:—	23:07
66	—:— 02:51 04:57	—:— 23:09	22:51
64	01:22 03:31 05:18	23:01 22:47	22:37
62	02:17 03:59 05:35	22:32 22:29	22:26
60	02:49 04:20 05:49	22:11 22:14	22:16
58	03:14 04:37 06:01	21:53 22:02	22:07
56	03:33 04:52 06:11	21:38 21:51	21:60
54	03:49 05:04 06:20	21:25 21:41	21:53
52	04:03 05:15 06:28	21:13 21:32	21:47
50	04:15 05:25 06:36	21:03 21:24	21:41
45	04:40 05:45 06:51	20:42 21:08	21:29
40	04:60 06:02 07:04	20:24 20:54	21:19
35	05:16 06:15 07:14	20:10 20:42	21:10
30	05:30 06:27 07:24	19:57 20:32	21:03
20	05:54 06:48 07:40	19:35 20:14	20:50
10	06:15 07:02 07:53	19:16 19:58	20:38
0	06:35 07:22 08:06	18:58 19:44	20:27
-10	06:54 07:38 08:19	18:40 19:29	20:16
-20	07:15 07:56 08:33	18:20 19:13	20:04
-30	07:38 08:16 08:49	17:58 18:55	19:50
-35	07:52 08:27 08:58	17:45 18:44	19:42
-40	08:08 08:41 09:08	17:29 18:32	19:33
-45	08:27 08:57 09:20	17:11 18:17	19:22
-50	08:51 09:16 09:34	16:48 17:59	19:09
-52	09:03 09:25 09:41	16:37 17:50	19:03
-54	09:16 09:35 09:49	16:25 17:41	18:56
-56	09:31 09:46 09:57	16:10 17:30	18:49
-58	09:48 09:60 10:06	15:53 17:18	18:40
-60	10:10 10:15 10:17	15:32 17:03	18:30

Sun		Moon		
Day	Eqn. of Time 00 ^h 12 ^h	Mer. Pass	Mer. Pass. Age	
18	06:13	06:16	12:06	12:46 00:21 1(1%)
19	06:18	06:20	12:06	13:32 01:10 2(3%)
20	06:22	06:24	12:06	14:16 01:55 3(7%)

July 21, 22 ,23 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	298°30.3	148°53.7	9°08.3	139°56.2	10°06.0	258°12.5	14°25.1	319°46.1	-10°45.9	Alpheratz	357°35.9	29°13.1					
1	313°32.7	163°56.2	9°07.8	154°57.2	10°05.4	273°14.6	14°25.2	334°48.7	-10°45.9	Ankaa	353°08.2	-42°10.5					
2	328°35.2	178°58.7	9°07.2	169°58.3	10°04.8	288°16.7	14°25.3	349°51.3	-10°46.0	Schedar	349°32.3	56°39.7					
3	343°37.7	194°01.2	9°06.6	184°59.3	10°04.2	303°18.9	14°25.4	4°53.9	-10°46.0	Diphda	348°48.3	-17°51.3					
4	358°40.1	209°03.6	9°06.1	200°00.3	10°03.7	318°21.0	14°25.5	19°56.5	-10°46.1	Achernar	335°21.1	-57°06.7					
5	13°42.6	224°06.1	9°05.5	215°01.3	10°03.1	333°23.1	14°25.6	34°59.0	-10°46.1	Hamal	327°52.6	23°34.3					
6	28°45.1	239°08.6	9°04.9	230°02.4	10°02.5	348°25.3	14°25.7	50°01.6	-10°46.2	Polaris	314°46.9	89°21.5					
7	43°47.5	254°11.1	9°04.4	245°03.4	10°01.9	3°27.4	14°25.8	65°04.2	-10°46.3	Akamar	315°12.8	-40°12.4					
8	58°50.0	269°13.6	9°03.8	260°04.4	10°01.3	18°29.5	14°25.9	80°06.8	-10°46.3	Menkar	314°07.5	4°11.0					
9	73°52.5	284°16.1	9°03.2	275°05.4	10°00.7	33°31.7	14°25.9	95°09.4	-10°46.4	Mirfak	308°30.2	49°56.5					
10	88°54.9	299°18.6	9°02.7	290°06.4	10°00.1	48°33.8	14°26.0	110°11.9	-10°46.4	Aldebaran	290°41.3	16°33.4					
11	103°57.4	314°21.1	9°02.1	305°07.5	9°59.5	63°36.0	14°26.1	125°14.5	-10°46.5	Rigel	281°05.3	-8°10.1					
12	118°59.8	329°23.6	9°01.5	320°08.5	9°58.9	78°38.1	14°26.2	140°17.1	-10°46.5	Capella	280°24.1	46°01.2					
13	134°02.3	344°26.1	9°01.0	335°09.5	9°58.3	93°40.2	14°26.3	155°19.7	-10°46.6	Bellatrix	278°24.4	6°22.3					
14	149°04.8	359°28.6	9°00.4	350°10.5	9°57.7	108°42.4	14°26.4	170°22.3	-10°46.6	Elnath	278°03.7	28°37.6					
15	164°07.2	14°31.2	8°59.8	5°11.5	9°57.2	123°44.5	14°26.5	185°24.8	-10°46.7	Alnilam	275°39.2	-1°11.1					
16	179°09.7	29°33.7	8°59.3	20°12.6	9°56.6	138°46.7	14°26.6	200°27.4	-10°46.7	Betelgeuse	270°53.7	7°24.7					
17	194°12.2	44°36.2	8°58.7	35°13.6	9°56.0	153°48.8	14°26.7	215°30.0	-10°46.8	Canopus	263°53.5	-52°42.3					
18	209°14.6	59°38.8	8°58.2	50°14.6	9°55.4	168°50.9	14°26.8	230°32.6	-10°46.9	Sirius	258°27.5	-16°44.6					
19	224°17.1	74°41.3	8°57.6	55°15.6	9°54.8	183°53.1	14°26.9	245°35.2	-10°46.9	Adara	255°07.2	-29°00.1					
20	239°19.6	89°43.8	8°57.1	80°16.7	9°54.2	198°55.2	14°27.0	260°37.8	-10°47.0	Procyon	244°52.3	5°10.1					
21	254°22.0	104°46.4	8°56.5	95°17.7	9°53.6	213°57.3	14°27.1	275°40.3	-10°47.0	Pollux	243°19.1	27°58.2					
22	269°24.5	119°48.9	8°56.0	110°18.7	9°53.0	228°59.5	14°27.2	290°42.9	-10°47.1	Avior	234°15.9	-59°35.0					
23	284°27.0	134°51.5	8°55.4	125°19.7	9°52.4	244°01.6	14°27.2	305°45.5	-10°47.1	Suhail	222°47.6	-43°31.6					
Mer.pass.:4:05:			v2.5 d-0.6 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.2			v2.6 d-0.1 m0.7					

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	299°29.4	149°54.0	8°54.9	140°20.7	9°51.8	259°03.8	14°27.3	320°48.1	-10°47.2					
1	314°31.9	164°56.6	8°54.3	155°21.8	9°51.2	274°05.9	14°27.4	335°50.7	-10°47.2					
2	329°34.3	179°59.2	8°53.8	170°22.8	9°50.6	289°08.1	14°27.5	350°53.3	-10°47.3					
3	344°36.8	195°01.7	8°53.2	185°23.8	9°50.0	304°10.2	14°27.6	5°55.8	-10°47.3					
4	359°39.3	210°04.3	8°52.7	200°24.8	9°49.4	319°12.3	14°27.7	20°58.4	-10°47.4					
5	14°41.7	225°06.9	8°52.1	215°25.9	9°48.9	334°14.5	14°27.8	36°01.0	-10°47.5					
6	29°44.2	240°09.4	8°51.6	230°26.9	9°48.3	349°16.6	14°27.9	51°03.6	-10°47.5					
7	44°46.7	255°12.0	8°51.0	245°27.9	9°47.7	4°18.8	14°28.0	66°06.2	-10°47.6					
8	59°49.1	270°14.6	8°50.5	260°28.9	9°47.1	19°20.9	14°28.1	81°08.8	-10°47.6					
9	74°51.6	285°17.2	8°50.0	275°30.0	9°46.5	34°23.0	14°28.2	96°11.3	-10°47.7					
10	89°54.1	300°19.8	8°49.4	290°31.0	9°45.9	49°25.2	14°28.3	111°13.9	-10°47.7					
11	104°56.5	315°22.4	8°48.9	305°32.0	9°45.3	64°27.3	14°28.3	126°16.5	-10°47.8					
12	119°59.0	330°25.0	8°48.3	320°33.0	9°44.7	79°29.5	14°28.4	141°19.1	-10°47.8					
13	135°01.4	345°27.6	8°47.8	335°34.0	9°44.1	94°31.6	14°28.5	156°21.7	-10°47.9					
14	150°03.9	0°30.2	8°47.3	350°35.1	9°43.5	109°33.8	14°28.6	171°24.3	-10°48.0					
15	165°06.4	15°32.8	8°46.7	5°36.1	9°42.9	124°35.9	14°28.7	186°26.9	-10°48.0					
16	180°08.8	30°35.4	8°46.2	20°37.1	9°42.3	139°38.1	14°28.8	201°29.0	-10°48.1					
17	195°11.3	45°38.1	8°45.7	35°38.1	9°41.7	154°40.2	14°28.9	216°32.4	-10°48.1					
18	210°13.8	60°40.7	8°45.1	50°39.2	9°41.1	169°42.3	14°29.0	231°34.6	-10°48.2					
19	225°16.2	75°43.3	8°44.6	65°40.2	9°40.5	184°44.5	14°29.1	246°37.2	-10°48.2					
20	240°18.7	90°46.0	8°44.1	80°41.2	9°39.9	199°46.6	14°29.2	261°39.8	-10°48.3					
21	255°21.2	105°48.6	8°43.6	95°42.2	9°39.3	214°48.8	14°29.3	276°42.4	-10°48.3					
22	270°23.6	120°51.2	8°43.0	110°43.2	9°38.7	229°50.9	14°29.3	291°44.9	-10°48.4					
23	285°26.1	135°53.9	8°42.5	125°44.3	9°38.1	244°53.1	14°29.4	306°47.5	-10°48.5					
Mer.pass.:4:01:			v2.6 d-0.5 m-4.5			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.2			v2.6 d-0.1 m0.7		

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	300°28.6	150°56.5	8°42.0	140°45.3	9°37.6	259°55.2	14°29.5	321°50.1	-10°48.5					
1	315°31.0	165°59.2	8°41.5	155°46.3	9°37.0	274°57.4	14°29.6	336°52.7	-10°48.6					
2	330°33.5	181°01.8	8°40.9	170°47.3	9°36.4	289°59.5	14°29.7	351°55.3	-10°48.6					
3	345°35.9	196°04.5	8°40.4	185°48.4	9°35.8	305°01.7	14°29.8	6°57.9	-10°48.7					
4	0°38.4	211°07.2	8°39.9	200°49.4	9°35.2	320°03.8	14°29.9	22°00.5	-10°48.7					
5	15°40.9	226°09.8	8°39.4	215°50.4	9°34.6	335°06.0	14°30.0	37°03.1	-10°48.8					
6	30°43.3	241°12.5	8°38.9	230°51.4	9°34.0	350°08.1	14°30.1	52°05.6	-10°48.8					
7	45°45.8	256°15.2	8°38.4	245°52.4	9°33.4	5°10.2	14°30.2	67°08.2	-10°48.9					
8	60°48.3	271°17.9	8°37.8	260°53.5	9°32.8	20°12.4	14°30.2	82°10.8	-10°49.0					
9	75°50.7	286°20.5	8°37.3	275°54.5	9°32.2	35°14.5	14°30.3	97°13.4	-10°49.0					
10	90°53.2	301°23.2	8°36.8	290°55.5	9°31.6	50°16.7	14°30.4	112°16.0	-10°49.1					
11	105°55.7	316°25.9	8°36.3	305°56.5	9°31.0	65°18.8	14°30.5	127°18.6	-10°49.1					
12	120°58.1	331°28.6	8°35.8	320°57.6	9°30.4	80°21.0	14°30.6	142°21.2	-10°49.2					
13	136°00.6	346°31.3	8°35.3	335°58.6	9°29.8	95°23.1	14°30.7	157°23.8	-10°49.2					
14	151°03.1	1°34.0	8°34.8	350°59.6	9°29.2	110°25.3	14°30.8	172°26.3	-10°49.3					
15	166°05.5	16°36.7	8°34.3	6°00.6	9°28.6	125°27.4	14°30.9	187°28.9	-10°49.4					
16	181°08.0	31°39.4	8°33.8	21°01.7	9°28.0	140°29.6	14°31.0	202°31.5	-10°49.4					
17	196°10.4	46°42.2	8°33.3	36°02.7	9°27.4	155°31.7	14°31.0	217°34.1	-10°49.5					
18	211°12.9	61°44.9	8°32.8	51°03.7	9°26.8	170°33.9	14°31.1	232°36.7	-10°49.5					
19	226°15.4	76°47.6	8°32.3	66°04.7	9°26.2	185°36.0	14°31.2	247°39.3	-10°49.6					
20	241°17.8	91°50.3	8°31.8	81°05.7	9°25.6	200°38.2	14°31.3	262°41.9	-10°49.6					
21	256°20.3	106°53.1	8°31.3	96°06.8	9°25.0	215°40.3	14°31.4	277°44.5	-10°49.7					
22	271°22.8	121°55.8	8°30.8	111°07.8	9°24.4	230°42.5	14°31.5	292°47.0	-10°49.8					
23	286°25.2	136°58.5	8°30.3	126°08.8	9°23.8	245°44.6	14°31.6	307°49.6	-10°49.8					
Mer.pass.:3:57:			v2.7 d-0.5 m-4.4			v1.0 d-0.6 m1.8			v2.1 d0.1 m-2.2			v2.6 d-0.1 m0.6		

2023/7/2	SHA	Mer.pass		
	Venus	210°23.5	14:02	
	Mars	201°25.9	14:39	
	Jupiter	319°42.2	06:46	
	Saturn	21°15.9	02:40	
	2023/7/2	SHA	Mer.pass	
		Venus	210°24.6	13:58
		Mars	200°51.3	14:38
		Jupiter	319°34.4	06:43
		Saturn	21°18.7	02:36
2023/7/2	SHA	Mer.pass		
	Venus	210°28.0	13:54	
	Mars	200°16.7	14:36	
	Jupiter	319°26.7	06:39	
	Saturn	21°21.6	02:32	
Horizontal parallax				
Venus:	0.4			
Mars:	0.1			

Sun				Moon													
Fri	GHA	Dec		GHA	ν	Dec	d	HP	Twilight				Twilight				
0	178°23.6	20°33.5		141°41.1	15.7	14°08.8	-12.2	54.0	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.		
1	193°23.6	20°33.0		156°15.8	15.8	13°56.6	-12.2	54.0	72	--	--	--	--	--	--		
2	208°23.5	20°32.5		170°50.6	15.8	13°44.4	-12.3	54.0	70	--	--	--	--	--	--		
3	223°23.5	20°32.0		185°25.5	15.9	13°32.1	-12.3	54.0	68	--	--	01:12	22:54	--	--		
4	238°23.5	20°31.6		200°00.3	15.9	13°19.8	-12.4	54.0	66	--	--	02:04	22:05	--	--		
5	253°23.4	20°31.1		214°35.3	15.9	13°07.4	-12.4	54.0	64	--	--	02:36	21:35	--	--		
6	268°23.4	20°30.6		229°10.2	16.0	12°55.0	-12.5	54.0	62	--	01:30	02:59	21:12	22:39	--		
7	283°23.4	20°30.1		243°45.2	16.0	12°42.5	-12.5	54.0	60	--	02:07	03:17	20:54	22:03	--		
8	298°23.3	20°29.6		258°20.3	16.1	12°29.9	-12.6	54.0	58	--	02:33	03:33	20:39	21:38	--		
9	313°23.3	20°29.2		272°55.4	16.1	12°17.3	-12.6	54.0	56	01:22	02:53	03:46	20:26	21:19	22:47		
10	328°23.3	20°28.7		287°30.5	16.2	12°04.7	-12.7	54.0	54	01:56	03:09	03:57	20:15	21:03	22:14		
11	343°23.2	20°28.2		302°05.7	16.2	11°52.0	-12.7	54.0	52	02:20	03:23	04:07	20:05	20:49	21:51		
12	358°23.2	20°27.7		316°40.9	16.2	11°39.3	-12.7	54.1	50	02:39	03:35	04:16	19:57	20:37	21:33		
13	13°23.2	20°27.2		331°16.1	16.3	11°26.6	-12.8	54.1	45	03:14	03:59	04:34	19:38	20:13	20:58		
14	28°23.1	20°26.7		345°51.4	16.3	11°13.7	-12.8	54.1	40	03:39	04:18	04:49	19:23	19:55	20:33		
15	43°23.1	20°26.3		0°26.8	16.3	11°00.9	-12.9	54.1	35	03:58	04:33	05:02	19:11	19:39	20:14		
16	58°23.1	20°25.8		15°02.1	16.4	10°48.0	-12.9	54.1	30	04:14	04:46	05:13	18:60	19:26	19:58		
17	73°23.1	20°25.3		29°37.5	16.4	10°35.1	-13.0	54.1	20	04:39	05:08	05:32	18:41	19:05	19:33		
18	88°23.0	20°24.8		44°12.9	16.4	10°22.1	-13.0	54.1	10	04:59	05:25	05:48	18:25	18:48	19:14		
19	103°23.0	20°24.3		58°48.4	16.5	10°09.1	-13.0	54.1	0	05:15	05:41	06:03	18:10	18:32	18:58		
20	118°23.0	20°23.8		73°23.9	16.5	9°56.0	-13.1	54.1	-10	05:30	05:56	06:18	17:55	18:18	18:43		
21	133°22.9	20°23.3		87°59.4	16.5	9°42.9	-13.1	54.1	-20	05:43	06:10	06:34	17:39	18:03	18:30		
22	148°22.9	20°22.8		102°35.0	16.6	9°29.8	-13.2	54.1	-30	05:57	06:26	06:52	17:22	17:47	18:16		
23	163°22.9	20°22.3		117°10.6	16.6	9°16.6	-13.2	54.1	-35	06:04	06:35	07:02	17:11	17:38	18:09		
	SD.=15.7	d=-0.5		S.D.=14.7					-40	06:11	06:45	07:14	16:59	17:29	18:02		
									-45	06:19	06:56	07:28	16:45	17:18	17:54		
									-50	06:29	07:09	07:45	16:28	17:05	17:45		
									-52	06:33	07:15	07:53	16:20	16:59	17:41		
									-54	06:37	07:21	08:02	16:11	16:52	17:37		
									-56	06:42	07:28	08:12	16:01	16:45	17:32		
									-58	06:47	07:36	08:23	15:50	16:37	17:27		
									-60	06:52	07:45	08:37	15:37	16:28	17:22		
									Lat.	Moonrise			Moonset				
									72	05:44	07:54	09:52	23:10	22:37	22:07		
									70	06:09	08:05	09:54	22:57	22:32	22:09		
									68	06:28	08:14	09:56	22:46	22:28	22:11		
									66	06:43	08:21	09:57	22:37	22:24	22:12		
									64	06:55	08:28	09:58	22:29	22:21	22:13		
									62	07:06	08:33	09:59	22:22	22:18	22:15		
									60	07:15	08:38	09:59	22:16	22:16	22:16		
									58	07:22	08:42	10:00	22:11	22:14	22:16		
									56	07:29	08:45	10:01	22:06	22:12	22:17		
									54	07:35	08:48	10:01	22:02	22:10	22:18		
									52	07:40	08:51	10:02	21:59	22:09	22:19		
									50	07:45	08:54	10:02	21:55	22:07	22:19		
									45	07:56	08:60	10:03	21:48	22:04	22:20		
									40	08:04	09:04	10:04	21:41	22:02	22:22		
									35	08:12	09:08	10:05	21:36	21:59	22:23		
									30	08:18	09:12	10:05	21:31	21:57	22:23		
									20	08:29	09:18	10:06	21:22	21:54	22:25		
									10	08:39	09:24	10:07	21:15	21:51	22:26		
									0	08:48	09:29	10:08	21:08	21:48	22:27		
									-10	08:57	09:34	10:09	21:01	21:45	22:28		
									-20	09:07	09:39	10:10	20:53	21:41	22:30		
									-30	09:18	09:45	10:11	20:44	21:38	22:31		
									-35	09:24	09:49	10:12	20:39	21:36	22:32		
									-40	09:31	09:53	10:13	20:33	21:33	22:33		
									-45	09:40	09:57	10:13	20:27	21:30	22:34		
									-50	09:50	10:02	10:14	20:18	21:27	22:35		
									-52	09:54	10:05	10:15	20:15	21:25	22:36		
									-54	09:59	10:08	10:15	20:11	21:23	22:36		
									-56	10:05	10:11	10:16	20:06	21:22	22:37		
									-58	10:11	10:14	10:17	20:01	21:19	22:38		
									-60	10:18	10:18	10:17	19:55	21:17	22:39		
									Day	Sun		Mer.	Moon		Age		
										Eqn.of Time	12 ^h	Pass	Upper	Lower			
									21	06:26	06:27	12:06	14:58	02:37	4(12%)		
									22	06:29	06:30	12:06	15:38	03:18	5(19%)		
									23	06:31	06:32	12:06	16:17	03:57	6(27%)		

July 24, 25 ,26 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	301°27.7	152°01.3	8°29.8	141°09.8	9°23.2	260°46.8	14°31.7	322°52.2	-10°49.9				Alpheratz	357°35.9	29°13.1		
1	316°30.2	167°04.0	8°29.3	156°10.9	9°22.6	275°49.0	14°31.8	337°54.8	-10°49.9				Ankaa	353°08.1	-42°10.5		
2	331°32.6	182°06.8	8°28.8	171°11.9	9°22.0	290°51.1	14°31.8	352°57.4	-10°50.0				Schedar	349°32.2	56°39.7		
3	346°35.1	197°09.5	8°28.3	186°12.9	9°21.4	305°53.3	14°31.9	7°60.0	-10°50.0				Diphda	348°48.3	-17°51.3		
4	1°37.5	212°12.3	8°27.8	201°13.9	9°20.8	320°55.4	14°32.0	23°02.6	-10°50.1				Achernar	335°21.0	-57°06.7		
5	16°40.0	227°15.1	8°27.3	216°15.0	9°20.2	335°57.6	14°32.1	38°05.2	-10°50.2				Hamal	327°52.6	23°34.3		
6	31°42.5	242°17.8	8°26.8	231°16.0	9°19.6	350°59.7	14°32.2	53°07.8	-10°50.2				Polaris	314°45.4	89°21.5		
7	46°44.9	257°20.6	8°26.3	246°17.0	9°19.0	6°01.9	14°32.3	68°10.3	-10°50.3				Akamar	315°12.8	-40°12.4		
8	61°47.4	272°23.4	8°25.8	261°18.0	9°18.4	21°04.0	14°32.4	83°12.9	-10°50.3				Menkar	314°07.5	4°11.0		
9	76°49.9	287°26.1	8°25.4	276°19.0	9°17.8	36°06.2	14°32.5	98°15.5	-10°50.4				Mirfak	308°30.2	49°56.5		
10	91°52.3	302°28.9	8°24.9	291°20.1	9°17.2	51°08.3	14°32.5	113°18.1	-10°50.4				Aldebaran	290°41.2	16°33.4		
11	106°54.8	317°31.7	8°24.4	306°21.1	9°16.6	66°10.5	14°32.6	128°20.7	-10°50.5				Rigel	281°05.3	-8°10.3		
12	121°57.3	332°34.5	8°23.9	321°22.1	9°16.0	81°12.6	14°32.7	143°23.3	-10°50.6				Capella	280°24.1	46°01.2		
13	136°59.7	347°37.3	8°23.4	336°23.1	9°15.4	96°14.8	14°32.8	158°25.9	-10°50.6				Bellatrix	278°24.4	6°22.3		
14	152°02.2	2°40.1	8°23.0	351°24.2	9°14.8	111°17.0	14°32.9	173°28.5	-10°50.7				Elnath	278°03.7	28°37.6		
15	167°04.7	17°42.9	8°22.5	6°25.2	9°14.2	126°19.1	14°33.0	188°31.1	-10°50.7				Alnilam	275°39.2	-1°11.1		
16	182°07.1	32°45.7	8°22.0	21°26.2	9°13.6	141°21.3	14°33.1	203°33.7	-10°50.8				Betelgeuse	270°53.7	7°24.7		
17	197°09.6	47°48.5	8°21.5	36°27.2	9°13.0	156°23.4	14°33.2	218°36.3	-10°50.8				Canopus	263°53.4	-52°42.3		
18	212°12.0	62°51.3	8°21.1	51°28.3	9°12.4	171°25.6	14°33.2	233°38.8	-10°50.9				Sirius	258°27.5	-16°44.6		
19	227°14.5	77°54.1	8°20.6	66°29.3	9°11.8	186°27.7	14°33.3	248°41.4	-10°51.0				Adara	255°07.2	-29°00.1		
20	242°17.0	92°57.0	8°20.1	81°30.3	9°11.2	201°29.9	14°33.4	263°44.0	-10°51.0				Procyon	244°52.3	5°10.1		
21	257°19.4	107°59.8	8°19.6	96°31.3	9°10.6	216°32.1	14°33.5	278°46.6	-10°51.1				Pollux	243°19.1	27°58.2		
22	272°21.9	123°02.6	8°19.2	111°32.4	9°10.0	231°34.2	14°33.6	293°49.2	-10°51.1				Avior	234°15.9	-59°35.0		
23	287°24.4	138°05.5	8°18.7	126°33.4	9°09.4	246°36.4	14°33.7	308°51.8	-10°51.2				Suhail	222°47.6	-43°31.6		
Mer.pass.:3:53:			v2.7 d-0.5 m-4.4			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.2			v2.6 d-0.1 m0.6					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	302°26.8	153°08.3	8°18.2	141°34.4	9°08.8	261°38.5	14°33.8	323°54.4	-10°51.2				Dubhe	193°42.9	61°37.7		
1	317°29.3	168°11.1	8°17.8	156°35.4	9°08.2	276°40.7	14°33.8	338°57.0	-10°51.3				Denebola	182°26.3	14°26.6		
2	332°31.8	183°14.0	8°17.3	171°36.4	9°07.6	291°42.8	14°33.9	353°59.6	-10°51.4				Gienah	175°45.0	-17°40.3		
3	347°34.2	198°16.8	8°16.8	186°37.5	9°07.0	306°45.0	14°34.0	9°02.2	-10°51.4				Acrux	173°01.8	-63°14.0		
4	2°36.7	213°19.7	8°16.4	201°38.5	9°06.4	321°47.2	14°34.1	24°04.8	-10°51.5				Gacrux	171°53.2	-57°14.9		
5	17°39.2	228°22.5	8°15.9	216°39.5	9°05.8	336°49.3	14°34.2	39°07.4	-10°51.5				Alioth	166°14.2	55°50.3		
6	32°41.6	243°25.4	8°15.5	231°40.5	9°05.2	351°51.5	14°34.3	54°09.9	-10°51.6				Spica	158°23.6	-11°17.0		
7	47°44.1	258°28.3	8°15.0	246°41.6	9°04.6	6°53.6	14°34.4	69°12.5	-10°51.7				Alcaid	152°53.0	49°12.1		
8	62°46.5	273°31.1	8°14.5	261°42.6	9°04.0	21°55.8	14°34.4	84°15.1	-10°51.7				Hadar	148°37.7	-60°29.4		
9	77°49.0	288°34.0	8°14.1	276°43.6	9°03.4	36°58.0	14°34.5	99°17.7	-10°51.8				Menkent	147°59.1	-36°29.3		
10	92°51.5	303°36.9	8°13.6	291°44.6	9°02.8	52°00.1	14°34.6	114°20.3	-10°51.8				Arcturus	145°48.8	19°04.1		
11	107°53.9	318°39.8	8°13.2	306°45.7	9°02.2	67°02.3	14°34.7	129°22.9	-10°51.9				Rigel Kent.	139°41.9	-60°56.2		
12	122°56.4	333°42.6	8°12.7	321°46.7	9°01.6	82°04.4	14°34.8	144°25.5	-10°51.9				Zubenelg.	136°57.3	-16°08.4		
13	137°58.9	348°45.5	8°12.3	336°47.7	9°01.0	97°06.6	14°34.9	159°28.1	-10°52.0				Kochab	137°19.5	74°03.8		
14	153°01.3	3°48.4	8°11.8	351°48.7	9°00.4	112°08.8	14°35.0	174°30.7	-10°52.1				Alphecca	126°04.6	26°38.3		
15	168°03.8	18°51.3	8°11.4	6°49.8	8°59.8	127°10.9	14°35.0	189°33.3	-10°52.1				Antares	112°17.1	-26°29.1		
16	183°06.3	33°54.2	8°10.9	21°50.8	8°59.2	142°13.1	14°35.1	204°35.9	-10°52.2				Atria	107°12.0	-69°04.4		
17	198°08.7	48°57.1	8°10.5	36°51.8	8°58.6	157°15.3	14°35.2	219°38.5	-10°52.2				Sabik	102°03.9	-15°45.2		
18	213°11.2	64°00.0	8°10.1	51°52.8	8°58.0	172°17.4	14°35.3	234°41.1	-10°52.3				Shaula	96°11.7	-37°07.3		
19	228°13.6	79°03.0	8°09.6	66°53.8	8°57.4	187°19.6	14°35.4	249°43.7	-10°52.4				Rasalhague	95°59.4	12°32.7		
20	243°16.1	94°05.9	8°09.2	81°54.9	8°56.8	202°21.7	14°35.5	264°46.3	-10°52.4				Etamin	90°42.3	51°29.3		
21	258°18.6	109°08.8	8°08.7	96°55.9	8°56.2	217°23.9	14°35.5	279°48.8	-10°52.5				Kaus Aust.	83°33.7	-34°22.4		
22	273°21.0	124°11.7	8°08.3	111°56.9	8°55.6	232°26.1	14°35.6	294°51.4	-10°52.5				Vega	80°33.7	38°48.4		
23	288°23.5	139°14.6	8°07.9	126°57.9	8°55.0	247°28.2	14°35.7	309°54.0	-10°52.6				Nunki	75°48.9	-26°16.0		
Mer.pass.:3:49:			v2.8 d-0.5 m-4.4			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.2			v2.6 d-0.1 m0.6					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	303°26.0	154°17.6	8°07.4	141°59.0	8°54.4	262°30.4	14°35.8	324°56.6	-10°52.6				Enif	33°39.7	9°59.0		
1	318°28.4	169°20.5	8°07.0	156°60.0	8°53.8	277°32.6	14°35.9	339°59.2	-10°52.7				Alnair	27°34.0	-46°50.7		
2	333°30.9	184°23.5	8°06.6	172°01.0	8°53.2	292°34.7	14°36.0	355°01.8	-10°52.8				Fomalhaut	15°15.6	-29°29.7		
3	348°33.4	199°26.4	8°06.1	187°02.0	8°52.6	307°36.9	14°36.0	10°04.4	-10°52.8				Scheat	13°46.2	28°12.5		
4	3°35.8	214°29.3	8°05.7	202°03.1	8°51.9	322°39.1	14°36.1	25°07.0	-10°52.9				Markab	13°30.9	15°19.9		
5	18°38.3	229°32.3	8°05.3	217°04.1	8°51.3	337°41.2	14°36.2	40°09.6	-10°52.9				2023/7/2	SHA	Mer.pass		
6	33°40.8	244°35.3	8°04.8	232°05.1	8°50.7	352°43.4	14°36.3	55°12.2	-10°53.0				Venus	210°33.6	13:49		
7	48°43.2	259°38.2	8°04.4	247°06.1	8°50.1	7°45.5	14°36.4	70°14.8	-10°53.1				Mars	199°42.1	14:34		
8	63°45.7	274°41.2	8°04.0	262°07.2	8°49.5	22°47.7	14°36.5	85°17.4	-10°53.1				Jupiter	319°19.1	06:36		
9	78°48.1	289°44.1	8°03.6	277°08.2	8°48.9	37°49.9	14°36.5	100°20.0	-10°53.2				Saturn	21°24.5	02:28		
10	93°50.6	304°47.1	8°03.1	292°09.2	8°48.3	52°522											

h Sun Moon

Mon	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight		
								Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
0	178°21.8	19°57.6	112°27.5	16.7	-2°00.3	-14.2	54.8	72	—:—	—:—	—:—	—:—	—:—	—:—
1	193°21.8	19°57.1	127°03.2	16.6	-2°14.4	-14.2	54.9	70	—:—	—:—	—:—	—:—	—:—	—:—
2	208°21.8	19°56.6	141°38.8	16.6	-2°28.6	-14.2	54.9	70	—:—	—:—	—:—	—:—	—:—	—:—
3	223°21.8	19°56.1	156°14.4	16.6	-2°42.7	-14.2	54.9	68	—:—	—:—	01:34	22:34	—:—	—:—
4	238°21.8	19°55.6	170°50.0	16.6	-2°56.9	-14.2	54.9	66	—:—	—:—	02:17	21:53	—:—	—:—
5	253°21.8	19°55.0	185°25.5	16.5	-3°11.1	-14.2	54.9	64	—:—	00:40	02:45	21:26	23:21	—:—
6	268°21.7	19°54.5	200°01.0	16.5	-3°25.2	-14.2	55.0	62	—:—	01:44	03:07	21:05	22:25	—:—
7	283°21.7	19°54.0	214°36.5	16.5	-3°39.4	-14.2	55.0	60	—:—	02:17	03:24	20:48	21:54	—:—
8	298°21.7	19°53.5	229°11.9	16.4	-3°53.6	-14.2	55.0	58	00:37	02:40	03:38	20:33	21:31	23:26
9	313°21.7	19°52.9	243°47.3	16.4	-4°07.7	-14.2	55.0	56	01:35	02:59	03:51	20:21	21:12	22:35
10	328°21.7	19°52.4	258°22.7	16.3	-4°21.9	-14.1	55.1	54	02:05	03:14	04:01	20:11	20:57	22:06
11	343°21.7	19°51.9	272°58.0	16.3	-4°36.0	-14.1	55.1	52	02:27	03:28	04:11	20:01	20:44	21:44
12	358°21.7	19°51.4	287°33.3	16.3	-4°50.2	-14.1	55.1	50	02:45	03:39	04:19	19:53	20:33	21:27
13	13°21.6	19°50.8	302°08.6	16.2	-5°04.3	-14.1	55.1	45	03:18	04:02	04:37	19:35	20:10	20:54
14	28°21.6	19°50.3	316°43.8	16.2	-5°18.4	-14.1	55.2	40	03:42	04:21	04:52	19:21	19:52	20:30
15	43°21.6	19°49.8	331°19.0	16.1	-5°32.5	-14.1	55.2	35	04:01	04:36	05:04	19:09	19:37	20:11
16	58°21.6	19°49.3	345°54.1	16.1	-5°46.6	-14.1	55.2	30	04:17	04:48	05:15	18:58	19:24	19:56
17	73°21.6	19°48.7	0°29.1	16.0	-6°00.7	-14.1	55.2	20	04:41	05:09	05:33	18:40	19:04	19:32
18	88°21.6	19°48.2	15°04.2	16.0	-6°14.8	-14.1	55.3	10	04:60	05:26	05:49	18:25	18:47	19:13
19	103°21.6	19°47.7	29°39.1	15.9	-6°28.9	-14.1	55.3	0	05:16	05:41	06:03	18:10	18:32	18:58
20	118°21.6	19°47.1	44°14.1	15.9	-6°43.0	-14.1	55.3	-10	05:29	05:55	06:17	17:56	18:18	18:44
21	133°21.6	19°46.6	58°48.9	15.8	-6°57.0	-14.0	55.3	-20	05:43	06:09	06:33	17:41	18:04	18:31
22	148°21.6	19°46.1	73°23.8	15.8	-7°11.1	-14.0	55.4	-30	05:56	06:25	06:50	17:23	17:49	18:18
23	163°21.5	19°45.6	87°58.5	15.7	-7°25.1	-14.0	55.4	-35	06:02	06:33	07:00	17:13	17:40	18:11
	SD.=15.7	d=-0.5	S.D.=15.0					-40	06:09	06:42	07:12	17:02	17:31	18:04
								-45	06:17	06:53	07:25	16:48	17:21	17:57
								-50	06:26	07:05	07:41	16:32	17:08	17:48
								-52	06:29	07:11	07:49	16:24	17:03	17:44
								-54	06:33	07:17	07:58	16:16	16:56	17:40
								-56	06:38	07:24	08:07	16:06	16:50	17:36
								-58	06:42	07:32	08:18	15:56	16:42	17:31
								-60	06:48	07:40	08:31	15:43	16:34	17:26
								Lat.	Moonrise			Moonset		
								72	11:51	14:01	17:01	21:34	20:53	19:28
								70	11:44	13:41	16:04	21:44	21:15	20:26
								68	11:38	13:26	15:31	21:53	21:31	21:01
								66	11:33	13:14	15:07	21:60	21:45	21:27
								64	11:29	13:04	14:48	22:06	21:57	21:46
								62	11:25	12:56	14:33	22:11	22:07	22:03
								60	11:22	12:48	14:20	22:15	22:15	22:16
								58	11:20	12:42	14:10	22:19	22:23	22:28
								56	11:17	12:36	14:00	22:23	22:29	22:38
								54	11:15	12:31	13:52	22:26	22:35	22:47
								52	11:13	12:27	13:45	22:29	22:41	22:55
								50	11:11	12:23	13:38	22:31	22:45	23:03
								45	11:07	12:14	13:24	22:37	22:56	23:18
								40	11:04	12:07	13:12	22:42	23:05	23:31
								35	11:02	12:01	13:02	22:46	23:12	23:42
								30	10:59	11:55	12:54	22:50	23:19	23:52
								20	10:55	11:46	12:39	22:57	23:31	—:—
								10	10:52	11:38	12:26	23:02	23:41	—:—
								0	10:48	11:30	12:15	23:08	23:51	—:—
								-10	10:45	11:22	12:03	23:13	—:—	00:01
								-20	10:41	11:14	11:50	23:19	—:—	00:11
								-30	10:38	11:05	11:36	23:26	—:—	00:23
								-35	10:35	11:00	11:28	23:30	—:—	00:30
								-40	10:33	10:54	11:19	23:34	—:—	00:38
								-45	10:30	10:48	11:08	23:39	—:—	00:47
								-50	10:26	10:40	10:55	23:45	—:—	00:58
								-52	10:25	10:36	10:49	23:48	—:—	01:04
								-54	10:23	10:32	10:43	23:51	—:—	01:09
								-56	10:21	10:27	10:35	23:55	—:—	01:16
								-58	10:19	10:22	10:27	23:59	—:—	01:23
								-60	10:17	10:17	10:18	—:—	00:03	01:31
								Day	Sun		Mer.	Moon		Age
									Eqn. of Time			Mer. Pass.		
									00 ^h	12 ^h	Pass	Upper	Lower	
								24	06:33	06:33	12:06	16:58	04:37	7(36%)
								25	06:34	06:34	12:06	17:40	05:18	8(46%)
								26	06:34	06:34	12:06	18:25	06:02	9(56%)

July 27, 28 ,29 (Thu., Fri., Sat.)

Aries			Venus		Mars		Jupiter		Saturn		Stars		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec
0	304°25.1	155°29.1	7°57.4	142°23.5	8°39.8	263°22.4	14°37.8	325°58.9	-10°54.1	Alpheratz 357°35.8 29°13.1			
1	319°27.6	170°32.2	7°57.0	157°24.6	8°39.2	278°24.6	14°37.9	341°01.5	-10°54.1	Ankaa 353°08.1 -42°10.5			
2	334°30.0	185°35.2	7°56.6	172°25.6	8°38.6	293°26.7	14°37.9	356°04.1	-10°54.2	Schedar 349°32.2 56°39.7			
3	349°32.5	200°38.2	7°56.2	187°26.6	8°38.0	308°28.9	14°38.0	11°06.7	-10°54.2	Diphda 348°48.3 -17°51.3			
4	4°35.0	215°41.3	7°55.8	202°27.6	8°37.4	323°31.1	14°38.1	26°09.3	-10°54.3	Achernar 335°21.0 -57°06.7			
5	19°37.4	230°44.3	7°55.4	217°28.7	8°36.8	338°33.3	14°38.2	41°11.9	-10°54.4	Hamal 327°52.6 23°34.4			
6	34°39.9	245°47.4	7°55.0	232°29.7	8°36.2	353°35.4	14°38.3	56°14.5	-10°54.4	Polaris 314°43.7 89°21.5			
7	49°42.4	260°50.4	7°54.6	247°30.7	8°35.6	8°37.6	14°38.4	71°17.1	-10°54.5	Akamar 315°12.8 -40°12.4			
8	64°44.8	275°53.5	7°54.2	262°31.7	8°35.0	23°39.8	14°38.4	86°19.7	-10°54.5	Menkar 314°07.5 4°11.0			
9	79°47.3	290°56.6	7°53.8	277°32.8	8°34.4	38°41.9	14°38.5	101°22.3	-10°54.6	Mirfak 308°30.1 49°56.5			
10	94°49.7	305°59.6	7°53.4	292°33.8	8°33.8	53°44.1	14°38.6	116°24.9	-10°54.7	Aldebaran 290°41.2 16°33.4			
11	109°52.2	321°02.7	7°53.0	307°34.8	8°33.2	68°46.3	14°38.7	131°27.5	-10°54.7	Rigel 281°05.3 -8°10.3			
12	124°54.7	336°05.8	7°52.6	322°35.8	8°32.6	83°48.5	14°38.8	146°30.1	-10°54.8	Capella 280°24.0 46°01.2			
13	139°57.1	351°08.9	7°52.2	337°36.9	8°32.0	98°50.6	14°38.8	161°32.7	-10°54.8	Bellatrix 278°24.4 6°22.3			
14	154°59.6	6°11.9	7°51.9	352°37.9	8°31.3	113°52.8	14°38.9	176°35.3	-10°54.9	Elnath 278°03.7 28°37.6			
15	170°02.1	21°15.0	7°51.5	7°38.9	8°30.7	128°55.0	14°39.0	191°37.9	-10°55.0	Alnilam 275°39.2 -1°11.1			
16	185°04.5	36°18.1	7°51.1	22°39.9	8°30.1	143°57.2	14°39.1	206°40.5	-10°55.0	Betelgeuse 270°53.7 7°24.7			
17	200°07.0	51°21.2	7°50.7	37°41.0	8°29.5	158°59.3	14°39.2	221°43.1	-10°55.1	Canopus 263°53.4 -52°42.3			
18	215°09.5	66°24.3	7°50.3	52°42.0	8°28.9	174°01.5	14°39.2	236°45.7	-10°55.2	Sirius 258°27.5 -16°44.6			
19	230°11.9	81°27.4	7°50.0	67°43.0	8°28.3	189°03.7	14°39.3	251°48.3	-10°55.2	Adara 255°07.2 -29°00.1			
20	245°14.4	96°30.5	7°49.6	82°44.0	8°27.7	204°05.9	14°39.4	266°50.9	-10°55.3	Procyon 244°52.3 5°10.1			
21	260°16.9	111°33.6	7°49.2	97°45.0	8°27.1	219°08.0	14°39.5	281°53.5	-10°55.3	Pollux 243°19.0 27°58.2			
22	275°19.3	126°36.7	7°48.8	112°46.1	8°26.5	234°10.2	14°39.6	296°56.1	-10°55.4	Avior 234°15.9 -59°35.0			
23	290°21.8	141°39.8	7°48.5	127°47.1	8°25.9	249°12.4	14°39.6	311°58.7	-10°55.5	Suhail 222°47.6 -43°31.6			
Mer.pass.:3:41:			v3.0 d-0.4 m-4.4		v1.0 d-0.6 m1.8		v2.2 d0.1 m-2.2		v2.6 d-0.1 m0.6		Miaplacidus 221°39.5 -69°48.8		
Alphard 217°49.2 -8°45.5													
Regulus 207°36.0 11°51.3													
Dubhe 193°42.9 61°37.7													
Denebola 182°26.3 14°26.6													
Gienah 175°45.0 -17°40.3													
Acrux 173°01.8 -63°14.0													
Gacrux 171°53.3 -57°14.9													
Alioth 166°14.3 55°50.2													
Spica 158°23.6 -11°17.0													
Alcaid 152°53.0 49°12.1													
Hadar 148°37.7 -60°29.4													
Menkent 147°59.1 -36°29.2													
Arcturus 145°48.8 19°04.1													
Rigel Kent. 139°41.9 -60°56.2													
Zubenelg. 136°57.3 -16°08.4													
Kochab 137°19.5 74°03.8													
Alphecca 126°04.6 26°38.3													
Antares 112°17.1 -26°29.1													
Atria 107°12.0 -69°04.4													
Sabik 102°03.9 -15°45.2													
Shaula 96°11.7 -37°07.3													
Rasalhague 95°59.4 12°32.7													
Etamin 90°42.3 51°29.3													
Kaus Aust. 83°33.7 -34°22.4													
Vega 80°33.7 38°48.4													
Nunki 75°48.9 -26°16.0													
Altair 62°00.9 8°55.8													
Peacock 53°07.0 -56°39.5													
Deneb 49°26.2 45°21.8													
Enif 33°39.7 9°59.0													
Alnair 27°34.0 -46°50.7													
Fomalhaut 15°15.6 -29°29.7													
Scheat 13°46.1 28°12.5													
Markab 13°30.9 15°19.9													
2023/7/2			SHA		Mer.pass								
Venus			211°04.0		13:35								
Mars			197°58.4		14:29								
Jupiter			318°57.3		06:26								
Saturn			21°33.8		02:16								
2023/7/2			SHA		Mer.pass								
Venus			211°18.7		13:30								
Mars			197°23.9		14:28								
Jupiter			318°50.3		06:22								
Saturn			21°37.0		02:12								
2023/7/2			SHA		Mer.pass								
Venus			211°35.7		13:25								
Mars			196°49.3		14:26								
Jupiter			318°43.5		06:19								
Saturn			21°40.3		02:07								
Horizontal parallax													
Venus: 0.5													
Mars: 0.1													
Mer.pass.:3:33:			v3.2 d-0.3 m-4.4		v1.0 d-0.6 m1.8		v2.2 d0.1 m-2.2		v2.6 d-0.1 m0.6				

h Sun Moon

GHA								Twilight							
Th	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Twilight	Naut.
0	178°21.4	19°18.8	80°48.9	11.5	-18°13.9	-12.0	57.0	72	—	—	—	—	—	—	—
1	193°21.4	19°18.3	95°19.3	11.4	-18°25.8	-11.9	57.0	70	—	—	—	00:29	23:24	—	—
2	208°21.4	19°17.7	109°49.6	11.2	-18°37.7	-11.8	57.0	68	—	—	—	01:52	22:16	—	—
3	223°21.4	19°17.1	124°19.8	11.1	-18°49.5	-11.8	57.1	66	—	—	—	02:29	21:41	—	—
4	238°21.4	19°16.6	138°49.9	11.0	-19°01.3	-11.7	57.1	64	—	—	01:11	02:55	21:16	22:56	—
5	253°21.4	19°16.0	153°19.8	10.9	-19°12.9	-11.6	57.2	62	—	—	01:57	03:15	20:57	22:12	—
6	268°21.4	19°15.5	167°49.6	10.8	-19°24.5	-11.5	57.2	60	—	—	02:26	03:31	20:41	21:44	—
7	283°21.4	19°14.9	182°19.3	10.6	-19°36.0	-11.5	57.2	58	01:04	02:48	03:44	20:27	21:23	23:03	
8	298°21.4	19°14.3	196°48.9	10.5	-19°47.4	-11.4	57.3	56	01:47	03:06	03:56	20:16	21:06	22:23	
9	313°21.5	19°13.8	211°18.4	10.4	-19°58.7	-11.3	57.3	54	02:14	03:20	04:06	20:06	20:51	21:57	
10	328°21.5	19°13.2	225°47.7	10.3	-20°10.0	-11.2	57.4	52	02:34	03:33	04:15	19:57	20:39	21:37	
11	343°21.5	19°12.6	240°16.9	10.1	-20°21.1	-11.1	57.4	50	02:51	03:44	04:23	19:49	20:28	21:21	
12	358°21.5	19°12.1	254°46.0	10.0	-20°32.2	-11.0	57.4	45	03:22	04:06	04:40	19:32	20:06	20:50	
13	13°21.5	19°11.5	269°14.9	9.9	-20°43.1	-10.9	57.5	40	03:46	04:24	04:54	19:18	19:49	20:27	
14	28°21.5	19°10.9	283°43.8	9.8	-20°54.0	-10.8	57.5	35	04:04	04:38	05:06	19:06	19:35	20:09	
15	43°21.5	19°10.4	298°12.5	9.6	-21°04.8	-10.7	57.6	30	04:19	04:50	05:16	18:56	19:22	19:54	
16	58°21.5	19°09.8	312°41.0	9.5	-21°15.5	-10.6	57.6	20	04:42	05:10	05:34	18:39	19:03	19:31	
17	73°21.5	19°09.2	327°09.5	9.4	-21°26.1	-10.5	57.6	10	05:01	05:27	05:49	18:24	18:46	19:12	
18	88°21.5	19°08.7	341°37.8	9.2	-21°36.5	-10.4	57.7	0	05:16	05:41	06:03	18:10	18:32	18:57	
19	103°21.5	19°08.1	356°05.9	9.1	-21°46.9	-10.3	57.7	-10	05:29	05:55	06:17	17:56	18:18	18:44	
20	118°21.5	19°07.5	10°34.0	9.0	-21°57.2	-10.2	57.7	-20	05:42	06:08	06:32	17:42	18:05	18:32	
21	133°21.6	19°07.0	25°01.9	8.8	-22°07.4	-10.1	57.8	-30	05:54	06:23	06:48	17:25	17:50	18:19	
22	148°21.6	19°06.4	39°29.7	8.7	-22°17.5	-10.0	57.8	-35	06:00	06:31	06:58	17:15	17:42	18:13	
23	163°21.6	19°05.8	53°57.3	8.6	-22°27.4	-9.9	57.9	-40	06:07	06:40	07:09	17:04	17:34	18:06	
SD.=15.7 d=-0.6								S.D.=15.5							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
0	178°21.6	19°05.2	68°24.8	8.4	-22°37.3	-9.8	57.9	72	—	—	—	—	—	—	</

July 30, 31 ,01 (Sun., Mon., Tue.)

Aries			Venus		Mars		Jupiter		Saturn		Stars			
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	307°22.5	159°17.3	7°32.0	143°37.3	7°55.9	265°59.3	14°43.5	329°06.2	-10°58.5	Alpheratz	357°35.8	29°13.2		
1	322°25.0	174°20.7	7°31.7	158°38.3	7°55.3	281°01.5	14°43.5	344°08.8	-10°58.5	Ankaa	353°08.1	-42°10.4		
2	337°27.5	189°24.0	7°31.4	173°39.3	7°54.7	296°03.7	14°43.6	359°11.4	-10°58.6	Schedar	349°32.2	56°39.8		
3	352°29.9	204°27.3	7°31.1	188°40.4	7°54.1	311°05.9	14°43.7	14°14.0	-10°58.6	Diphda	348°48.2	-17°51.3		
4	7°32.4	219°30.6	7°30.8	203°41.4	7°53.5	326°08.1	14°43.8	29°16.6	-10°58.7	Achernar	335°21.0	-57°06.7		
5	22°34.8	234°33.9	7°30.5	218°42.4	7°52.9	341°10.3	14°43.8	44°19.2	-10°58.8	Hamal	327°52.5	23°34.4		
6	37°37.3	249°37.3	7°30.2	233°43.4	7°52.2	356°12.4	14°43.9	59°21.8	-10°58.8	Polaris	314°41.8	89°21.5		
7	52°39.8	264°40.6	7°29.9	248°44.5	7°51.6	11°14.6	14°44.0	74°24.4	-10°58.9	Akamar	315°12.7	-40°12.3		
8	67°42.2	279°43.9	7°29.7	263°45.5	7°51.0	26°16.8	14°44.1	89°27.0	-10°59.0	Menkar	314°07.4	4°11.0		
9	82°44.7	294°47.3	7°29.4	278°46.5	7°50.4	41°19.0	14°44.1	104°29.6	-10°59.0	Mirfak	308°30.1	49°56.5		
10	97°47.2	309°50.6	7°29.1	293°47.5	7°49.8	56°21.2	14°44.2	119°32.3	-10°59.1	Aldebaran	290°41.2	16°33.4		
11	112°49.6	324°54.0	7°28.8	308°48.6	7°49.2	71°23.4	14°44.3	134°34.9	-10°59.1	Rigel	281°05.2	-8°10.3		
12	127°52.1	339°57.3	7°28.5	323°49.6	7°48.6	86°25.6	14°44.4	149°37.5	-10°59.2	Capella	280°24.0	46°01.2		
13	142°54.6	355°00.7	7°28.2	338°50.6	7°47.9	101°27.8	14°44.4	164°40.1	-10°59.3	Bellatrix	278°24.4	6°22.3		
14	157°57.0	10°04.0	7°28.0	353°51.6	7°47.3	116°30.0	14°44.5	179°42.7	-10°59.3	Elnath	278°03.6	28°37.6		
15	172°59.5	25°07.4	7°27.7	8°52.7	7°46.7	131°32.2	14°44.6	194°45.3	-10°59.4	Alnilam	275°39.2	-1°11.1		
16	188°02.0	40°10.7	7°27.4	23°53.7	7°46.1	146°34.4	14°44.7	209°47.9	-10°59.5	Betelgeuse	270°53.6	7°24.8		
17	203°04.4	55°14.1	7°27.1	38°54.7	7°45.5	161°36.5	14°44.7	224°50.5	-10°59.5	Canopus	263°53.4	-52°42.3		
18	218°06.9	70°17.5	7°26.9	53°55.7	7°44.9	176°38.7	14°44.8	239°53.1	-10°59.6	Sirius	258°27.5	-16°44.6		
19	233°09.3	85°20.9	7°26.6	68°56.8	7°44.2	191°40.9	14°44.9	254°55.7	-10°59.6	Adara	255°07.1	-29°00.1		
20	248°11.8	100°24.2	7°26.3	83°57.8	7°43.6	206°43.1	14°45.0	269°58.3	-10°59.7	Procyon	244°52.3	5°10.1		
21	263°14.3	115°27.6	7°26.0	98°58.8	7°43.0	221°45.3	14°45.0	285°00.9	-10°59.8	Pollux	243°19.0	27°58.2		
22	278°16.7	130°31.0	7°25.8	113°59.8	7°42.4	236°47.5	14°45.1	300°03.5	-10°59.8	Avior	234°15.9	-59°35.0		
23	293°19.2	145°34.4	7°25.5	129°00.9	7°41.8	251°49.7	14°45.2	315°06.1	-10°59.9	Suhail	222°47.6	-43°31.6		
Mer.pass.:3:29:			v3.3 d-0.3 m-4.4		v1.0 d-0.6 m1.8		v2.2 d0.1 m-2.2		v2.6 d-0.1 m0.6					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	308°21.7	160°37.8	7°25.3	144°01.9	7°41.2	266°51.9	14°45.2	330°08.7	-10°60.0	Dubhe	193°43.0	61°37.7		
1	323°24.1	175°41.2	7°25.0	159°02.9	7°40.6	281°54.1	14°45.3	345°11.4	-11°00.0	Denebola	182°26.3	14°26.6		
2	338°26.6	190°44.6	7°24.7	174°03.9	7°39.9	296°56.3	14°45.4	0°14.0	-11°00.1	Gienah	175°45.0	-17°40.3		
3	353°29.1	205°48.0	7°24.5	189°05.0	7°39.3	311°58.5	14°45.5	15°16.6	-11°00.2	Acruz	173°01.8	-63°14.0		
4	8°31.5	220°51.4	7°24.2	204°06.0	7°38.7	327°00.7	14°45.5	30°19.2	-11°00.2	Gacrux	171°53.3	-57°14.9		
5	23°34.0	235°54.8	7°24.0	219°07.0	7°38.1	342°02.9	14°45.6	45°21.8	-11°00.3	Alioth	166°14.3	55°50.2		
6	38°36.5	250°58.2	7°23.7	234°08.0	7°37.5	357°05.1	14°45.7	60°24.4	-11°00.3	Spica	158°23.6	-11°17.0		
7	53°38.9	266°01.7	7°23.5	249°09.1	7°36.9	12°07.3	14°45.8	75°27.0	-11°00.4	Alcaid	152°53.0	49°12.1		
8	68°41.4	281°05.1	7°23.2	264°10.1	7°36.2	27°09.5	14°45.8	90°29.6	-11°00.5	Hadar	148°37.8	-60°29.4		
9	83°43.8	296°08.5	7°22.9	279°11.1	7°35.6	42°11.7	14°45.9	105°32.2	-11°00.5	Menkent	147°59.1	-36°29.2		
10	98°46.3	311°11.9	7°22.7	294°12.1	7°35.0	57°13.9	14°46.0	120°34.8	-11°00.6	Arcturus	145°48.9	19°04.1		
11	113°48.8	326°15.4	7°22.5	309°13.2	7°34.4	72°16.1	14°46.1	135°37.4	-11°00.7	Rigel Kent.	139°41.9	-60°56.2		
12	128°51.2	341°18.8	7°22.2	324°14.2	7°33.8	87°18.3	14°46.1	150°40.0	-11°00.7	Zubenelg.	136°57.3	-16°08.4		
13	143°53.7	356°22.3	7°22.0	339°15.2	7°33.2	102°20.5	14°46.2	165°42.6	-11°00.8	Kochab	137°19.6	74°03.8		
14	158°56.2	11°25.7	7°21.7	354°16.2	7°32.5	117°22.7	14°46.3	180°45.3	-11°00.8	Alphecca	126°04.6	26°38.4		
15	173°58.6	26°29.2	7°21.5	9°17.3	7°31.9	132°24.9	14°46.3	195°47.9	-11°00.9	Antares	112°17.1	-26°29.1		
16	189°01.1	41°32.6	7°21.2	24°18.3	7°31.3	147°27.1	14°46.4	210°50.5	-11°01.0	Atria	107°12.0	-69°04.4		
17	204°03.6	56°36.1	7°21.0	39°19.3	7°30.7	162°29.3	14°46.5	225°53.1	-11°01.0	Sabik	102°03.9	-15°45.2		
18	219°06.0	71°39.5	7°20.8	54°20.3	7°30.1	177°31.5	14°46.6	240°55.7	-11°01.1	Shaula	96°11.7	-37°07.3		
19	234°08.5	86°43.0	7°20.5	69°21.4	7°29.4	192°33.7	14°46.6	255°58.3	-11°01.2	Rasalhague	95°59.4	12°32.7		
20	249°11.0	101°46.4	7°20.3	84°22.4	7°28.8	207°35.9	14°46.7	271°00.9	-11°01.2	Etamin	90°42.3	51°29.3		
21	264°13.4	116°49.9	7°20.1	99°23.4	7°28.2	222°38.1	14°46.8	286°03.5	-11°01.3	Kaus Aust.	83°33.7	-34°22.4		
22	279°15.9	131°53.4	7°19.8	114°24.4	7°27.6	237°40.3	14°46.8	301°06.1	-11°01.4	Vega	80°33.7	38°48.4		
23	294°18.3	146°56.9	7°19.6	129°25.5	7°27.0	252°42.5	14°46.9	316°08.7	-11°01.4	Nunki	75°48.9	-26°16.0		
Mer.pass.:3:25:			v3.4 d-0.3 m-4.3		v1.0 d-0.6 m1.8		v2.2 d0.1 m-2.2		v2.6 d-0.1 m0.6					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	309°20.8	162°00.3	7°19.4	144°26.5	7°26.4	267°44.7	14°47.0	331°11.3	-11°01.5	Alnair	27°34.0	-46°50.7		
1	324°23.3	177°03.8	7°19.2	159°27.5	7°25.7	282°46.9	14°47.1	346°14.0	-11°01.5	Fomalhaut	15°15.6	-29°29.7		
2	339°25.7	192°07.3	7°18.9	174°28.5	7°25.1	297°49.1	14°47.1	1°16.6	-11°01.6	Scheat	13°46.1	28°12.5		
3	354°28.2	207°10.8	7°18.7	189°29.6	7°24.5	312°51.3	14°47.2	16°19.2	-11°01.7	Markab	13°30.8	15°19.9		
4	9°30.7	222°14.3	7°18.5	204°30.6	7°23.9	327°53.5	14°47.3	31°21.8	-11°01.7					
5	24°33.1	237°17.8	7°18.3	219°31.6	7°23.3	342°55.7	14°47.3	46°24.4	-11°01.8	2023/7/3	SHA	Mer.pass		
6	39°35.6	252°21.3	7°18.1	234°32.6	7°22.6	357°57.9	14°47.4	61°27.0	-11°01.9	Venus	211°54.8	13:20		
7	54°38.1	267°24.8	7°17.8	249°33.7	7°22.0	13°00.1	14°47.5	76°29.6	-11°01.9	Mars	196°14.8	14:25		
8	69°40.5	282°28.3	7°17.6	264°34.7	7°21.4	28°02.3	14°47.6	91°32.2	-11°02.0	Jupiter	318°36.8	06:15		
9	84°43.0	297°31.8	7°17.4	279°35.7	7°20.8	43°04.5	14°47.6	106°34.8	-11°02.1	Saturn	21°43.7	02:03		
10	99°45.5	312°35.3	7°17.2	294°36.7	7°20.2	58°06.7	14°47.7	121°37.4	-11°02.1	2023/7/3	SHA	Mer.pass		
11	114°47.9	327°38.9	7°17.0	309°37.8	7°19.6	73°08.9	14°47.8	136°40.1	-11°02.2	Venus	212°16.1	13:14		
12	129°50.4	342°42.4	7°16.8	324°38.8	7°18.9	88°11.1	14°47.8	151°42.7	-11°02.3	Mars	195°40.2	14:23		
13	144°52.8	357°45.9	7°16.6	339°39.8	7°18.3	103°13.3	14°47.9	166°45.3	-11°02.3	Jupiter	318°30.2	06:12		
14	159°55.3	12°49.4	7°16.4	354°40.8	7°17.7	118°15.5	14°48.0	181°47.9	-11°02.4	Saturn	21°47.1	01:59		
15	174°57.8	27°53.0	7°16.2	9°41.9										

h Sun Moon														
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
								Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
0	178°22.4	18°37.1	39°55.2	2.7	-27°43.1	-2.3	59.8	72	--	--	--	--	--	--
1	193°22.4	18°36.5	54°16.9	2.7	-27°45.3	-2.1	59.8	70	--	--	01:14	22:50	--	--
2	208°22.4	18°35.9	68°38.5	2.6	-27°47.3	-1.9	59.9	68	--	--	02:08	22:00	--	--
3	223°22.5	18°35.3	83°00.0	2.5	-27°49.1	-1.7	59.9	66	--	--	02:41	21:29	--	--
4	238°22.5	18°34.7	97°21.5	2.4	-27°50.6	-1.5	59.9	64	--	01:32	03:04	21:06	22:36	--
5	253°22.5	18°34.1	111°42.9	2.4	-27°52.0	-1.3	60.0	62	--	02:10	03:22	20:48	21:60	--
6	268°22.5	18°33.5	126°04.3	2.3	-27°53.2	-1.1	60.0	60	--	02:36	03:38	20:34	21:34	--
7	283°22.6	18°32.9	140°25.5	2.2	-27°54.2	-0.9	60.0	58	01:23	02:56	03:50	20:21	21:15	22:45
8	298°22.6	18°32.3	154°46.8	2.2	-27°54.9	-0.7	60.1	56	01:58	03:12	04:02	20:10	20:59	22:12
9	313°22.6	18°31.7	169°07.9	2.1	-27°55.5	-0.5	60.1	54	02:22	03:26	04:11	20:01	20:45	21:48
10	328°22.6	18°31.1	183°29.0	2.1	-27°55.8	-0.3	60.1	52	02:41	03:38	04:20	19:52	20:34	21:30
11	343°22.7	18°30.5	197°50.1	2.0	-27°56.0	-0.0	60.2	50	02:57	03:48	04:27	19:44	20:23	21:14
12	358°22.7	18°29.9	212°11.1	2.0	-27°55.9	0.2	60.2	45	03:27	04:10	04:44	19:28	20:02	20:45
13	13°22.7	18°29.3	226°32.1	1.9	-27°55.7	0.4	60.2	40	03:49	04:27	04:57	19:15	19:46	20:23
14	28°22.7	18°28.7	240°53.0	1.9	-27°55.2	0.6	60.3	35	04:07	04:40	05:08	19:04	19:32	20:06
15	43°22.8	18°28.1	255°13.9	1.9	-27°54.5	0.8	60.3	30	04:21	04:52	05:18	18:54	19:20	19:51
16	58°22.8	18°27.5	269°34.7	1.8	-27°53.6	1.0	60.3	20	04:44	05:11	05:35	18:38	19:01	19:29
17	73°22.8	18°26.9	283°55.5	1.8	-27°52.5	1.2	60.4	10	05:01	05:27	05:50	18:23	18:45	19:11
18	88°22.8	18°26.3	298°16.3	1.8	-27°51.2	1.4	60.4	0	05:16	05:41	06:03	18:10	18:32	18:57
19	103°22.9	18°25.7	312°37.1	1.7	-27°49.7	1.6	60.4	-10	05:29	05:54	06:16	17:57	18:19	18:44
20	118°22.9	18°25.1	326°57.8	1.7	-27°48.0	1.8	60.4	-20	05:41	06:07	06:30	17:43	18:06	18:32
21	133°22.9	18°24.5	341°18.5	1.7	-27°46.0	2.0	60.5	-30	05:52	06:21	06:46	17:27	17:52	18:21
22	148°23.0	18°23.9	355°39.2	1.7	-27°43.9	2.3	60.5	-35	05:58	06:29	06:56	17:18	17:44	18:15
23	163°23.0	18°23.2	9°59.9	1.7	-27°41.5	2.5	60.5	-40	06:05	06:37	07:06	17:07	17:36	18:09
SD.=15.8 d=-0.6 S.D.=16.3								-45	06:11	06:47	07:19	16:55	17:27	18:02
								-50	06:19	06:58	07:33	16:40	17:15	17:55
								-52	06:22	07:03	07:40	16:33	17:10	17:51
								-54	06:25	07:09	07:48	16:25	17:05	17:48
								-56	06:29	07:15	07:57	16:17	16:59	17:44
								-58	06:33	07:21	08:07	16:07	16:52	17:40
								-60	06:38	07:29	08:18	15:56	16:45	17:36
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
									Sun	Mon	Tue	Sun	Mon	Tue
0	178°23.0	18°22.6	24°20.6	1.7	-27°38.9	2.7	60.6	72	--	--	--	--	--	--
1	193°23.1	18°22.0	38°41.2	1.7	-27°36.2	2.9	60.6	70	--	--	--	--	--	--
2	208°23.1	18°21.4	53°01.9	1.7	-27°33.2	3.1	60.6	68	--	--	23:55	--	--	--
3	223°23.1	18°20.8	67°22.6	1.7	-27°29.9	3.3	60.6	66	--	--	22:44	--	--	--
4	238°23.1	18°20.2	81°43.2	1.7	-27°26.5	3.5	60.7	64	--	--	22:58	--	23:60	--
5	253°23.2	18°19.6	96°03.9	1.7	-27°22.9	3.7	60.7	62	21:56	21:46	21:41	22:43	--	01:11
6	268°23.2	18°19.0	110°24.6	1.7	-27°19.0	4.0	60.7	60	20:41	21:10	21:20	23:58	--	01:47
7	283°23.2	18°18.3	124°45.3	1.7	-27°15.0	4.2	60.8	58	20:05	20:44	21:03	--	00:34	02:12
8	298°23.3	18°17.7	139°06.0	1.7	-27°10.7	4.4	60.8	56	19:39	20:23	20:49	--	00:60	02:32
9	313°23.3	18°17.1	153°26.7	1.7	-27°06.2	4.6	60.8	54	19:18	20:06	20:36	00:14	01:20	02:49
10	328°23.3	18°16.5	167°47.5	1.8	-27°01.5	4.8	60.8	52	19:01	19:51	20:25	00:31	01:37	03:04
11	343°23.4	18°15.9	182°08.2	1.8	-26°56.6	5.0	60.8	50	18:46	19:38	20:15	00:46	01:52	03:16
12	358°23.4	18°15.3	196°29.1	1.8	-26°51.5	5.2	60.9	45	18:16	19:12	19:54	01:15	02:22	03:42
13	13°23.4	18°14.7	210°49.9	1.9	-26°46.2	5.4	60.9	40	17:53	18:50	19:37	01:39	02:45	04:02
14	28°23.5	18°14.0	225°10.8	1.9	-26°40.7	5.6	60.9	35	17:34	18:33	19:23	01:58	03:04	04:19
15	43°23.5	18°13.4	239°31.7	1.9	-26°35.0	5.8	60.9	30	17:17	18:18	19:10	02:14	03:21	04:34
16	58°23.5	18°12.8	253°52.6	2.0	-26°29.0	6.0	61.0	20	16:49	17:52	18:48	02:42	03:48	04:58
17	73°23.6	18°12.2	268°13.6	2.0	-26°22.9	6.2	61.0	10	16:25	17:29	18:30	03:06	04:12	05:19
18	88°23.6	18°11.6	282°34.6	2.1	-26°16.6	6.4	61.0	0	16:03	17:08	18:12	03:28	04:34	05:39
19	103°23.6	18°10.9	296°55.7	2.1	-26°10.0	6.6	61.0	-10	15:40	16:47	17:54	03:51	04:56	05:58
20	118°23.7	18°10.3	311°16.8	2.2	-26°03.3	6.8	61.0	-20	15:16	16:25	17:35	04:15	05:19	06:19
21	133°23.7	18°09.7	325°38.0	2.2	-25°56.3	7.0	61.1	-30	14:48	15:58	17:13	04:43	05:46	06:43
22	148°23.7	18°09.1	339°59.3	2.3	-25°49.2	7.2	61.1	-35	14:32	15:43	17:00	04:59	06:02	06:57
23	163°23.8	18°08.5	354°20.6	2.3	-25°41.8	7.4	61.1	-40	14:12	15:25	16:45	05:18	06:21	07:13
SD.=15.8 d=-0.6 S.D.=16.5								-45	13:49	15:03	16:27	05:41	06:43	07:32
								-50	13:19	14:36	16:05	06:11	07:11	07:55
								-52	13:05	14:22	15:54	06:26	07:25	08:07
								-54	12:48	14:06	15:42	06:43	07:41	08:19
								-56	12:27	13:48	15:28	07:03	07:60	08:34
								-58	12:02	13:25	15:12	07:29	08:23	08:51
								-60	11:27	12:56	14:52	08:04	08:53	09:12
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
0	178°23.8	18°07.8	8°41.9	2.4	-25°34.3	7.6	61.1	30	06:30	06:29	12:06	22:18	09:45	13(92%)
1	193°23.8	18°07.2	23°03.4	2.5	-25°26.5	7.8	61.1	31	06:28	06:26	12:06	23:23	10:51	14(97%)
2	208°23.9	18°06.6	37°24.9	2.5	-25°18.6	8.0	61.1	1	06:25	06:23	12:06	00:26	11:55	15(100%)
3	223°23.9	18°06.0	51°46.4	2.6	-25°10.5	8.2	61.2							
4	238°24.0	18°05.3	66°08.1	2.7	-25°02.2	8.4	61.2							
5	253°24.0	18°04.7	80°29.8	2.7	-24°53.7	8.6	61.2							
6	268°24.0	18°04.1	94°51.5	2.8	-24°45.0	8.8	61.2							
7	283°24.1	18°03.5	109°13.4	2.9	-24°36.1	9.0	61.2							
8	298°24.1	18°02.8	123°35.3	3.0	-24°27.0	9.2	61.2							
9	313°24.1	18°02.2	137°57.4	3.1	-24°17.8	9.3	61.2							
10	328°24.2	18°01.6	152°19.5	3.1	-24°08.3	9.5	61.3							
11	343°24.2	18°00.9	166°41.6	3.2	-23°58.7	9.7	61.3							
12	358°24.3	18°00.3	181°03.9	3.3	-23°48.9	9.9	61.3							
13	13°24.3	17°59.7	195°26.3	3.4	-23°38.9	10.1	61.3							

August 02, 03 ,04 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars					
Wed	GHA		GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec				
0	310°20.0		163°24.9	7°14.4		144°51.1	7°11.5		268°37.6	14°48.7		332°14.0	-11°03.0		Alpheratz	357°35.8	29°13.2			
1	325°22.4		178°28.5	7°14.2		159°52.1	7°10.9		283°39.8	14°48.7		347°16.6	-11°03.1		Ankaa	353°08.0	-42°10.4			
2	340°24.9		193°32.0	7°14.1		174°53.1	7°10.3		298°42.0	14°48.8		2°19.2	-11°03.2		Schedar	349°32.1	56°39.8			
3	355°27.3		208°35.6	7°13.9		189°54.2	7°09.6		313°44.2	14°48.9		17°21.8	-11°03.2		Diphda	348°48.2	-17°51.3			
4	10°29.8		223°39.2	7°13.7		204°55.2	7°09.0		328°46.4	14°49.0		32°24.5	-11°03.3		Achernar	335°20.9	-57°06.7			
5	25°32.3		238°42.8	7°13.5		219°56.2	7°08.4		343°48.6	14°49.0		47°27.1	-11°03.3		Hamal	327°52.5	23°34.4			
6	40°34.7		253°46.4	7°13.3		234°57.2	7°07.8		358°50.8	14°49.1		62°29.7	-11°03.4		Polaris	314°40.3	89°21.5			
7	55°37.2		268°49.9	7°13.2		249°58.3	7°07.2		13°53.0	14°49.2		77°32.3	-11°03.5		Akamar	315°12.7	-40°12.3			
8	70°39.7		283°53.5	7°13.0		264°59.3	7°06.5		28°55.2	14°49.2		92°34.9	-11°03.5		Menkar	314°07.4	4°11.0			
9	85°42.1		298°57.1	7°12.8		280°00.3	7°05.9		43°57.4	14°49.3		107°37.5	-11°03.6		Mirfak	308°30.1	49°56.5			
10	100°44.6		314°00.7	7°12.6		295°01.3	7°05.3		58°59.6	14°49.4		122°40.1	-11°03.7		Aldebaran	290°41.2	16°33.4			
11	115°47.1		329°04.3	7°12.5		310°02.4	7°04.7		74°01.9	14°49.4		137°42.7	-11°03.7		Rigel	281°05.2	-8°10.3			
12	130°49.5		344°07.9	7°12.3		325°03.4	7°04.0		89°04.1	14°49.5		152°45.4	-11°03.8		Capella	280°24.0	46°01.2			
13	145°52.0		359°11.5	7°12.1		340°04.4	7°03.4		104°06.3	14°49.6		167°48.0	-11°03.9		Bellatrix	278°24.4	6°22.3			
14	160°54.4		14°15.1	7°12.0		355°05.4	7°02.8		119°08.5	14°49.6		182°50.6	-11°03.9		Elnath	278°03.6	28°37.6			
15	175°56.9		29°18.7	7°11.8		10°06.5	7°02.2		134°10.7	14°49.7		197°53.2	-11°04.0		Alnilam	275°39.2	-1°11.1			
16	190°59.4		44°22.4	7°11.6		25°07.5	7°01.6		149°12.9	14°49.8		212°55.8	-11°04.1		Betelgeuse	270°53.6	7°24.8			
17	206°01.8		59°26.0	7°11.5		40°08.5	7°00.9		164°15.1	14°49.8		227°58.4	-11°04.1		Canopus	263°53.4	-52°42.2			
18	221°04.3		74°29.6	7°11.3		55°09.5	7°00.3		179°17.3	14°49.9		243°01.0	-11°04.2		Sirius	258°27.5	-16°44.6			
19	236°06.8		89°33.2	7°11.1		70°10.6	6°59.7		194°19.5	14°50.0		258°03.6	-11°04.3		Adara	255°07.1	-29°00.1			
20	251°09.2		104°36.8	7°11.0		85°11.6	6°59.1		209°21.8	14°50.0		273°06.3	-11°04.3		Procyon	244°52.3	5°10.1			
21	266°11.7		119°40.5	7°10.8		100°12.6	6°58.5		224°24.0	14°50.1		288°08.9	-11°04.4		Pollux	243°19.0	27°58.2			
22	281°14.2		134°44.1	7°10.7		115°13.6	6°57.8		239°26.2	14°50.2		303°11.5	-11°04.5		Avior	234°15.9	-59°35.0			
23	296°16.6		149°47.7	7°10.5		130°14.7	6°57.2		254°28.4	14°50.2		318°14.1	-11°04.5		Suhail	222°47.6	-43°31.6			
Mer.pass.:3:18:			v3.6 d-0.2 m-4.3			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.2			v2.6 d-0.1 m0.6								
															Miaplacidus			221°39.5	-69°48.8	
															Alphard			217°49.2	-8°45.5	
															Regulus			207°36.0	11°51.3	
															Dubhe			193°43.0	61°37.7	
															Denebola			182°26.3	14°26.6	
															Gienah			175°45.0	-17°40.3	
															Acrux			173°01.8	-63°14.0	
															Gacrux			171°53.3	-57°14.9	
															Alioth			166°14.3	55°50.2	
															Spica			158°23.6	-11°17.0	
															Alcaid			152°53.0	49°12.1	
															Hadar			148°37.8	-60°29.4	
															Menkent			147°59.1	-36°29.2	
															Arcturus			145°48.9	19°04.1	
															Rigel Kent.			139°41.9	-60°56.2	
															Zubenelg.			136°57.3	-16°08.4	
															Kochab			137°19.6	74°03.8	
															Alphecca			126°04.7	26°38.4	
															Antares			112°17.1	-26°29.1	
															Atria			107°12.1	-69°04.4	
															Sabik			102°03.9	-15°45.2	
															Shaula			96°11.7	-37°07.3	
															Rasalhague			95°59.4	12°32.7	
															Etamin			90°42.3	51°29.3	
															Kaus Aust.			83°33.7	-34°22.4	
															Vega			80°33.7	38°48.4	
															Nunki			75°48.9	-26°16.0	
															Altair			62°00.8	8°55.8	
															Peacock			53°06.9	-56°39.5	
															Deneb			49°26.1	45°21.9	
															Enif			33°39.6	9°59.0	
															Alnair			27°34.0	-46°50.7	
															Fomalhaut			15°15.6	-29°29.7	
															Scheat			13°46.1	28°12.6	
															Markab			13°30.8	15°19.9	
															2023/8/2			SHA	Mer.pass	
															Venus			213°05.0	13:03	
															Mars			194°31.1	14:20	
															Jupiter			318°17.6	06:05	
															Saturn			21°54.1	01:51	
															2023/8/3			SHA	Mer.pass	
															Venus			213°32.3	12:57	
															Mars			193°56.6	14:18	
															Jupiter			318°11.5	06:01	
															Saturn			21°57.6	01:47	
															2023/8/4			SHA	Mer.pass	
															Venus			214°01.4	12:51	
															Mars			193°22.0	14:16	
															Jupiter			318°05.6	05:58	
															Saturn			22°01.2	01:42	
															Horizontal parallax					
															Venus:				0.5	
															Mars:				0.1	
Mer.pass.:3:10:			v3.7 d-0.1 m-4.3			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.3			v2.6 d-0.1 m0.6								

h		Sun		Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	178°24.8	17°52.7	353°38.5	4.5	-21°38.1	11.9	61.4
1	193°24.8	17°52.1	8°02.0	4.6	-21°26.2	12.0	61.4
2	208°24.8	17°51.5	22°25.6	4.7	-21°14.1	12.2	61.4
3	223°24.9	17°50.8	36°49.3	4.8	-21°01.8	12.3	61.4
4	238°24.9	17°50.2	51°13.2	4.9	-20°49.4	12.5	61.4
5	253°25.0	17°49.5	65°37.1	5.0	-20°36.9	12.6	61.4
6	268°25.0	17°48.9	80°01.2	5.1	-20°24.2	12.7	61.4
7	283°25.1	17°48.3	94°25.3	5.2	-20°11.4	12.9	61.4
8	298°25.1	17°47.6	108°49.6	5.3	-19°58.4	13.0	61.4
9	313°25.1	17°47.0	123°14.0	5.4	-19°45.3	13.2	61.4
10	328°25.2	17°46.4	137°38.4	5.5	-19°32.1	13.3	61.4
11	343°25.2	17°45.7	152°03.0	5.6	-19°18.8	13.4	61.4
12	358°25.3	17°45.1	166°27.7	5.7	-19°05.3	13.5	61.4
13	13°25.3	17°44.4	180°52.5	5.9	-18°51.7	13.7	61.4
14	28°25.4	17°43.8	195°17.4	6.0	-18°37.9	13.8	61.3
15	43°25.4	17°43.1	209°42.4	6.1	-18°24.1	13.9	61.3
16	58°25.5	17°42.5	224°07.6	6.2	-18°10.1	14.0	61.3
17	73°25.5	17°41.9	238°32.8	6.3	-17°56.0	14.2	61.3
18	88°25.6	17°41.2	252°58.1	6.4	-17°41.8	14.3	61.3
19	103°25.6	17°40.6	267°23.6	6.5	-17°27.5	14.4	61.3
20	118°25.7	17°39.9	281°49.2	6.6	-17°13.0	14.5	61.3
21	133°25.7	17°39.3	296°14.8	6.7	-16°58.5	14.6	61.3
22	148°25.8	17°38.6	310°40.6	6.8	-16°43.9	14.7	61.3
23	163°25.8	17°38.0	325°06.5	6.9	-16°29.1	14.8	61.3
SD.=15.8		d=-0.6	S.D.=16.7				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	178°25.8	17°37.3	339°32.5	7.0	-16°14.3	14.9	61.3
1	193°25.9	17°36.7	353°58.5	7.1	-15°59.3	15.0	61.3
2	208°25.9	17°36.0	8°24.7	7.2	-15°44.3	15.1	61.2
3	223°26.0	17°35.4	22°51.0	7.4	-15°29.1	15.2	61.2
4	238°26.0	17°34.7	37°17.4	7.5	-15°13.9	15.3	61.2
5	253°26.1	17°34.1	51°44.0	7.6	-14°58.6	15.4	61.2
6	268°26.1	17°33.4	66°10.6	7.7	-14°43.2	15.4	61.2
7	283°26.2	17°32.8	80°37.3	7.8	-14°27.7	15.5	61.2
8	298°26.2	17°32.1	95°04.1	7.9	-14°12.1	15.6	61.2
9	313°26.3	17°31.5	109°31.0	8.0	-13°56.5	15.7	61.2
10	328°26.3	17°30.8	123°58.0	8.1	-13°40.7	15.8	61.1
11	343°26.4	17°30.2	138°25.1	8.2	-13°24.9	15.8	61.1
12	358°26.5	17°29.5	152°52.4	8.3	-13°09.1	15.9	61.1
13	13°26.5	17°28.9	167°19.7	8.4	-12°53.1	16.0	61.1
14	28°26.6	17°28.2	181°47.1	8.5	-12°37.1	16.0	61.1
15	43°26.6	17°27.6	196°14.6	8.5	-12°21.0	16.1	61.1
16	58°26.7	17°26.9	210°42.2	8.6	-12°04.9	16.2	61.0
17	73°26.7	17°26.3	225°09.9	8.7	-11°48.7	16.2	61.0
18	88°26.8	17°25.6	239°37.6	8.8	-11°32.4	16.3	61.0
19	103°26.8	17°25.0	254°05.5	8.9	-11°16.1	16.4	61.0
20	118°26.9	17°24.3	268°33.5	9.0	-10°59.7	16.4	61.0
21	133°26.9	17°23.6	283°01.5	9.1	-10°43.3	16.5	60.9
22	148°27.0	17°23.0	297°29.7	9.2	-10°26.8	16.5	60.9
23	163°27.0	17°22.3	311°57.9	9.3	-10°10.2	16.6	60.9
SD.=15.8		d=-0.6	S.D.=16.7				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	178°27.1	17°21.7	326°26.2	9.4	-9°53.7	16.6	60.9
1	193°27.1	17°21.0	340°54.6	9.4	-9°37.0	16.6	60.9
2	208°27.2	17°20.3	355°23.1	9.5	-9°20.4	16.7	60.8
3	223°27.3	17°19.7	9°51.7	9.6	-9°03.7	16.7	60.8
4	238°27.3	17°19.0	24°20.3	9.7	-8°46.9	16.8	60.8
5	253°27.4	17°18.4	38°49.0	9.8	-8°30.1	16.8	60.8
6	268°27.4	17°17.7	53°17.8	9.8	-8°13.3	16.8	60.7
7	283°27.5	17°17.0	67°46.7	9.9	-7°56.5	16.9	60.7
8	298°27.5	17°16.4	82°15.7	10.0	-7°39.6	16.9	60.7
9	313°27.6	17°15.7	96°44.7	10.1	-7°22.7	16.9	60.7
10	328°27.7	17°15.0	111°13.8	10.1	-7°05.8	16.9	60.6
11	343°27.7	17°14.4	125°43.0	10.2	-6°48.8	17.0	60.6
12	358°27.8	17°13.7	140°12.2	10.3	-6°31.8	17.0	60.6
13	13°27.8	17°13.1	154°41.5	10.4	-6°14.8	17.0	60.5
14	28°27.9	17°12.4	169°10.9	10.4	-5°57.8	17.0	60.5
15	43°27.9	17°11.7	183°40.4	10.5	-5°40.8	17.0	60.5
16	58°28.0	17°11.1	198°09.9	10.6	-5°23.7	17.1	60.5
17	73°28.1	17°10.4	212°39.5	10.6	-5°06.7	17.1	60.4
18	88°28.1	17°09.7	227°09.1	10.7	-4°49.6	17.1	60.4
19	103°28.2	17°09.1	241°38.8	10.7	-4°32.5	17.1	60.4
20	118°28.2	17°08.4	256°08.6	10.8	-4°15.5	17.1	60.3
21	133°28.3	17°07.7	270°38.4	10.9	-3°58.4	17.1	60.3
22	148°28.4	17°07.0	285°08.3	10.9	-3°41.3	17.1	60.3
23	163°28.4	17°06.4	299°38.3	11.0	-3°24.2	17.1	60.3
SD.=15.8		d=-0.7	S.D.=16.6				
Twilight		Twilight		Twilight		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	Naut.
72	--	--	--	--	--	--	--
70	--	--	01:41	22:25	--	--	--
68	--	--	02:24	21:45	--	--	--
66	--	00:49	02:52	21:17	23:12	--	--
64	--	01:49	03:14	20:57	22:18	--	--
62	--	02:22	03:31	20:40	21:47	--	--
60	00:45	02:45	03:45	20:26	21:25	23:17	--
58	01:39	03:04	03:57	20:14	21:06	22:29	--
56	02:09	03:19	04:07	20:04	20:51	22:01	--
54	02:31	03:32	04:16	19:55	20:39	21:39	--
52	02:48	03:43	04:24	19:47	20:28	21:22	--
50	03:03	03:53	04:32	19:40	20:18	21:08	--
45	03:31	04:14	04:47	19:24	19:58	20:40	--
40	03:53	04:30	04:60	19:12	19:42	20:19	--
35	04:09	04:43	05:11	19:01	19:29	20:02	--
30	04:23	04:54	05:20	18:52	19:18	19:49	--
20	04:45	05:13	05:36	18:36	18:60	19:27	--
10	05:02	05:28	05:50	18:22	18:45	19:10	--
0	05:16	05:41	06:03	18:10	18:31	18:57	--
-10	05:28	05:54	06:16	17:57	18:19	18:44	--
-20	05:39	06:06	06:29	17:44	18:07	18:33	--
-30	05:50	06:19	06:44	17:29	17:54	18:22	--
-35	05:56	06:26	06:53	17:20	17:46	18:17	--
-40	06:02	06:34	07:03	17:10	17:39	18:11	--
-45	06:08	06:43	07:15	16:58	17:30	18:05	--
-50	06:15	06:54	07:29	16:44	17:19	17:58	--
-52	06:18	06:59	07:36	16:37	17:14	17:55	--
-54	06:21	07:04	07:43	16:30	17:09	17:52	--
-56	06:24	07:10	07:51	16:22	17:04	17:49	--
-58	06:28	07:16	08:00	16:13	16:57	17:45	--
-60	06:32	07:23	08:11	16:02	16:50	17:41	--
Moonrise		Moonset		Moonrise		Moonset	
Lat.	Wed	Thu	Fri	Wed	Thu	Fri	
72	--	22:30	21:48	--	03:35	06:43	
70	--	22:14	21:43	--	04:16	06:56	
68	22:32	22:01	21:38	01:17	04:43	07:07	
66	22:09	21:50	21:35	02:26	05:03	07:15	
64	21:52	21:41	21:31	03:02	05:20	07:23	
62	21:37	21:33	21:29	03:27	05:33	07:29	
60	21:24	21:26	21:26	03:47	05:44	07:34	
58	21:14	21:20	21:24	04:04	05:54	07:39	
56	21:04	21:14	21:22	04:17	06:02	07:43	
54	20:56	21:10	21:21	04:29	06:10	07:46	
52	20:48	21:05	21:19	04:40	06:16	07:50	
50	20:41	21:01	21:18	04:49	06:22	07:53	
45	20:27	20:52	21:14	05:08	06:35	07:59	
40	20:14	20:45	21:12	05:24	06:46	08:04	
35	20:04	20:39	21:10	05:37	06:55	08:09	
30	19:55	20:33	21:08	05:49	07:03	08:13	
20	19:39	20:23	21:04	06:08	07:16	08:20	
10	19:25	20:15	21:01	06:25	07:27	08:26	
0	19:12	20:07	20:58	06:41	07:38	08:31	
-10	18:58	19:59	20:55	06:56	07:49	08:37	
-20	18:44	19:50	20:52	07:13	08:00	08:43	
-30	18:28	19:40	20:48	07:31	08:13	08:49	
-35	18:18	19:34	20:46	07:42	08:20	08:53	
-40	18:07	19:27	20:44	07:55	08:28	08:57	
-45	17:54	19:20	20:41	08:09	08:38	09:02	
-50	17:39	19:10	20:38	08:27	08:49	09:08	
-52	17:31	19:06	20:37	08:35	08:55	09:10	
-54	17:23	19:01	20:35	08:44	09:01	09:13	
-56	17:14	18:56	20:33	08:54	09:07	09:16	
-58	17:03	18:50	20:31	09:06	09:14	09:20	
-60	16:50	18:43	20:29	09:19	09:22	09:24	
Sun		Moon		Sun		Moon	
Day	Eqn.of Time	Mer.	Mer.	Day	Eqn.of Time	Mer.	Mer.
	00 ^h	12 ^h	Pass		00 ^h	12 ^h	Pass
2	06:21	06:19	12:06	00:26	12:56	16(99%)	
3	06:17	06:14	12:06	01:25	13:52	17(95%)	
4	06:12	06:09	12:06	02:19	14:44	18(89%)	

August 05, 06 ,07 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	313°17.4	167°49.6	7°05.1	146°04.9	6°26.6	271°17.2	14°53.4	335°22.3	-11°07.7	Alpheratz	357°35.8	29°13.2					
1	328°19.8	182°53.4	7°05.0	161°05.9	6°26.0	286°19.4	14°53.5	350°24.9	-11°07.8	Ankaa	353°08.0	-42°10.4					
2	343°22.3	197°57.1	7°04.9	176°06.9	6°25.4	301°21.7	14°53.6	5°27.5	-11°07.9	Schedar	349°32.1	56°39.8					
3	358°24.8	213°00.9	7°04.9	191°07.9	6°24.7	316°23.9	14°53.6	20°30.1	-11°07.9	Diphda	348°48.2	-17°51.3					
4	13°27.2	228°04.7	7°04.8	206°09.0	6°24.1	331°26.1	14°53.7	35°32.8	-11°08.0	Achernar	335°20.9	-57°06.7					
5	28°29.7	243°08.5	7°04.7	221°10.0	6°23.5	346°28.3	14°53.7	50°35.4	-11°08.1	Hamal	327°52.5	23°34.4					
6	43°32.2	258°12.3	7°04.7	236°11.0	6°22.8	1°30.6	14°53.8	65°38.0	-11°08.1	Polaris	314°38.8	89°21.5					
7	58°34.6	273°16.1	7°04.6	251°12.0	6°22.2	16°32.8	14°53.9	80°40.6	-11°08.2	Akamar	315°12.7	-40°12.3					
8	73°37.1	288°19.9	7°04.5	266°13.0	6°21.6	31°35.0	14°53.9	95°43.2	-11°08.3	Menkar	314°07.4	4°11.0					
9	88°39.5	303°23.7	7°04.5	281°14.1	6°21.0	46°37.3	14°54.0	110°45.9	-11°08.3	Mirfak	308°30.0	49°56.5					
10	103°42.0	318°27.5	7°04.4	296°15.1	6°20.3	61°39.5	14°54.1	125°48.5	-11°08.4	Aldebaran	290°41.1	16°33.4					
11	118°44.5	333°31.3	7°04.4	311°16.1	6°19.7	76°41.7	14°54.1	140°51.1	-11°08.5	Rigel	281°05.2	-8°10.3					
12	133°46.9	348°35.1	7°04.3	326°17.1	6°19.1	91°43.9	14°54.2	155°53.7	-11°08.5	Capella	280°23.9	46°01.2					
13	148°49.4	3°38.9	7°04.3	341°18.2	6°18.5	106°46.2	14°54.2	170°56.3	-11°08.6	Bellatrix	278°24.3	6°22.3					
14	163°51.9	18°42.7	7°04.2	356°19.2	6°17.8	121°48.4	14°54.3	185°59.0	-11°08.7	Elnath	278°03.6	28°37.6					
15	178°54.3	33°46.6	7°04.2	11°20.2	6°17.2	136°50.6	14°54.4	201°01.6	-11°08.7	Alnilam	275°39.1	-1°11.1					
16	193°56.8	48°50.4	7°04.1	26°21.2	6°16.6	151°52.9	14°54.4	216°04.2	-11°08.8	Betelgeuse	270°53.6	7°24.8					
17	208°59.3	63°54.2	7°04.1	41°22.3	6°15.9	166°55.1	14°54.5	231°06.8	-11°08.9	Canopus	263°53.4	-52°42.2					
18	224°01.7	78°58.0	7°04.0	56°23.3	6°15.3	181°57.3	14°54.6	246°09.4	-11°09.0	Sirius	258°27.5	-16°44.5					
19	239°04.2	94°01.9	7°04.0	71°24.3	6°14.7	196°59.6	14°54.6	261°12.1	-11°09.0	Adara	255°07.1	-29°00.0					
20	254°06.6	109°05.7	7°03.9	86°25.3	6°14.1	212°01.8	14°54.7	276°14.7	-11°09.1	Procyon	244°52.3	5°10.1					
21	269°09.1	124°09.5	7°03.9	101°26.4	6°13.4	227°04.0	14°54.7	291°17.3	-11°09.2	Pollux	243°19.0	27°58.2					
22	284°11.6	139°13.3	7°03.9	116°27.4	6°12.8	242°06.3	14°54.8	306°19.9	-11°09.2	Avior	234°15.9	-59°34.9					
23	299°14.0	154°17.2	7°03.8	131°28.4	6°12.2	257°08.5	14°54.9	321°22.5	-11°09.3	Suhail	222°47.6	-43°31.6					
Mer.pass.:3:06:			v3.8 d-0.1 m-4.3			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.3			v2.6 d-0.1 m0.6					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	314°16.5	169°21.0	7°03.8	146°29.4	6°11.5	272°10.7	14°54.9	336°25.2	-11°09.4	Dubhe	193°43.0	61°37.7					
1	329°19.0	184°24.9	7°03.8	161°30.5	6°10.9	287°13.0	14°55.0	351°27.8	-11°09.4	Denebola	182°26.3	14°26.6					
2	344°21.4	199°28.7	7°03.7	176°31.5	6°10.3	302°15.2	14°55.0	6°30.4	-11°09.5	Gienah	175°45.0	-17°40.3					
3	359°23.9	214°32.5	7°03.7	191°32.5	6°09.7	317°17.4	14°55.1	21°33.0	-11°09.6	Acruz	173°01.9	-63°13.9					
4	14°26.4	229°36.4	7°03.7	206°33.5	6°09.0	332°19.7	14°55.2	36°35.6	-11°09.6	Gacrux	171°53.3	-57°14.9					
5	29°28.8	244°40.2	7°03.6	221°34.6	6°08.4	347°21.9	14°55.2	51°38.3	-11°09.7	Alioth	166°14.3	55°50.2					
6	44°31.3	259°44.1	7°03.6	236°35.6	6°07.8	2°24.1	14°55.3	66°40.9	-11°09.8	Spica	158°23.7	-11°17.0					
7	59°33.8	274°48.0	7°03.6	251°36.6	6°07.1	17°26.4	14°55.3	81°43.5	-11°09.8	Alcaid	152°53.0	49°12.1					
8	74°36.2	289°51.8	7°03.6	266°37.6	6°06.5	32°28.6	14°55.4	96°46.1	-11°09.9	Hadar	148°37.8	-60°29.4					
9	89°38.7	304°55.7	7°03.6	281°38.7	6°05.9	47°30.8	14°55.5	111°48.7	-11°10.0	Menkent	147°59.1	-36°29.2					
10	104°41.1	319°59.5	7°03.5	296°39.7	6°05.3	62°33.1	14°55.5	126°51.4	-11°10.0	Arcturus	145°48.9	19°04.1					
11	119°43.6	335°03.4	7°03.5	311°40.7	6°04.6	77°35.3	14°55.6	141°54.0	-11°10.1	Rigel Kent.	139°42.0	-60°56.2					
12	134°46.1	350°07.3	7°03.5	326°41.7	6°04.0	92°37.6	14°55.6	156°56.6	-11°10.2	Zubenelg.	136°57.3	-16°08.4					
13	149°48.5	5°11.1	7°03.5	341°42.7	6°03.4	107°39.8	14°55.7	171°59.2	-11°10.2	Kochab	137°19.7	74°03.8					
14	164°51.0	20°15.0	7°03.5	356°43.8	6°02.7	122°42.0	14°55.8	187°01.8	-11°10.3	Alphecca	126°04.7	26°38.4					
15	179°53.5	35°18.9	7°03.5	11°44.8	6°02.1	137°44.3	14°55.8	202°04.5	-11°10.4	Antares	112°17.1	-26°29.1					
16	194°55.9	50°22.7	7°03.5	26°45.8	6°01.5	152°46.5	14°55.9	217°07.1	-11°10.4	Atria	107°12.1	-69°04.4					
17	209°58.4	65°26.6	7°03.4	41°46.8	6°00.8	167°48.7	14°55.9	232°09.7	-11°10.5	Sabik	102°03.9	-15°45.2					
18	225°00.9	80°30.5	7°03.4	56°47.9	6°00.2	182°51.0	14°56.0	247°12.3	-11°10.6	Shaula	96°11.7	-37°07.3					
19	240°03.3	95°34.4	7°03.4	71°48.9	5°59.6	197°53.2	14°56.1	262°15.0	-11°10.6	Rasalhague	95°59.4	12°32.7					
20	255°05.8	110°38.3	7°03.4	86°49.9	5°59.0	212°55.5	14°56.1	277°17.6	-11°10.7	Etamin	90°42.3	51°29.3					
21	270°08.2	125°42.1	7°03.4	101°50.9	5°58.3	227°57.7	14°56.2	292°20.2	-11°10.8	Kaus Aust.	83°33.7	-34°22.4					
22	285°10.7	140°46.0	7°03.4	116°52.0	5°57.7	242°59.9	14°56.2	307°22.8	-11°10.8	Vega	80°33.7	38°48.4					
23	300°13.2	155°49.9	7°03.4	131°53.0	5°57.1	258°02.2	14°56.3	322°25.4	-11°10.9	Nunki	75°48.9	-26°16.0					
Mer.pass.:3:02:			v3.8 d-0.0 m-4.2			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.3			v2.6 d-0.1 m0.5					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	315°15.6	170°53.8	7°03.4	146°54.0	5°56.4	273°04.4	14°56.3	337°28.1	-11°11.0	Alnair	27°33.9	-46°50.7					
1	330°18.1	185°57.7	7°03.4	161°55.0	5°55.8	288°06.7	14°56.4	352°30.7	-11°11.0	Fomalhaut	15°15.5	-29°29.7					
2	345°20.6	201°01.6	7°03.4	176°56.1	5°55.2	303°08.9	14°56.5	7°33.3	-11°11.1	Scheat	13°46.1	28°12.6					
3	0°23.0	216°05.5	7°03.5	191°57.1	5°54.5	318°11.2	14°56.5	22°35.9	-11°11.2	Markab	13°30.8	15°19.9					
4	15°25.5	231°09.4	7°03.5	206°58.1	5°53.9	333°13.4	14°56.6	37°38.6	-11°11.2								
5	30°28.0	246°13.3	7°03.5	221°59.1	5°53.3	348°15.6	14°56.6	52°41.2	-11°11.3	2023/8/5	SHA	Mer.pass					
6	45°30.4	261°17.2	7°03.5	237°00.1	5°52.6	3°17.9	14°56.7	67°43.8	-11°11.4	Venus	214°32.2	12:45					
7	60°32.9	276°21.1	7°03.5	252°01.2	5°52.0	18°20.1	14°56.8	82°46.4	-11°11.4	Mars	192°47.5	14:15					
8	75°35.4	291°25.0	7°03.5	267°02.2	5°51.4	33°22.4	14°56.8	97°49.0	-11°11.5	Jupiter	317°59.8	05:54					
9	90°37.8	306°28.9	7°03.5	282°03.2	5°50.8	48°24.6	14°56.9	112°51.7	-11°11.6	Saturn	22°04.9	01:38					
10	105°40.3	321°32.8	7°03.6	297°04.2	5°50.1												

h		Sun		Moon			
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	178°28.5	17°05.7	314°08.3	11.0	-3°07.1	17.1	60.2
1	193°28.5	17°05.0	328°38.3	11.1	-2°50.0	17.1	60.2
2	208°28.6	17°04.4	343°08.4	11.1	-2°32.9	17.1	60.2
3	223°28.7	17°03.7	357°38.6	11.2	-2°15.8	17.1	60.1
4	238°28.7	17°03.0	12°08.8	11.2	-1°58.7	17.1	60.1
5	253°28.8	17°02.3	26°39.0	11.3	-1°41.7	17.1	60.1
6	268°28.9	17°01.7	41°09.3	11.3	-1°24.6	17.1	60.0
7	283°28.9	17°01.0	55°39.7	11.4	-1°07.6	17.0	60.0
8	298°29.0	17°00.3	70°10.0	11.4	-0°50.5	17.0	60.0
9	313°29.0	16°59.6	84°40.5	11.4	-0°33.5	17.0	59.9
10	328°29.1	16°59.0	99°10.9	11.5	-0°16.5	17.0	59.9
11	343°29.2	16°58.3	113°41.5	11.5	0°00.5	17.0	59.9
12	358°29.2	16°57.6	128°12.0	11.6	0°17.4	16.9	59.8
13	13°29.3	16°56.9	142°42.6	11.6	0°34.4	16.9	59.8
14	28°29.4	16°56.3	157°13.2	11.6	0°51.3	16.9	59.8
15	43°29.4	16°55.6	171°43.9	11.7	1°08.2	16.9	59.7
16	58°29.5	16°54.9	186°14.5	11.7	1°25.0	16.8	59.7
17	73°29.6	16°54.2	200°45.3	11.7	1°41.9	16.8	59.7
18	88°29.6	16°53.6	215°16.0	11.8	1°58.7	16.8	59.6
19	103°29.7	16°52.9	229°46.8	11.8	2°15.4	16.8	59.6
20	118°29.8	16°52.2	244°17.6	11.8	2°32.2	16.7	59.6
21	133°29.8	16°51.5	258°48.4	11.8	2°48.9	16.7	59.5
22	148°29.9	16°50.8	273°19.3	11.9	3°05.6	16.7	59.5
23	163°30.0	16°50.2	287°50.2	11.9	3°22.2	16.6	59.4
SD.=15.8		d=-0.7	S.D.=16.4				
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	178°30.0	16°49.5	302°21.1	11.9	3°38.8	16.6	59.4
1	193°30.1	16°48.8	316°52.0	11.9	3°55.4	16.5	59.4
2	208°30.2	16°48.1	331°23.0	12.0	4°11.9	16.5	59.3
3	223°30.2	16°47.4	345°53.9	12.0	4°28.4	16.5	59.3
4	238°30.3	16°46.7	0°24.9	12.0	4°44.8	16.4	59.3
5	253°30.4	16°46.1	14°55.9	12.0	5°01.2	16.4	59.2
6	268°30.4	16°45.4	29°26.9	12.0	5°17.5	16.3	59.2
7	283°30.5	16°44.7	43°57.9	12.0	5°33.8	16.3	59.2
8	298°30.6	16°44.0	58°29.0	12.0	5°50.1	16.2	59.1
9	313°30.6	16°43.3	73°00.0	12.1	6°06.3	16.2	59.1
10	328°30.7	16°42.6	87°31.1	12.1	6°22.4	16.1	59.0
11	343°30.8	16°41.9	102°02.2	12.1	6°38.5	16.1	59.0
12	358°30.8	16°41.2	116°33.2	12.1	6°54.5	16.0	59.0
13	13°30.9	16°40.6	131°04.3	12.1	7°10.5	16.0	58.9
14	28°31.0	16°39.9	145°35.4	12.1	7°26.4	15.9	58.9
15	43°31.1	16°39.2	160°06.5	12.1	7°42.3	15.8	58.9
16	58°31.1	16°38.5	174°37.6	12.1	7°58.1	15.8	58.8
17	73°31.2	16°37.8	189°08.7	12.1	8°13.9	15.7	58.8
18	88°31.3	16°37.1	203°39.8	12.1	8°29.6	15.7	58.7
19	103°31.3	16°36.4	218°10.9	12.1	8°45.2	15.6	58.7
20	118°31.4	16°35.7	232°42.0	12.1	9°00.7	15.5	58.7
21	133°31.5	16°35.0	247°13.0	12.1	9°16.2	15.5	58.6
22	148°31.6	16°34.3	261°44.1	12.1	9°31.7	15.4	58.6
23	163°31.6	16°33.7	276°15.2	12.1	9°47.0	15.3	58.6
SD.=15.8		d=-0.7	S.D.=16.2				
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	178°31.7	16°33.0	290°46.3	12.1	10°02.3	15.3	58.5
1	193°31.8	16°32.3	305°17.4	12.1	10°17.6	15.2	58.5
2	208°31.9	16°31.6	319°48.4	12.1	10°32.7	15.1	58.4
3	223°31.9	16°30.9	334°19.5	12.0	10°47.8	15.0	58.4
4	238°32.0	16°30.2	348°50.5	12.0	11°02.8	15.0	58.4
5	253°32.1	16°29.5	3°21.5	12.0	11°17.7	14.9	58.3
6	268°32.2	16°28.8	17°52.5	12.0	11°32.6	14.8	58.3
7	283°32.2	16°28.1	32°23.5	12.0	11°47.4	14.7	58.3
8	298°32.3	16°27.4	46°54.5	12.0	12°02.1	14.7	58.2
9	313°32.4	16°26.7	61°25.5	12.0	12°16.7	14.6	58.2
10	328°32.5	16°26.0	75°56.4	11.9	12°31.3	14.5	58.1
11	343°32.5	16°25.3	90°27.4	11.9	12°45.7	14.4	58.1
12	358°32.6	16°24.6	104°58.3	11.9	13°00.1	14.3	58.1
13	13°32.7	16°23.9	119°29.2	11.9	13°14.4	14.3	58.0
14	28°32.8	16°23.2	134°00.1	11.9	13°28.7	14.2	58.0
15	43°32.8	16°22.5	148°30.9	11.8	13°42.8	14.1	58.0
16	58°32.9	16°21.8	163°01.8	11.8	13°56.9	14.0	57.9
17	73°33.0	16°21.1	177°32.6	11.8	14°10.8	13.9	57.9
18	88°33.1	16°20.4	192°03.4	11.8	14°24.7	13.8	57.8
19	103°33.1	16°19.7	206°34.1	11.8	14°38.5	13.7	57.8
20	118°33.2	16°19.0	221°04.9	11.7	14°52.2	13.7	57.8
21	133°33.3	16°18.3	235°35.6	11.7	15°05.8	13.6	57.7
22	148°33.4	16°17.6	250°06.3	11.7	15°19.3	13.5	57.7
23	163°33.5	16°16.9	264°37.0	11.6	15°32.8	13.4	57.7
SD.=15.8		d=-0.7	S.D.=16.0				

Lat.	Twilight		Sunrise	Sunset	Twilight	
	Naut.	Civil			Civil	Naut.
72	--	--	00:53	23:04	--	--
70	--	--	02:02	22:04	--	--
68	--	--	02:38	21:30	--	--
66	--	01:21	03:03	21:06	22:43	--
64	--	02:05	03:23	20:47	22:03	--
62	--	02:33	03:39	20:31	21:35	--
60	01:13	02:55	03:52	20:18	21:15	22:52
58	01:53	03:12	04:03	20:07	20:58	22:15
56	02:19	03:26	04:13	19:58	20:44	21:50
54	02:39	03:38	04:21	19:49	20:32	21:30
52	02:55	03:49	04:29	19:42	20:22	21:15
50	03:09	03:58	04:36	19:35	20:13	21:01
45	03:36	04:18	04:51	19:20	19:53	20:35
40	03:56	04:33	05:03	19:09	19:38	20:15
35	04:12	04:45	05:13	18:58	19:26	19:59
30	04:25	04:56	05:22	18:50	19:15	19:46
20	04:46	05:14	05:37	18:35	18:58	19:25
10	05:02	05:28	05:50	18:21	18:44	19:09
0	05:16	05:41	06:03	18:09	18:31	18:56
-10	05:27	05:53	06:15	17:57	18:19	18:45
-20	05:38	06:04	06:27	17:45	18:08	18:34
-30	05:48	06:17	06:42	17:30	17:55	18:24
-35	05:54	06:24	06:50	17:22	17:49	18:19
-40	05:59	06:31	06:60	17:13	17:41	18:13
-45	06:05	06:40	07:11	17:02	17:33	18:08
-50	06:11	06:50	07:24	16:48	17:23	18:02
-52	06:13	06:54	07:30	16:42	17:19	17:59
-54	06:16	06:59	07:37	16:35	17:14	17:56
-56	06:19	07:04	07:45	16:28	17:09	17:53
-58	06:22	07:10	07:54	16:19	17:03	17:50
-60	06:26	07:16	08:03	16:09	16:56	17:47

Lat.	Moonrise			Moonset		
	Sat	Sun	Mon	Sat	Sun	Mon
72	21:12	20:33	19:40	09:14	11:37	14:13
70	21:15	20:47	20:10	09:15	11:27	13:45
68	21:18	20:58	20:33	09:15	11:19	13:25
66	21:21	21:07	20:50	09:16	11:12	13:09
64	21:23	21:14	21:05	09:16	11:06	12:56
62	21:25	21:21	21:17	09:17	11:01	12:45
60	21:26	21:27	21:27	09:17	10:57	12:35
58	21:28	21:32	21:37	09:18	10:53	12:27
56	21:29	21:36	21:45	09:18	10:50	12:20
54	21:30	21:40	21:52	09:18	10:47	12:14
52	21:32	21:44	21:58	09:18	10:44	12:08
50	21:33	21:48	22:04	09:19	10:42	12:03
45	21:35	21:55	22:17	09:19	10:37	11:52
40	21:37	22:01	22:28	09:20	10:32	11:43
35	21:38	22:07	22:37	09:20	10:28	11:36
30	21:40	22:12	22:45	09:20	10:25	11:29
20	21:42	22:20	22:59	09:21	10:19	11:17
10	21:45	22:28	23:11	09:21	10:14	11:07
0	21:47	22:35	23:23	09:21	10:10	10:58
-10	21:49	22:42	23:35	09:22	10:05	10:48
-20	21:52	22:50	23:47	09:22	09:60	10:38
-30	21:54	22:58	--	09:22	09:54	10:27
-35	21:56	23:04	--	09:23	09:51	10:20
-40	21:58	23:09	--	09:23	09:47	10:13
-45	21:60	23:16	--	09:23	09:43	10:04
-50	22:03	23:25	--	09:23	09:38	09:54
-52	22:04	23:29	--	09:23	09:36	09:49
-54	22:05	23:33	--	09:23	09:33	09:44
-56	22:07	23:38	--	09:24	09:31	09:38
-58	22:08	23:43	--	09:24	09:28	09:32
-60	22:10	23:49	--	09:24	09:24	09:25

Day	Sun			Moon		
	Eqn.of Time 00 ^h	12 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age
5	06:06	06:03	12:06	03:09	15:34	19(81%)
6	06:00	05:57	12:05	03:58	16:22	20(71%)
7	05:53	05:50	12:05	04:46	17:10	21(60%)

August 08, 09 ,10 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	316°14.8	172°27.7	7°04.0	147°18.6	5°41.3	273°58.3	14°57.7	338°31.0	-11°12.6				Alpheratz	357°35.8	29°13.2		
1	331°17.2	187°31.7	7°04.0	162°19.6	5°40.6	289°00.5	14°57.8	353°33.6	-11°12.7				Ankaa	353°08.0	-42°10.5		
2	346°19.7	202°35.6	7°04.1	177°20.6	5°40.0	304°02.8	14°57.8	8°36.3	-11°12.7				Schedar	349°32.1	56°39.8		
3	1°22.2	217°39.6	7°04.1	192°21.6	5°39.4	319°05.0	14°57.9	23°38.9	-11°12.8				Diphda	348°48.2	-17°51.3		
4	16°24.6	232°43.5	7°04.2	207°22.7	5°38.7	334°07.3	14°57.9	38°41.5	-11°12.9				Achernar	335°20.8	-57°06.7		
5	31°27.1	247°47.4	7°04.2	222°23.7	5°38.1	349°09.5	14°58.0	53°44.1	-11°12.9				Hamal	327°52.5	23°34.4		
6	46°29.6	262°51.4	7°04.2	237°24.7	5°37.5	4°11.8	14°58.1	68°46.8	-11°13.0				Polaris	314°37.1	89°21.5		
7	61°32.0	277°55.3	7°04.3	252°25.7	5°36.8	19°14.0	14°58.1	83°49.4	-11°13.1				Akamar	315°12.6	-40°12.3		
8	76°34.5	292°59.3	7°04.4	267°26.8	5°36.2	34°16.3	14°58.2	98°52.0	-11°13.2				Menkar	314°07.4	4°11.0		
9	91°37.0	308°03.2	7°04.4	282°27.8	5°35.6	49°18.5	14°58.2	113°54.6	-11°13.2				Mirfak	308°30.0	49°56.5		
10	106°39.4	323°07.2	7°04.5	297°28.8	5°34.9	64°20.8	14°58.3	128°57.3	-11°13.3				Aldebaran	290°41.1	16°33.4		
11	121°41.9	338°11.1	7°04.5	312°29.8	5°34.3	79°23.0	14°58.3	143°59.9	-11°13.4				Rigel	281°05.2	-8°10.3		
12	136°44.3	353°15.1	7°04.6	327°30.8	5°33.7	94°25.3	14°58.4	159°02.5	-11°13.4				Capella	280°23.9	46°01.2		
13	151°46.8	8°19.0	7°04.6	342°31.9	5°33.0	109°27.5	14°58.4	174°05.1	-11°13.5				Bellatrix	278°24.3	6°22.3		
14	166°49.3	23°23.0	7°04.7	357°32.9	5°32.4	124°29.8	14°58.5	189°07.8	-11°13.6				Elnath	278°03.6	28°37.6		
15	181°51.7	38°27.0	7°04.8	12°33.9	5°31.8	139°32.0	14°58.6	204°10.4	-11°13.6				Alnilam	275°39.1	-1°11.1		
16	196°54.2	53°30.9	7°04.8	27°34.9	5°31.1	154°34.3	14°58.6	219°13.0	-11°13.7				Betelgeuse	270°53.6	7°24.8		
17	211°56.7	68°34.9	7°04.9	42°36.0	5°30.5	169°36.5	14°58.7	234°15.6	-11°13.8				Canopus	263°53.3	-52°42.2		
18	226°59.1	83°38.8	7°05.0	57°37.0	5°29.9	184°38.8	14°58.7	249°18.3	-11°13.8				Sirius	258°27.5	-16°44.5		
19	242°01.6	98°42.8	7°05.0	72°38.0	5°29.2	199°41.0	14°58.8	264°20.9	-11°13.9				Adara	255°07.1	-29°00.0		
20	257°04.1	113°46.8	7°05.1	87°39.0	5°28.6	214°43.3	14°58.8	279°23.5	-11°14.0				Procyon	244°52.3	5°10.1		
21	272°06.5	128°50.7	7°05.2	102°40.1	5°28.0	229°45.5	14°58.9	294°26.1	-11°14.0				Pollux	243°19.0	27°58.2		
22	287°09.0	143°54.7	7°05.2	117°41.1	5°27.3	244°47.8	14°58.9	309°28.8	-11°14.1				Avior	234°15.9	-59°34.9		
23	302°11.5	158°58.7	7°05.3	132°42.1	5°26.7	259°50.1	14°59.0	324°31.4	-11°14.2				Suhail	222°47.6	-43°31.5		
Mer.pass.:2:54:			v3.9 d0.0 m-4.2			v1.0 d-0.6 m1.8			v2.2 d0.1 m-2.3			v2.6 d-0.1 m0.5					

Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec						
0	317°13.9	174°02.7	7°05.4	147°43.1	5°26.1	274°52.3	14°59.0	339°34.0	-11°14.2					
1	332°16.4	189°06.6	7°05.5	162°44.1	5°25.4	289°54.6	14°59.1	354°36.6	-11°14.3					
2	347°18.8	204°10.6	7°05.6	177°45.2	5°24.8	304°56.8	14°59.2	9°39.3	-11°14.4					
3	2°21.3	219°14.6	7°05.6	192°46.2	5°24.2	319°59.1	14°59.2	24°41.9	-11°14.5					
4	17°23.8	234°18.6	7°05.7	207°47.2	5°23.5	335°01.3	14°59.3	39°44.5	-11°14.5					
5	32°26.2	249°22.5	7°05.8	222°48.2	5°22.9	350°03.6	14°59.3	54°47.2	-11°14.6					
6	47°28.7	264°26.5	7°05.9	237°49.3	5°22.3	5°05.8	14°59.4	69°49.8	-11°14.7					
7	62°31.2	279°30.5	7°06.0	252°50.3	5°21.6	20°08.1	14°59.4	84°52.4	-11°14.7					
8	77°33.6	294°34.5	7°06.1	267°51.3	5°21.0	35°10.4	14°59.5	99°55.0	-11°14.8					
9	92°36.1	309°38.5	7°06.2	282°52.3	5°20.4	50°12.6	14°59.5	114°57.7	-11°14.9					
10	107°38.6	324°42.4	7°06.2	297°53.3	5°19.7	65°14.9	14°59.6	130°00.3	-11°14.9					
11	122°41.0	339°46.4	7°06.3	312°54.4	5°19.1	80°17.1	14°59.6	145°02.9	-11°15.0					
12	137°43.5	354°50.4	7°06.4	327°55.4	5°18.4	95°19.4	14°59.7	160°05.5	-11°15.1					
13	152°46.0	9°54.4	7°06.5	342°56.4	5°17.8	110°21.6	14°59.7	175°08.2	-11°15.1					
14	167°48.4	24°58.4	7°06.6	357°57.4	5°17.2	125°23.9	14°59.8	190°10.8	-11°15.2					
15	182°50.9	40°02.4	7°06.7	12°58.5	5°16.5	140°26.2	14°59.8	205°13.4	-11°15.3					
16	197°53.3	55°06.4	7°06.8	27°59.5	5°15.9	155°28.4	14°59.9	220°16.0	-11°15.4					
17	212°55.8	70°10.4	7°06.9	43°00.5	5°15.3	170°30.7	14°59.9	235°18.7	-11°15.4					
18	227°58.3	85°14.4	7°07.0	58°01.5	5°14.6	185°32.9	15°00.0	250°21.3	-11°15.5					
19	243°00.7	100°18.3	7°07.1	73°02.5	5°14.0	200°35.2	15°00.1	265°23.9	-11°15.6					
20	258°03.2	115°22.3	7°07.2	88°03.6	5°13.4	215°37.5	15°00.1	280°26.6	-11°15.6					
21	273°05.7	130°26.3	7°07.3	103°04.6	5°12.7	230°39.7	15°00.2	295°29.2	-11°15.7					
22	288°08.1	145°30.3	7°07.5	118°05.6	5°12.1	245°42.0	15°00.2	310°31.8	-11°15.8					
23	303°10.6	160°34.3	7°07.6	133°06.6	5°11.5	260°44.2	15°00.3	325°34.4	-11°15.8					
Mer.pass.:2:50:			v4.0 d0.1 m-4.2			v2.3 d0.1 m-2.3			v2.6 d-0.1 m0.5					

Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	
0	318°13.1	175°38.3	7°07.7	148°07.7	5°10.8	275°46.5	15°00.3	340°37.1	-11°15.9
1	333°15.5	190°42.3	7°07.8	163°08.7	5°10.2	290°48.8	15°00.4	355°39.7	-11°16.0
2	348°18.0	205°46.3	7°07.9	178°09.7	5°09.5	305°51.0	15°00.4	10°42.3	-11°16.0
3	3°20.5	220°50.3	7°08.0	193°10.7	5°08.9	320°53.3	15°00.5	25°44.9	-11°16.1
4	18°22.9	235°54.3	7°08.1	208°11.7	5°08.3	335°55.6	15°00.5	40°47.6	-11°16.2
5	33°25.4	250°58.3	7°08.3	223°12.8	5°07.6	350°57.8	15°00.6	55°50.2	-11°16.3
6	48°27.8	266°02.3	7°08.4	238°13.8	5°07.0	6°00.1	15°00.6	70°52.8	-11°16.3
7	63°30.3	281°06.4	7°08.5	253°14.8	5°06.4	21°02.3	15°00.7	85°55.5	-11°16.4
8	78°32.8	296°10.4	7°08.6	268°15.8	5°05.7	36°04.6	15°00.7	100°58.1	-11°16.5
9	93°35.2	311°14.4	7°08.7	283°16.9	5°05.1	51°06.9	15°00.8	116°00.7	-11°16.5
10	108°37.7	326°18.4	7°08.9	298°17.9	5°04.5	66°09.1	15°00.8	131°03.3	-11°16.6
11	123°40.2	341°22.4	7°09.0	313°18.9	5°03.8	81°11.4	15°00.9	146°06.0	-11°16.7
12	138°42.6	356°26.4	7°09.1	328°19.9	5°03.2	96°13.7	15°00.9	161°08.6	-11°16.7
13	153°45.1	11°30.4	7°09.3	343°20.9	5°02.5	111°15.9	15°01.0	176°11.2	-11°16.8
14	168°47.6	26°34.4	7°09.4	358°22.0	5°01.9	126°18.2	15°01.0	191°13.9	-11°16.9
15	183°50.0	41°38.4	7°09.5	13°23.0	5°01.3	141°20.5	15°01.1	206°16.5	-11°16.9
16	198°52.5	56°42.4	7°09.7	28°24.0	5°00.6	156°22.7	15°01.1	221°19.1	-11°17.0
17	213°54.9	71°46.5	7°09.8	43°25.0	4°60.0	171°25.0	15°01.2	236°21.7	-11°17.1
18	228°57.4	86°50.5	7°09.9	58°26.1	4°59.4	186°27.3	15°01.2	251°24.4	-11°17.2
19	243°59.9	101°54.5	7°10.1	73°27.1	4°58.7	201°29.5	15°01.3	266°27.0	-11°17.2
20	259°02.3	116°58.5	7°10.2	88°28.1	4°58.1	216°31.8	15°01.3	281°29.6	-11°17.3
21	274°04.8	132°02.5	7°10.3	103°29.1	4°57.4	231°34.1	15°01.4	296°32.3	-11°17.4
22	289°07.3	147°06.5	7°10.5	118°30.1	4°56.8	246°36.3	15°01.4	311°34.9	-11°17.4
23	304°09.7								

Sun				Moon												
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Sunrise	Sunset	Twilight	
0	178°33.5	16°16.2		279°07.6	11.6	15°46.1	13.3	57.6	72	—:—	—:—	01:32	22:30	—:—	—:—	
1	193°33.6	16°15.5		293°38.2	11.6	15°59.3	13.2	57.6	70	—:—	—:—	02:21	21:45	—:—	—:—	
2	208°33.7	16°14.8		308°08.8	11.6	16°12.5	13.1	57.5	68	—:—	00:16	02:52	21:15	23:27	—:—	
3	223°33.8	16°14.1		322°39.3	11.5	16°25.5	13.0	57.5	66	—:—	01:44	03:15	20:54	22:22	—:—	
4	238°33.9	16°13.4		337°09.8	11.5	16°38.5	12.9	57.5	64	—:—	02:19	03:32	20:36	21:48	—:—	
5	253°33.9	16°12.7		351°40.3	11.5	16°51.3	12.8	57.4	62	00:14	02:45	03:47	20:22	21:24	23:31	
6	268°34.0	16°12.0		6°10.8	11.4	17°04.1	12.7	57.4	60	01:33	03:04	03:59	20:10	21:05	22:33	
7	283°34.1	16°11.2		20°41.2	11.4	17°16.7	12.6	57.4	58	02:06	03:20	04:09	20:00	20:49	22:02	
8	298°34.2	16°10.5		35°11.6	11.4	17°29.3	12.5	57.3	56	02:29	03:33	04:19	19:51	20:36	21:39	
9	313°34.3	16°09.8		49°41.9	11.3	17°41.8	12.4	57.3	54	02:47	03:44	04:27	19:43	20:25	21:22	
10	328°34.3	16°09.1		64°12.2	11.3	17°54.1	12.3	57.3	52	03:02	03:54	04:34	19:36	20:15	21:07	
11	343°34.4	16°08.4		78°42.5	11.3	18°06.4	12.2	57.2	50	03:15	04:03	04:40	19:30	20:07	20:54	
12	358°34.5	16°07.7		93°12.8	11.2	18°18.5	12.1	57.2	45	03:41	04:21	04:54	19:16	19:49	20:29	
13	13°34.6	16°07.0		107°43.0	11.2	18°30.5	12.0	57.2	40	03:60	04:36	05:06	19:05	19:34	20:10	
14	28°34.7	16°06.3		122°13.2	11.2	18°42.5	11.9	57.1	35	04:15	04:48	05:15	18:55	19:23	19:55	
15	43°34.7	16°05.6		136°43.3	11.1	18°54.3	11.8	57.1	30	04:28	04:58	05:24	18:47	19:13	19:43	
16	58°34.8	16°04.9		151°13.4	11.1	19°06.0	11.7	57.0	20	04:48	05:15	05:38	18:33	18:56	19:23	
17	73°34.9	16°04.1		165°43.5	11.0	19°17.6	11.6	57.0	10	05:03	05:29	05:51	18:20	18:42	19:08	
18	88°35.0	16°03.4		180°13.5	11.0	19°29.1	11.4	57.0	0	05:16	05:41	06:02	18:09	18:30	18:55	
19	103°35.1	16°02.7		194°43.5	11.0	19°40.5	11.3	56.9	-10	05:27	05:52	06:14	17:58	18:19	18:45	
20	118°35.2	16°02.0		209°13.5	10.9	19°51.8	11.2	56.9	-20	05:37	06:03	06:26	17:46	18:08	18:35	
21	133°35.3	16°01.3		223°43.4	10.9	20°03.0	11.1	56.9	-30	05:46	06:15	06:39	17:32	17:57	18:25	
22	148°35.3	16°00.6		238°13.2	10.9	20°14.0	11.0	56.8	-35	05:51	06:21	06:47	17:24	17:51	18:21	
23	163°35.4	15°59.9		252°43.1	10.8	20°25.0	10.9	56.8	-40	05:56	06:28	06:56	17:15	17:44	18:16	
	SD.=15.8	d=-0.7		S.D.=15.7					-45	06:01	06:36	07:07	17:05	17:36	18:11	
									-50	06:06	06:45	07:19	16:52	17:27	18:05	
									-52	06:09	06:49	07:25	16:47	17:23	18:03	
									-54	06:11	06:53	07:32	16:40	17:18	18:01	
									-56	06:14	06:58	07:39	16:33	17:14	17:58	
									-58	06:17	07:04	07:47	16:25	17:08	17:55	
									-60	06:20	07:10	07:56	16:16	17:02	17:52	
Wed	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
0	178°35.5	15°59.1		267°12.9	10.8	20°35.8	10.8	56.8	72	—:—	—:—	—:—	—:—	—:—	—:—	
1	193°35.6	15°58.4		281°42.6	10.7	20°46.5	10.7	56.7	70	18:53	—:—	—:—	16:46	—:—	—:—	
2	208°35.7	15°57.7		296°12.4	10.7	20°57.1	10.5	56.7	68	19:53	—:—	—:—	15:47	—:—	—:—	
3	223°35.8	15°57.0		310°42.0	10.7	21°07.6	10.4	56.7	66	20:28	19:34	—:—	15:13	17:52	—:—	
4	238°35.8	15°56.3		325°11.7	10.6	21°18.0	10.3	56.6	64	20:53	20:35	—:—	14:49	16:52	—:—	
5	253°35.9	15°55.6		339°41.3	10.6	21°28.2	10.2	56.6	62	21:13	21:10	21:07	14:30	16:18	18:10	
6	268°36.0	15°54.8		354°10.8	10.5	21°38.4	10.1	56.6	60	21:30	21:35	21:47	14:14	15:54	17:30	
7	283°36.1	15°54.1		8°40.4	10.5	21°48.4	10.0	56.5	58	21:44	21:55	22:14	14:01	15:34	17:03	
8	298°36.2	15°53.4		23°09.8	10.5	21°58.3	9.8	56.5	56	21:56	22:12	22:36	13:50	15:18	16:41	
9	313°36.3	15°52.7		37°39.3	10.4	22°08.0	9.7	56.5	54	22:06	22:26	22:54	13:40	15:04	16:24	
10	328°36.4	15°52.0		52°08.7	10.4	22°17.7	9.6	56.5	52	22:16	22:38	23:09	13:31	14:52	16:09	
11	343°36.5	15°51.2		66°38.0	10.3	22°27.2	9.5	56.4	50	22:24	22:49	23:23	13:24	14:42	15:56	
12	358°36.5	15°50.5		81°07.4	10.3	22°36.6	9.3	56.4	45	22:42	23:12	23:50	13:07	14:20	15:29	
13	13°36.6	15°49.8		95°36.6	10.3	22°45.9	9.2	56.4	40	22:57	23:31	—:—	12:53	14:02	15:08	
14	28°36.7	15°49.1		110°05.9	10.2	22°55.1	9.1	56.3	35	23:10	23:47	—:—	12:42	13:47	14:51	
15	43°36.8	15°48.4		124°35.1	10.2	23°04.1	9.0	56.3	30	23:21	—:—	00:00	12:32	13:34	14:36	
16	58°36.9	15°47.6		139°04.2	10.1	23°13.0	8.8	56.3	20	23:40	—:—	00:24	12:15	13:13	14:10	
17	73°37.0	15°46.9		153°33.4	10.1	23°21.8	8.7	56.2	10	23:56	—:—	00:44	11:60	12:54	13:48	
18	88°37.1	15°46.2		168°02.5	10.1	23°30.4	8.6	56.2	0	—:—	00:12	01:03	11:46	12:36	13:28	
19	103°37.2	15°45.5		182°31.5	10.0	23°38.9	8.5	56.2	-10	—:—	00:28	01:22	11:32	12:19	13:08	
20	118°37.3	15°44.7		197°00.5	10.0	23°47.3	8.3	56.1	-20	—:—	00:45	01:43	11:18	12:00	12:46	
21	133°37.3	15°44.0		211°29.5	10.0	23°55.6	8.2	56.1	-30	00:02	01:05	02:07	11:01	11:39	12:21	
22	148°37.4	15°43.3		225°58.4	9.9	24°03.7	8.1	56.1	-35	00:10	01:16	02:21	10:51	11:26	12:06	
23	163°37.5	15°42.6		240°27.3	9.9	24°11.7	7.9	56.1	-40	00:20	01:29	02:37	10:40	11:12	11:49	
	SD.=15.8	d=-0.7		S.D.=15.5					-45	00:31	01:45	02:57	10:27	10:55	11:29	
									-50	00:45	02:05	03:21	10:12	10:34	11:03	
									-52	00:52	02:14	03:33	10:05	10:24	10:51	
									-54	00:59	02:25	03:47	09:57	10:13	10:36	
									-56	01:08	02:37	04:03	09:48	10:01	10:20	
									-58	01:17	02:51	04:22	09:37	09:46	10:01	
									-60	01:27	03:07	04:46	09:26	09:29	09:36	
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Day	Sun			Moon		Age	
0	178°37.6	15°41.8		254°56.2	9.8	24°19.6	7.8	56.0		Eqn. of Time	Mer.	Mer. Pass.				
1	193°37.7	15°41.1		269°25.0	9.8	24°27.4	7.7	56.0		00 ^h	12 ^h	Pass	Upper	Lower		
2	208°37.8	15°40.4		283°53.8	9.8	24°35.0	7.5	56.0	8	05:46	05:42	12:05	05:34	17:59	22(49%)	
3	223°37.9	15°39.7		298°22.5	9.7	24°42.5	7.4	55.9	9	05:38	05:34	12:05	06:24	18:49	23(39%)	
4	238°38.0	15°38.9		312°51.3	9.7	24°49.8	7.3	55.9	10	05:30	05:25	12:05	07:15	19:41	24(29%)	
5	253°38.1	15°38.2		327°19.9	9.7	24°57.0	7.1	55.9								
6	268°38.2	15°37.5		341°48.6	9.6	25°04.1	7.0	55.9								
7	283°38.3	15°36.8		356°17.2	9.6	25°11.1	6.9	55.8								
8	298°38.4	15°36.0		10°45.8	9.6	25°17.9	6.7	55.8								
9	313°38.4	15°35.3		25°14.3	9.5	25°24.5	6.6	55.8								
10	328°38.5	15°34.6		39°42.9	9.5	25°31.1	6.5	55.8								
11	343°38.6	15°33.8		54°11.4	9.5	25°37.5	6.3	55.7								
12	358°38.7	15°33.1		68°39.8	9.4	25°43.8	6.2	55.7								
13	13°38.8	15°32.4		83°08.3	9.4	25°49.9	6.1	55.7								
14	28°38.9	15°31.6		97°36.7	9.4	25°55.9	5.9	55.6								
15	43°39.0	15°30.9		112°05.0	9.4	26°01.7	5.8	55.6								
16	58°39.1	15°30.2		126°33.4	9.3	26°07.5	5.6	55.6								
17	73°39.2	15°29.4		141°01.7	9.3	26°13.0	5.5	55.6								
18	88°39.3	15°28.7		155°30.0	9.3	26°18.5	5.4	55.5								
19	103°39.4	15°28.0		169°58.3	9.3	26°23.8	5.2	55.5								
20	118°39.5	15°27.2		184°26.5	9.2	26°28.9	5.1	55.5								
21	133°39.6	15°26.5		198°54.8	9.2	26°33.9	4.9	55.5								
22	148°39.7	15°25.8		213°23.0	9.2	26°38.8	4.8	55.4								
23	163°39.8	15°25.0		227°51.2	9.2	26°43.5	4.7	55.4								
	SD.=15.8	d=-0.7		S.D.=15.3												

August 11, 12 ,13 (Fri., Sat., Sun.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	319°12.2	177°14.6	7°10.8	148°32.2	4°55.5	276°40.9	15°01.5	341°40.1	-11°17.6	Alpheratz	357°35.7	29°13.2
1	334°14.7	192°18.6	7°10.9	163°33.2	4°54.9	291°43.1	15°01.6	356°42.8	-11°17.6	Ankaa	353°08.0	-42°10.5
2	349°17.1	207°22.6	7°11.1	178°34.2	4°54.2	306°45.4	15°01.6	11°45.4	-11°17.7	Schedar	349°32.0	56°39.8
3	4°19.6	222°26.6	7°11.2	193°35.2	4°53.6	321°47.7	15°01.7	26°48.0	-11°17.8	Diphda	348°48.1	-17°51.3
4	19°22.1	237°30.6	7°11.4	208°36.3	4°53.0	336°49.9	15°01.7	41°50.7	-11°17.9	Achernar	335°20.8	-57°06.7
5	34°24.5	252°34.7	7°11.5	223°37.3	4°52.3	351°52.2	15°01.8	56°53.3	-11°17.9	Hamal	327°52.4	23°34.4
6	49°27.0	267°38.7	7°11.7	238°38.3	4°51.7	6°54.5	15°01.8	71°55.9	-11°18.0	Polaris	314°35.3	89°21.5
7	64°29.4	282°42.7	7°11.8	253°39.3	4°51.1	21°56.8	15°01.9	86°58.6	-11°18.1	Akamar	315°12.6	-40°12.3
8	79°31.9	297°46.7	7°12.0	268°40.4	4°50.4	36°59.0	15°01.9	102°01.2	-11°18.1	Menkar	314°07.3	4°11.0
9	94°34.4	312°50.7	7°12.1	283°41.4	4°49.8	52°01.3	15°02.0	117°03.8	-11°18.2	Mirfak	308°30.0	49°56.5
10	109°36.8	327°54.8	7°12.3	298°42.4	4°49.1	67°03.6	15°02.0	132°06.4	-11°18.3	Aldebaran	290°41.1	16°33.4
11	124°39.3	342°58.8	7°12.5	313°43.4	4°48.5	82°05.8	15°02.1	147°09.1	-11°18.3	Rigel	281°05.1	-8°10.3
12	139°41.8	358°02.8	7°12.6	328°44.4	4°47.9	97°08.1	15°02.1	162°11.7	-11°18.4	Capella	280°23.9	46°01.2
13	154°44.2	1°06.8	7°12.8	343°45.5	4°47.2	112°10.4	15°02.2	177°14.3	-11°18.5	Bellatrix	278°24.3	6°22.4
14	169°46.7	28°10.9	7°13.0	358°46.5	4°46.6	127°12.7	15°02.2	192°17.0	-11°18.6	Elnath	278°03.6	28°37.6
15	184°49.2	43°14.9	7°13.1	13°47.5	4°45.9	142°14.9	15°02.3	207°19.6	-11°18.6	Alnilam	275°39.1	-1°11.1
16	199°51.6	58°18.9	7°13.3	28°48.5	4°45.3	157°17.2	15°02.3	222°22.2	-11°18.7	Betelgeuse	270°53.6	7°24.8
17	214°54.1	73°22.9	7°13.5	43°49.5	4°44.7	172°19.5	15°02.4	237°24.9	-11°18.8	Canopus	263°53.3	-52°42.2
18	229°56.6	88°27.0	7°13.6	58°50.6	4°44.0	187°21.8	15°02.4	252°27.5	-11°18.8	Sirius	258°27.4	-16°44.5
19	244°59.0	103°31.0	7°13.8	73°51.6	4°43.4	202°24.0	15°02.5	267°30.1	-11°18.9	Adara	255°07.1	-29°00.0
20	260°01.5	118°35.0	7°14.0	88°52.6	4°42.7	217°26.3	15°02.5	282°32.7	-11°19.0	Procyon	244°52.3	5°10.1
21	275°03.9	133°39.0	7°14.1	103°53.6	4°42.1	232°28.6	15°02.6	297°35.4	-11°19.0	Pollux	243°19.0	27°58.2
22	290°06.4	148°43.1	7°14.3	118°54.7	4°41.5	247°30.9	15°02.6	312°38.0	-11°19.1	Avior	234°15.9	-59°34.9
23	305°08.9	163°47.1	7°14.5	133°55.7	4°40.8	262°33.1	15°02.6	327°40.6	-11°19.2	Suhail	222°47.6	-43°31.5
Mer.pass.:2:42:		v4.0 d0.1 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.3		v2.6 d-0.1 m0.5		Miaplacidus	221°39.5	-69°48.7
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Alphard	217°49.2	-8°45.5
0	320°11.3	178°51.1	7°14.7	148°56.7	4°40.2	277°35.4	15°02.7	342°43.3	-11°19.3	Regulus	207°36.0	11°51.3
1	335°13.8	193°55.2	7°14.9	163°57.7	4°39.6	292°37.7	15°02.7	357°45.9	-11°19.3	Dubhe	193°43.0	61°37.7
2	350°16.3	208°59.2	7°15.0	178°58.7	4°38.9	307°40.0	15°02.8	12°48.5	-11°19.4	Denebola	182°26.3	14°26.6
3	5°18.7	224°03.2	7°15.2	193°59.8	4°38.3	322°42.2	15°02.8	27°51.2	-11°19.5	Gienah	175°45.0	-17°40.3
4	20°21.2	239°07.2	7°15.4	209°00.8	4°37.6	337°44.5	15°02.9	42°53.8	-11°19.5	Acrux	173°01.9	-63°13.9
5	35°23.7	254°11.3	7°15.6	224°01.8	4°37.0	352°46.8	15°02.9	57°56.4	-11°19.6	Gacrux	171°53.4	-57°14.8
6	50°26.1	269°15.3	7°15.8	239°02.8	4°36.3	7°49.1	15°03.0	72°59.1	-11°19.7	Alioth	166°14.3	55°50.2
7	65°28.6	284°19.3	7°16.0	254°03.8	4°35.7	22°51.3	15°03.0	88°01.7	-11°19.7	Spica	158°23.7	-11°17.0
8	80°31.1	299°23.3	7°16.1	269°04.9	4°35.1	37°53.6	15°03.1	103°04.3	-11°19.8	Alcaid	152°53.1	49°12.0
9	95°33.5	314°27.4	7°16.3	284°05.9	4°34.4	52°55.9	15°03.1	118°07.0	-11°19.9	Hadar	148°37.9	-60°29.4
10	110°36.0	329°31.4	7°16.5	299°06.9	4°33.8	67°58.2	15°03.2	133°09.6	-11°20.0	Menkent	147°59.1	-36°29.2
11	125°38.4	344°35.4	7°16.7	314°07.9	4°33.1	83°00.5	15°03.2	148°12.2	-11°20.0	Arcturus	145°48.9	19°04.1
12	140°40.9	359°39.5	7°16.9	329°08.9	4°32.5	98°02.7	15°03.3	163°14.8	-11°20.1	Rigel Kent.	139°42.0	-60°56.2
13	155°43.4	14°43.5	7°17.1	344°10.0	4°31.9	113°05.0	15°03.3	178°17.5	-11°20.2	Zubenelg.	136°57.3	-16°08.4
14	170°45.8	29°47.5	7°17.3	359°11.0	4°31.2	128°07.3	15°03.3	193°20.1	-11°20.2	Kochab	137°19.8	74°03.8
15	185°48.3	44°51.5	7°17.5	14°12.0	4°30.6	143°09.6	15°03.4	208°22.7	-11°20.3	Alphecca	126°04.7	26°38.4
16	200°50.8	59°55.6	7°17.7	29°13.0	4°29.9	158°11.9	15°03.4	223°25.4	-11°20.4	Antares	112°17.1	-26°29.1
17	215°53.2	74°59.6	7°17.9	44°14.0	4°29.3	173°14.1	15°03.5	238°28.0	-11°20.4	Atria	107°12.1	-69°04.4
18	230°55.7	90°03.6	7°18.1	59°15.1	4°28.7	188°16.4	15°03.5	253°30.6	-11°20.5	Sabik	102°03.9	-15°45.2
19	245°58.2	105°07.7	7°18.3	74°16.1	4°28.0	203°18.7	15°03.6	268°33.3	-11°20.6	Shaula	96°11.7	-37°07.3
20	261°00.6	120°11.7	7°18.5	89°17.1	4°27.4	218°21.0	15°03.6	283°35.9	-11°20.7	Rasalhague	95°59.4	12°32.7
21	276°03.1	135°15.7	7°18.7	104°18.1	4°26.7	233°23.3	15°03.7	298°38.5	-11°20.7	Etamin	90°42.4	51°29.3
22	291°05.6	150°19.7	7°18.9	119°19.1	4°26.1	248°25.6	15°03.7	313°41.2	-11°20.8	Kaus Aust.	83°33.7	-34°22.4
23	306°08.0	165°23.8	7°19.1	134°20.2	4°25.5	263°27.8	15°03.8	328°43.8	-11°20.9	Vega	80°33.7	38°48.4
Mer.pass.:2:38:		v4.0 d0.2 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.3		v2.6 d-0.1 m0.5		Nunki	75°48.9	-26°16.0
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Altair	62°00.8	8°55.9
0	321°10.5	180°27.8	7°19.3	149°21.2	4°24.8	278°30.1	15°03.8	343°46.4	-11°20.9	Peacock	53°06.9	-56°39.6
1	336°12.9	195°31.8	7°19.5	164°22.2	4°24.2	293°32.4	15°03.8	358°49.1	-11°21.0	Deneb	49°26.1	45°21.9
2	351°15.4	210°35.9	7°19.7	179°23.2	4°23.5	308°34.7	15°03.9	13°51.7	-11°21.1	Enif	33°39.6	9°59.0
3	6°17.9	225°39.9	7°20.0	194°24.2	4°22.9	323°37.0	15°03.9	28°54.3	-11°21.2	Alnair	27°33.9	-46°50.7
4	21°20.3	240°43.9	7°20.2	209°25.3	4°22.2	338°39.3	15°04.0	43°57.0	-11°21.2	Fomalhaut	15°15.5	-29°29.7
5	36°22.8	255°47.9	7°20.4	224°26.3	4°21.6	353°41.5	15°04.0	58°59.6	-11°21.3	Scheat	13°46.0	28°12.6
6	51°25.3	270°52.0	7°20.6	239°27.3	4°21.0	8°43.8	15°04.1	74°02.2	-11°21.4	Markab	13°30.8	15°19.9
7	66°27.7	285°56.0	7°20.8	254°28.3	4°20.3	23°46.1	15°04.1	89°04.9	-11°21.4	2023/8/1 SHA Mer.pass		
8	81°30.2	301°00.0	7°21.0	269°29.3	4°19.7	38°48.4	15°04.2	104°07.5	-11°21.5	Venus	218°02.4	12:08
9	96°32.7	316°04.0	7°21.2	284°30.4	4°19.0	53°50.7	15°04.2	119°10.1	-11°21.6	Mars	189°20.0	14:05
10	111°35.1	331°08.1	7°21.5	299°31.4	4°18.4	68°53.0	15°04.3	134°12.8	-11°21.6	Jupiter	317°28.7	05:32
11	126°37.6	346°12.1	7°21.7	314°32.4	4°17.8	83°55.3	15°04.3	149°15.4	-11°21.7	Saturn	22°28.0	01:13
12	141°40.0	1°16.1	7°21.9	329°33.4	4°17.1	98°57.5	15°04.3	164°18.0	-11°21.8	2023/8/1 SHA Mer.pass		
13	156°42.5	16°20.1	7°22.1	344°34.4	4°16.5	113°59.8	15°04.4	179°20.7	-11°21.9	Venus	218°39.8	12:01
14	171°45.0	31°24.2	7°22.4	359°35.5	4°15.8	129°02.1	15°04.4	194°23.3	-11°21.9	Mars	188°45.4	14:03
15	186°47.4	46°28.2	7°22.6	14°36.5	4°15.2	144°04.4	15°04.5	209°25.9	-11°22.0	Jupiter	317°24.1	05:29
16	201°49.9	61°32.2	7°22.8	29°37.5	4°14.5	159°06.7	15°04.5	224°28.6	-11°22.1	Saturn	22°	

Sun				Moon												
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight				Twilight			
0	178°39.9	15°24.3	242°19.3	9.2	26°48.1	4.5	55.4	72	—:—	—:—	Sunrise	Sunset	Civil	Naut.		
1	193°40.0	15°23.6	256°47.5	9.1	26°52.6	4.4	55.4	70	—:—	—:—	02:39	22:04	—:—	—:—		
2	208°40.1	15°22.8	271°15.6	9.1	26°56.9	4.2	55.4	70	—:—	—:—	02:39	21:27	—:—	—:—		
3	223°40.2	15°22.1	285°43.7	9.1	27°01.1	4.1	55.3	68	—:—	01:13	03:05	21:01	22:48	—:—		
4	238°40.3	15°21.3	300°11.8	9.1	27°05.1	4.0	55.3	66	—:—	02:03	03:26	20:42	22:03	—:—		
5	253°40.4	15°20.6	314°39.9	9.1	27°09.0	3.8	55.3	64	—:—	02:33	03:42	20:26	21:34	—:—		
6	268°40.5	15°19.9	329°08.0	9.1	27°12.7	3.7	55.3	62	01:05	02:55	03:55	20:13	21:12	22:57		
7	283°40.5	15°19.1	343°36.0	9.1	27°16.3	3.5	55.2	60	01:50	03:13	04:06	20:02	20:55	22:16		
8	298°40.6	15°18.4	358°04.1	9.0	27°19.8	3.4	55.2	58	02:18	03:27	04:16	19:53	20:41	21:49		
9	313°40.7	15°17.7	12°32.1	9.0	27°23.1	3.2	55.2	56	02:39	03:40	04:24	19:44	20:29	21:29		
10	328°40.8	15°16.9	27°00.2	9.0	27°26.3	3.1	55.2	54	02:55	03:50	04:32	19:37	20:18	21:13		
11	343°40.9	15°16.2	41°28.2	9.0	27°29.3	3.0	55.2	52	03:09	03:60	04:39	19:30	20:09	20:59		
12	358°41.0	15°15.4	55°56.2	9.0	27°32.2	2.8	55.1	50	03:21	04:08	04:45	19:24	20:01	20:47		
13	13°41.1	15°14.7	70°24.2	9.0	27°34.9	2.7	55.1	45	03:45	04:25	04:58	19:12	19:44	20:24		
14	28°41.2	15°13.9	84°52.2	9.0	27°37.5	2.5	55.1	40	04:03	04:39	05:08	19:01	19:30	20:06		
15	43°41.3	15°13.2	99°20.2	9.0	27°40.0	2.4	55.1	35	04:18	04:50	05:17	18:52	19:19	19:52		
16	58°41.4	15°12.5	113°48.2	9.0	27°42.3	2.2	55.0	30	04:30	05:00	05:25	18:44	19:10	19:40		
17	73°41.5	15°11.7	128°16.2	9.0	27°44.4	2.1	55.0	20	04:49	05:16	05:39	18:31	18:54	19:21		
18	88°41.6	15°11.0	142°44.2	9.0	27°46.4	1.9	55.0	10	05:03	05:29	05:51	18:19	18:41	19:07		
19	103°41.7	15°10.2	157°12.2	9.0	27°48.3	1.8	55.0	0	05:15	05:40	06:02	18:08	18:30	18:55		
20	118°41.8	15°09.5	171°40.2	9.0	27°50.0	1.7	55.0	-10	05:26	05:51	06:13	17:58	18:19	18:45		
21	133°41.9	15°08.7	186°08.2	9.0	27°51.6	1.5	54.9	-20	05:35	06:01	06:24	17:47	18:09	18:35		
22	148°42.1	15°08.0	200°36.2	9.0	27°53.1	1.4	54.9	-30	05:44	06:12	06:37	17:34	17:59	18:27		
23	163°42.2	15°07.2	215°04.3	9.0	27°54.4	1.2	54.9	-35	05:48	06:18	06:44	17:26	17:53	18:23		
								-40	05:52	06:24	06:53	17:18	17:46	18:18		
								-45	05:57	06:32	07:02	17:08	17:39	18:14		
								-50	06:02	06:40	07:14	16:57	17:31	18:09		
								-52	06:04	06:44	07:20	16:51	17:27	18:07		
								-54	06:06	06:48	07:26	16:45	17:23	18:05		
								-56	06:08	06:52	07:32	16:39	17:19	18:03		
								-58	06:11	06:57	07:40	16:31	17:14	18:01		
								-60	06:13	07:03	07:48	16:23	17:08	17:58		
								Lat.	Moonrise			Moonset				
								72	—:—	—:—	—:—	—:—	—:—	—:—		
								70	—:—	—:—	—:—	—:—	—:—	—:—		
								68	—:—	—:—	—:—	—:—	—:—	—:—		
								66	—:—	—:—	—:—	—:—	—:—	—:—		
								64	—:—	—:—	—:—	—:—	—:—	—:—		
								62	21:08	22:08	23:55	19:59	20:49	20:49		
								60	22:14	23:11	—:—	18:53	19:46	20:11		
								58	22:49	23:45	—:—	18:18	19:12	19:44		
								56	23:14	—:—	00:10	17:53	18:47	19:22		
								54	23:35	—:—	00:30	17:33	18:27	19:05		
								52	23:52	—:—	00:47	17:16	18:10	18:50		
								50	—:—	00:06	01:01	17:01	17:55	18:37		
								45	—:—	00:36	01:30	16:32	17:26	18:10		
								40	00:11	00:59	01:53	16:09	17:03	17:48		
								35	00:29	01:18	02:12	15:50	16:44	17:31		
								30	00:45	01:34	02:28	15:34	16:27	17:15		
								20	01:11	02:02	02:55	15:06	15:60	16:49		
								10	01:34	02:26	03:19	14:43	15:36	16:27		
								0	01:55	02:48	03:41	14:21	15:14	16:05		
								-10	02:17	03:11	04:03	13:59	14:51	15:44		
								-20	02:40	03:35	04:26	13:35	14:28	15:22		
								-30	03:06	04:02	04:53	13:08	13:60	14:55		
								-35	03:22	04:19	05:09	12:52	13:43	14:39		
								-40	03:41	04:38	05:28	12:33	13:24	14:21		
								-45	04:03	05:02	05:50	12:10	13:01	13:59		
								-50	04:32	05:32	06:19	11:41	12:31	13:31		
								-52	04:46	05:47	06:33	11:27	12:16	13:17		
								-54	05:02	06:04	06:50	11:10	11:58	13:01		
								-56	05:22	06:25	07:09	10:51	11:38	12:41		
								-58	05:46	06:51	07:33	10:26	11:11	12:18		
								-60	06:18	07:28	08:05	09:54	10:34	11:46		
								Day	Sun			Moon				
									Eqn. of Time	Mer.		Mer. Pass.	Age			
									00 ^h	12 ^h	Pass	Upper	Lower			
								11	05:21	05:16	12:05	08:08	20:34	25(21%)		
								12	05:11	05:06	12:05	09:01	21:27	26(14%)		
								13	05:01	04:56	12:04	09:53	22:18	27(8%)		

August 14, 15 ,16 (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars	
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec
0	322°09.6	182°04.4	7°24.7	149°45.7	4°09.4	279°25.0	15°04.9	344°49.6	-11°22.6	Alpheratz	357°35.7 29°13.2
1	337°12.1	197°08.4	7°24.9	164°46.7	4°08.8	294°27.3	15°04.9	359°52.3	-11°22.7	Ankaa	353°08.0 -42°10.5
2	352°14.5	212°12.4	7°25.1	179°47.7	4°08.1	309°29.6	15°04.9	14°54.9	-11°22.8	Schedar	349°32.0 56°39.8
3	7°17.0	227°16.4	7°25.4	194°48.7	4°07.5	324°31.9	15°05.0	29°57.5	-11°22.8	Diphda	348°48.1 -17°51.3
4	22°19.5	242°20.4	7°25.6	209°49.7	4°06.8	339°34.2	15°05.0	45°00.2	-11°22.9	Achernar	335°20.8 -57°06.7
5	37°21.9	257°24.4	7°25.9	224°50.8	4°06.2	354°36.5	15°05.1	60°02.8	-11°23.0	Hamal	327°52.4 23°34.4
6	52°24.4	272°28.5	7°26.1	239°51.8	4°05.5	9°38.8	15°05.1	75°05.4	-11°23.1	Polaris	314°33.7 89°21.5
7	67°26.9	287°32.5	7°26.4	254°52.8	4°04.9	24°41.0	15°05.2	90°08.1	-11°23.1	Akamar	315°12.6 -40°12.3
8	82°29.3	302°36.5	7°26.6	269°53.8	4°04.3	39°43.3	15°05.2	105°10.7	-11°23.2	Menkar	314°07.3 4°11.0
9	97°31.8	317°40.5	7°26.8	284°54.8	4°03.6	54°45.6	15°05.2	120°13.3	-11°23.3	Mirfak	308°29.9 49°56.5
10	112°34.3	332°44.5	7°27.1	299°55.9	4°03.0	69°47.9	15°05.3	135°16.0	-11°23.3	Aldebaran	290°41.1 16°33.4
11	127°36.7	347°48.5	7°27.3	314°56.9	4°02.3	84°50.2	15°05.3	150°18.6	-11°23.4	Rigel	281°05.1 -8°10.3
12	142°39.2	2°52.5	7°27.6	329°57.9	4°01.7	99°52.5	15°05.4	165°21.2	-11°23.5	Capella	280°23.8 46°01.2
13	157°41.7	17°56.5	7°27.8	344°58.9	4°01.0	114°54.8	15°05.4	180°23.9	-11°23.6	Bellatrix	278°24.3 6°22.4
14	172°44.1	33°00.5	7°28.1	359°59.9	4°00.4	129°57.1	15°05.4	195°26.5	-11°23.6	Elnath	278°03.5 28°37.6
15	187°46.6	48°04.5	7°28.4	15°00.9	3°59.7	144°59.4	15°05.5	210°29.1	-11°23.7	Alnilam	275°39.1 -1°11.1
16	202°49.0	63°08.6	7°28.6	30°02.0	3°59.1	160°01.7	15°05.5	225°31.8	-11°23.8	Betelgeuse	270°53.5 7°24.8
17	217°51.5	78°12.6	7°28.9	45°03.0	3°58.5	175°04.0	15°05.6	240°34.4	-11°23.8	Canopus	263°53.3 -52°42.2
18	232°54.0	93°16.6	7°29.1	60°04.0	3°57.8	190°06.3	15°05.6	255°37.0	-11°23.9	Sirius	258°27.4 -16°44.5
19	247°56.4	108°20.6	7°29.4	75°05.0	3°57.2	205°08.6	15°05.7	270°39.7	-11°24.0	Adara	255°07.1 -29°00.0
20	262°58.9	123°24.6	7°29.6	90°06.0	3°56.5	220°10.9	15°05.7	285°42.3	-11°24.1	Procyon	244°52.2 5°10.1
21	278°01.4	138°28.6	7°29.9	105°07.1	3°55.9	235°13.2	15°05.7	300°44.9	-11°24.1	Pollux	243°18.9 27°58.2
22	293°03.8	153°32.6	7°30.2	120°08.1	3°55.2	250°15.5	15°05.8	315°47.6	-11°24.2	Avior	234°15.9 -59°34.9
23	308°06.3	168°36.6	7°30.4	135°09.1	3°54.6	265°17.8	15°05.8	330°50.2	-11°24.3	Suhail	222°47.6 -43°31.5
Mer. pass.:2:30:		v4.0 d0.2 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.3		v2.6 d-0.1 m0.5		Miaplacidus 221°39.5 -69°48.8	

Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	323°08.8	183°40.6	7°30.7	150°10.1	3°54.0	280°20.1	15°05.9	345°52.8	-11°24.3
1	338°11.2	198°44.6	7°30.9	165°11.1	3°53.3	295°22.4	15°05.9	0°55.5	-11°24.4
2	353°13.7	213°48.6	7°31.2	180°12.2	3°52.7	310°24.7	15°05.9	15°58.1	-11°24.5
3	8°16.2	228°52.6	7°31.5	195°13.2	3°52.0	325°27.0	15°06.0	31°00.7	-11°24.6
4	23°18.6	243°56.6	7°31.7	210°14.2	3°51.4	340°29.3	15°06.0	46°03.4	-11°24.6
5	38°21.1	259°00.6	7°32.0	225°15.2	3°50.7	355°31.6	15°06.1	61°06.0	-11°24.7
6	53°23.5	274°04.5	7°32.3	240°16.2	3°50.1	10°33.9	15°06.1	76°08.7	-11°24.8
7	68°26.0	289°08.5	7°32.5	255°17.2	3°49.4	25°36.2	15°06.1	91°11.3	-11°24.8
8	83°28.5	304°12.5	7°32.8	270°18.3	3°48.8	40°38.5	15°06.2	106°13.9	-11°24.9
9	98°30.9	319°16.5	7°33.1	285°19.3	3°48.1	55°40.8	15°06.2	121°16.6	-11°25.0
10	113°33.4	334°20.5	7°33.4	300°20.3	3°47.5	70°43.1	15°06.3	136°19.2	-11°25.1
11	128°35.9	349°24.5	7°33.6	315°21.3	3°46.9	85°45.4	15°06.3	151°21.8	-11°25.1
12	143°38.3	4°28.5	7°33.9	330°22.3	3°46.2	100°47.7	15°06.3	166°24.5	-11°25.2
13	158°40.8	19°32.5	7°34.2	345°23.4	3°45.6	115°50.0	15°06.4	181°27.1	-11°25.3
14	173°43.3	34°36.4	7°34.5	0°24.4	3°44.9	130°52.3	15°06.4	196°29.7	-11°25.3
15	188°45.7	49°40.4	7°34.7	15°25.4	3°44.3	145°54.6	15°06.5	211°32.4	-11°25.4
16	203°48.2	64°44.4	7°35.0	30°26.4	3°43.6	160°56.9	15°06.5	226°35.0	-11°25.5
17	218°50.6	79°48.4	7°35.3	45°27.4	3°43.0	175°59.2	15°06.5	241°37.6	-11°25.6
18	233°53.1	94°52.4	7°35.6	60°28.4	3°42.3	191°01.5	15°06.6	256°40.3	-11°25.6
19	248°55.6	109°56.4	7°35.9	75°29.5	3°41.7	206°03.8	15°06.6	271°42.9	-11°25.7
20	263°58.0	125°00.3	7°36.1	90°30.5	3°41.0	221°06.1	15°06.6	286°45.5	-11°25.8
21	279°00.5	140°04.3	7°36.4	105°31.5	3°40.4	236°08.4	15°06.7	301°48.2	-11°25.8
22	294°03.0	155°08.3	7°36.7	120°32.5	3°39.8	251°10.7	15°06.7	316°50.8	-11°25.9
23	309°05.4	170°12.2	7°37.0	135°33.5	3°39.1	266°13.0	15°06.8	331°53.5	-11°26.0
	Mer.pass.:2:27:	v4.0 d0.3 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.3		v2.6 d-0.1 m0.5	

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	324°07.9	185°16.2	7°37.3	150°34.5	3°38.5	281°15.3	15°06.8	346°56.1	-11°26.0
1	339°10.4	200°20.2	7°37.6	165°35.6	3°37.8	296°17.6	15°06.8	1°58.7	-11°26.1
2	354°12.8	215°24.2	7°37.9	180°36.6	3°37.2	311°19.9	15°06.9	17°01.4	-11°26.2
3	9°15.3	230°28.1	7°38.2	195°37.6	3°36.5	326°22.2	15°06.9	32°04.0	-11°26.3
4	24°17.8	245°32.1	7°38.4	210°38.6	3°35.9	341°24.5	15°07.0	47°06.6	-11°26.3
5	39°20.2	260°36.1	7°38.7	225°39.6	3°35.2	356°26.8	15°07.0	62°09.3	-11°26.4
6	54°22.7	275°40.0	7°39.0	240°40.7	3°34.6	11°29.2	15°07.0	77°11.9	-11°26.5
7	69°25.1	290°44.0	7°39.3	255°41.7	3°33.9	26°31.5	15°07.1	92°14.5	-11°26.6
8	84°27.6	305°47.9	7°39.6	270°42.7	3°33.3	41°33.8	15°07.1	107°17.2	-11°26.6
9	99°30.1	320°51.9	7°39.9	285°43.7	3°32.6	56°36.1	15°07.1	122°19.8	-11°26.7
10	114°32.5	335°55.9	7°40.2	300°44.7	3°32.0	71°38.4	15°07.2	137°22.5	-11°26.8
11	129°35.0	350°59.8	7°40.5	315°45.7	3°31.4	86°40.7	15°07.2	152°25.1	-11°26.8
12	144°37.5	6°03.8	7°40.8	330°46.8	3°30.7	101°43.0	15°07.3	167°27.7	-11°26.9
13	159°39.9	21°07.7	7°41.1	345°47.8	3°30.1	116°45.3	15°07.3	182°30.4	-11°27.0
14	174°42.4	36°11.7	7°41.4	0°48.8	3°29.4	131°47.6	15°07.3	197°33.0	-11°27.1
15	189°44.9	51°15.6	7°41.7	15°49.8	3°28.8	146°49.9	15°07.4	212°35.6	-11°27.1
16	204°47.3	66°19.6	7°42.0	30°50.8	3°28.1	161°52.2	15°07.4	227°38.3	-11°27.2
17	219°49.8	81°23.5	7°42.3	45°51.8	3°27.5	176°54.6	15°07.4	242°40.9	-11°27.3
18	234°52.3	96°27.5	7°42.6	60°52.9	3°26.8	191°56.9	15°07.5	257°43.6	-11°27.3
19	249°54.7	111°31.4	7°42.9	75°53.9	3°26.2	206°59.2	15°07.5	272°46.2	-11°27.4
20	264°57.2	126°35.3	7°43.2	90°54.9	3°25.5	222°01.5	15°07.5	287°48.8	-11°27.5
21	279°59.6	141°39.3	7°43.5	105°55.9	3°24.9	237°03.8	15°07.6	302°51.5	-11°27.6
22	295°02.1	156°43.2	7°43.8	120°56.9	3°24.2	252°06.1	15°07.6	317°54.1	-11°27.6
23	310°04.6	171°47.1	7°44.1	135°57.9	3°23.6	267°08.4	15°07.7	332°56.7	-11°27.7
	Mer.pass.:2.23;	v4.0 d0.3 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.3		v2.6 d-0.1 m0.5	

	SHA	Dec
Alpheratz	357° 35.7	29° 13.2
Ankaa	353° 08.0	-42° 10.5
Schedar	349° 32.0	56° 39.8
Diphda	348° 48.1	-17° 51.3
Achernar	335° 20.8	-57° 06.7
Hamal	327° 52.4	23° 34.4
Polaris	314° 33.7	89° 21.5
Akamar	315° 12.6	-40° 12.3
Menkar	314° 07.3	4° 11.0
Mirfak	308° 29.9	49° 56.5
Aldebaran	290° 41.1	-6° 33.4
Rigel	281° 05.1	-8° 10.3
Capella	280° 23.8	46° 01.1
Bellatrix	278° 24.3	6° 22.4
Elnath	278° 03.5	28° 37.6
Anilam	275° 39.1	-7° 11.1
Betelgeuse	270° 53.5	7° 24.8
Canopus	263° 53.3	-52° 42.2
Sirius	258° 27.4	-16° 44.5
Adara	255° 07.1	-29° 00.0
Procyon	244° 52.2	5° 10.1
Pollux	243° 18.9	27° 58.2
Avior	234° 15.9	-59° 34.9
Suhail	222° 47.6	-43° 31.5
Miaplacidus	221° 39.5	-69° 48.7
Alphard	217° 49.2	-8° 45.5
Regulus	207° 35.9	11° 51.3
Dubhe	193° 43.0	61° 37.6
Denebola	182° 26.3	14° 26.6
Genah	175° 45.0	-17° 40.3
Acrux	173° 01.9	-63° 13.9
Gacrux	171° 53.4	-57° 14.8
Alioth	166° 14.3	55° 50.2
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.1	49° 12.0
Hadar	148° 37.9	-60° 29.4
Menkent	147° 59.1	-36° 29.2
Arcturus	145° 48.9	19° 04.1
Rigel Kent.	139° 42.0	-60° 56.2
Zubenelg.	136° 57.3	-16° 08.4
Kochab	137° 19.9	74° 03.8
Alphecca	126° 04.7	26° 38.4
Antares	112° 17.1	-26° 29.1
Atria	107° 12.2	-69° 04.4
Sabik	102° 03.9	-15° 45.2
Shaula	96° 11.7	-37° 07.3
Rasalhague	95° 59.4	12° 32.7
Etamin	90° 42.4	51° 29.3
Kaus Aust.	83° 33.7	-34° 22.4
Vega	80° 33.7	38° 48.5
Nunki	75° 48.9	-26° 16.0
Altair	62° 00.8	8° 55.9
Peacock	53° 06.9	-56° 39.6
Deneb	49° 26.1	45° 21.9
Enif	33° 39.6	9° 59.0
Alnair	27° 33.9	-46° 50.7
Fomalhaut	15° 15.5	-29° 29.7
Scheat	13° 46.0	28° 12.6
Markab	13° 30.8	15° 20.0
2023/8/1	SHA	Mer.pass
Venus	219° 54.7	11:49
Mars	187° 36.0	14:00
Jupiter	317° 15.4	05:22
Saturn	22° 40.0	01:01
2023/8/1	SHA	Mer.pass
Venus	220° 31.8	11:42
Mars	187° 01.4	13:58
Jupiter	317° 11.3	05:18
Saturn	22° 44.1	00:56
2023/8/1	SHA	Mer.pass
Venus	221° 08.3	11:36
Mars	186° 26.7	13:57
Jupiter	317° 07.4	05:14
Saturn	22° 48.2	00:52
Horizontal parallax		
Venus:		0.5
Mars:		0.1

Sun				Moon												
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight				Twilight			
0	178°47.4	14°30.2	204°30.9	10.8	26°07.6	-5.4	54.2	72	—:—	—:—	02:22	21:41	—:—	—:—		
1	193°47.6	14°29.4	219°00.7	10.9	26°02.1	-5.5	54.2	70	—:—	—:—	02:55	21:10	—:—	—:—		
2	208°47.7	14°28.6	233°30.7	10.9	25°56.5	-5.6	54.2	68	—:—	01:41	03:18	20:48	22:21	—:—		
3	223°47.8	14°27.9	248°00.6	11.0	25°50.8	-5.8	54.2	66	—:—	02:19	03:36	20:30	21:45	—:—		
4	238°47.9	14°27.1	262°30.7	11.1	25°45.0	-5.9	54.2	64	—:—	02:46	03:51	20:16	21:20	—:—		
5	253°48.0	14°26.3	277°00.8	11.1	25°39.0	-6.0	54.2	62	01:30	03:06	04:03	20:04	21:01	22:33		
6	268°48.1	14°25.6	291°30.9	11.2	25°33.0	-6.1	54.2	60	02:05	03:22	04:13	19:54	20:45	22:00		
7	283°48.2	14°24.8	306°01.1	11.3	25°26.8	-6.2	54.1	58	02:29	03:35	04:22	19:45	20:32	21:37		
8	298°48.4	14°24.0	320°31.4	11.3	25°20.5	-6.3	54.1	56	02:48	03:47	04:30	19:37	20:21	21:19		
9	313°48.5	14°23.3	335°01.8	11.4	25°14.1	-6.5	54.1	54	03:03	03:57	04:37	19:31	20:11	21:04		
10	328°48.6	14°22.5	349°32.2	11.4	25°07.6	-6.6	54.1	52	03:16	04:05	04:44	19:24	20:02	20:51		
11	343°48.7	14°21.7	4°02.7	11.5	25°01.0	-6.7	54.1	50	03:27	04:13	04:49	19:19	19:55	20:40		
12	358°48.8	14°21.0	18°33.2	11.6	24°54.2	-6.8	54.1	45	03:50	04:29	05:01	19:07	19:39	20:18		
13	13°48.9	14°20.2	33°03.8	11.6	24°47.4	-6.9	54.1	40	04:07	04:42	05:11	18:57	19:26	20:01		
14	28°49.1	14°19.4	47°34.5	11.7	24°40.4	-7.0	54.1	35	04:21	04:53	05:20	18:49	19:16	19:48		
15	43°49.2	14°18.6	62°05.2	11.8	24°33.3	-7.1	54.1	30	04:32	05:02	05:27	18:41	19:07	19:36		
16	58°49.3	14°17.9	76°36.1	11.8	24°26.1	-7.2	54.1	20	04:50	05:17	05:40	18:29	18:52	19:19		
17	73°49.4	14°17.1	91°06.9	11.9	24°18.8	-7.3	54.1	10	05:04	05:29	05:51	18:18	18:40	19:05		
18	88°49.5	14°16.3	105°37.9	12.0	24°11.4	-7.5	54.1	0	05:15	05:40	06:01	18:08	18:29	18:54		
19	103°49.6	14°15.5	120°08.9	12.0	24°03.9	-7.6	54.1	-10	05:25	05:50	06:11	17:58	18:20	18:45		
20	118°49.8	14°14.8	134°40.0	12.1	23°56.3	-7.7	54.0	-20	05:33	05:59	06:22	17:47	18:10	18:36		
21	133°49.9	14°14.0	149°11.1	12.2	23°48.6	-7.8	54.0	-30	05:41	06:09	06:34	17:35	18:00	18:28		
22	148°50.0	14°13.2	163°42.3	12.3	23°40.8	-7.9	54.0	-35	05:45	06:15	06:41	17:29	17:55	18:25		
23	163°50.1	14°12.5	178°13.6	12.3	23°32.8	-8.0	54.0	-40	05:49	06:21	06:49	17:21	17:49	18:21		
								-45	05:53	06:27	06:58	17:12	17:42	18:17		
								-50	05:57	06:35	07:09	17:01	17:35	18:13		
								-52	05:59	06:38	07:14	16:56	17:32	18:11		
								-54	06:00	06:42	07:19	16:51	17:28	18:10		
								-56	06:02	06:46	07:25	16:44	17:24	18:08		
								-58	06:04	06:50	07:32	16:38	17:20	18:06		
								-60	06:06	06:55	07:40	16:30	17:15	18:04		
								Lat.	Moonrise			Moonset				
								72	—:—	—:—	—:—	—:—	—:—	22:27		
								70	—:—	—:—	00:48	—:—	23:16	21:52		
								68	—:—	—:—	01:56	—:—	22:06	21:27		
								66	—:—	00:08	02:32	22:19	21:29	21:08		
								64	—:—	01:06	02:57	21:20	21:03	20:52		
								62	—:—	01:39	03:17	20:46	20:43	20:39		
								60	00:33	02:03	03:33	20:21	20:26	20:27		
								58	00:59	02:22	03:47	20:01	20:12	20:18		
								56	01:20	02:38	03:58	19:45	19:59	20:09		
								54	01:38	02:52	04:08	19:31	19:49	20:01		
								52	01:52	03:04	04:17	19:18	19:39	19:54		
								50	02:05	03:14	04:25	19:07	19:30	19:48		
								45	02:31	03:36	04:42	18:45	19:12	19:35		
								40	02:52	03:54	04:56	18:26	18:57	19:23		
								35	03:10	04:09	05:08	18:11	18:45	19:14		
								30	03:24	04:22	05:18	17:57	18:33	19:05		
								20	03:50	04:43	05:35	17:34	18:14	18:51		
								10	04:11	05:02	05:51	17:14	17:57	18:38		
								0	04:31	05:19	06:05	16:55	17:42	18:26		
								-10	04:52	05:37	06:19	16:36	17:26	18:13		
								-20	05:13	05:55	06:34	16:16	17:09	18:00		
								-30	05:38	06:17	06:51	15:52	16:49	17:45		
								-35	05:52	06:29	07:01	15:38	16:37	17:36		
								-40	06:09	06:43	07:12	15:22	16:24	17:26		
								-45	06:29	07:00	07:25	15:02	16:08	17:14		
								-50	06:55	07:21	07:41	14:38	15:49	16:59		
								-52	07:07	07:31	07:49	14:26	15:39	16:53		
								-54	07:21	07:42	07:57	14:13	15:29	16:45		
								-56	07:37	07:55	08:06	13:57	15:17	16:36		
								-58	07:56	08:09	08:17	13:38	15:03	16:27		
								-60	08:20	08:26	08:29	13:15	14:46	16:15		
								Day	Sun		Mer.	Moon		Age		
									Eqn.of Time	12 ^h	Pass	Upper	Lower			
								14	04:50	04:45	12:04	10:43	23:07	28(3%)		
								15	04:39	04:33	12:04	11:30	23:53	29(1%)		
								16	04:27	04:21	12:04	12:15	00:36	0(0%)		

August 17, 18 ,19 (Thu., Fri., Sat.)

Aries			Venus		Mars		Jupiter		Saturn		Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	325°07.0	186°51.1	7°44.5	150°59.0	3°22.9	282°10.7	15°07.7	347°59.4	-11°27.8	Alpheratz	357°35.7	29°13.2		
1	340°09.5	201°55.0	7°44.8	165°60.0	3°22.3	297°13.1	15°07.7	3°02.0	-11°27.8	Ankaa	353°07.9	-42°10.5		
2	355°12.0	216°58.9	7°45.1	181°01.0	3°21.6	312°15.4	15°07.8	18°04.6	-11°27.9	Schedar	349°32.0	56°39.9		
3	10°14.4	232°02.9	7°45.4	196°02.0	3°21.0	327°17.7	15°07.8	33°07.3	-11°28.0	Diphda	348°48.1	-17°51.3		
4	25°16.9	247°06.8	7°45.7	211°03.0	3°20.4	342°20.0	15°07.8	48°09.9	-11°28.1	Achernar	335°20.7	-57°06.7		
5	40°19.4	262°10.7	7°46.0	226°04.0	3°19.7	357°22.3	15°07.9	63°12.6	-11°28.1	Hamal	327°52.4	23°34.4		
6	55°21.8	277°14.7	7°46.3	241°05.1	3°19.1	12°24.6	15°07.9	78°15.2	-11°28.2	Polaris	314°32.2	89°21.5		
7	70°24.3	292°18.6	7°46.6	256°06.1	3°18.4	27°26.9	15°07.9	93°17.8	-11°28.3	Akamar	315°12.6	-40°12.3		
8	85°26.7	307°22.5	7°47.0	271°07.1	3°17.8	42°29.3	15°08.0	108°20.5	-11°28.3	Menkar	314°07.3	4°11.0		
9	100°29.2	322°26.4	7°47.3	286°08.1	3°17.1	57°31.6	15°08.0	123°23.1	-11°28.4	Mirfak	308°29.9	49°56.5		
10	115°31.7	337°30.3	7°47.6	301°09.1	3°16.5	72°33.9	15°08.0	138°25.7	-11°28.5	Aldebaran	290°41.0	16°33.5		
11	130°34.1	352°34.2	7°47.9	316°10.1	3°15.8	87°36.2	15°08.1	153°28.4	-11°28.6	Rigel	281°05.1	-8°10.3		
12	145°36.6	7°38.2	7°48.2	331°11.2	3°15.2	102°38.5	15°08.1	168°31.0	-11°28.6	Capella	280°23.8	46°01.2		
13	160°39.1	22°42.1	7°48.5	346°12.2	3°14.5	117°40.8	15°08.2	183°33.7	-11°28.7	Bellatrix	278°24.3	6°22.4		
14	175°41.5	37°46.0	7°48.9	1°13.2	3°13.9	132°43.2	15°08.2	198°36.3	-11°28.8	Elnath	278°03.5	28°37.6		
15	190°44.0	52°49.9	7°49.2	16°14.2	3°13.2	147°45.5	15°08.2	213°38.9	-11°28.8	Alnilam	275°39.1	-1°11.1		
16	205°46.5	67°53.8	7°49.5	31°15.2	3°12.6	162°47.8	15°08.3	228°41.6	-11°28.9	Betelgeuse	270°53.5	7°24.8		
17	220°48.9	82°57.7	7°49.8	46°16.2	3°11.9	177°50.1	15°08.3	243°44.2	-11°29.0	Canopus	263°53.3	-52°42.2		
18	235°51.4	98°01.6	7°50.2	61°17.3	3°11.3	192°52.4	15°08.3	258°08.8	-11°29.1	Sirius	258°27.4	-16°44.5		
19	250°53.9	113°05.5	7°50.5	76°18.3	3°10.6	207°54.7	15°08.4	273°49.5	-11°29.1	Adara	255°07.0	-29°00.0		
20	265°56.3	128°09.4	7°50.8	91°19.3	3°10.0	222°57.1	15°08.4	288°52.1	-11°29.2	Procyon	244°52.2	5°10.2		
21	280°58.8	143°13.3	7°51.1	106°20.3	3°09.3	237°59.4	15°08.4	303°08.4	-11°29.3	Pollux	243°18.9	27°58.2		
22	296°01.2	158°17.2	7°51.5	121°21.3	3°08.7	253°01.7	15°08.5	318°57.4	-11°29.3	Avior	234°15.8	-59°34.9		
23	311°03.7	173°21.1	7°51.8	136°22.3	3°08.0	268°04.0	15°08.5	334°00.0	-11°29.4	Suhail	222°47.6	-43°31.5		
Mer.pass.:2:19:		v3.9 d0.3 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.4		v2.6 d-0.1 m0.5		Miaplacidus			221°39.5	-69°48.8

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	326°06.2	188°25.0	7°52.1	151°23.4	3°07.4	283°06.3	15°08.5	349°02.7	-11°29.5
1	341°08.6	203°28.8	7°52.4	166°24.4	3°06.7	298°08.7	15°08.6	4°05.3	-11°29.6
2	356°11.1	218°32.7	7°52.8	181°25.4	3°06.1	313°11.0	15°08.6	19°08.0	-11°29.6
3	11°13.6	233°36.6	7°53.1	196°26.4	3°05.4	328°13.3	15°08.6	34°10.6	-11°29.7
4	26°16.0	248°40.5	7°53.4	211°27.4	3°04.8	343°15.6	15°08.7	49°13.2	-11°29.8
5	41°18.5	263°44.4	7°53.8	226°28.4	3°04.1	358°18.0	15°08.7	64°15.9	-11°29.8
6	56°21.0	278°48.2	7°54.1	241°29.4	3°03.5	13°20.3	15°08.7	79°18.5	-11°29.9
7	71°23.4	293°52.1	7°54.4	256°30.5	3°02.8	28°22.6	15°08.8	94°21.1	-11°30.0
8	86°25.9	308°56.0	7°54.8	271°31.5	3°02.2	43°24.9	15°08.8	109°23.8	-11°30.1
9	101°28.3	323°59.9	7°55.1	286°32.5	3°01.5	58°27.2	15°08.8	124°26.4	-11°30.1
10	116°30.8	339°03.7	7°55.4	301°33.5	3°00.9	73°29.6	15°08.9	139°29.1	-11°30.2
11	131°33.3	354°07.6	7°55.8	316°34.5	3°00.3	88°31.9	15°08.9	154°31.7	-11°30.3
12	146°35.7	9°11.5	7°56.1	331°35.5	2°59.6	103°34.2	15°08.9	169°34.3	-11°30.4
13	161°38.2	24°15.3	7°56.4	346°36.6	2°59.0	118°36.5	15°09.0	184°37.0	-11°30.4
14	176°40.7	39°19.2	7°56.8	1°37.6	2°58.3	133°38.9	15°09.0	199°39.6	-11°30.5
15	191°43.1	54°23.0	7°57.1	16°38.6	2°57.7	148°41.2	15°09.0	214°42.3	-11°30.6
16	206°45.6	69°26.9	7°57.5	31°39.6	2°57.0	163°43.5	15°09.1	229°44.9	-11°30.6
17	221°48.1	84°30.7	7°57.8	46°40.6	2°56.4	178°45.8	15°09.1	244°47.5	-11°30.7
18	236°50.5	99°34.6	7°58.1	61°41.6	2°55.7	193°48.2	15°09.1	259°50.2	-11°30.8
19	251°53.0	114°38.4	7°58.5	76°42.6	2°55.1	208°50.5	15°09.1	274°52.8	-11°30.9
20	266°55.5	129°42.3	7°58.8	91°43.7	2°54.4	223°52.8	15°09.2	289°55.4	-11°30.9
21	281°57.9	144°46.1	7°59.2	106°44.7	2°53.8	238°55.2	15°09.2	304°58.1	-11°31.0
22	297°00.4	159°50.0	7°59.5	121°45.7	2°53.1	253°57.5	15°09.2	320°00.7	-11°31.1
23	312°02.8	174°53.8	7°59.9	136°46.7	2°52.5	268°59.8	15°09.3	335°03.4	-11°31.1
Mer.pass.:2:15:		v3.9 d0.3 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.4		v2.6 d-0.1 m0.4	

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	327°05.3	189°57.6	8°00.2	151°47.7	2°51.8	284°02.1	15°09.3	350°06.0	-11°31.2
1	342°07.8	205°01.5	8°00.5	166°48.7	2°51.2	299°04.5	15°09.3	5°08.6	-11°31.3
2	357°10.2	220°05.3	8°00.9	181°49.7	2°50.5	314°06.8	15°09.4	20°11.3	-11°31.4
3	12°12.7	235°09.1	8°01.2	196°50.8	2°49.9	329°09.1	15°09.4	35°13.9	-11°31.4
4	27°15.2	250°12.9	8°01.6	211°51.8	2°49.2	344°11.5	15°09.4	50°16.6	-11°31.5
5	42°17.6	265°16.8	8°01.9	226°52.8	2°48.6	359°13.8	15°09.5	65°19.2	-11°31.6
6	57°20.1	280°20.6	8°02.3	241°53.8	2°47.9	14°16.1	15°09.5	80°21.8	-11°31.6
7	72°22.6	295°24.4	8°02.6	256°54.8	2°47.3	29°18.4	15°09.5	95°24.5	-11°31.7
8	87°25.0	310°28.2	8°03.0	271°55.8	2°46.6	44°20.8	15°09.6	110°27.1	-11°31.8
9	102°27.5	325°32.0	8°03.3	286°56.9	2°46.0	59°23.1	15°09.6	125°29.8	-11°31.9
10	117°30.0	340°35.9	8°03.7	301°57.9	2°45.3	74°25.4	15°09.6	140°32.4	-11°31.9
11	132°32.4	355°39.7	8°04.0	316°58.9	2°44.7	89°27.8	15°09.6	155°35.0	-11°32.0
12	147°34.9	10°43.5	8°04.4	331°59.9	2°44.0	104°30.1	15°09.7	170°37.7	-11°32.1
13	162°37.3	25°47.3	8°04.7	347°00.9	2°43.4	119°32.4	15°09.7	185°40.3	-11°32.2
14	177°39.8	40°51.1	8°05.1	2°01.9	2°42.7	134°34.8	15°09.7	200°43.0	-11°32.2
15	192°42.3	55°54.9	8°05.4	17°02.9	2°42.1	149°37.1	15°09.8	215°45.6	-11°32.3
16	207°44.7	70°58.7	8°05.8	32°04.0	2°41.4	164°39.4	15°09.8	230°48.2	-11°32.4
17	222°47.2	86°02.5	8°06.2	47°05.0	2°40.7	179°41.8	15°09.8	245°50.9	-11°32.4
18	237°49.7	101°06.2	8°06.5	62°06.0	2°40.1	194°44.1	15°09.9	260°53.5	-11°32.5
19	252°52.1	116°10.0	8°06.9	77°07.0	2°39.4	209°46.4	15°09.9	275°56.2	-11°32.6
20	267°54.6	131°13.8	8°07.2	92°08.0	2°38.8	224°48.8	15°09.9	290°58.8	-11°32.7
21	282°57.1	146°17.6	8°07.6	107°09.0	2°38.1	239°51.1	15°09.9	306°01.4	-11°32.7
22	297°59.5	161°21.4	8°07.9	122°10.0	2°37.5	254°53.4	15°10.0	321°04.1	-11°32.8
23	313°02.0	176°25.2	8°08.3	137°11.0	2°36.8	269°55.8	15°10.0	336°06.7	-11°32.9
Mer.pass.:2:11:		v3.8 d0.3 m-4.2		v1.0 d-0.6 m1.8		v2.3 d0.0 m-2.4		v2.6 d-0.1 m0.4	

	SHA	Dec
Alpheratz	357° 35.7	29° 13.2
Ankaa	353° 07.9	-42° 10.5
Schedar	349° 32.0	56° 39.9
Diphda	348° 48.1	-17° 51.3
Achernar	335° 20.7	-57° 06.7
Hamal	327° 52.4	23° 34.4
Polaris	314° 32.2	89° 21.5
Akamar	315° 12.6	-40° 12.3
Menkar	314° 07.3	4° 11.
Mirfak	308° 29.9	49° 56.5
Aldebaran	290° 41.0	16° 33.5
Rigel	281° 05.1	-8° 10.3
Capella	280° 23.8	46° 01.2
Bellatrix	278° 24.3	6° 22.4
Elnath	278° 03.5	28° 37.6
Alnilam	275° 39.1	-1° 11.1
Betelgeuse	270° 53.5	7° 24.8
Canopus	263° 53.3	-52° 42.2
Sirius	258° 27.4	-16° 44.5
Adara	255° 07.0	-29° 00.0
Procyon	244° 52.2	5° 10.2
Pollux	243° 18.9	27° 58.2
Avior	234° 15.8	-59° 34.9
Suhail	222° 47.6	-43° 31.5
Miaplacidus	221° 39.5	-69° 48.7
Alphard	217° 49.2	-8° 45.5
Regulus	207° 35.9	11° 51.3
Dubhe	193° 43.0	61° 37.6
Deneb	182° 26.3	14° 26.6
Genah	175° 45.0	-17° 40.3
Acrux	173° 01.9	-63° 13.9
Gacrux	171° 53.4	-57° 14.8
Alioth	166° 14.4	55° 50.2
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.1	49° 12.0
Hadar	148° 37.9	-60° 29.4
Menkent	147° 59.1	-36° 29.2
Arcturus	145° 48.9	19° 04.1
Rigel Kent.	139° 42.1	-60° 56.2
Zubenelg.	136° 57.4	-16° 08.4
Kochab	137° 19.9	74° 03.8
Alphecca	126° 04.7	26° 38.4
Antares	112° 17.1	-26° 29.1
Atria	107° 12.2	-69° 04.4
Sabik	102° 04.0	-15° 45.2
Shaula	96° 11.7	-37° 07.3
Rasalhague	95° 59.5	12° 32.7
Etamin	90° 42.4	51° 29.4
Kaus Aust.	83° 33.7	-34° 22.4
Vega	80° 33.7	38° 48.5
Nunki	75° 48.9	-26° 16.0
Altair	62° 00.9	8° 55.9
Peacock	53° 06.9	-56° 39.6
Deneb	49° 26.1	45° 21.9
Enif	33° 39.6	9° 59.1
Alnair	27° 33.9	-46° 50.7
Fomalhaut	15° 15.5	-29° 29.7
Scheat	13° 46.0	28° 12.6
Markab	13° 30.7	15° 20.0

2023/8/1	SHA	Mer.pass
Venus	221°44.0	11:30
Mars	185°51.9	13:55
Jupiter	317°03.7	05:10
Saturn	22°52.3	00:48

2023/8/1	SHA	Mer.pass
Venus	222° 18.8	11:23
Mars	185° 17.2	13:54
Jupiter	317° 00.2	05:07
Saturn	22° 56.5	00:44

2023/8/1	SHA	Mer.pass
Venus	222°52.3	11:17
Mars	184°42.4	13:52
Jupiter	316°56.8	05:03
Saturn	23°00.7	00:39

Horizontal parallax	
Venus:	0.5
Mars:	0.1

Sun				Moon													
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight				Twilight			
0	178°56.2	13°34.0		171°07.8	15.4	15°16.5	-11.9	53.9	72	—:—	—:—	02:42	21:20	—:—	—:—		
1	193°56.4	13°33.2		185°42.2	15.5	15°04.5	-12.0	53.9	70	—:—	01:09	03:10	20:54	22:47	—:—		
2	208°56.5	13°32.4		200°16.7	15.5	14°52.5	-12.0	53.9	68	—:—	02:03	03:31	20:34	21:59	—:—		
3	223°56.6	13°31.6		214°51.3	15.6	14°40.4	-12.1	53.9	66	—:—	02:35	03:47	20:18	21:29	—:—		
4	238°56.8	13°30.8		229°25.9	15.6	14°28.3	-12.2	53.9	64	01:01	02:58	04:00	20:06	21:07	22:57		
5	253°56.9	13°30.0		244°00.5	15.7	14°16.1	-12.2	53.9	62	01:49	03:16	04:11	19:55	20:49	22:14		
6	268°57.0	13°29.2		258°35.2	15.7	14°03.9	-12.3	53.9	60	02:18	03:30	04:21	19:45	20:35	21:46		
7	283°57.2	13°28.4		273°10.0	15.8	13°51.6	-12.3	54.0	58	02:39	03:43	04:29	19:37	20:23	21:26		
8	298°57.3	13°27.6		287°44.8	15.8	13°39.2	-12.4	54.0	56	02:57	03:53	04:36	19:30	20:13	21:09		
9	313°57.4	13°26.8		302°19.6	15.9	13°26.8	-12.4	54.0	54	03:11	04:03	04:43	19:24	20:04	20:55		
10	328°57.6	13°26.0		316°54.5	15.9	13°14.4	-12.5	54.0	52	03:23	04:11	04:48	19:18	19:56	20:43		
11	343°57.7	13°25.2		331°29.4	16.0	13°01.9	-12.5	54.0	50	03:33	04:18	04:54	19:13	19:49	20:33		
12	358°57.8	13°24.4		346°04.4	16.0	12°49.3	-12.6	54.0	45	03:54	04:33	05:05	19:02	19:34	20:12		
13	13°58.0	13°23.6		0°39.4	16.0	12°36.7	-12.6	54.0	40	04:10	04:45	05:14	18:53	19:22	19:56		
14	28°58.1	13°22.8		15°14.5	16.1	12°24.1	-12.7	54.0	35	04:23	04:55	05:22	18:45	19:12	19:44		
15	43°58.2	13°22.0		29°49.6	16.1	12°11.4	-12.7	54.0	30	04:34	05:04	05:29	18:38	19:03	19:33		
16	58°58.4	13°21.2		44°24.7	16.2	11°58.7	-12.8	54.0	20	04:51	05:18	05:41	18:27	18:50	19:16		
17	73°58.5	13°20.4		58°59.9	16.2	11°45.9	-12.8	54.0	10	05:04	05:29	05:51	18:17	18:38	19:04		
18	88°58.6	13°19.6		73°35.1	16.2	11°33.0	-12.9	54.0	0	05:15	05:39	06:01	18:07	18:28	18:53		
19	103°58.8	13°18.8		88°10.4	16.3	11°20.2	-12.9	54.0	-10	05:24	05:48	06:10	17:58	18:20	18:44		
20	118°58.9	13°18.0		102°45.7	16.3	11°07.2	-12.9	54.0	-20	05:31	05:57	06:20	17:48	18:11	18:37		
21	133°59.0	13°17.2		117°21.0	16.3	10°54.3	-13.0	54.0	-30	05:38	06:07	06:31	17:37	18:02	18:30		
22	148°59.2	13°16.4		131°56.4	16.4	10°41.3	-13.0	54.0	-35	05:42	06:11	06:37	17:31	17:57	18:27		
23	163°59.3	13°15.6		146°31.8	16.4	10°28.2	-13.1	54.0	-40	05:45	06:17	06:45	17:24	17:52	18:23		
SD.=15.8 d=-0.8 S.D.=14.7								-45	05:48	06:23	06:53	17:15	17:46	18:20			
								-50	05:52	06:30	07:03	17:05	17:39	18:17			
								-52	05:53	06:33	07:08	17:01	17:36	18:16			
								-54	05:55	06:36	07:13	16:56	17:33	18:14			
								-56	05:56	06:40	07:19	16:50	17:29	18:13			
								-58	05:57	06:43	07:25	16:44	17:25	18:11			
								-60	05:59	06:48	07:32	16:37	17:21	18:10			
								Lat.	Moonrise			Moonset					
								72	03:09	05:28	07:29	21:34	20:58	20:27			
								70	03:42	05:43	07:33	21:17	20:50	20:27			
								68	04:05	05:54	07:37	21:03	20:44	20:27			
								66	04:23	06:04	07:40	20:52	20:39	20:27			
								64	04:38	06:12	07:42	20:43	20:35	20:27			
								62	04:50	06:18	07:44	20:35	20:31	20:27			
								60	05:00	06:24	07:46	20:28	20:27	20:27			
								58	05:09	06:29	07:48	20:22	20:24	20:27			
								56	05:17	06:34	07:49	20:16	20:22	20:27			
								54	05:24	06:38	07:51	20:11	20:19	20:27			
								52	05:30	06:41	07:52	20:07	20:17	20:27			
								50	05:36	06:45	07:53	20:03	20:15	20:27			
								45	05:48	06:52	07:55	19:54	20:11	20:27			
								40	05:57	06:58	07:57	19:46	20:07	20:27			
								35	06:06	07:03	07:59	19:40	20:04	20:27			
								30	06:13	07:07	08:01	19:34	20:01	20:27			
								20	06:26	07:15	08:03	19:24	19:56	20:27			
								10	06:37	07:22	08:06	19:15	19:51	20:27			
								0	06:47	07:28	08:08	19:07	19:47	20:27			
								-10	06:58	07:34	08:10	18:59	19:43	20:27			
								-20	07:09	07:41	08:12	18:50	19:38	20:26			
								-30	07:21	07:49	08:15	18:40	19:33	20:26			
								-35	07:28	07:53	08:16	18:34	19:30	20:26			
								-40	07:36	07:58	08:18	18:27	19:27	20:26			
								-45	07:46	08:03	08:20	18:19	19:23	20:26			
								-50	07:57	08:10	08:22	18:09	19:18	20:26			
								-52	08:02	08:13	08:23	18:05	19:16	20:26			
								-54	08:08	08:17	08:24	17:60	19:13	20:26			
								-56	08:14	08:20	08:26	17:54	19:10	20:26			
								-58	08:21	08:25	08:27	17:48	19:07	20:26			
								-60	08:29	08:29	08:29	17:41	19:04	20:26			
								Day	Sun			Moon					
									Eqn.of Time	Mer.		Mer.Pass.	Age				
									00 ^h	12 ^h	Pass	Upper	Lower				
								17	04:15	04:09	12:04	12:57	00:36	1(1%)			
								18	04:02	03:56	12:03	13:37	01:17	2(4%)			
								19	03:49	03:42	12:03	14:17	01:57	3(9%)			
SD.=15.8 d=-0.8 S.D.=14.8																	

August 20, 21 ,22 (Sun., Mon., Tue.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	328°04.4	191°28.9	8°08.7	152°12.1	2°36.2	284°58.1	15°10.0	351°09.4	-11°32.9	Alpheratz	357°35.7	29°13.2
1	343°06.9	206°32.7	8°09.0	167°13.1	2°35.5	300°00.5	15°10.1	6°12.0	-11°33.0	Ankaa	353°07.9	-42°10.5
2	358°09.4	221°36.5	8°09.4	182°14.1	2°34.9	315°02.8	15°10.1	21°14.6	-11°33.1	Schedar	349°32.0	56°39.9
3	13°11.8	236°40.2	8°09.7	197°15.1	2°34.2	330°05.1	15°10.1	36°17.3	-11°33.2	Diphda	348°48.1	-17°51.3
4	28°14.3	251°44.0	8°10.1	212°16.1	2°33.6	345°07.5	15°10.1	51°19.9	-11°33.2	Achernar	335°20.7	-57°06.7
5	43°16.8	266°47.8	8°10.5	227°17.1	2°32.9	0°09.8	15°10.2	66°22.6	-11°33.3	Hamal	327°52.4	23°34.4
6	58°19.2	281°51.5	8°10.8	242°18.1	2°32.3	15°12.1	15°10.2	81°25.2	-11°33.4	Polaris	314°30.8	89°21.5
7	73°21.7	296°55.3	8°11.2	257°19.2	2°31.6	30°14.5	15°10.2	96°27.8	-11°33.4	Akamar	315°12.5	-40°12.3
8	88°24.2	311°59.0	8°11.6	272°20.2	2°31.0	45°16.8	15°10.3	111°30.5	-11°33.5	Menkar	314°07.3	4°11.0
9	103°26.6	327°02.8	8°11.9	287°21.2	2°30.3	60°19.2	15°10.3	126°33.1	-11°33.6	Mirfak	308°29.9	49°56.5
10	118°29.1	342°06.5	8°12.3	302°22.2	2°29.7	75°21.5	15°10.3	141°35.8	-11°33.7	Aldebaran	290°41.0	16°33.5
11	133°31.6	357°10.3	8°12.6	317°23.2	2°29.0	90°23.8	15°10.3	156°38.4	-11°33.7	Rigel	281°05.1	-8°10.3
12	148°34.0	12°14.0	8°13.0	332°24.2	2°28.4	105°26.2	15°10.4	171°41.0	-11°33.8	Capella	280°23.8	46°01.2
13	163°36.5	27°17.7	8°13.4	347°25.2	2°27.7	120°28.5	15°10.4	186°43.7	-11°33.9	Bellatrix	278°24.2	6°22.4
14	178°38.9	42°21.5	8°13.7	2°26.2	2°27.1	135°30.9	15°10.4	201°46.3	-11°34.0	Elnath	278°03.5	28°37.6
15	193°41.4	57°25.2	8°14.1	17°27.3	2°26.4	150°33.2	15°10.5	216°49.0	-11°34.0	Alnilam	275°39.0	-1°11.1
16	208°43.9	72°28.9	8°14.5	32°28.3	2°25.8	165°35.5	15°10.5	231°51.6	-11°34.1	Betelgeuse	270°53.5	7°24.8
17	223°46.3	87°32.7	8°14.8	47°29.3	2°25.1	180°37.9	15°10.5	246°54.2	-11°34.2	Canopus	263°53.2	-52°42.2
18	238°48.8	102°36.4	8°15.2	62°30.3	2°24.5	195°40.2	15°10.5	261°56.9	-11°34.2	Sirius	258°27.4	-16°44.5
19	253°51.3	117°40.1	8°15.6	77°31.3	2°23.8	210°42.6	15°10.6	276°59.5	-11°34.3	Adara	255°07.0	-28°60.0
20	268°53.7	132°43.8	8°16.0	92°32.3	2°23.2	225°44.9	15°10.6	292°02.2	-11°34.4	Procyon	244°52.2	5°10.2
21	283°56.2	147°47.5	8°16.3	107°33.3	2°22.5	240°47.2	15°10.6	307°04.8	-11°34.5	Pollux	243°18.9	27°58.2
22	298°58.7	162°51.3	8°16.7	122°34.4	2°21.9	255°49.6	15°10.6	322°07.4	-11°34.5	Avior	234°15.8	-59°34.9
23	314°01.1	177°55.0	8°17.1	137°35.4	2°21.2	270°51.9	15°10.7	337°10.1	-11°34.6	Suhail	222°47.6	-43°31.5
Mer.pass.:2:07:		v3.8 d0.4 m-4.2		v1.0 d-0.7 m1.8		v2.3 d0.0 m-2.4		v2.6 d-0.1 m0.4		Miaplacidus	221°39.5	-69°48.7
										Alphard	217°49.2	-8°45.5
										Regulus	207°35.9	11°51.3
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Dubhe	193°43.0	61°37.6
0	329°03.6	192°58.7	8°17.4	152°36.4	2°20.6	285°54.3	15°10.7	352°12.7	-11°34.7	Denebola	182°26.3	14°26.6
1	344°06.0	208°02.4	8°17.8	167°37.4	2°19.9	300°56.6	15°10.7	7°15.4	-11°34.7	Gienah	175°45.0	-17°40.3
2	359°08.5	223°06.1	8°18.2	182°38.4	2°19.2	315°59.0	15°10.7	22°18.0	-11°34.8	Acrux	173°02.0	-63°13.9
3	14°11.0	238°09.8	8°18.6	197°39.4	2°18.6	331°01.3	15°10.8	37°20.6	-11°34.9	Gacrux	171°53.4	-57°14.8
4	29°13.4	253°13.5	8°18.9	212°40.4	2°17.9	346°03.7	15°10.8	52°23.3	-11°35.0	Alioth	166°14.4	55°50.2
5	44°15.9	268°17.2	8°19.3	227°41.4	2°17.3	1°06.0	15°10.8	67°25.9	-11°35.0	Spica	158°23.7	-11°17.0
6	59°18.4	283°20.8	8°19.7	242°42.5	2°16.6	16°08.3	15°10.9	82°28.6	-11°35.1	Alcaid	152°53.1	49°12.0
7	74°20.8	298°24.5	8°20.0	257°43.5	2°16.0	31°10.7	15°10.9	97°31.2	-11°35.2	Hadar	148°37.9	-60°29.4
8	89°23.3	313°28.2	8°20.4	272°44.5	2°15.3	46°13.0	15°10.9	112°33.8	-11°35.3	Menkent	147°59.2	-36°29.2
9	104°25.8	328°31.9	8°20.8	287°45.5	2°14.7	61°15.4	15°10.9	127°36.5	-11°35.3	Arcturus	145°48.9	19°04.1
10	119°28.2	343°35.6	8°21.2	302°46.5	2°14.0	76°17.7	15°11.0	142°39.1	-11°35.4	Rigel Kent.	139°42.1	-60°56.2
11	134°30.7	358°39.2	8°21.5	317°47.5	2°13.4	91°20.1	15°11.0	157°41.8	-11°35.5	Zubenelg.	136°57.4	-16°08.4
12	149°33.2	13°42.9	8°21.9	332°48.5	2°12.7	106°22.4	15°11.0	172°44.4	-11°35.5	Kochab	137°20.0	74°03.8
13	164°35.6	28°46.6	8°22.3	347°49.5	2°12.1	121°24.8	15°11.0	187°47.1	-11°35.6	Alphecca	126°04.7	26°38.4
14	179°38.1	43°50.2	8°22.7	2°50.5	2°11.4	136°27.1	15°11.1	202°49.7	-11°35.7	Antares	112°17.2	-26°29.1
15	194°40.5	58°53.9	8°23.1	17°51.6	2°10.8	151°29.5	15°11.1	217°52.3	-11°35.8	Atria	107°12.3	-69°04.4
16	209°43.0	73°57.6	8°23.4	32°52.6	2°10.1	166°31.8	15°11.1	232°55.0	-11°35.8	Sabik	102°04.0	-15°45.2
17	224°45.5	89°01.2	8°23.8	47°53.6	2°09.5	181°34.2	15°11.1	247°57.6	-11°35.9	Shaula	96°11.7	-37°07.3
18	239°47.9	104°04.9	8°24.2	62°54.6	2°08.8	196°36.5	15°11.2	263°00.3	-11°36.0	Rasalhague	95°59.5	12°32.7
19	254°50.4	119°08.5	8°24.6	77°55.6	2°08.1	211°38.9	15°11.2	278°02.9	-11°36.0	Etamin	90°42.4	51°29.4
20	269°52.9	134°12.1	8°24.9	92°56.6	2°07.5	226°41.2	15°11.2	293°05.5	-11°36.1	Kaus Aust.	83°33.8	-34°22.4
21	284°55.3	149°15.8	8°25.3	107°57.6	2°06.8	241°43.6	15°11.2	308°08.2	-11°36.2	Vega	80°33.8	38°48.5
22	299°57.8	164°19.4	8°25.7	122°58.6	2°06.2	256°45.9	15°11.3	323°10.8	-11°36.3	Nunki	75°48.9	-26°16.1
23	315°00.3	179°23.1	8°26.1	137°59.7	2°05.5	271°48.3	15°11.3	338°13.5	-11°36.3	Altair	62°00.9	8°55.9
Mer.pass.:2:03:		v3.7 d0.4 m-4.2		v1.0 d-0.7 m1.8		v2.3 d0.0 m-2.4		v2.6 d-0.1 m0.4		Peacock	53°06.9	-56°39.6
										Deneb	49°26.2	45°21.9
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.7
										Fomalhaut	15°15.5	-29°29.7
										Scheat	13°46.0	28°12.6
										Markab	13°30.7	15°20.0
										2023/8/2	SHA	Mer.pass
										Venus	223°24.5	11:11
										Mars	184°07.6	13:50
										Jupiter	316°53.7	04:59
										Saturn	23°04.9	00:35
										2023/8/2	SHA	Mer.pass
										Venus	223°55.1	11:05
										Mars	183°32.8	13:49
										Jupiter	316°50.7	04:56
										Saturn	23°09.1	00:31
										2023/8/2	SHA	Mer.pass
										Venus	224°24.0	10:60
										Mars	182°57.9	13:47
										Jupiter	316°47.9	04:52
										Saturn	23°13.4	00:27
										Horizontal paralax		
										Venus:	0.5	
										Mars:	0.1	
Mer.pass.:1:59:		v3.6 d0.4 m-4.2		v1.0 d-0.7 m1.8		v2.4 d0.0 m-2.4		v2.6 d-0.1 m0.4				

Sun							Moon							
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	179°06.2	12°35.8	141°49.7	16.9	-0°45.8	-14.1	54.5	72	--	--	03:01	21:01	--	--
1	194°06.3	12°35.0	156°25.6	16.9	-0°60.0	-14.1	54.5	70	--	--	01:42	03:25	20:38	22:17
2	209°06.5	12°34.2	171°01.5	16.9	-1°14.1	-14.2	54.5	68	--	--	02:22	03:43	20:21	21:39
3	224°06.6	12°33.4	185°37.4	16.9	-1°28.3	-14.2	54.5	66	--	--	02:49	03:57	20:07	21:14
4	239°06.8	12°32.6	200°13.3	16.9	-1°42.4	-14.2	54.6	64	01:29	03:09	04:09	19:55	20:54	22:30
5	254°06.9	12°31.7	214°49.1	16.8	-1°56.6	-14.2	54.6	62	02:06	03:26	04:19	19:45	20:38	21:56
6	269°07.1	12°30.9	229°25.0	16.8	-2°10.7	-14.2	54.6	60	02:30	03:39	04:28	19:37	20:25	21:33
7	284°07.2	12°30.1	244°00.8	16.8	-2°24.9	-14.2	54.6	58	02:50	03:50	04:35	19:30	20:14	21:14
8	299°07.4	12°29.3	258°36.6	16.8	-2°39.0	-14.2	54.6	56	03:05	04:00	04:42	19:23	20:05	20:59
9	314°07.5	12°28.5	273°12.3	16.8	-2°53.2	-14.1	54.6	54	03:18	04:09	04:48	19:17	19:56	20:46
10	329°07.7	12°27.6	287°48.1	16.7	-3°07.3	-14.1	54.7	52	03:29	04:16	04:53	19:12	19:49	20:35
11	344°07.8	12°26.8	302°23.8	16.7	-3°21.5	-14.1	54.7	50	03:39	04:23	04:58	19:07	19:42	20:26
12	359°08.0	12°26.0	316°59.5	16.7	-3°35.6	-14.1	54.7	45	03:59	04:37	05:08	18:57	19:28	20:07
13	14°08.1	12°25.2	331°35.2	16.7	-3°49.8	-14.1	54.7	40	04:14	04:48	05:17	18:49	19:17	19:52
14	29°08.3	12°24.3	346°10.8	16.6	-4°03.9	-14.1	54.7	35	04:26	04:58	05:24	18:42	19:08	19:40
15	44°08.4	12°23.5	0°46.4	16.6	-4°18.0	-14.1	54.7	30	04:36	05:06	05:31	18:35	19:00	19:30
16	59°08.6	12°22.7	15°22.0	16.6	-4°32.1	-14.1	54.8	20	04:52	05:19	05:42	18:25	18:47	19:14
17	74°08.7	12°21.9	29°57.5	16.5	-4°46.2	-14.1	54.8	10	05:04	05:30	05:51	18:15	18:37	19:02
18	89°08.9	12°21.0	44°33.0	16.5	-5°00.3	-14.1	54.8	0	05:14	05:39	05:60	18:07	18:28	18:52
19	104°09.0	12°20.2	59°08.5	16.5	-5°14.4	-14.1	54.8	-10	05:22	05:47	06:09	17:58	18:19	18:44
20	119°09.2	12°19.4	73°44.0	16.4	-5°28.5	-14.1	54.8	-20	05:29	05:55	06:18	17:49	18:11	18:37
21	134°09.3	12°18.5	88°19.4	16.4	-5°42.6	-14.1	54.8	-30	05:36	06:04	06:28	17:39	18:03	18:31
22	149°09.5	12°17.7	102°54.7	16.3	-5°56.6	-14.0	54.9	-35	05:38	06:08	06:34	17:33	17:59	18:29
23	164°09.6	12°16.9	117°30.1	16.3	-6°10.6	-14.0	54.9	-40	05:41	06:13	06:41	17:26	17:54	18:26
	SD.=15.8	d=-0.8	S.D.=14.9					-45	05:44	06:18	06:48	17:19	17:49	18:23
								-50	05:46	06:24	06:57	17:10	17:43	18:21
								-52	05:47	06:27	07:02	17:06	17:40	18:20
								-54	05:48	06:30	07:06	17:01	17:38	18:19
								-56	05:50	06:33	07:11	16:56	17:35	18:18
								-58	05:51	06:36	07:17	16:50	17:31	18:17
								-60	05:52	06:40	07:24	16:44	17:27	18:16
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	179°09.8	12°16.1	132°05.3	16.3	-6°24.7	-14.0	54.9	72	09:26	11:30	14:01	19:55	19:18	18:17
1	194°09.9	12°15.2	146°40.6	16.2	-6°38.7	-14.0	54.9	70	09:22	11:15	13:25	20:03	19:35	18:56
2	209°10.1	12°14.4	161°15.8	16.2	-6°52.7	-14.0	54.9	68	09:18	11:03	12:60	20:09	19:49	19:23
3	224°10.2	12°13.6	175°50.9	16.1	-7°06.6	-14.0	55.0	66	09:15	10:54	12:40	20:14	20:00	19:43
4	239°10.4	12°12.7	190°26.0	16.1	-7°20.6	-13.9	55.0	64	09:13	10:45	12:25	20:19	20:10	20:00
5	254°10.5	12°11.9	205°01.1	16.0	-7°34.5	-13.9	55.0	62	09:10	10:39	12:12	20:23	20:18	20:14
6	269°10.7	12°11.1	219°36.1	16.0	-7°48.5	-13.9	55.0	60	09:08	10:33	12:01	20:26	20:26	20:26
7	284°10.8	12°10.3	234°11.1	15.9	-8°02.4	-13.9	55.0	58	09:07	10:27	11:52	20:29	20:32	20:36
8	299°11.0	12°09.4	248°46.0	15.9	-8°16.2	-13.9	55.1	56	09:05	10:23	11:44	20:32	20:38	20:45
9	314°11.1	12°08.6	263°20.9	15.8	-8°30.1	-13.8	55.1	54	09:04	10:19	11:37	20:34	20:43	20:53
10	329°11.3	12°07.8	277°55.7	15.8	-8°43.9	-13.8	55.1	52	09:03	10:15	11:30	20:37	20:47	21:00
11	344°11.4	12°06.9	292°30.5	15.7	-8°57.7	-13.8	55.1	50	09:02	10:12	11:24	20:39	20:51	21:07
12	359°11.6	12°06.1	307°05.2	15.7	-9°11.5	-13.8	55.2	45	08:59	10:04	11:12	20:43	21:01	21:21
13	14°11.8	12°05.3	321°39.8	15.6	-9°25.3	-13.7	55.2	40	08:57	09:58	11:02	20:47	21:08	21:32
14	29°11.9	12°04.4	336°14.4	15.6	-9°39.0	-13.7	55.2	35	08:56	09:53	10:53	20:50	21:15	21:42
15	44°12.1	12°03.6	350°48.9	15.5	-9°52.7	-13.7	55.2	30	08:54	09:49	10:45	20:53	21:21	21:51
16	59°12.2	12°02.8	5°23.4	15.4	-10°06.4	-13.7	55.2	20	08:52	09:41	10:32	20:58	21:31	22:06
17	74°12.4	12°01.9	19°57.8	15.4	-10°20.1	-13.6	55.3	10	08:49	09:34	10:21	21:02	21:40	22:20
18	89°12.5	12°01.1	34°32.2	15.3	-10°33.7	-13.6	55.3	0	08:47	09:28	10:11	21:06	21:48	22:32
19	104°12.7	12°00.3	49°06.5	15.3	-10°47.3	-13.6	55.3	-10	08:45	09:22	10:00	21:11	21:56	22:45
20	119°12.8	11°59.4	63°40.7	15.2	-11°00.8	-13.5	55.3	-20	08:43	09:15	09:49	21:15	22:05	22:58
21	134°13.0	11°58.6	78°14.9	15.1	-11°14.4	-13.5	55.4	-30	08:41	09:07	09:36	21:20	22:16	23:14
22	149°13.1	11°57.8	92°49.0	15.1	-11°27.9	-13.5	55.4	-35	08:39	09:03	09:29	21:23	22:22	23:23
23	164°13.3	11°56.9	107°23.0	15.0	-11°41.3	-13.4	55.4	-40	08:38	08:58	09:21	21:27	22:29	23:33
	SD.=15.8	d=-0.8	S.D.=15.0					-45	08:36	08:53	09:12	21:30	22:37	23:46
								-50	08:34	08:46	09:00	21:35	22:46	--
								-52	08:33	08:43	08:55	21:37	22:51	--
								-54	08:32	08:40	08:49	21:40	22:56	--
								-56	08:31	08:36	08:43	21:42	23:01	--
								-58	08:29	08:32	08:36	21:45	23:07	--
								-60	08:28	08:27	08:28	21:48	23:14	--
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun		Mer.	Moon		Age
0	179°13.5	11°56.1	121°57.0	14.9	-11°54.7	-13.4	55.4	20	03:35	03:28	12:03	14:56	02:36	4(15%)
1	194°13.6	11°55.3	136°30.9	14.9	-12°08.1	-13.4	55.5	21	03:21	03:14	12:03	15:37	03:17	5(22%)
2	209°13.8	11°54.4	151°04.7	14.8	-12°21.5	-13.3	55.5	22	03:06	02:59	12:02	16:21	03:59	6(31%)
3	224°13.9	11°53.6	165°38.4	14.7	-12°34.8	-13.3	55.5							
4	239°14.1	11°52.7	180°12.1	14.6	-12°48.0	-13.2	55.5							
5	254°14.2	11°51.9	194°45.7	14.6	-13°01.3	-13.2	55.6							
6	269°14.4	11°51.1	209°19.2	14.5	-13°14.4	-13.2	55.6							
7	284°14.6	11°50.2	223°52.7	14.4	-13°27.6	-13.1	55.6							
8	299°14.7	11°49.4	238°26.0	14.3	-13°40.7	-13.1	55.6							
9	314°14.9	11°48.5	252°59.3	14.2	-13°53.7	-13.0	55.7							
10	329°15.0	11°47.7	267°32.5	14.2	-14°06.7	-13.0	55.7							
11	344°15.2	11°46.9	282°05.7	14.1	-14°19.7	-12.9	55.7							
12	359°15.3	11°46.0	296°38.7	14.0	-14°32.6	-12.9	55.7							
13	14°15.5	11°45.2	311°11.7	13.9	-14°45.5	-12.8	55.8							
14	29°15.7	11°44°												

August 23, 24 ,25 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	331°01.9	195°52.9	8°35.7	153°24.9	1°49.2	287°47.2	15°11.9	354°19.5	-11°38.1				Alpheratz	357°35.7	29°13.3		
1	346°04.3	210°56.4	8°36.1	168°25.9	1°48.5	302°49.5	15°11.9	9°22.1	-11°38.2				Ankaa	353°07.9	-42°10.5		
2	1°06.8	225°60.0	8°36.5	183°26.9	1°47.9	317°51.9	15°11.9	24°24.8	-11°38.3				Schedar	349°31.9	56°39.9		
3	16°09.3	241°03.5	8°36.9	198°28.0	1°47.2	332°54.2	15°11.9	39°27.4	-11°38.4				Diphda	348°48.1	-17°51.3		
4	31°11.7	256°07.0	8°37.2	213°29.0	1°46.6	347°56.6	15°11.9	54°30.1	-11°38.4				Achernar	335°20.7	-57°06.7		
5	46°14.2	271°10.6	8°37.6	228°30.0	1°45.9	2°59.0	15°12.0	69°32.7	-11°38.5				Hamal	327°52.4	23°34.4		
6	61°16.6	286°14.1	8°38.0	243°31.0	1°45.3	18°01.3	15°12.0	84°35.4	-11°38.6				Polaris	314°29.1	89°21.5		
7	76°19.1	301°17.6	8°38.4	258°32.0	1°44.6	33°03.7	15°12.0	99°38.0	-11°38.6				Akamar	315°12.5	-40°12.3		
8	91°21.6	316°21.1	8°38.8	273°33.0	1°44.0	48°06.1	15°12.0	114°40.6	-11°38.7				Menkar	314°07.3	4°11.0		
9	106°24.0	331°24.7	8°39.2	288°34.0	1°43.3	63°08.4	15°12.1	129°43.3	-11°38.8				Mirfak	308°29.8	49°56.5		
10	121°26.5	346°28.2	8°39.6	303°35.0	1°42.6	78°10.8	15°12.1	144°45.9	-11°38.9				Aldebaran	290°41.0	16°33.5		
11	136°29.0	1°31.7	8°40.0	318°36.0	1°42.0	93°13.1	15°12.1	159°48.6	-11°38.9				Rigel	281°05.1	-8°10.3		
12	151°31.4	16°35.2	8°40.4	333°37.0	1°41.3	108°15.5	15°12.1	174°51.2	-11°39.0				Capella	280°23.8	46°01.2		
13	166°33.9	31°38.7	8°40.8	348°38.1	1°40.7	123°17.9	15°12.1	189°53.8	-11°39.1				Bellatrix	278°24.2	6°22.4		
14	181°36.4	46°42.2	8°41.1	3°39.1	1°40.0	138°20.2	15°12.2	204°56.5	-11°39.1				Elnath	278°03.5	28°37.6		
15	196°38.8	61°45.7	8°41.5	18°40.1	1°39.4	153°22.6	15°12.2	219°59.1	-11°39.2				Alnilam	275°39.0	-1°11.1		
16	211°41.3	76°49.2	8°41.9	33°41.1	1°38.7	168°25.0	15°12.2	235°01.8	-11°39.3				Betelgeuse	270°53.5	7°24.8		
17	226°43.7	91°52.7	8°42.3	48°42.1	1°38.1	183°27.3	15°12.2	250°04.4	-11°39.4				Canopus	263°53.2	-52°42.2		
18	241°46.2	106°56.2	8°42.7	63°43.1	1°37.4	198°29.7	15°12.2	265°07.1	-11°39.4				Sirius	258°27.4	-16°44.5		
19	256°48.7	121°59.7	8°43.1	78°44.1	1°36.7	213°32.1	15°12.3	280°09.7	-11°39.5				Adara	255°07.0	-28°60.0		
20	271°51.1	137°03.2	8°43.5	93°45.1	1°36.1	228°34.4	15°12.3	295°12.3	-11°39.6				Procyon	244°52.2	5°10.2		
21	286°53.6	152°06.6	8°43.9	108°46.1	1°35.4	243°36.8	15°12.3	310°15.0	-11°39.7				Pollux	243°18.9	27°58.2		
22	301°56.1	167°10.1	8°44.3	123°47.1	1°34.8	258°39.2	15°12.3	325°17.6	-11°39.7				Avior	234°15.8	-59°34.9		
23	316°58.5	182°13.6	8°44.7	138°48.1	1°34.1	273°41.5	15°12.3	340°20.3	-11°39.8				Suhail	222°47.6	-43°31.5		
Mer.pass.:1:55:			v3.5 d0.4 m-4.3			v1.0 d-0.7 m1.8			v2.4 d0.0 m-2.4			v2.6 d-0.1 m0.4					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	332°01.0	197°17.0	8°45.1	153°49.2	1°33.5	288°43.9	15°12.4	355°22.9	-11°39.9				Alphard	217°49.2	-8°45.5		
1	347°03.5	212°20.5	8°45.4	168°50.2	1°32.8	303°46.3	15°12.4	10°25.6	-11°39.9				Regulus	207°35.9	11°51.3		
2	2°05.9	227°24.0	8°45.8	183°51.2	1°32.2	318°48.6	15°12.4	25°28.2	-11°40.0				Dubhe	193°43.0	61°37.6		
3	17°08.4	242°27.4	8°46.2	198°52.2	1°31.5	333°51.0	15°12.4	40°30.8	-11°40.1				Denebola	182°26.3	14°26.6		
4	32°10.9	257°30.9	8°46.6	213°53.2	1°30.8	348°53.4	15°12.4	55°33.5	-11°40.2				Gienah	175°45.0	-17°40.3		
5	47°13.3	272°34.3	8°47.0	228°54.2	1°30.2	3°55.7	15°12.5	70°36.1	-11°40.2				Acrux	173°02.0	-63°13.9		
6	62°15.8	287°37.8	8°47.4	243°55.2	1°29.5	18°58.1	15°12.5	85°38.8	-11°40.3				Gacrux	171°53.4	-57°14.8		
7	77°18.2	302°41.2	8°47.8	258°56.2	1°28.9	34°00.5	15°12.5	100°41.4	-11°40.4				Alioth	166°14.4	55°50.2		
8	92°20.7	317°44.6	8°48.2	273°57.2	1°28.2	49°02.8	15°12.5	115°44.0	-11°40.4				Spica	158°23.7	-11°17.0		
9	107°23.2	332°48.1	8°48.6	288°58.2	1°27.6	64°05.2	15°12.5	130°46.7	-11°40.5				Alcaid	152°53.1	49°12.0		
10	122°25.6	347°51.5	8°49.0	303°59.2	1°26.9	79°07.6	15°12.5	145°49.3	-11°40.6				Hadar	148°38.0	-60°29.4		
11	137°28.1	2°54.9	8°49.4	319°00.3	1°26.3	94°10.0	15°12.6	160°52.0	-11°40.7				Menkent	147°59.2	-36°29.2		
12	152°30.6	17°58.4	8°49.8	334°01.3	1°25.6	109°12.3	15°12.6	175°54.6	-11°40.7				Arcturus	145°48.9	19°04.1		
13	167°33.0	33°01.8	8°50.2	349°02.3	1°24.9	124°14.7	15°12.6	190°57.3	-11°40.8				Rigel Kent.	139°42.1	-60°56.1		
14	182°35.5	48°05.2	8°50.6	4°03.3	1°24.3	139°17.1	15°12.6	205°59.9	-11°40.9				Zubenelg.	136°57.4	-16°08.4		
15	197°38.0	63°08.6	8°51.0	19°04.3	1°23.6	154°19.4	15°12.6	221°02.5	-11°41.0				Kochab	137°20.1	74°03.8		
16	212°40.4	78°12.0	8°51.4	34°05.3	1°23.0	169°21.8	15°12.7	236°05.2	-11°41.0				Alphecca	126°04.8	26°38.4		
17	227°42.9	93°15.4	8°51.7	49°06.3	1°22.3	184°24.2	15°12.7	251°07.8	-11°41.1				Antares	112°17.2	-26°29.1		
18	242°45.4	108°18.8	8°52.1	64°07.3	1°21.7	199°26.6	15°12.7	266°10.5	-11°41.2				Atria	107°12.3	-69°04.4		
19	257°47.8	123°22.2	8°52.5	79°08.3	1°21.0	214°28.9	15°12.7	281°13.1	-11°41.2				Sabik	102°04.0	-15°45.2		
20	272°50.3	138°25.6	8°52.9	94°09.3	1°20.4	229°31.3	15°12.7	296°15.8	-11°41.3				Shaula	96°11.8	-37°07.3		
21	287°52.7	153°29.0	8°53.3	109°10.3	1°19.7	244°33.7	15°12.7	311°18.4	-11°41.4				Rasalhague	95°59.5	12°32.7		
22	302°55.2	168°32.4	8°53.7	124°11.3	1°19.0	259°36.1	15°12.8	326°21.0	-11°41.5				Etamin	90°42.4	51°29.4		
23	317°57.7	183°35.8	8°54.1	139°12.3	1°18.4	274°38.4	15°12.8	341°23.7	-11°41.5				Kaus Aust.	83°33.8	-34°22.4		
Mer.pass.:1:51:			v3.5 d0.4 m-4.3			v1.0 d-0.7 m1.8			v2.4 d0.0 m-2.4			v2.6 d-0.1 m0.4					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	333°00.1	198°39.1	8°54.5	154°13.4	1°17.7	289°40.8	15°12.8	356°26.3	-11°41.6				2023/8/2	SHA	Mer.pass		
1	348°02.6	213°42.5	8°54.9	169°14.4	1°17.1	304°43.2	15°12.8	11°29.0	-11°41.7				Venus	224°51.0	10:54		
2	3°05.1	228°45.9	8°55.3	184°15.4	1°16.4	319°45.6	15°12.8	26°31.6	-11°41.7				Mars	182°23.1	13:45		
3	18°07.5	243°49.2	8°55.7	199°16.4	1°15.8	334°47.9	15°12.9	41°34.3	-11°41.8				Jupiter	316°45.3	04:48		
4	33°10.0	258°52.6	8°56.1	214°17.4	1°15.1	349°50.3	15°12.9	56°36.9	-11°41.9				Saturn	23°17.6	00:23		
5	48°12.5	273°56.0	8°56.5	229°18.4	1°14.5	4°52.7	15°12.9	71°39.5	-11°42.0				2023/8/2	SHA	Mer.pass		
6	63°14.9	288°59.3	8°56.9	244°19.4	1°13.8	19°55.1	15°12.9	86°42.2	-11°42.0				Venus	225°16.0	10:48		
7	78°17.4	304°02.7	8°57.3	259°20.4	1°13.1	34°57.4	15°12.9	101°44.8	-11°42.1				Mars	181°48.2	13:44		
8	93°19.9	319°06.0	8°57.7	274°21.4	1°12.5	49°59.8	15°12.9	116°47.5	-11°42.2				Jupiter	316°42.9	04:44		
9	108°22.3	334°09.3	8°58.1	289°22.4	1°11.8	65°02.2	15°13.0	131°50.1	-11°42.2				Saturn	23°21.9	00:18		
10	123°24.8	349°12.7	8°58.5	304°23.4	1°11.2	80°04.6	15°13.0	146°52.8									

Sun							Moon							
Wed	GHA	Dec	GHA	ν	Dec	d	HP							
0	179°17.3	11°35.9	111°08.3	12.9	-17°03.3	-12.2	56.1	Lat.	Twilight			Sunset	Twilight	
1	194°17.4	11°35.1	125°40.2	12.8	-17°15.5	-12.1	56.1	72	Naut.	Civil	Sunrise	20:43	Civil	Naut.
2	209°17.6	11°34.2	140°12.0	12.7	-17°27.6	-12.1	56.1	70	--	01:10	03:18	20:23	21:52	--
3	224°17.8	11°33.4	154°43.6	12.6	-17°39.7	-12.0	56.2	68	--	02:07	03:39	20:07	21:21	--
4	239°17.9	11°32.5	169°15.2	12.5	-17°51.6	-11.9	56.2	66	01:01	03:02	04:08	19:55	20:59	22:53
5	254°18.1	11°31.7	183°46.7	12.4	-18°03.6	-11.9	56.2	64	01:51	03:21	04:18	19:45	20:42	22:09
6	269°18.2	11°30.9	198°18.0	12.3	-18°15.4	-11.8	56.3	62	02:20	03:35	04:27	19:36	20:27	21:41
7	284°18.4	11°30.0	212°49.3	12.2	-18°27.2	-11.7	56.3	60	02:42	03:47	04:35	19:28	20:15	21:20
8	299°18.6	11°29.2	227°20.5	12.1	-18°38.8	-11.7	56.3	58	02:59	03:58	04:42	19:21	20:05	21:03
9	314°18.7	11°28.3	241°51.5	12.0	-18°50.5	-11.6	56.3	56	03:13	04:07	04:48	19:16	19:57	20:49
10	329°18.9	11°27.5	256°22.5	11.9	-19°02.0	-11.5	56.4	54	03:25	04:15	04:53	19:10	19:49	20:38
11	344°19.1	11°26.6	270°53.3	11.8	-19°13.5	-11.4	56.4	52	03:36	04:22	04:58	19:06	19:42	20:28
12	359°19.2	11°25.8	285°24.0	11.7	-19°24.9	-11.3	56.4	50	03:45	04:28	05:03	19:01	19:36	20:19
13	14°19.4	11°24.9	299°54.7	11.6	-19°36.2	-11.3	56.5	45	04:03	04:41	05:12	18:52	19:23	20:01
14	29°19.5	11°24.1	314°25.2	11.5	-19°47.4	-11.2	56.5	40	04:17	04:51	05:20	18:44	19:13	19:47
15	44°19.7	11°23.2	328°55.6	11.3	-19°58.5	-11.1	56.5	35	04:29	05:00	05:27	18:38	19:04	19:35
16	59°19.9	11°22.4	343°25.9	11.2	-20°09.6	-11.0	56.6	30	04:38	05:08	05:32	18:32	18:57	19:26
17	74°20.0	11°21.5	357°56.0	11.1	-20°20.6	-10.9	56.6	20	04:53	05:20	05:42	18:22	18:45	19:11
18	89°20.2	11°20.7	12°26.1	11.0	-20°31.5	-10.8	56.6	10	05:05	05:30	05:51	18:14	18:35	19:00
19	104°20.4	11°19.8	26°56.1	10.9	-20°42.3	-10.8	56.7	0	05:14	05:38	05:59	18:06	18:27	18:51
20	119°20.5	11°19.0	41°25.9	10.8	-20°53.0	-10.7	56.7	-10	05:21	05:46	06:07	17:58	18:19	18:44
21	134°20.7	11°18.1	55°55.6	10.7	-21°03.6	-10.6	56.7	-20	05:27	05:53	06:15	17:50	18:12	18:38
22	149°20.9	11°17.3	70°25.2	10.6	-21°14.1	-10.5	56.8	-30	05:33	06:00	06:25	17:41	18:05	18:33
23	164°21.0	11°16.4	84°54.7	10.4	-21°24.6	-10.4	56.8	-35	05:35	06:04	06:30	17:35	18:01	18:31
	SD.=15.8	d=-0.8	S.D.=15.3					-40	05:37	06:09	06:36	17:29	17:57	18:28
								-45	05:39	06:13	06:43	17:22	17:52	18:27
								-50	05:41	06:18	06:52	17:14	17:47	18:25
								-52	05:42	06:21	06:55	17:10	17:45	18:24
								-54	05:42	06:23	06:60	17:06	17:43	18:24
								-56	05:43	06:26	07:04	17:02	17:40	18:23
								-58	05:43	06:29	07:09	16:56	17:37	18:23
								-60	05:44	06:32	07:15	16:51	17:34	18:22
Thu	GHA	Dec	GHA	ν	Dec	d	HP							
0	179°21.2	11°15.6	99°24.1	10.3	-21°34.9	-10.3	56.8							
1	194°21.4	11°14.7	113°53.4	10.2	-21°45.1	-10.2	56.9							
2	209°21.5	11°13.9	128°22.5	10.1	-21°55.3	-10.1	56.9							
3	224°21.7	11°13.0	142°51.5	10.0	-22°05.3	-10.0	56.9							
4	239°21.9	11°12.2	157°20.4	9.8	-22°15.2	-9.9	57.0							
5	254°22.0	11°11.3	171°49.2	9.7	-22°25.1	-9.8	57.0							
6	269°22.2	11°10.5	186°17.9	9.6	-22°34.8	-9.7	57.0							
7	284°22.4	11°09.6	200°46.4	9.5	-22°44.4	-9.6	57.1							
8	299°22.5	11°08.8	215°14.8	9.4	-22°54.0	-9.5	57.1							
9	314°22.7	11°07.9	229°43.1	9.2	-23°03.4	-9.4	57.1							
10	329°22.9	11°07.0	244°11.3	9.1	-23°12.7	-9.2	57.2							
11	344°23.0	11°06.2	258°39.4	9.0	-23°21.8	-9.1	57.2							
12	359°23.2	11°05.3	273°07.3	8.9	-23°30.9	-9.0	57.3							
13	14°23.4	11°04.5	287°35.1	8.8	-23°39.9	-8.9	57.3							
14	29°23.5	11°03.6	302°02.8	8.6	-23°48.7	-8.8	57.3							
15	44°23.7	11°02.8	316°30.4	8.5	-23°57.4	-8.7	57.4							
16	59°23.9	11°01.9	330°57.8	8.4	-24°06.0	-8.5	57.4							
17	74°24.0	11°01.1	345°25.1	8.3	-24°14.5	-8.4	57.4							
18	89°24.2	11°00.2	359°52.3	8.1	-24°22.8	-8.3	57.5							
19	104°24.4	10°59.3	14°19.4	8.0	-24°31.0	-8.2	57.5							
20	119°24.5	10°58.5	28°46.4	7.9	-24°39.1	-8.0	57.5							
21	134°24.7	10°57.6	43°13.2	7.8	-24°47.1	-7.9	57.6							
22	149°24.9	10°56.8	57°39.9	7.7	-24°54.9	-7.8	57.6							
23	164°25.1	10°55.9	72°06.5	7.5	-25°02.6	-7.6	57.6							
	SD.=15.8	d=-0.9	S.D.=15.5											
Fri	GHA	Dec	GHA	ν	Dec	d	HP							
0	179°25.2	10°55.1	86°33.0	7.4	-25°10.2	-7.5	57.7							
1	194°25.4	10°54.2	100°59.3	7.3	-25°17.6	-7.4	57.7							
2	209°25.6	10°53.3	115°25.6	7.2	-25°24.9	-7.2	57.8							
3	224°25.7	10°52.5	129°51.7	7.0	-25°32.1	-7.1	57.8							
4	239°25.9	10°51.6	144°17.7	6.9	-25°39.1	-6.9	57.8							
5	254°26.1	10°50.8	158°43.5	6.8	-25°46.0	-6.8	57.9							
6	269°26.3	10°49.9	173°09.3	6.7	-25°52.7	-6.7	57.9							
7	284°26.4	10°49.0	187°34.9	6.6	-25°59.3	-6.5	57.9							
8	299°26.6	10°48.2	202°00.4	6.5	-26°05.7	-6.4	58.0							
9	314°26.8	10°47.3	216°25.8	6.3	-26°12.0	-6.2	58.0							
10	329°26.9	10°46.5	230°51.1	6.2	-26°18.1	-6.1	58.1							
11	344°27.1	10°45.6	245°16.3	6.1	-26°24.1	-5.9	58.1							
12	359°27.3	10°44.7	259°41.4	6.0	-26°29.9	-5.8	58.1							
13	14°27.5	10°43.9	274°06.3	5.9	-26°35.6	-5.6	58.2							
14	29°27.6	10°43.0	288°31.1	5.8	-26°41.1	-5.4	58.2							
15	44°27.8	10°42.1	302°55.9	5.7	-26°46.5	-5.3	58.3							
16	59°28.0	10°41.3	317°20.5	5.6	-26°51.7	-5.1	58.3							
17	74°28.2	10°40.4	331°45.0	5.5	-26°56.7	-5.0	58.3							
18	89°28.3	10°39.6	346°09.4	5.3	-27°01.6	-4.8	58.4							
19	104°28.5	10°38.7	0°33.7	5.2	-27°06.3	-4.6	58.4							
20	119°28.7	10°37.8	14°57.9	5.1	-27°10.8	-4.5	58.4							
21	134°28.9	10°37.0	29°22.0	5.0	-27°15.2	-4.3	58.5							
22	149°29.0	10°36.1	43°45.9	4.9	-27°19.4	-4.1	58.5							
23	164°29.2	10°35.2	58°09.8	4.8	-27°23.4	-3.9	58.6							
	SD.=15.8	d=-0.9	S.D.=15.7											
Day	Sun			Moon			Age							
	Eqn. of Time	Mer.	Upper	Lower										
23	00 ^h	12 ^h	Pass											
24	02:51	02:43	12:02	17:08	04:44	7(41%)								
25	02:35	02:27	12:02	18:00	05:33	8(51%)								
	02:19	02:11	12:02	18:57	06:28	9(62%)								

August 26, 27 ,28 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	333°59.3	199°59.0	9°04.0	154°37.5	1°02.0	290°37.9	15°13.2	357°29.8	-11°43.3				Alpheratz	357°35.6	29°13.3		
1	349°01.7	215°02.3	9°04.4	169°38.5	1°01.3	305°40.3	15°13.2	12°32.4	-11°43.4				Ankaa	353°07.9	-42°10.5		
2	4°04.2	230°05.6	9°04.8	184°39.5	1°00.7	320°42.7	15°13.2	27°35.0	-11°43.5				Schedar	349°31.9	56°39.9		
3	19°06.7	245°08.8	9°05.2	199°40.5	1°00.0	335°45.1	15°13.2	42°37.7	-11°43.5				Diphda	348°48.1	-17°51.3		
4	34°09.1	260°12.1	9°05.6	214°41.5	0°59.3	350°47.5	15°13.2	57°40.3	-11°43.6				Achernar	335°20.7	-57°06.7		
5	49°11.6	275°15.4	9°06.0	229°42.6	0°58.7	5°49.8	15°13.3	72°43.0	-11°43.7				Hamal	327°52.3	23°34.5		
6	64°14.1	290°18.6	9°06.4	244°43.6	0°58.0	20°52.2	15°13.3	87°45.6	-11°43.8				Polaris	314°27.3	89°21.5		
7	79°16.5	305°21.9	9°06.8	259°44.6	0°57.4	35°54.6	15°13.3	102°48.3	-11°43.8				Akamar	315°12.5	-40°12.3		
8	94°19.0	320°25.1	9°07.1	274°45.6	0°56.7	50°57.0	15°13.3	117°50.9	-11°43.9				Menkar	314°07.2	4°11.1		
9	109°21.5	335°28.4	9°07.5	289°46.6	0°56.1	65°59.4	15°13.3	132°53.5	-11°44.0				Mirfak	308°29.8	49°56.5		
10	124°23.9	350°31.6	9°07.9	304°47.6	0°55.4	81°01.8	15°13.3	147°56.2	-11°44.0				Aldebaran	290°41.0	16°33.5		
11	139°26.4	5°34.9	9°08.3	319°48.6	0°54.7	96°04.2	15°13.3	162°58.8	-11°44.1				Rigel	281°05.0	-8°10.3		
12	154°28.8	20°38.1	9°08.7	334°49.6	0°54.1	111°06.5	15°13.4	178°01.5	-11°44.2				Capella	280°23.7	46°01.2		
13	169°31.3	35°41.3	9°09.1	349°50.6	0°53.4	126°08.9	15°13.4	193°04.1	-11°44.3				Bellatrix	278°24.2	6°22.4		
14	184°33.8	50°44.6	9°09.5	4°51.6	0°52.8	141°11.3	15°13.4	208°06.8	-11°44.3				Elnath	278°03.4	28°37.6		
15	199°36.2	65°47.8	9°09.9	19°52.6	0°52.1	156°13.7	15°13.4	223°09.4	-11°44.4				Alnilam	275°39.0	-1°11.1		
16	214°38.7	80°51.0	9°10.3	34°53.6	0°51.5	171°16.1	15°13.4	238°12.0	-11°44.5				Betelgeuse	270°53.5	7°24.8		
17	229°41.2	95°54.2	9°10.7	49°54.6	0°50.8	186°18.5	15°13.4	253°14.7	-11°44.5				Canopus	263°53.2	-52°42.1		
18	244°43.6	110°57.5	9°11.1	64°55.6	0°50.1	201°20.9	15°13.4	268°17.3	-11°44.6				Sirius	258°27.4	-16°44.5		
19	259°46.1	126°00.7	9°11.5	79°56.6	0°49.5	216°23.3	15°13.5	283°20.0	-11°44.7				Adara	255°07.0	-28°60.0		
20	274°48.6	141°03.9	9°11.9	94°57.6	0°48.8	231°25.7	15°13.5	298°22.6	-11°44.8				Procyon	244°52.2	5°10.2		
21	289°51.0	156°07.1	9°12.3	109°58.6	0°48.2	246°28.0	15°13.5	313°25.3	-11°44.8				Pollux	243°18.9	27°58.2		
22	304°53.5	171°10.3	9°12.7	124°59.6	0°47.5	261°30.4	15°13.5	328°27.9	-11°44.9				Avior	234°15.8	-59°34.8		
23	319°56.0	186°13.5	9°13.1	140°00.7	0°46.9	276°32.8	15°13.5	343°30.5	-11°45.0				Suhail	222°47.6	-43°31.5		
Mer.pass.:1:43:			v3.3 d0.4 m-4.3			v1.0 d-0.7 m1.8			v2.4 d0.0 m-2.4			v2.6 d-0.1 m0.4					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	334°58.4	201°16.6	9°13.4	155°01.7	0°46.2	291°35.2	15°13.5	358°33.2	-11°45.0				Dubhe	193°43.0	61°37.6		
1	350°00.9	216°19.8	9°13.8	170°02.7	0°45.5	306°37.6	15°13.5	13°35.8	-11°45.1				Denebola	182°26.3	14°26.6		
2	5°03.3	231°23.0	9°14.2	185°03.7	0°44.9	321°40.0	15°13.5	28°38.5	-11°45.2				Gienah	175°45.0	-17°40.3		
3	20°05.8	246°26.2	9°14.6	200°04.7	0°44.2	336°42.4	15°13.6	43°41.1	-11°45.3				Acrux	173°02.0	-63°13.9		
4	35°08.3	261°29.3	9°15.0	215°05.7	0°43.6	351°44.8	15°13.6	58°43.8	-11°45.3				Gacrux	171°53.4	-57°14.8		
5	50°10.7	276°32.5	9°15.4	230°06.7	0°42.9	6°47.2	15°13.6	73°46.4	-11°45.4				Alioth	166°14.4	55°50.2		
6	65°13.2	291°35.7	9°15.8	245°07.7	0°42.3	21°49.6	15°13.6	88°49.0	-11°45.5				Spica	158°23.7	-11°17.0		
7	80°15.7	306°38.8	9°16.2	260°08.7	0°41.6	36°52.0	15°13.6	103°51.7	-11°45.5				Alcaid	152°53.2	49°12.0		
8	95°18.1	321°42.0	9°16.6	275°09.7	0°40.9	51°54.4	15°13.6	118°54.3	-11°45.6				Hadar	148°38.0	-60°29.4		
9	110°20.6	336°45.1	9°17.0	290°10.7	0°40.3	66°56.8	15°13.6	133°57.0	-11°45.7				Menkent	147°59.2	-36°29.2		
10	125°23.1	351°48.3	9°17.4	305°11.7	0°39.6	81°59.2	15°13.6	148°59.6	-11°45.8				Arcturus	145°49.0	19°04.1		
11	140°25.5	6°51.4	9°17.8	320°12.7	0°39.0	97°01.5	15°13.7	164°02.3	-11°45.8				Rigel Kent.	139°42.1	-60°56.1		
12	155°28.0	21°54.6	9°18.2	335°13.7	0°38.3	112°03.9	15°13.7	179°04.9	-11°45.9				Zubenelg.	136°57.4	-16°08.3		
13	170°30.5	36°57.7	9°18.5	350°14.7	0°37.6	127°06.3	15°13.7	194°07.5	-11°46.0				Kochab	137°20.1	74°03.8		
14	185°32.9	52°00.8	9°18.9	5°15.7	0°37.0	142°08.7	15°13.7	209°10.2	-11°46.1				Alphecca	126°04.8	26°38.4		
15	200°35.4	67°04.0	9°19.3	20°16.7	0°36.3	157°11.1	15°13.7	224°12.8	-11°46.1				Antares	112°17.2	-26°29.1		
16	215°37.8	82°07.1	9°19.7	35°17.7	0°35.7	172°13.5	15°13.7	239°15.5	-11°46.2				Atria	107°12.3	-69°04.4		
17	230°40.3	97°10.2	9°20.1	50°18.7	0°35.0	187°15.9	15°13.7	254°18.1	-11°46.3				Sabik	102°04.0	-15°45.2		
18	245°42.8	112°13.3	9°20.5	65°19.7	0°34.4	202°18.3	15°13.7	269°20.8	-11°46.3				Shaula	96°11.8	-37°07.3		
19	260°45.2	127°16.4	9°20.9	80°20.7	0°33.7	217°20.7	15°13.7	284°23.4	-11°46.4				Rasalhague	95°59.5	12°32.8		
20	275°47.7	142°19.5	9°21.3	95°21.7	0°33.0	232°23.1	15°13.8	299°26.0	-11°46.5				Etamin	90°42.5	51°29.4		
21	290°50.2	157°22.6	9°21.7	110°22.7	0°32.4	247°25.5	15°13.8	314°28.7	-11°46.6				Kaus Aust.	83°33.8	-34°22.4		
22	305°52.6	172°25.7	9°22.1	125°23.8	0°31.7	262°27.9	15°13.8	329°31.3	-11°46.6				Vega	80°33.8	38°48.5		
23	320°55.1	187°28.8	9°22.4	140°24.8	0°31.1	277°30.3	15°13.8	344°34.0	-11°46.7				Nunki	75°48.9	-26°16.1		
Mer.pass.:1:39:			v3.2 d0.4 m-4.3			v1.0 d-0.7 m1.8			v2.4 d0.0 m-2.4			v2.6 d-0.1 m0.4					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	335°57.6	202°31.9	9°22.8	155°25.8	0°30.4	292°32.7	15°13.8	359°36.6	-11°46.8				2023/8/2	SHA	Mer.pass		
1	351°00.0	217°35.0	9°23.2	170°26.8	0°29.7	307°35.1	15°13.8	14°39.3	-11°46.8				Venus	225°59.7	10:38		
2	6°02.5	232°38.1	9°23.6	185°27.8	0°29.1	322°37.5	15°13.8	29°41.9	-11°46.9				Mars	180°38.2	13:41		
3	21°05.0	247°41.2	9°24.0	200°28.8	0°28.4	337°39.9	15°13.8	44°44.5	-11°47.0				Jupiter	316°38.6	04:37		
4	36°07.4	262°44.2	9°24.4	215°29.8	0°27.8	352°42.3	15°13.8	59°47.2	-11°47.1				Saturn	23°30.5	00:10		
5	51°09.9	277°47.3	9°24.8	230°30.8	0°27.1	7°44.7	15°13.8	74°49.8	-11°47.1				2023/8/2	SHA	Mer.pass		
6	66°12.3	292°50.4	9°25.2	245°31.8	0°26.5	22°47.1	15°13.9	89°52.5	-11°47.2				Venus	226°18.2	10:33		
7	81°14.8	307°53.4	9°25.6	260°32.8	0°25.8	37°49.5	15°13.9	104°55.1	-11°47.3				Mars	180°03.2	13:39		
8	96°17.3	322°56.5	9°25.9	275°33.8	0°25.1	52°51.9	15°13.9	119°57.8	-11°47.3				Jupiter	316°36.8	04:37		
9	111°19.7	337°59.5	9°26.3	290°34.8	0°24.5	67°54.3	15°13.9	135°00.4	-11°47.4				Saturn	23°30.5	00:10		
10	126°22.2	353°02.6	9°26.7	305°35.8	0°23.8	82°56.7	15°13.9	150°03.0	-1								

Sun				Moon												
Sat	GHA	Dec		GHA	ν	Dec	d	HP		Twilight			Twilight			
0	179°29.4	10°34.4		72°33.6	4.7	-27°27.3	-3.8	58.6	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	194°29.6	10°33.5		86°57.3	4.6	-27°31.0	-3.6	58.6	72	—:—	01:47	03:34	20:25	22:08	—:—	
2	209°29.7	10°32.6		101°20.9	4.5	-27°34.5	-3.4	58.7	70	—:—	02:28	03:52	20:08	21:30	—:—	
3	224°29.9	10°31.8		115°44.4	4.5	-27°37.8	-3.2	58.7	68	—:—	02:55	04:06	19:54	21:04	—:—	
4	239°30.1	10°30.9		130°07.8	4.4	-27°41.0	-3.1	58.7	66	01:32	03:15	04:18	19:43	20:45	22:24	
5	254°30.3	10°30.0		144°31.1	4.3	-27°44.0	-2.9	58.8	64	02:09	03:31	04:27	19:34	20:29	21:50	
6	269°30.4	10°29.2		158°54.4	4.2	-27°46.8	-2.7	58.8	62	02:34	03:45	04:35	19:26	20:16	21:26	
7	284°30.6	10°28.3		173°17.5	4.1	-27°49.4	-2.5	58.9	60	02:53	03:56	04:42	19:19	20:06	21:07	
8	299°30.8	10°27.4		187°40.6	4.0	-27°51.8	-2.3	58.9	58	03:08	04:05	04:48	19:13	19:56	20:52	
9	314°31.0	10°26.6		202°03.6	3.9	-27°54.1	-2.2	58.9	56	03:21	04:13	04:54	19:08	19:48	20:40	
10	329°31.1	10°25.7		216°26.5	3.9	-27°56.1	-2.0	59.0	54	03:32	04:21	04:59	19:03	19:41	20:29	
11	344°31.3	10°24.8		230°49.3	3.8	-27°58.0	-1.8	59.0	52	03:42	04:27	05:03	18:59	19:35	20:20	
12	359°31.5	10°24.0		245°12.1	3.7	-27°59.7	-1.6	59.0	50	03:50	04:33	05:07	18:55	19:29	20:11	
13	14°31.7	10°23.1		259°34.7	3.6	-28°01.2	-1.4	59.1	45	04:07	04:45	05:16	18:47	19:17	19:55	
14	29°31.8	10°22.2		273°57.4	3.6	-28°02.5	-1.2	59.1	40	04:21	04:55	05:23	18:40	19:08	19:41	
15	44°32.0	10°21.3		288°19.9	3.5	-28°03.7	-1.0	59.2	35	04:32	05:03	05:29	18:34	18:60	19:31	
16	59°32.2	10°20.5		302°42.4	3.4	-28°04.6	-0.8	59.2	30	04:40	05:09	05:34	18:29	18:53	19:22	
17	74°32.4	10°19.6		317°04.8	3.4	-28°05.3	-0.6	59.2	20	04:54	05:21	05:43	18:20	18:42	19:09	
18	89°32.6	10°18.7		331°27.1	3.3	-28°05.9	-0.4	59.3	10	05:05	05:30	05:51	18:12	18:33	18:58	
19	104°32.7	10°17.9		345°49.4	3.3	-28°06.2	-0.3	59.3	0	05:13	05:37	05:58	18:05	18:26	18:50	
20	119°32.9	10°17.0		0°11.7	3.2	-28°06.4	-0.1	59.3	-10	05:20	05:44	06:05	17:58	18:19	18:44	
21	134°33.1	10°16.1		14°33.9	3.2	-28°06.4	0.1	59.4	-20	05:25	05:51	06:13	17:50	18:13	18:39	
22	149°33.3	10°15.3		28°56.0	3.1	-28°06.1	0.3	59.4	-30	05:29	05:57	06:21	17:42	18:06	18:34	
23	164°33.4	10°14.4		43°18.1	3.1	-28°05.7	0.5	59.5	-35	05:31	06:01	06:26	17:37	18:03	18:33	
	SD.=15.8	d=-0.9		S.D.=16.0					-40	05:33	06:04	06:32	17:32	17:60	18:31	
									-45	05:34	06:08	06:38	17:26	17:56	18:30	
									-50	05:35	06:13	06:45	17:19	17:51	18:29	
									-52	05:36	06:15	06:49	17:15	17:49	18:29	
									-54	05:36	06:17	06:53	17:11	17:47	18:29	
									-56	05:36	06:19	06:57	17:07	17:45	18:28	
									-58	05:36	06:21	07:01	17:03	17:43	18:28	
									-60	05:36	06:24	07:07	16:58	17:40	18:29	
										Moonrise			Moonset			
									Lat.	Sat	Sun	Mon	Sat	Sun	Mon	
									72	—:—	—:—	—:—	—:—	—:—	—:—	
									70	—:—	—:—	—:—	—:—	—:—	—:—	
									68	—:—	—:—	—:—	—:—	—:—	—:—	
									66	—:—	—:—	—:—	—:—	—:—	—:—	
									64	—:—	—:—	20:36	—:—	—:—	23:50	
									62	—:—	20:06	19:57	—:—	22:07	—:—	
									60	18:30	19:14	19:29	21:29	22:59	—:—	
									58	17:51	18:42	19:08	22:07	23:30	—:—	
									56	17:24	18:18	18:50	22:34	23:54	—:—	
									54	17:03	17:58	18:35	22:56	—:—	00:13	
									52	16:45	17:42	18:22	23:13	—:—	00:29	
									50	16:30	17:28	18:10	23:29	—:—	00:43	
									45	15:59	16:59	17:46	23:59	—:—	01:11	
									40	15:35	16:36	17:26	—:—	00:23	01:34	
									35	15:16	16:17	17:10	—:—	00:42	01:52	
									30	14:59	16:01	16:56	—:—	00:59	02:08	
									20	14:31	15:33	16:32	00:26	01:28	02:34	
									10	14:07	15:10	16:11	00:50	01:52	02:57	
									0	13:44	14:48	15:51	01:12	02:14	03:18	
									-10	13:22	14:26	15:32	01:34	02:37	03:39	
									-20	12:58	14:02	15:11	01:58	03:01	04:02	
									-30	12:30	13:34	14:46	02:25	03:29	04:28	
									-35	12:13	13:18	14:32	02:41	03:45	04:43	
									-40	11:54	12:59	14:15	03:00	04:05	05:00	
									-45	11:31	12:36	13:55	03:23	04:28	05:21	
									-50	11:01	12:07	13:29	03:53	04:58	05:48	
									-52	10:46	11:52	13:17	04:07	05:12	06:00	
									-54	10:29	11:35	13:03	04:24	05:29	06:15	
									-56	10:09	11:15	12:46	04:44	05:50	06:32	
									-58	09:44	10:50	12:26	05:09	06:15	06:52	
									-60	09:09	10:15	12:01	05:44	06:50	07:18	
										Sun			Moon			
									Day	Eqn.of Time 00 ^h	12 ^h	Mer. Pass	Mer.Pass.		Age	
									26	02:02	01:54	12:01	19:59	07:27	10(72%)	
									27	01:45	01:37	12:01	21:02	08:30	11(82%)	
									28	01:28	01:19	12:01	22:06	09:34	12(90%)	
										Sun			Moon			
										Eqn.of Time 00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
										00 ^h			Mer.Pass.			Age
										12 ^h			Mer.Pass.			Age
										Mer. Pass			Mer.Pass.			Age
							</									

August 29, 30 ,31 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	336°56.7	203°44.8	9°32.1	155°49.8	0°14.6	293°30.4	15°14.0	0°40.0	-11°48.5	Alpheratz	357°35.6	29°13.3
1	351°59.2	218°47.8	9°32.5	170°50.8	0°13.9	308°32.8	15°14.0	15°42.7	-11°48.6	Ankaa	353°07.9	-42°10.5
2	7°01.6	233°50.8	9°32.9	185°51.8	0°13.3	323°35.2	15°14.0	30°45.3	-11°48.6	Schedar	349°31.9	56°39.9
3	22°04.1	248°53.8	9°33.3	200°52.8	0°12.6	338°37.6	15°14.0	45°48.0	-11°48.7	Diphda	348°48.0	-17°51.3
4	37°06.6	263°56.7	9°33.6	215°53.8	0°12.0	353°40.0	15°14.0	60°50.6	-11°48.8	Achernar	335°20.6	-57°06.7
5	52°09.0	278°59.7	9°34.0	230°54.8	0°11.3	8°42.4	15°14.1	75°53.3	-11°48.8	Hamal	327°52.3	23°34.5
6	67°11.5	294°02.7	9°34.4	245°55.8	0°10.6	23°44.9	15°14.1	90°55.9	-11°48.9	Polaris	314°25.8	89°21.5
7	82°13.9	309°05.6	9°34.8	260°56.8	0°10.0	38°47.3	15°14.1	105°58.5	-11°49.0	Akamar	315°12.5	-40°12.3
8	97°16.4	324°08.6	9°35.2	275°57.8	0°09.3	53°49.7	15°14.1	121°01.2	-11°49.1	Menkar	314°07.2	4°11.1
9	112°18.9	339°11.5	9°35.6	290°58.8	0°08.7	68°52.1	15°14.1	136°03.8	-11°49.1	Mirfak	308°29.8	49°56.5
10	127°21.3	354°14.5	9°35.9	305°59.8	0°08.0	83°54.5	15°14.1	151°06.5	-11°49.2	Aldebaran	290°40.9	16°33.5
11	142°23.8	9°17.4	9°36.3	321°00.8	0°07.3	98°56.9	15°14.1	166°09.1	-11°49.3	Rigel	281°05.0	-8°10.3
12	157°26.3	24°20.4	9°36.7	336°01.8	0°06.7	113°59.3	15°14.1	181°11.8	-11°49.3	Capella	280°23.7	46°01.2
13	172°28.7	39°23.3	9°37.1	351°02.8	0°06.0	129°01.7	15°14.1	196°14.4	-11°49.4	Bellatrix	278°24.2	6°22.4
14	187°31.2	54°26.2	9°37.5	6°03.8	0°05.4	144°04.1	15°14.1	211°17.0	-11°49.5	Elnath	278°03.4	28°37.6
15	202°33.7	69°29.2	9°37.8	21°04.8	0°04.7	159°06.6	15°14.1	226°19.7	-11°49.5	Alnilam	275°39.0	-1°11.0
16	217°36.1	84°32.1	9°38.2	36°05.8	0°04.0	174°09.0	15°14.1	241°22.3	-11°49.6	Betelgeuse	270°53.4	7°24.8
17	232°38.6	99°35.0	9°38.6	51°06.8	0°03.4	189°11.4	15°14.1	256°25.0	-11°49.7	Canopus	263°53.2	-52°42.1
18	247°41.1	114°37.9	9°39.0	66°07.8	0°02.7	204°13.8	15°14.1	271°27.6	-11°49.8	Sirius	258°27.3	-16°44.5
19	262°43.5	129°40.8	9°39.3	81°08.8	0°02.1	219°16.2	15°14.2	286°30.3	-11°49.8	Adara	255°07.0	-28°60.0
20	277°46.0	144°43.7	9°39.7	96°09.8	0°01.4	234°18.6	15°14.2	301°32.9	-11°49.9	Procyon	244°52.2	5°10.2
21	292°48.4	159°46.6	9°40.1	111°10.8	0°00.8	249°21.0	15°14.2	316°35.5	-11°50.0	Pollux	243°18.8	27°58.2
22	307°50.9	174°49.5	9°40.5	126°11.8	0°00.1	264°23.5	15°14.2	331°38.2	-11°50.0	Avior	234°15.8	-59°34.8
23	322°53.4	189°52.4	9°40.9	141°12.8	-0°00.6	279°25.9	15°14.2	346°40.8	-11°50.1	Suhail	222°47.6	-43°31.4
Mer.pass.:1:31:		v3.0 d0.4 m-4.4		v1.0 d-0.7 m1.8		v2.4 d0.0 m-2.4		v2.6 d-0.1 m0.4		Miaplacidus	221°39.5	-69°48.6
										Alphard	217°49.2	-8°45.5
										Regulus	207°35.9	11°51.3
										Dubhe	193°43.0	61°37.6
										Denebola	182°26.3	14°26.6
										Gienah	175°45.0	-17°40.3
										Acrux	173°02.0	-63°13.9
										Gacrux	171°53.4	-57°14.8
										Alioth	166°14.4	55°50.1
										Spica	158°23.7	-11°17.0
										Alcaid	152°53.2	49°12.0
										Hadar	148°38.0	-60°29.4
										Menkent	147°59.2	-36°29.2
										Arcturus	145°49.0	19°04.1
										Rigel Kent.	139°42.2	-60°56.1
										Zubenelg.	136°57.4	-16°08.3
										Kochab	137°20.2	74°03.8
										Alphecca	126°04.8	26°38.4
										Antares	112°17.2	-26°29.1
										Atria	107°12.4	-69°04.4
										Sabik	102°04.0	-15°45.2
										Shaula	96°11.8	-37°07.3
										Rasalhague	95°59.5	12°32.8
										Etamin	90°42.5	51°29.4
										Kaus Aust.	83°33.8	-34°22.5
										Vega	80°33.8	38°48.5
										Nunki	75°48.9	-26°16.1
										Altair	62°00.9	8°55.9
										Peacock	53°06.9	-56°39.6
										Deneb	49°26.2	45°22.0
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.7
										Fomalhaut	15°15.4	-29°29.7
										Scheat	13°46.0	28°12.7
										Markab	13°30.7	15°20.0
										2023/8/2	SHA	Mer.pass
										Venus	226°48.1	10:23
										Mars	178°53.1	13:36
										Jupiter	316°33.7	04:25
										Saturn	23°43.3	23:53
										2023/8/3	SHA	Mer.pass
										Venus	226°59.5	10:18
										Mars	178°18.0	13:34
										Jupiter	316°32.4	04:21
										Saturn	23°47.6	23:49
										2023/8/3	SHA	Mer.pass
										Venus	227°08.4	10:14
										Mars	177°42.8	13:33
										Jupiter	316°31.4	04:18
										Saturn	23°51.9	23:45
										Horizontal paralax		
										Venus:		0.4
										Mars:		0.1
Mer.pass.:1:24:		v2.8 d0.4 m-4.4		v1.0 d-0.7 m1.7		v2.4 d0.0 m-2.5		v2.6 d-0.1 m0.4				

h		Sun		Moon										
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Sunset	Twilight	
0	179°42.4	9°31.3	27°17.1	4.0	-23°39.9	10.1	60.9	72	---	02:13	03:50	20:08	21:41	---
1	194°42.6	9°30.4	41°40.1	4.0	-23°29.7	10.3	61.0	70	---	02:46	04:05	19:53	21:11	---
2	209°42.8	9°29.5	56°03.2	4.1	-23°19.3	10.5	61.0	68	01:05	03:10	04:18	19:41	20:48	22:45
3	224°43.0	9°28.7	70°26.3	4.2	-23°08.8	10.6	61.0	66	01:55	03:27	04:28	19:32	20:31	22:01
4	239°43.2	9°27.8	84°49.6	4.3	-22°58.0	10.8	61.0	64	02:25	03:42	04:36	19:23	20:17	21:33
5	254°43.4	9°26.9	99°12.9	4.3	-22°47.1	11.0	61.0	62	02:46	03:54	04:43	19:16	20:06	21:12
6	269°43.5	9°26.0	113°36.3	4.4	-22°36.1	11.1	61.1	60	03:03	04:04	04:49	19:10	19:56	20:55
7	284°43.7	9°25.1	127°59.7	4.5	-22°24.9	11.3	61.1	58	03:17	04:12	04:55	19:05	19:47	20:42
8	299°43.9	9°24.2	142°23.3	4.6	-22°13.5	11.5	61.1	56	03:29	04:20	04:60	19:00	19:40	20:30
9	314°44.1	9°23.3	156°46.9	4.7	-22°01.9	11.6	61.1	54	03:39	04:26	05:04	18:56	19:34	20:20
10	329°44.3	9°22.5	171°10.6	4.7	-21°50.2	11.8	61.1	52	03:48	04:32	05:08	18:52	19:28	20:12
11	344°44.5	9°21.6	185°34.4	4.8	-21°38.3	11.9	61.1	50	03:56	04:38	05:12	18:49	19:23	20:04
12	359°44.7	9°20.7	199°58.2	4.9	-21°26.3	12.1	61.2	45	04:12	04:49	05:19	18:41	19:12	19:49
13	14°44.9	9°19.8	214°22.2	5.0	-21°14.1	12.3	61.2	40	04:24	04:58	05:26	18:35	19:03	19:36
14	29°45.1	9°18.9	228°46.2	5.1	-21°01.8	12.4	61.2	35	04:34	05:05	05:31	18:30	18:56	19:27
15	44°45.2	9°18.0	243°10.4	5.2	-20°49.3	12.6	61.2	30	04:42	05:11	05:36	18:25	18:50	19:18
16	59°45.4	9°17.1	257°34.6	5.3	-20°36.7	12.7	61.2	20	04:55	05:21	05:44	18:17	18:40	19:06
17	74°45.6	9°16.2	271°58.9	5.3	-20°23.9	12.8	61.2	10	05:05	05:30	05:51	18:10	18:32	18:56
18	89°45.8	9°15.3	286°23.3	5.4	-20°11.0	13.0	61.2	0	05:12	05:37	05:57	18:04	18:25	18:49
19	104°46.0	9°14.4	300°47.8	5.5	-19°57.9	13.1	61.3	-10	05:18	05:43	06:04	17:58	18:19	18:44
20	119°46.2	9°13.6	315°12.3	5.6	-19°44.7	13.3	61.3	-20	05:23	05:48	06:11	17:51	18:13	18:39
21	134°46.4	9°12.7	329°37.0	5.7	-19°31.4	13.4	61.3	-30	05:26	05:54	06:18	17:44	18:08	18:36
22	149°46.6	9°11.8	344°01.7	5.8	-19°17.9	13.5	61.3	-35	05:27	05:57	06:22	17:40	18:05	18:35
23	164°46.8	9°10.9	358°26.6	5.9	-19°04.3	13.7	61.3	-40	05:28	05:60	06:27	17:35	18:02	18:34
	SD.=15.8	d=-0.9	S.D.=16.6											
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	179°47.0	9°10.0	12°51.5	6.0	-18°50.6	13.8	61.3	72	---	21:11	20:18	---	---	03:27
1	194°47.1	9°09.1	27°16.5	6.1	-18°36.7	13.9	61.3	70	22:08	20:46	20:08	---	00:29	03:50
2	209°47.3	9°08.2	41°41.6	6.2	-18°22.7	14.1	61.3	68	21:11	20:26	20:00	---	01:24	04:07
3	224°47.5	9°07.3	56°06.8	6.2	-18°08.5	14.2	61.3	66	20:36	20:11	19:53	---	01:57	04:21
4	239°47.7	9°06.4	70°32.1	6.3	-17°54.3	14.3	61.3	64	20:11	19:58	19:47	---	02:21	04:32
5	254°47.9	9°05.5	84°57.5	6.4	-17°39.9	14.4	61.4	62	19:51	19:46	19:42	00:28	02:40	04:42
6	269°48.1	9°04.6	99°23.0	6.5	-17°25.4	14.5	61.4	60	19:35	19:37	19:37	00:55	02:55	04:50
7	284°48.3	9°03.7	113°48.6	6.6	-17°10.8	14.7	61.4	58	19:21	19:28	19:33	01:16	03:08	04:57
8	299°48.5	9°02.9	128°14.2	6.7	-16°56.1	14.8	61.4	56	19:09	19:21	19:30	01:33	03:19	05:03
9	314°48.7	9°02.0	142°40.0	6.8	-16°41.3	14.9	61.4	54	18:58	19:14	19:26	01:48	03:29	05:09
10	329°48.9	9°01.1	157°05.8	6.9	-16°26.3	15.0	61.4	52	18:49	19:08	19:23	02:00	03:37	05:14
11	344°49.1	9°00.2	171°31.7	7.0	-16°11.3	15.1	61.4	50	18:40	19:03	19:21	02:11	03:45	05:18
12	359°49.3	8°59.3	185°57.7	7.1	-15°56.1	15.2	61.4	45	18:22	18:51	19:15	02:34	04:01	05:28
13	14°49.5	8°58.4	200°23.8	7.1	-15°40.9	15.3	61.4	40	18:08	18:41	19:10	02:53	04:15	05:36
14	29°49.6	8°57.5	214°50.0	7.2	-15°25.5	15.4	61.4	35	17:55	18:33	19:06	03:08	04:26	05:43
15	44°49.8	8°56.6	229°16.3	7.3	-15°10.0	15.5	61.4	30	17:44	18:25	19:02	03:21	04:36	05:48
16	59°50.0	8°55.7	243°42.6	7.4	-14°54.5	15.6	61.4	20	17:25	18:12	18:55	03:44	04:52	05:59
17	74°50.2	8°54.8	258°09.1	7.5	-14°38.8	15.7	61.4	10	17:08	18:01	18:49	04:03	05:07	06:08
18	89°50.4	8°53.9	272°35.6	7.6	-14°23.1	15.8	61.4	0	16:53	17:50	18:44	04:21	05:20	06:16
19	104°50.6	8°53.0	287°02.3	7.7	-14°07.2	15.9	61.4	-10	16:37	17:39	18:38	04:39	05:33	06:24
20	119°50.8	8°52.1	301°29.0	7.8	-13°51.3	16.0	61.4	-20	16:20	17:28	18:32	04:57	05:48	06:33
21	134°51.0	8°51.2	315°55.8	7.8	-13°35.3	16.1	61.4	-30	16:00	17:14	18:26	05:19	06:03	06:42
22	149°51.2	8°50.3	330°22.6	7.9	-13°19.2	16.1	61.4	-35	15:49	17:06	18:22	05:32	06:13	06:48
23	164°51.4	8°49.4	344°49.6	8.0	-13°03.0	16.2	61.4	-40	15:36	16:58	18:17	05:46	06:23	06:54
	SD.=15.8	d=-0.9	S.D.=16.7											
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		
0	179°51.6	8°48.5	359°16.6	8.1	-12°46.8	16.3	61.4	29	01:10	01:01	12:01	23:06	10:36	13(96%)
1	194°51.8	8°47.6	13°43.8	8.2	-12°30.5	16.4	61.4	30	00:52	00:43	12:00	00:03	11:35	14(99%)
2	209°52.0	8°46.7	28°11.0	8.2	-12°14.0	16.4	61.4	31	00:34	00:24	12:00	00:03	12:29	15(100%)
3	224°52.2	8°45.8	42°38.2	8.3	-11°57.6	16.5	61.4							
4	239°52.4	8°44.9	57°05.6	8.4	-11°41.0	16.6	61.3							
5	254°52.6	8°44.0	71°33.1	8.5	-11°24.4	16.6	61.3							
6	269°52.7	8°43.1	86°00.6	8.6	-11°07.7	16.7	61.3							
7	284°52.9	8°42.2	100°28.2	8.6	-10°51.0	16.8	61.3							
8	299°53.1	8°41.3	114°55.8	8.7	-10°34.2	16.8	61.3							
9	314°53.3	8°40.4	129°23.6	8.8	-10°17.3	16.9	61.3							
10	329°53.5	8°39.5	143°51.4	8.9	-10°00.4	16.9	61.3							
11	344°53.7	8°38.6	158°19.3	8.9	-9°43.5	17.0	61.3							
12	359°53.9	8°37.7	172°47.3	9.0	-9°26.4	17.0	61.3							
13	14°54.1	8°36.8	187°15.3	9.1	-9°09.4	17.1	61.3							
14	29°54.3	8°35.9	201°43.4	9.1	-8°52.3	17.1	61.2							
15	44°54.5	8°35.0	216°11.6	9.2	-8°35.1	17.2	61.2							
16	59°54.7	8°34.1	230°39.8	9.3	-8°17.9	17.2	61.2							
17	74°54.9	8°33.2	245°08.1	9.3	-8°00.6	17.3	61.2							
18	89°55.1	8°32.3	259°36.5	9.4	-7°43.4	17.3	61.2							
19	104°55.3	8°31.4	274°04.9	9.5	-7°26.0	17.3	61.2							
20	119°55.5	8°30.5	288°33.4	9.5	-7°08.7	17.4	61.2							
21	134°55.7	8°29.6	303°02.0	9.6	-6°51.3	17.4	61.1							
22	149°55.9	8°28.7	317°30.6	9.7	-6°33.9	17.4	61.1							
23	164°56.1	8°27.8	331°59.3	9.7	-6°16.4	17.5	61.1							
	SD.=15.8	d=-0.9	S.D.=16.7											

September 01, 02 ,03 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars				
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	339°54.1	207°08.9	9°58.8	157°01.8	-0°32.9	296°24.6	15°14.3	3°50.3	-11°53.6	Alpheratz	357°35.6	29°13.3							
1	354°56.6	222°11.6	9°59.2	172°02.8	-0°33.6	311°27.1	15°14.3	18°53.0	-11°53.7	Ankaa	353°07.8	-42°10.5							
2	9°59.0	237°14.3	9°59.5	187°03.8	-0°34.2	326°29.5	15°14.3	33°55.6	-11°53.7	Schedar	349°31.9	56°39.9							
3	25°01.5	252°16.9	9°59.9	202°04.8	-0°34.9	341°31.9	15°14.3	48°58.3	-11°53.8	Diphda	348°48.0	-17°51.3							
4	40°04.0	267°19.6	10°00.2	217°05.8	-0°35.5	356°34.4	15°14.3	64°00.9	-11°53.9	Achernar	335°20.6	-57°06.7							
5	55°06.4	282°22.3	10°00.6	232°06.8	-0°36.2	11°36.8	15°14.3	79°03.5	-11°53.9	Hamal	327°52.3	23°34.5							
6	70°08.9	297°24.9	10°00.9	247°07.7	-0°36.9	26°39.2	15°14.3	94°06.2	-11°54.0	Polaris	314°24.5	89°21.5							
7	85°11.4	312°27.6	10°01.3	262°08.7	-0°37.5	41°41.7	15°14.3	109°08.8	-11°54.1	Akamar	315°12.4	-40°12.3							
8	100°13.8	327°30.2	10°01.7	277°09.7	-0°38.2	56°44.1	15°14.3	124°11.5	-11°54.1	Menkar	314°07.2	4°11.1							
9	115°16.3	342°32.9	10°02.0	292°10.7	-0°38.8	71°46.5	15°14.3	139°14.1	-11°54.2	Mirfak	308°29.7	49°56.5							
10	130°18.8	357°35.5	10°02.4	307°11.7	-0°39.5	86°49.0	15°14.3	154°16.7	-11°54.3	Aldebaran	290°40.9	16°33.5							
11	145°21.2	12°38.2	10°02.7	322°12.7	-0°40.2	101°51.4	15°14.3	169°19.4	-11°54.4	Rigel	281°05.0	-8°10.3							
12	160°23.7	27°40.8	10°03.1	337°13.7	-0°40.8	116°53.8	15°14.3	184°22.0	-11°54.4	Capella	280°23.6	46°01.2							
13	175°26.1	42°43.4	10°03.4	352°14.7	-0°41.5	131°56.3	15°14.3	199°24.7	-11°54.5	Bellatrix	278°24.1	6°22.4							
14	190°28.6	57°46.0	10°03.8	7°15.7	-0°42.2	146°58.7	15°14.3	214°27.3	-11°54.6	Elnath	278°03.4	28°37.6							
15	205°31.1	72°48.7	10°04.1	22°16.7	-0°42.8	162°01.2	15°14.3	229°30.0	-11°54.6	Alnilam	275°39.0	-1°11.0							
16	220°33.5	87°51.3	10°04.5	37°17.7	-0°43.5	177°03.6	15°14.3	244°32.6	-11°54.7	Betelgeuse	270°53.4	7°24.8							
17	235°36.0	102°53.9	10°04.8	52°18.7	-0°44.1	192°06.0	15°14.3	259°35.2	-11°54.8	Canopus	263°53.1	-52°42.1							
18	250°38.5	117°56.5	10°05.2	67°19.7	-0°44.8	207°08.5	15°14.3	274°37.9	-11°54.9	Sirius	258°27.3	-16°44.5							
19	265°40.9	132°59.1	10°05.5	82°20.7	-0°45.5	222°10.9	15°14.3	289°40.5	-11°54.9	Adara	255°07.0	-28°60.0							
20	280°43.4	148°01.7	10°05.8	97°21.7	-0°46.1	237°13.3	15°14.3	304°43.2	-11°55.0	Procyon	244°52.1	5°10.2							
21	295°45.9	163°04.3	10°06.2	112°22.7	-0°46.8	252°15.8	15°14.3	319°45.8	-11°55.1	Pollux	243°18.8	27°58.2							
22	310°48.3	178°06.9	10°06.5	127°23.7	-0°47.4	267°18.2	15°14.3	334°48.5	-11°55.1	Avior	234°15.8	-59°34.8							
23	325°50.8	193°09.5	10°06.9	142°24.7	-0°48.1	282°20.7	15°14.3	349°51.1	-11°55.2	Suhail	222°47.6	-43°31.4							
Mer.pass.:1:20:			v2.7 d0.4 m-4.4			v1.0 d-0.7 m1.7			v2.4 d0.0 m-2.5			v2.6 d-0.1 m0.4							
															Miaplacidus	221°39.4	-69°48.6		
															Alphard	217°49.2	-8°45.5		
															Regulus	207°35.9	11°51.3		
															Dubhe	193°43.0	61°37.6		
															Denebola	182°26.3	14°26.6		
															Gienah	175°45.0	-17°40.3		
															Acrux	173°02.0	-63°13.8		
															Gacrux	171°53.5	-57°14.8		
															Alioth	166°14.4	55°50.1		
															Spica	158°23.7	-11°17.0		
															Alcaid	152°53.2	49°12.0		
															Hadar	148°38.0	-60°29.3		
															Menkent	147°59.2	-36°29.2		
															Arcturus	145°49.0	19°04.1		
															Rigel Kent.	139°42.2	-60°56.1		
															Zubenelg.	136°57.4	-16°08.3		
															Kochab	137°20.2	74°03.8		
															Alphecca	126°04.8	26°38.4		
															Antares	112°17.2	-26°29.1		
															Atria	107°12.4	-69°04.4		
															Sabik	102°04.0	-15°45.2		
															Shaula	96°11.8	-37°07.3		
															Rasalhague	95°59.5	12°32.8		
															Etamin	90°42.5	51°29.4		
															Kaus Aust.	83°33.8	-34°22.5		
															Vega	80°33.8	38°48.5		
															Nunki	75°48.9	-26°16.1		
															Altair	62°00.9	8°55.9		
															Peacock	53°07.0	-56°39.6		
															Deneb	49°26.2	45°22.0		
															Enif	33°39.6	9°59.1		
															Alnair	27°33.9	-46°50.7		
															Fomalhaut	15°15.4	-29°29.7		
															Scheat	13°46.0	28°12.7		
															Markab	13°30.7	15°20.0		
															2023/9/1	SHA	Mer.pass		
															Venus	227°14.8	10:10		
															Mars	177°07.7	13:31		
															Jupiter	316°30.5	04:14		
															Saturn	23°56.2	23:40		
															2023/9/2	SHA	Mer.pass		
															Venus	227°18.8	10:05		
															Mars	176°32.4	13:29		
															Jupiter	316°29.8	04:10		
															Saturn	24°00.5	23:36		
															2023/9/3	SHA	Mer.pass		
															Venus	227°20.4	10:02		
															Mars	175°57.1	13:28		
															Jupiter	316°29.4	04:06		
															Saturn	24°04.8	23:32		
															Horizontal paralax				
															Venus:		0.4		
															Mars:		0.1		
Mer.pass.:1:12:			v2.5 d0.3 m-4.4			v1.0 d-0.7 m1.7			v2.4 d-0.0 m-2.5			v2.6 d-0.1 m0.4							

Sun				Moon														
Fri	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Sunset	Twilight				
0	179°56.3	8°26.9		346°28.0	9.8	-5°59.0	17.5	61.1	72	Naut.	Civil	Sunrise	19:51	21:18	--			
1	194°56.5	8°26.0		0°56.8	9.8	-5°41.5	17.5	61.1	70	00:39	03:03	04:18	19:39	20:52	23:22			
2	209°56.7	8°25.1		15°25.7	9.9	-5°24.0	17.5	61.1	68	01:37	03:23	04:29	19:28	20:33	22:15			
3	224°56.9	8°24.2		29°54.6	9.9	-5°06.4	17.5	61.0	66	02:14	03:39	04:37	19:20	20:18	21:41			
4	239°57.1	8°23.3		44°23.5	10.0	-4°48.9	17.6	61.0	64	02:39	03:52	04:45	19:13	20:05	21:17			
5	254°57.3	8°22.4		58°52.5	10.0	-4°31.3	17.6	61.0	62	02:58	04:03	04:51	19:07	19:55	20:58			
6	269°57.5	8°21.5		73°21.6	10.1	-4°13.7	17.6	61.0	60	03:13	04:12	04:56	19:01	19:46	20:44			
7	284°57.7	8°20.6		87°50.7	10.1	-3°56.1	17.6	61.0	58	03:26	04:19	05:01	18:57	19:38	20:31			
8	299°57.9	8°19.7		102°19.9	10.2	-3°38.5	17.6	60.9	56	03:37	04:26	05:06	18:53	19:32	20:21			
9	314°58.1	8°18.8		116°49.1	10.2	-3°20.9	17.6	60.9	54	03:46	04:32	05:09	18:49	19:26	20:12			
10	329°58.3	8°17.9		131°18.3	10.3	-3°03.3	17.6	60.9	52	03:54	04:38	05:13	18:46	19:21	20:04			
11	344°58.5	8°17.0		145°47.6	10.3	-2°45.7	17.6	60.9	50	04:01	04:42	05:16	18:43	19:16	19:57			
12	359°58.7	8°16.1		160°17.0	10.4	-2°28.1	17.6	60.8	45	04:16	04:52	05:23	18:36	19:06	19:42			
13	14°58.9	8°15.2		174°46.4	10.4	-2°10.5	17.6	60.8	40	04:27	05:01	05:28	18:31	18:58	19:31			
14	29°59.1	8°14.3		189°15.8	10.4	-1°52.8	17.6	60.8	35	04:37	05:07	05:33	18:26	18:52	19:22			
15	44°59.3	8°13.4		203°45.3	10.5	-1°35.2	17.6	60.8	30	04:44	05:13	05:37	18:22	18:46	19:15			
16	59°59.5	8°12.4		218°14.8	10.5	-1°17.6	17.6	60.7	20	04:56	05:22	05:45	18:15	18:37	19:03			
17	74°59.7	8°11.5		232°44.3	10.6	-1°00.0	17.6	60.7	10	05:05	05:30	05:51	18:09	18:30	18:55			
18	89°59.9	8°10.6		247°13.9	10.6	-0°42.4	17.6	60.7	0	05:11	05:36	05:57	18:03	18:24	18:48			
19	105°00.1	8°09.7		261°43.5	10.6	-0°24.9	17.6	60.6	-10	05:16	05:41	06:02	17:58	18:19	18:43			
20	120°00.3	8°08.8		276°13.1	10.7	-0°07.3	17.6	60.6	-20	05:20	05:46	06:08	17:52	18:14	18:40			
21	135°00.5	8°07.9		290°42.8	10.7	0°10.2	17.5	60.6	-30	05:23	05:51	06:15	17:45	18:09	18:37			
22	150°00.7	8°07.0		305°12.5	10.7	0°27.8	17.5	60.6	-35	05:24	05:53	06:18	17:42	18:07	18:37			
23	165°00.9	8°06.1		319°42.3	10.8	0°45.3	17.5	60.5	-40	05:24	05:55	06:23	17:38	18:05	18:36			
SD.=15.8				d=-0.9				S.D.=16.7				-45	05:24	05:58	06:27	17:33	18:02	18:36
												-50	05:23	06:01	06:33	17:27	17:60	18:37
												-52	05:23	06:02	06:36	17:25	17:59	18:38
												-54	05:22	06:03	06:39	17:22	17:58	18:38
												-56	05:21	06:04	06:42	17:19	17:56	18:39
												-58	05:20	06:06	06:45	17:15	17:55	18:40
												-60	05:19	06:07	06:49	17:11	17:54	18:42
												Moonrise		Moonset				
												Lat.	Fri	Sat	Sun	Fri	Sat	Sun
												72	19:39	19:02	18:15	06:13	08:43	11:16
												70	19:39	19:10	18:37	06:19	08:38	10:57
												68	19:38	19:17	18:54	06:25	08:34	10:43
												66	19:38	19:24	19:08	06:29	08:30	10:31
												64	19:38	19:29	19:19	06:33	08:27	10:21
												62	19:38	19:33	19:29	06:36	08:25	10:13
												60	19:37	19:37	19:37	06:38	08:23	10:05
												58	19:37	19:41	19:45	06:41	08:21	09:59
												56	19:37	19:44	19:52	06:43	08:19	09:54
												54	19:37	19:47	19:58	06:45	08:18	09:49
												52	19:37	19:49	20:03	06:46	08:16	09:44
												50	19:36	19:52	20:08	06:48	08:15	09:40
												45	19:36	19:57	20:19	06:51	08:12	09:32
												40	19:36	20:01	20:27	06:54	08:10	09:25
												35	19:36	20:05	20:35	06:57	08:08	09:18
												30	19:36	20:08	20:42	06:59	08:07	09:13
												20	19:35	20:14	20:54	07:02	08:04	09:04
												10	19:35	20:20	21:04	07:05	08:01	08:56
												0	19:35	20:25	21:14	07:08	07:59	08:48
												-10	19:35	20:30	21:24	07:11	07:56	08:41
												-20	19:35	20:35	21:35	07:14	07:53	08:33
												-30	19:34	20:41	21:47	07:17	07:51	08:24
												-35	19:34	20:45	21:55	07:19	07:49	08:18
												-40	19:34	20:49	22:03	07:21	07:47	08:12
												-45	19:34	20:54	22:13	07:24	07:45	08:06
												-50	19:34	21:00	22:24	07:27	07:42	07:58
												-52	19:34	21:03	22:30	07:28	07:41	07:54
												-54	19:34	21:06	22:36	07:29	07:39	07:50
												-56	19:34	21:09	22:43	07:31	07:38	07:45
												-58	19:34	21:13	22:51	07:33	07:36	07:40
												-60	19:34	21:17	22:59	07:35	07:35	07:35
												Day	Sun			Moon		
													Eqn.of Time	Mer.		Mer.Pass.		Age
													00 ^h	12 ^h	Pass	Upper	Lower	
												1	00:15	00:05	12:00	00:56	13:21	16(97%)
												2	00:04	00:14	11:59	01:46	14:11	17(91%)
												3	00:24	00:33	11:59	02:36	15:01	18(84%)

September 04, 05 ,06 (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	342°51.5	210°11.1	10°23.1	158°13.3	-1°20.5	299°20.6	15°14.2	7°00.5	-11°58.6	Alpheratz	357°35.6	29°13.3
1	357°54.0	225°13.4	10°23.4	173°14.3	-1°21.2	314°23.1	15°14.1	22°03.2	-11°58.7	Ankaa	353°07.8	-42°10.5
2	12°56.5	240°15.8	10°23.7	188°15.3	-1°21.8	329°25.5	15°14.1	37°05.8	-11°58.8	Schedar	349°31.8	56°39.9
3	27°58.9	255°18.2	10°24.0	203°16.3	-1°22.5	344°28.0	15°14.1	52°08.5	-11°58.8	Diphda	348°48.0	-17°51.3
4	43°01.4	270°20.5	10°24.3	218°17.3	-1°23.1	359°30.5	15°14.1	67°11.1	-11°58.9	Achernar	335°20.6	-57°06.8
5	58°03.8	285°22.9	10°24.6	233°18.3	-1°23.8	14°32.9	15°14.1	82°13.7	-11°59.0	Hamal	327°52.3	23°34.5
6	73°06.3	300°25.3	10°25.0	248°19.3	-1°24.5	29°35.4	15°14.1	97°16.4	-11°59.0	Polaris	314°23.0	89°21.5
7	88°08.8	315°27.6	10°25.3	263°20.2	-1°25.1	44°37.8	15°14.1	112°19.0	-11°59.1	Akamar	315°12.4	-40°12.3
8	103°11.2	330°30.0	10°25.6	278°21.2	-1°25.8	59°40.3	15°14.1	127°21.7	-11°59.2	Menkar	314°07.2	4°11.1
9	118°13.7	345°32.3	10°25.9	293°22.2	-1°26.4	74°42.8	15°14.1	142°24.3	-11°59.2	Mirfak	308°29.7	49°56.5
10	133°16.2	0°34.6	10°26.2	308°23.2	-1°27.1	89°45.2	15°14.1	157°26.9	-11°59.3	Aldebaran	290°40.9	16°33.5
11	148°18.6	15°37.0	10°26.5	323°24.2	-1°27.8	104°47.7	15°14.1	172°29.6	-11°59.4	Rigel	281°05.0	-8°10.3
12	163°21.1	30°39.3	10°26.8	338°25.2	-1°28.4	119°50.1	15°14.1	187°32.2	-11°59.4	Capella	280°23.6	46°01.2
13	178°23.6	45°41.6	10°27.1	353°26.2	-1°29.1	134°52.6	15°14.1	202°34.9	-11°59.5	Bellatrix	278°24.1	6°22.4
14	193°26.0	60°44.0	10°27.4	8°27.2	-1°29.7	149°55.1	15°14.1	217°37.5	-11°59.6	Elnath	278°03.3	28°37.6
15	208°28.5	75°46.3	10°27.7	23°28.2	-1°30.4	164°57.5	15°14.0	232°40.1	-11°59.7	Alnilam	275°38.9	-1°11.0
16	223°31.0	90°48.6	10°28.0	38°29.2	-1°31.1	179°60.0	15°14.0	247°42.8	-11°59.7	Betelgeuse	270°53.4	7°24.8
17	238°33.4	105°50.9	10°28.3	53°30.1	-1°31.7	195°02.4	15°14.0	262°45.4	-11°59.8	Canopus	263°53.1	-52°42.1
18	253°35.9	120°53.2	10°28.6	68°31.1	-1°32.4	210°04.9	15°14.0	277°48.1	-11°59.9	Sirius	258°27.3	-16°44.5
19	268°38.3	135°55.5	10°29.0	83°32.1	-1°33.1	225°07.4	15°14.0	292°50.7	-11°59.9	Adara	255°06.9	-28°60.0
20	283°40.8	150°57.8	10°29.3	98°33.1	-1°33.7	240°09.8	15°14.0	307°53.4	-11°60.0	Procyon	244°52.1	5°10.2
21	298°43.3	166°00.1	10°29.6	113°34.1	-1°34.4	255°12.3	15°14.0	322°56.0	-12°00.1	Pollux	243°18.8	27°58.2
22	313°45.7	181°02.4	10°29.9	128°35.1	-1°35.0	270°14.8	15°14.0	337°58.6	-12°00.1	Avior	234°15.7	-59°34.8
23	328°48.2	196°04.7	10°30.2	143°36.1	-1°35.7	285°17.2	15°14.0	353°01.3	-12°00.2	Suhail	222°47.5	-43°31.4
Mer.pass.:1:08:		v2.4 d0.3 m-4.4		v1.0 d-0.7 m1.7		v2.5 d-0.0 m-2.5		v2.6 d-0.1 m0.4		Miaplacidus	221°39.4	-69°48.6
										Alphard	217°49.1	-8°45.5
										Regulus	207°35.9	11°51.3
										Dubhe	193°43.0	61°37.5
										Denebola	182°26.3	14°26.6
										Gienah	175°45.0	-17°40.3
										Acrux	173°02.0	-63°13.8
										Gacrux	171°53.5	-57°14.7
										Alioth	166°14.4	55°50.1
										Spica	158°23.7	-11°17.0
										Alcaid	152°53.2	49°12.0
										Hadar	148°38.1	-60°29.3
										Menkent	147°59.2	-36°29.2
										Arcturus	145°49.0	19°04.1
										Rigel Kent.	139°42.2	-60°56.1
										Zubenelg.	136°57.4	-16°08.3
										Kochab	137°20.3	74°03.8
										Alphecca	126°04.8	26°38.4
										Antares	112°17.2	-26°29.1
										Atria	107°12.4	-69°04.4
										Sabik	102°04.0	-15°45.2
										Shaula	96°11.8	-37°07.3
										Rasalhague	95°59.5	12°32.8
										Etamin	90°42.5	51°29.4
										Kaus Aust.	83°33.8	-34°22.5
										Vega	80°33.8	38°48.5
										Nunki	75°49.0	-26°16.1
										Altair	62°00.9	8°55.9
										Peacock	53°07.0	-56°39.6
										Deneb	49°26.2	45°22.0
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.8
										Fomalhaut	15°15.4	-29°29.7
										Scheat	13°46.0	28°12.7
										Markab	13°30.7	15°20.0
										2023/9/4	SHA	Mer.pass
										Venus	227°19.5	09:58
										Mars	175°21.8	13:26
										Jupiter	316°29.1	04:02
										Saturn	24°09.0	23:28
										2023/9/5	SHA	Mer.pass
										Venus	227°16.3	09:54
										Mars	174°46.4	13:25
										Jupiter	316°29.0	03:58
										Saturn	24°13.2	23:24
										2023/9/6	SHA	Mer.pass
										Venus	227°10.8	09:51
										Mars	174°11.0	13:23
										Jupiter	316°29.2	03:54
										Saturn	24°17.5	23:19
										Horizontal paralax		
										Venus:	0.4	
										Mars:	0.1	
Mer.pass.:1:00:		v2.2 d0.3 m-4.5		v1.0 d-0.7 m1.7		v2.5 d-0.0 m-2.5		v2.6 d-0.1 m0.4				

Sun				Moon										
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180°10.8	7°21.3	310°11.9	10.8	14°04.6	14.5	58.8	72	—:—	02:56	04:19	19:35	20:56	—:—
1	195°11.0	7°20.4	324°41.7	10.8	14°19.1	14.4	58.7	70	01:13	03:19	04:31	19:24	20:35	22:33
2	210°11.2	7°19.5	339°11.5	10.8	14°33.4	14.3	58.7	68	02:01	03:37	04:40	19:16	20:18	21:50
3	225°11.4	7°18.6	353°41.2	10.7	14°47.7	14.3	58.7	66	02:31	03:50	04:47	19:08	20:04	21:22
4	240°11.7	7°17.6	8°11.0	10.7	15°02.0	14.2	58.6	64	02:52	04:02	04:53	19:02	19:53	21:02
5	255°11.9	7°16.7	22°40.7	10.7	15°16.1	14.1	58.6	62	03:09	04:11	04:59	18:57	19:44	20:46
6	270°12.1	7°15.8	37°10.3	10.7	15°30.1	14.0	58.5	60	03:23	04:19	05:04	18:52	19:36	20:32
7	285°12.3	7°14.9	51°40.0	10.6	15°44.0	13.9	58.5	58	03:34	04:26	05:08	18:48	19:30	20:21
8	300°12.5	7°14.0	66°09.6	10.6	15°57.8	13.8	58.5	56	03:44	04:32	05:11	18:45	19:24	20:12
9	315°12.7	7°13.0	80°39.2	10.6	16°11.5	13.6	58.4	54	03:53	04:38	05:15	18:42	19:18	20:03
10	330°12.9	7°12.1	95°08.8	10.6	16°25.1	13.5	58.4	52	04:00	04:43	05:18	18:39	19:14	19:56
11	345°13.1	7°11.2	109°38.3	10.5	16°38.6	13.4	58.3	50	04:07	04:47	05:20	18:36	19:09	19:50
12	0°13.3	7°10.3	124°07.8	10.5	16°51.9	13.3	58.3	45	04:20	04:56	05:26	18:30	19:00	19:36
13	15°13.5	7°09.3	138°37.3	10.5	17°05.2	13.2	58.3	40	04:31	05:04	05:31	18:26	18:53	19:26
14	30°13.7	7°08.4	153°06.7	10.4	17°18.4	13.1	58.2	35	04:39	05:10	05:35	18:22	18:47	19:18
15	45°13.9	7°07.5	167°36.1	10.4	17°31.5	13.0	58.2	30	04:46	05:15	05:39	18:18	18:42	19:11
16	60°14.1	7°06.6	182°05.5	10.4	17°44.4	12.9	58.1	20	04:57	05:23	05:45	18:12	18:34	19:00
17	75°14.3	7°05.7	196°34.9	10.3	17°57.3	12.8	58.1	10	05:05	05:29	05:51	18:07	18:28	18:53
18	90°14.6	7°04.7	211°04.2	10.3	18°10.0	12.7	58.1	0	05:11	05:35	05:56	18:02	18:23	18:47
19	105°14.8	7°03.8	225°33.5	10.3	18°22.6	12.6	58.0	-10	05:15	05:39	06:00	17:57	18:18	18:43
20	120°15.0	7°02.9	240°02.8	10.2	18°35.1	12.4	58.0	-20	05:18	05:43	06:05	17:52	18:15	18:40
21	135°15.2	7°02.0	254°32.0	10.2	18°47.5	12.3	57.9	-30	05:19	05:47	06:11	17:47	18:11	18:39
22	150°15.4	7°01.0	269°01.2	10.2	18°59.8	12.2	57.9	-35	05:20	05:49	06:14	17:44	18:09	18:39
23	165°15.6	7°00.1	283°30.3	10.1	19°11.9	12.1	57.9	-40	05:19	05:51	06:18	17:40	18:08	18:39
	SD.=15.9	d=-0.9	S.D.=16.0					-45	05:19	05:52	06:22	17:36	18:06	18:40
								-50	05:17	05:54	06:27	17:32	18:04	18:41
								-52	05:16	05:55	06:29	17:29	18:03	18:42
								-54	05:15	05:56	06:31	17:27	18:03	18:44
								-56	05:14	05:57	06:34	17:25	18:02	18:45
								-58	05:12	05:58	06:37	17:22	18:01	18:46
								-60	05:11	05:59	06:40	17:18	18:00	18:48
									Moonrise			Moonset		
								Lat.	Mon	Tue	Wed	Mon	Tue	Wed
								72	16:34	—:—	—:—	14:44	—:—	—:—
								70	17:43	—:—	—:—	13:37	—:—	—:—
								68	18:20	—:—	—:—	13:01	—:—	—:—
								66	18:47	18:10	—:—	12:36	15:01	—:—
								64	19:08	18:52	18:08	12:17	14:20	16:54
								62	19:25	19:20	19:15	12:01	13:53	15:47
								60	19:39	19:42	19:50	11:48	13:31	15:13
								58	19:51	20:00	20:16	11:37	13:14	14:48
								56	20:01	20:15	20:37	11:27	12:59	14:28
								54	20:11	20:28	20:53	11:19	12:47	14:11
								52	20:19	20:40	21:08	11:11	12:36	13:57
								50	20:27	20:50	21:21	11:04	12:26	13:44
								45	20:43	21:12	21:47	10:50	12:06	13:19
								40	20:56	21:29	22:08	10:38	11:49	12:59
								35	21:08	21:44	22:26	10:28	11:36	12:42
								30	21:18	21:57	22:41	10:19	11:24	12:27
								20	21:35	22:19	23:06	10:04	11:03	12:03
								10	21:50	22:38	23:29	09:50	10:46	11:41
								0	22:05	22:56	23:50	09:38	10:29	11:22
								-10	22:19	23:15	—:—	09:26	10:13	11:02
								-20	22:35	23:34	—:—	09:13	09:55	10:41
								-30	22:53	23:57	—:—	08:58	09:35	10:17
								-35	23:03	—:—	00:10	08:50	09:24	10:03
								-40	23:15	—:—	00:26	08:40	09:11	09:46
								-45	23:30	—:—	00:45	08:28	08:55	09:27
								-50	23:48	—:—	01:08	08:15	08:36	09:02
								-52	23:56	—:—	01:19	08:09	08:27	08:51
								-54	—:—	00:05	01:32	08:02	08:17	08:37
								-56	—:—	00:16	01:47	07:54	08:05	08:22
								-58	—:—	00:28	02:05	07:45	07:52	08:04
								-60	—:—	00:43	02:26	07:35	07:37	07:42
									Sun			Moon		
								Day	Eqn.of Time	Mer.		Mer.Pass.		Age
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:09	17:35	21(55%)
									Sun			Moon		
									00 ^h	12 ^h	Pass	Upper	Lower	
								4	00:43	00:53	11:59	03:26	15:51	19(75%)
								5	01:03	01:13	11:58	04:16	16:42	20(65%)
								6	01:23	01:33	11:58	05:0		

September 07, 08 ,09 (Thu., Fri., Sat.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	345°48.9	212°51.9	10°44.0	159°24.4	-2°08.1	302°18.4	15°13.5	10°10.6	-12°03.5	Alpheratz	357°35.6	29°13.3	
1	0°51.4	227°54.0	10°44.3	174°25.4	-2°08.8	317°20.9	15°13.4	25°13.3	-12°03.6	Ankaa	353°07.8	-42°10.5	
2	15°53.9	242°56.0	10°44.6	189°26.4	-2°09.5	332°23.4	15°13.4	40°15.9	-12°03.7	Schedar	349°31.8	56°40.0	
3	30°56.3	257°58.1	10°44.8	204°27.4	-2°10.1	347°25.9	15°13.4	55°18.5	-12°03.8	Diphda	348°48.0	-17°51.3	
4	45°58.8	273°00.2	10°45.1	219°28.3	-2°10.8	2°28.4	15°13.4	70°21.2	-12°03.8	Achernar	335°20.5	-57°06.8	
5	61°01.3	288°02.3	10°45.4	234°29.3	-2°11.4	17°30.8	15°13.4	85°23.8	-12°03.9	Hamal	327°52.2	23°34.5	
6	76°03.7	303°04.3	10°45.6	249°30.3	-2°12.1	32°33.3	15°13.4	100°26.4	-12°04.0	Polaris	314°21.3	89°21.6	
7	91°06.2	318°06.4	10°45.9	264°31.3	-2°12.8	47°35.8	15°13.4	115°29.1	-12°04.0	Akamar	315°12.4	-40°12.3	
8	106°08.7	333°08.5	10°46.2	279°32.3	-2°13.4	62°38.3	15°13.3	130°31.7	-12°04.1	Menkar	314°07.1	4°11.1	
9	121°11.1	348°10.5	10°46.4	294°33.3	-2°14.1	77°40.8	15°13.3	145°34.4	-12°04.2	Mirfak	308°29.7	49°56.6	
10	136°13.6	3°12.6	10°46.7	309°34.2	-2°14.7	92°43.3	15°13.3	160°37.0	-12°04.2	Aldebaran	290°40.9	16°33.5	
11	151°16.0	18°14.6	10°46.9	324°35.2	-2°15.4	107°45.7	15°13.3	175°39.6	-12°04.3	Rigel	281°04.9	-8°10.3	
12	166°18.5	33°16.7	10°47.2	339°36.2	-2°16.1	122°48.2	15°13.3	190°42.3	-12°04.4	Capella	280°23.6	46°01.2	
13	181°21.0	48°18.7	10°47.4	354°37.2	-2°16.7	137°50.7	15°13.3	205°44.9	-12°04.4	Bellatrix	278°24.1	6°22.4	
14	196°23.4	63°20.8	10°47.7	9°38.2	-2°17.4	152°53.2	15°13.3	220°47.6	-12°04.5	Elnath	278°03.3	28°37.6	
15	211°25.9	78°22.8	10°48.0	24°39.2	-2°18.1	167°55.7	15°13.2	235°50.2	-12°04.6	Alnilam	275°38.9	-1°11.0	
16	226°28.4	93°24.8	10°48.2	39°40.1	-2°18.7	182°58.2	15°13.2	250°52.8	-12°04.6	Betelgeuse	270°53.4	7°24.8	
17	241°30.8	108°26.8	10°48.5	54°41.1	-2°19.4	198°00.7	15°13.2	265°55.5	-12°04.7	Canopus	263°53.1	-52°42.1	
18	256°33.3	123°28.9	10°48.7	69°42.1	-2°20.0	213°03.2	15°13.2	280°58.1	-12°04.8	Sirius	258°27.3	-16°44.5	
19	271°35.8	138°30.9	10°49.0	84°43.1	-2°20.7	228°05.6	15°13.2	296°00.7	-12°04.8	Adara	255°06.9	-28°60.0	
20	286°38.2	153°32.9	10°49.2	99°44.1	-2°21.4	243°08.1	15°13.2	311°03.4	-12°04.9	Procyon	244°52.1	5°10.2	
21	301°40.7	168°34.9	10°49.5	114°45.0	-2°22.0	258°10.6	15°13.2	326°06.0	-12°05.0	Pollux	243°18.8	27°58.2	
22	316°43.2	183°36.9	10°49.7	129°46.0	-2°22.7	273°13.1	15°13.1	341°08.7	-12°05.0	Avior	234°15.7	-59°34.8	
23	331°45.6	198°38.9	10°50.0	144°47.0	-2°23.4	288°15.6	15°13.1	356°11.3	-12°05.1	Suhail	222°47.5	-43°31.4	
Mer.pass.:0:56:		v2.1 d0.3 m-4.5		v1.0 d-0.7 m1.7		v2.5 d-0.0 m-2.5		v2.6 d-0.1 m0.4		Miaplacidus	221°39.4	-69°48.6	
Alphard												217°49.1	-8°45.5
Regulus												207°35.9	11°51.3
Dubhe												193°43.0	61°37.5
Denebola												182°26.3	14°26.6
Gienah												175°45.0	-17°40.3
Acrux												173°02.0	-63°13.8
Gacrux												171°53.5	-57°14.7
Alioth												166°14.5	55°50.1
Spica												158°23.7	-11°17.0
Alcaid												152°53.2	49°12.0
Hadar												148°38.1	-60°29.3
Menkent												147°59.2	-36°29.2
Arcturus												145°49.0	19°04.1
Rigel Kent.												139°42.2	-60°56.1
Zubenelg.												136°57.4	-16°08.3
Kochab												137°20.3	74°03.7
Alphecca												126°04.8	26°38.4
Antares												112°17.2	-26°29.1
Atria												107°12.5	-69°04.4
Sabik												102°04.0	-15°45.2
Shaula												96°11.8	-37°07.3
Rasalhague												95°59.5	12°32.8
Etamin												90°42.6	51°29.4
Kaus Aust.												83°33.8	-34°22.5
Vega												80°33.8	38°48.5
Nunki												75°49.0	-26°16.1
Altair												62°00.9	8°55.9
Peacock												53°07.0	-56°39.6
Deneb												49°26.2	45°22.0
Enif												33°39.6	9°59.1
Alnair												27°33.9	-46°50.8
Fomalhaut												15°15.4	-29°29.7
Scheat												13°46.0	28°12.7
Markab												13°30.7	15°20.0
2023/9/7												SHA	Mer.pass
Venus												227°02.9	09:47
Mars												173°35.5	13:21
Jupiter												316°29.5	03:50
Saturn												24°21.7	23:15
2023/9/8												SHA	Mer.pass
Venus												226°52.8	09:44
Mars												172°59.9	13:20
Jupiter												316°30.0	03:46
Saturn												24°25.9	23:11
2023/9/9												SHA	Mer.pass
Venus												226°40.6	09:41
Mars												172°24.3	13:18
Jupiter												316°30.7	03:42
Saturn												24°30.0	23:07
Horizontal parallax													
Venus:												0.4	
Mars:												0.1	
Mer.pass.:0:48:		v1.9 d0.2 m-4.5		v1.0 d-0.7 m1.7		v2.5 d-0.0 m-2.5		v2.6 d-0.1 m0.4					

h		Sun		Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°25.9	6°14.6	272°39.2	8.7	26°28.7	5.5	56.1
1	195°26.1	6°13.7	287°06.9	8.7	26°34.1	5.3	56.0
2	210°26.3	6°12.7	301°34.6	8.7	26°39.4	5.2	56.0
3	225°26.5	6°11.8	316°02.2	8.7	26°44.5	5.1	56.0
4	240°26.8	6°10.9	330°29.9	8.6	26°49.5	4.9	55.9
5	255°27.0	6°09.9	344°57.5	8.6	26°54.3	4.8	55.9
6	270°27.2	6°09.0	359°25.2	8.6	26°59.0	4.6	55.9
7	285°27.4	6°08.1	13°52.8	8.6	27°03.5	4.5	55.8
8	300°27.6	6°07.1	28°20.4	8.6	27°07.9	4.3	55.8
9	315°27.8	6°06.2	42°48.0	8.6	27°12.2	4.2	55.8
10	330°28.0	6°05.3	57°15.6	8.6	27°16.3	4.0	55.7
11	345°28.2	6°04.3	71°43.2	8.6	27°20.2	3.9	55.7
12	0°28.5	6°03.4	86°10.8	8.6	27°24.0	3.7	55.7
13	15°28.7	6°02.5	100°38.3	8.6	27°27.6	3.6	55.7
14	30°28.9	6°01.5	115°05.9	8.6	27°31.1	3.4	55.6
15	45°29.1	6°00.6	129°33.5	8.6	27°34.5	3.3	55.6
16	60°29.3	5°59.7	144°01.1	8.6	27°37.7	3.1	55.6
17	75°29.5	5°58.7	158°28.7	8.6	27°40.7	3.0	55.5
18	90°29.7	5°57.8	172°56.3	8.6	27°43.6	2.8	55.5
19	105°30.0	5°56.8	187°23.8	8.6	27°46.4	2.7	55.5
20	120°30.2	5°55.9	201°51.4	8.6	27°49.0	2.5	55.5
21	135°30.4	5°55.0	216°19.0	8.6	27°51.4	2.4	55.4
22	150°30.6	5°54.0	230°46.6	8.6	27°53.8	2.2	55.4
23	165°30.8	5°53.1	245°14.3	8.6	27°55.9	2.1	55.4
SD.=15.9		d=-0.9	S.D.=15.3				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	180°31.0	5°52.2	259°41.9	8.6	27°57.9	1.9	55.4
1	195°31.2	5°51.2	274°09.5	8.6	27°59.8	1.8	55.3
2	210°31.5	5°50.3	288°37.2	8.7	28°01.5	1.6	55.3
3	225°31.7	5°49.3	303°04.8	8.7	28°03.1	1.5	55.3
4	240°31.9	5°48.4	317°32.5	8.7	28°04.5	1.3	55.3
5	255°32.1	5°47.5	332°00.2	8.7	28°05.8	1.2	55.2
6	270°32.3	5°46.5	346°27.9	8.7	28°06.9	1.1	55.2
7	285°32.5	5°45.6	0°55.6	8.7	28°07.9	0.9	55.2
8	300°32.7	5°44.7	15°23.4	8.8	28°08.7	0.8	55.2
9	315°33.0	5°43.7	29°51.2	8.8	28°09.4	0.6	55.1
10	330°33.2	5°42.8	44°19.0	8.8	28°09.9	0.5	55.1
11	345°33.4	5°41.8	58°46.8	8.8	28°10.3	0.3	55.1
12	0°33.6	5°40.9	73°14.6	8.9	28°10.6	0.2	55.1
13	15°33.8	5°40.0	87°42.5	8.9	28°10.7	0.0	55.0
14	30°34.0	5°39.0	102°10.4	8.9	28°10.7	-0.1	55.0
15	45°34.3	5°38.1	116°38.3	8.9	28°10.5	-0.3	55.0
16	60°34.5	5°37.1	131°06.2	9.0	28°10.1	-0.4	55.0
17	75°34.7	5°36.2	145°34.2	9.0	28°09.7	-0.5	54.9
18	90°34.9	5°35.3	160°02.2	9.0	28°09.0	-0.7	54.9
19	105°35.1	5°34.3	174°30.3	9.1	28°08.3	-0.8	54.9
20	120°35.3	5°33.4	188°58.3	9.1	28°07.4	-1.0	54.9
21	135°35.5	5°32.4	203°26.5	9.1	28°06.3	-1.1	54.9
22	150°35.8	5°31.5	217°54.6	9.2	28°05.1	-1.3	54.8
23	165°36.0	5°30.6	232°22.8	9.2	28°03.8	-1.4	54.8
SD.=15.9		d=-0.9	S.D.=15.1				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	180°36.2	5°29.6	246°51.0	9.2	28°02.4	-1.5	54.8
1	195°36.4	5°28.7	261°19.3	9.3	28°00.7	-1.7	54.8
2	210°36.6	5°27.7	275°47.6	9.3	27°59.0	-1.8	54.8
3	225°36.8	5°26.8	290°15.9	9.4	27°57.1	-2.0	54.7
4	240°37.1	5°25.8	304°44.3	9.4	27°55.1	-2.1	54.7
5	255°37.3	5°24.9	319°12.7	9.5	27°52.9	-2.2	54.7
6	270°37.5	5°24.0	333°41.2	9.5	27°50.6	-2.4	54.7
7	285°37.7	5°23.0	348°09.7	9.5	27°48.2	-2.5	54.7
8	300°37.9	5°22.1	2°38.3	9.6	27°45.6	-2.6	54.6
9	315°38.1	5°21.1	17°06.9	9.6	27°42.9	-2.8	54.6
10	330°38.4	5°20.2	31°35.6	9.7	27°40.0	-2.9	54.6
11	345°38.6	5°19.2	46°04.3	9.7	27°37.0	-3.1	54.6
12	0°38.8	5°18.3	60°33.1	9.8	27°33.9	-3.2	54.6
13	15°39.0	5°17.4	75°01.9	9.8	27°30.7	-3.3	54.6
14	30°39.2	5°16.4	89°30.7	9.9	27°27.3	-3.5	54.5
15	45°39.4	5°15.5	103°59.7	9.9	27°23.8	-3.6	54.5
16	60°39.7	5°14.5	118°28.6	10.0	27°20.1	-3.7	54.5
17	75°39.9	5°13.6	132°57.7	10.1	27°16.3	-3.8	54.5
18	90°40.1	5°12.6	147°26.7	10.1	27°12.4	-4.0	54.5
19	105°40.3	5°11.7	161°55.9	10.2	27°08.4	-4.1	54.5
20	120°40.5	5°10.7	176°25.1	10.2	27°04.2	-4.2	54.4
21	135°40.7	5°09.8	190°54.3	10.3	26°59.9	-4.4	54.4
22	150°41.0	5°08.9	205°23.6	10.3	26°55.5	-4.5	54.4
23	165°41.2	5°07.9	219°53.0	10.4	26°50.9	-4.6	54.4
SD.=15.9		d=-0.9	S.D.=14.9				
Twilight		Twilight		Twilight		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	00:27	03:15	04:34	19:19	20:36	23:04	
70	01:45	03:34	04:43	19:10	20:18	22:02	
68	02:21	03:49	04:50	19:03	20:03	21:29	
66	02:46	04:01	04:57	18:57	19:52	21:06	
64	03:05	04:11	05:02	18:52	19:42	20:48	
62	03:20	04:20	05:07	18:47	19:34	20:33	
60	03:32	04:27	05:11	18:43	19:27	20:21	
58	03:42	04:33	05:14	18:40	19:21	20:11	
56	03:51	04:39	05:17	18:37	19:15	20:02	
54	03:59	04:44	05:20	18:34	19:11	19:55	
52	04:06	04:48	05:23	18:32	19:06	19:48	
50	04:12	04:52	05:25	18:30	19:03	19:42	
45	04:24	04:60	05:30	18:25	18:55	19:30	
40	04:34	05:07	05:34	18:21	18:48	19:21	
35	04:42	05:12	05:38	18:17	18:43	19:13	
30	04:48	05:16	05:41	18:14	18:39	19:07	
20	04:58	05:24	05:46	18:09	18:32	18:57	
10	05:05	05:29	05:50	18:05	18:26	18:51	
0	05:10	05:34	05:55	18:01	18:22	18:46	
-10	05:13	05:37	05:59	17:57	18:18	18:43	
-20	05:15	05:41	06:03	17:53	18:15	18:41	
-30	05:16	05:43	06:07	17:49	18:13	18:40	
-35	05:15	05:45	06:10	17:46	18:11	18:41	
-40	05:15	05:46	06:13	17:43	18:10	18:42	
-45	05:13	05:47	06:16	17:40	18:09	18:43	
-50	05:11	05:48	06:20	17:36	18:08	18:46	
-52	05:09	05:48	06:22	17:34	18:08	18:47	
-54	05:08	05:49	06:24	17:32	18:08	18:49	
-56	05:06	05:49	06:26	17:30	18:07	18:51	
-58	05:04	05:50	06:29	17:28	18:07	18:53	
-60	05:02	05:50	06:31	17:25	18:07	18:55	
Moonrise		Moonset		Moonrise		Moonset	
Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	—:—	—:—	—:—	—:—	
64	—:—	—:—	—:—	—:—	—:—	—:—	
62	19:09	—:—	21:28	17:46	—:—	19:07	
60	20:11	20:58	22:15	16:44	17:49	18:20	
58	20:45	21:34	22:45	16:10	17:12	17:50	
56	21:10	22:00	23:07	15:45	16:46	17:27	
54	21:30	22:21	23:26	15:26	16:25	17:08	
52	21:47	22:38	23:42	15:09	16:08	16:52	
50	22:01	22:53	23:55	14:55	15:53	16:38	
45	22:31	23:23	—:—	14:25	15:23	16:10	
40	22:54	23:47	—:—	14:03	14:60	15:48	
35	23:13	—:—	00:06	13:44	14:40	15:29	
30	23:29	—:—	00:22	13:28	14:24	15:14	
20	23:57	—:—	00:50	13:01	13:56	14:47	
10	—:—	00:21	01:14	12:37	13:32	14:23	
0	—:—	00:43	01:36	12:15	13:09	14:02	
-10	00:10	01:06	01:59	11:54	12:47	13:40	
-20	00:33	01:30	02:23	11:30	12:22	13:16	
-30	00:59	01:58	02:51	11:03	11:54	12:49	
-35	01:15	02:14	03:07	10:47	11:38	12:33	
-40	01:33	02:34	03:26	10:29	11:18	12:14	
-45	01:55	02:57	03:49	10:06	10:54	11:51	
-50	02:23	03:27	04:19	09:38	10:24	11:21	
-52	02:36	03:42	04:34	09:24	10:09	11:07	
-54	02:52	03:60	04:51	09:08	09:51	10:50	
-56	03:11	04:21	05:11	08:49	09:30	10:30	
-58	03:34	04:48	05:37	08:25	09:03	10:04	
-60	04:05	05:26	06:12	07:54	08:25	09:29	
Sun		Moon		Sun		Moon	
Day	Eqn.of Time	Mer.	Mer.	Day	Eqn.of Time	Mer.	Mer.
	00 ^h	12 ^h	Pass		00 ^h	12 ^h	Pass
7	01:44	01:54	11:58	6:02	18:29	22(44%)	
8	02:04	02:14	11:57	06:56	19:22	23(35%)	
9	02:25	02:35	11:57	07:49	20:14	24(26%)	

September 10, 11 ,12 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	348°46.4	215°12.6	11°01.2	160°35.0	-2°55.8	305°18.0	15°12.2	13°20.5	-12°08.4				Alpheratz	357°35.6	29°13.3		
1	3°48.8	230°14.4	11°01.4	175°36.0	-2°56.4	320°20.5	15°12.2	28°23.1	-12°08.4				Ankaa	353°07.8	-42°10.5		
2	18°51.3	245°16.2	11°01.6	190°36.9	-2°57.1	335°23.0	15°12.2	43°25.8	-12°08.5				Schedar	349°31.8	56°40.0		
3	33°53.8	260°18.1	11°01.8	205°37.9	-2°57.8	350°25.5	15°12.2	58°28.4	-12°08.6				Diphda	348°48.0	-17°51.3		
4	48°56.2	275°19.9	11°02.0	220°38.9	-2°58.4	5°28.0	15°12.2	73°31.0	-12°08.6				Achernar	335°20.5	-57°06.8		
5	63°58.7	290°21.7	11°02.2	235°39.9	-2°59.1	20°30.6	15°12.1	88°33.7	-12°08.7				Hamal	327°52.2	23°34.5		
6	79°01.1	305°23.5	11°02.4	250°40.8	-2°59.8	35°33.1	15°12.1	103°36.3	-12°08.8				Polaris	314°19.9	89°21.6		
7	94°03.6	320°25.3	11°02.6	265°41.8	-3°00.4	50°35.6	15°12.1	118°39.0	-12°08.8				Akamar	315°12.4	-40°12.3		
8	109°06.1	335°27.1	11°02.8	280°42.8	-3°01.1	65°38.1	15°12.1	133°41.6	-12°08.9				Menkar	314°07.1	4°11.1		
9	124°08.5	350°28.9	11°03.0	295°43.8	-3°01.7	80°40.6	15°12.1	148°44.2	-12°09.0				Mirfak	308°29.6	49°56.6		
10	139°11.0	5°30.6	11°03.2	310°44.7	-3°02.4	95°43.1	15°12.0	163°46.9	-12°09.0				Aldebaran	290°40.8	16°33.5		
11	154°13.5	20°32.4	11°03.4	325°45.7	-3°03.1	110°45.6	15°12.0	178°49.5	-12°09.1				Rigel	281°04.9	-8°10.3		
12	169°15.9	35°34.2	11°03.6	340°46.7	-3°03.7	125°48.1	15°12.0	193°52.1	-12°09.2				Capella	280°23.5	46°01.2		
13	184°18.4	50°36.0	11°03.8	355°47.7	-3°04.4	140°50.6	15°12.0	208°54.8	-12°09.2				Bellatrix	278°24.1	6°22.4		
14	199°20.9	65°37.8	11°04.0	10°48.6	-3°05.0	155°53.1	15°12.0	223°57.4	-12°09.3				Elnath	278°03.3	28°37.6		
15	214°23.3	80°39.5	11°04.2	25°49.6	-3°05.7	170°55.7	15°11.9	239°00.0	-12°09.3				Alnilam	275°38.9	-1°11.0		
16	229°25.8	95°41.3	11°04.4	40°50.6	-3°06.4	185°58.2	15°11.9	254°02.7	-12°09.4				Betelgeuse	270°53.3	7°24.8		
17	244°28.3	110°43.1	11°04.6	55°51.6	-3°07.0	201°00.7	15°11.9	269°05.3	-12°09.5				Canopus	263°53.0	-52°42.1		
18	259°30.7	125°44.8	11°04.8	70°52.5	-3°07.7	216°03.2	15°11.9	284°07.9	-12°09.5				Sirius	258°27.2	-16°44.5		
19	274°33.2	140°46.6	11°05.0	85°53.5	-3°08.4	231°05.7	15°11.8	299°10.6	-12°09.6				Adara	255°06.9	-28°59.9		
20	289°35.6	155°48.3	11°05.2	100°54.5	-3°09.0	246°08.2	15°11.8	314°13.2	-12°09.7				Procyon	244°52.1	5°10.2		
21	304°38.1	170°50.1	11°05.4	115°55.5	-3°09.7	261°10.7	15°11.8	329°15.8	-12°09.7				Pollux	243°18.8	27°58.2		
22	319°40.6	185°51.8	11°05.6	130°56.4	-3°10.3	276°13.3	15°11.8	344°18.5	-12°09.8				Avior	234°15.7	-59°34.8		
23	334°43.0	200°53.6	11°05.8	145°57.4	-3°11.0	291°15.8	15°11.8	359°21.1	-12°09.9				Suhail	222°47.5	-43°31.4		
Mer.pass.:0:44:			v1.8 d0.2 m-4.5			v1.0 d-0.7 m1.7			v2.5 d-0.0 m-2.5			v2.6 d-0.1 m0.5					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	349°45.5	215°55.3	11°06.0	160°58.4	-3°11.7	306°18.3	15°11.7	14°23.7	-12°09.9				Dubhe	193°43.0	61°37.5		
1	4°48.0	230°57.1	11°06.1	175°59.4	-3°12.3	321°20.8	15°11.7	29°26.4	-12°10.0				Denebola	182°26.3	14°26.6		
2	19°50.4	245°58.8	11°06.3	191°00.3	-3°13.0	336°23.3	15°11.7	44°29.0	-12°10.1				Gienah	175°45.0	-17°40.3		
3	34°52.9	261°00.5	11°06.5	206°01.3	-3°13.6	351°25.8	15°11.7	59°31.6	-12°10.1				Acrux	173°02.0	-63°13.8		
4	49°55.4	276°02.2	11°06.7	221°02.3	-3°14.3	6°28.3	15°11.6	74°34.3	-12°10.2				Gacrux	171°53.5	-57°14.7		
5	64°57.8	291°04.0	11°06.9	236°03.3	-3°15.0	21°30.9	15°11.6	89°36.9	-12°10.3				Alioth	166°14.5	55°50.1		
6	80°00.3	306°05.7	11°07.1	251°04.2	-3°15.6	36°33.4	15°11.6	104°39.6	-12°10.3				Spica	158°23.7	-11°17.0		
7	95°02.8	321°07.4	11°07.3	266°05.2	-3°16.3	51°35.9	15°11.6	119°42.2	-12°10.4				Alcaid	152°53.2	49°12.0		
8	110°05.2	336°09.1	11°07.4	281°06.2	-3°17.0	66°38.4	15°11.5	134°44.8	-12°10.5				Hadar	148°38.1	-60°29.3		
9	125°07.7	351°10.8	11°07.6	296°07.2	-3°17.6	81°40.9	15°11.5	149°47.5	-12°10.5				Menkent	147°59.2	-36°29.2		
10	140°10.1	6°12.5	11°07.8	311°08.1	-3°18.3	96°43.5	15°11.5	164°50.1	-12°10.6				Arcturus	145°49.0	19°04.0		
11	155°12.6	21°14.2	11°08.0	326°09.1	-3°18.9	111°46.0	15°11.5	179°52.7	-12°10.7				Rigel Kent.	139°42.3	-60°56.1		
12	170°15.1	36°15.9	11°08.2	341°10.1	-3°19.6	126°48.5	15°11.4	194°55.4	-12°10.7				Zubenelg.	136°57.4	-16°08.3		
13	185°17.5	51°17.6	11°08.3	356°11.0	-3°20.3	141°51.0	15°11.4	209°58.0	-12°10.8				Kochab	137°20.4	74°03.7		
14	200°20.0	66°19.3	11°08.5	11°12.0	-3°20.9	156°53.5	15°11.4	225°00.6	-12°10.9				Alphecca	126°04.8	26°38.3		
15	215°22.5	81°21.0	11°08.7	26°13.0	-3°21.6	171°56.0	15°11.4	240°03.3	-12°10.9				Antares	112°17.2	-26°29.1		
16	230°24.9	96°22.7	11°08.9	41°14.0	-3°22.2	186°58.6	15°11.4	255°05.9	-12°11.0				Atria	107°12.5	-69°04.4		
17	245°27.4	111°24.4	11°09.0	56°14.9	-3°22.9	202°01.1	15°11.3	270°08.5	-12°11.0				Sabik	102°04.0	-15°45.2		
18	260°29.9	126°26.1	11°09.2	71°15.9	-3°23.6	217°03.6	15°11.3	285°11.2	-12°11.1				Shaula	96°11.8	-37°07.3		
19	275°32.3	141°27.7	11°09.4	86°16.9	-3°24.2	232°06.1	15°11.3	300°13.8	-12°11.2				Rasalhague	95°59.6	12°32.8		
20	290°34.8	156°29.4	11°09.6	101°17.9	-3°24.9	247°08.7	15°11.3	315°16.4	-12°11.2				Etamin	90°42.6	51°29.4		
21	305°37.2	171°31.1	11°09.7	116°18.8	-3°25.5	262°11.2	15°11.2	330°19.1	-12°11.3				Kaus Aust.	83°33.8	-34°22.5		
22	320°39.7	186°32.7	11°09.9	131°19.8	-3°26.2	277°13.7	15°11.2	345°21.7	-12°11.4				Vega	80°33.9	38°48.5		
23	335°42.2	201°34.4	11°10.1	146°20.8	-3°26.9	292°16.2	15°11.2	0°24.3	-12°11.4				Nunki	75°49.0	-26°16.1		
Mer.pass.:0:40:			v1.7 d0.2 m-4.5			v1.0 d-0.7 m1.7			v2.5 d-0.0 m-2.5			v2.6 d-0.1 m0.5					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	350°44.6	216°36.1	11°10.3	161°21.7	-3°27.5	307°18.7	15°11.2	15°27.0	-12°11.5				2023/9/1	SHA	Mer.pass		
1	5°47.1	231°37.7	11°10.4	176°22.7	-3°28.2	322°21.3	15°11.1	30°29.6	-12°11.6				Venus	226°26.2	09:38		
2	20°49.6	246°39.4	11°10.6	191°23.7	-3°28.9	337°23.8	15°11.1	45°32.2	-12°11.6				Mars	171°48.6	13:17		
3	35°52.0	261°41.0	11°10.8	206°24.7	-3°29.5	352°26.3	15°11.1	60°34.9	-12°11.7				Jupiter	316°31.7	03:38		
4	50°54.5	276°42.7	11°10.9	221°25.6	-3°30.2	7°28.8	15°11.1	75°37.5	-12°11.8				Saturn	24°34.1	23:03		
5	65°57.0	291°44.3	11°11.1	236°26.6	-3°30.8	22°31.4	15°11.0	90°40.1	-12°11.8				2023/9/1	SHA	Mer.pass		
6	80°59.4	306°45.9	11°11.2	251°27.6	-3°31.5	37°33.9	15°11.0	105°42.8	-12°11.9				Venus	226°09.8	09:35		
7	96°01.9	321°47.6	11°11.4	266°28.5	-3°32.2	52°36.4	15°11.0	120°45.4	-12°11.9				Mars	171°12.9	13:15		
8	111°04.4	336°49.2	11°11.6	281°29.5	-3°32.8	67°38.9	15°11.0	135°48.0	-12°12.0				Jupiter	316°32.8	03:34		
9	126°06.8	351°50.8	11°11.7	296°30.5	-3°33.5	82°41.5	15°10.9	150°50.7	-12°12.1				Saturn	24°38.2	22:58		
10																	

Sun				Moon										
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180°41.4	5°07.0	234°22.4	10.5	26°46.2	-4.7	54.4	72	01:24	03:32	04:47	19:03	20:17	22:19
1	195°41.6	5°06.0	248°51.9	10.5	26°41.4	-4.9	54.4	70	02:10	03:48	04:55	18:56	20:02	21:37
2	210°41.8	5°05.1	263°21.5	10.6	26°36.5	-5.0	54.4	68	02:39	04:02	05:01	18:50	19:49	21:10
3	225°42.1	5°04.1	277°51.1	10.6	26°31.5	-5.1	54.3	66	03:00	04:12	05:06	18:45	19:39	20:50
4	240°42.3	5°03.2	292°20.8	10.7	26°26.3	-5.2	54.3	64	03:17	04:21	05:11	18:41	19:30	20:34
5	255°42.5	5°02.2	306°50.5	10.8	26°21.0	-5.4	54.3	62	03:30	04:28	05:14	18:37	19:23	20:21
6	270°42.7	5°01.3	321°20.3	10.8	26°15.5	-5.5	54.3	60	03:41	04:35	05:18	18:34	19:17	20:10
7	285°42.9	5°00.3	335°50.2	10.9	26°10.0	-5.6	54.3	58	03:50	04:40	05:21	18:32	19:12	20:01
8	300°43.1	4°59.4	350°20.1	11.0	26°04.3	-5.7	54.3	56	03:58	04:45	05:23	18:29	19:07	19:53
9	315°43.4	4°58.4	4°50.1	11.0	25°58.6	-5.8	54.3	54	04:05	04:49	05:25	18:27	19:03	19:46
10	330°43.6	4°57.5	19°20.1	11.1	25°52.7	-6.0	54.3	52	04:12	04:53	05:27	18:25	18:59	19:40
11	345°43.8	4°56.6	33°50.2	11.2	25°46.6	-6.1	54.3	50	04:17	04:56	05:29	18:23	18:56	19:35
12	0°44.0	4°55.6	48°20.4	11.2	25°40.5	-6.2	54.2	45	04:28	05:04	05:33	18:19	18:49	19:24
13	15°44.2	4°54.7	62°50.7	11.3	25°34.2	-6.3	54.2	40	04:37	05:09	05:37	18:16	18:43	19:15
14	30°44.4	4°53.7	77°21.0	11.4	25°27.9	-6.4	54.2	35	04:44	05:14	05:40	18:13	18:39	19:09
15	45°44.7	4°52.8	91°51.4	11.4	25°21.4	-6.5	54.2	30	04:50	05:18	05:42	18:11	18:35	19:03
16	60°44.9	4°51.8	106°21.9	11.5	25°14.8	-6.7	54.2	20	04:59	05:24	05:46	18:07	18:29	18:55
17	75°45.1	4°50.9	120°52.4	11.6	25°08.1	-6.8	54.2	10	05:05	05:29	05:50	18:03	18:24	18:49
18	90°45.3	4°49.9	135°23.0	11.6	25°01.3	-6.9	54.2	0	05:09	05:33	05:53	17:60	18:21	18:45
19	105°45.5	4°49.0	149°53.6	11.7	24°54.3	-7.0	54.2	-10	05:11	05:36	05:57	17:57	18:18	18:42
20	120°45.8	4°48.0	164°24.3	11.8	24°47.3	-7.1	54.2	-20	05:12	05:38	06:00	17:54	18:16	18:41
21	135°46.0	4°47.1	178°55.1	11.8	24°40.1	-7.2	54.2	-30	05:12	05:40	06:04	17:50	18:14	18:42
22	150°46.2	4°46.1	193°26.0	11.9	24°32.9	-7.3	54.1	-35	05:11	05:41	06:06	17:48	18:13	18:43
23	165°46.4	4°45.2	207°56.9	12.0	24°25.5	-7.4	54.1	-40	05:10	05:41	06:08	17:46	18:13	18:44
								-45	05:08	05:41	06:11	17:43	18:13	18:47
								-50	05:04	05:42	06:14	17:41	18:13	18:50
								-52	05:03	05:42	06:15	17:39	18:13	18:52
								-54	05:01	05:42	06:17	17:38	18:13	18:54
								-56	04:58	05:41	06:18	17:36	18:13	18:56
								-58	04:56	05:41	06:20	17:34	18:13	18:59
								-60	04:53	05:41	06:22	17:32	18:14	19:02
								Lat.	Moonrise			Moonset		
								72	-:-	-:-	-:-	-:-	-:-	21:12
								70	-:-	-:-	-:-	-:-	-:-	20:22
								68	-:-	23:11	-:-	-:-	20:46	19:51
								66	-:-	-:-	00:03	-:-	19:54	19:27
								64	22:34	-:-	00:34	19:45	19:22	19:08
								62	23:16	-:-	00:57	19:02	18:57	18:53
								60	23:45	-:-	01:16	18:33	18:38	18:40
								58	-:-	00:06	01:31	18:11	18:22	18:29
								56	-:-	00:24	01:44	17:53	18:09	18:19
								54	-:-	00:39	01:56	17:37	17:57	18:11
								52	-:-	00:52	02:06	17:24	17:46	18:03
								50	-:-	01:04	02:14	17:12	17:37	17:56
								45	00:23	01:27	02:33	16:48	17:17	17:41
								40	00:45	01:46	02:48	16:28	17:01	17:28
								35	01:03	02:02	03:01	16:11	16:47	17:17
								30	01:18	02:15	03:12	15:57	16:35	17:08
								20	01:44	02:38	03:31	15:33	16:14	16:52
								10	02:07	02:58	03:48	15:12	15:56	16:38
								0	02:28	03:17	04:03	14:52	15:39	16:24
								-10	02:49	03:35	04:18	14:32	15:22	16:11
								-20	03:11	03:55	04:34	14:11	15:04	15:56
								-30	03:37	04:18	04:53	13:46	14:43	15:39
								-35	03:52	04:31	05:04	13:31	14:30	15:29
								-40	04:10	04:46	05:16	13:14	14:16	15:18
								-45	04:31	05:04	05:31	12:53	13:59	15:05
								-50	04:58	05:27	05:48	12:27	13:37	14:49
								-52	05:11	05:37	05:56	12:15	13:27	14:41
								-54	05:26	05:49	06:06	12:00	13:16	14:32
								-56	05:43	06:03	06:16	11:43	13:02	14:23
								-58	06:04	06:19	06:28	11:22	12:47	14:12
								-60	06:31	06:39	06:41	10:56	12:28	13:59
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.		Age
									00 ^h	12 ^h	Pass	Upper	Lower	
								10	02:46	02:56	11:57	08:40	21:04	25(18%)
								11	03:06	03:17	11:56	09:28	21:51	26(11%)
								12	03:28	03:38	11:56	10:13	22:35	27(6%)
								SD.=15.9	d=-1.0	S.D.=14.7				

September 13, 14 ,15 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	351°43.8	217°14.9	11°14.0	161°45.0	-3°43.4	308°19.4	15°10.5	16°30.1	-12°13.0	Alpheratz	357°35.6	29°13.3					
1	6°46.2	232°16.4	11°14.2	176°46.0	-3°44.1	323°21.9	15°10.5	31°32.8	-12°13.1	Ankaa	353°07.8	-42°10.5					
2	21°48.7	247°18.0	11°14.3	191°47.0	-3°44.7	338°24.5	15°10.5	46°35.4	-12°13.2	Schedar	349°31.8	56°40.0					
3	36°51.2	262°19.6	11°14.5	206°47.9	-3°45.4	353°27.0	15°10.4	61°38.0	-12°13.2	Diphda	348°48.0	-17°51.3					
4	51°53.6	277°21.1	11°14.6	221°48.9	-3°46.0	8°29.5	15°10.4	76°40.7	-12°13.3	Achernar	335°20.5	-57°06.8					
5	66°56.1	292°22.7	11°14.8	236°49.9	-3°46.7	23°32.1	15°10.4	91°43.3	-12°13.4	Hamal	327°52.2	23°34.5					
6	81°58.6	307°24.3	11°14.9	251°50.8	-3°47.4	38°34.6	15°10.4	106°45.9	-12°13.4	Polaris	314°18.7	89°21.6					
7	97°01.0	322°25.8	11°15.1	266°51.8	-3°48.0	53°37.1	15°10.3	121°48.6	-12°13.5	Akamar	315°12.3	-40°12.3					
8	112°03.5	337°27.4	11°15.2	281°52.8	-3°48.7	68°39.7	15°10.3	136°51.2	-12°13.5	Menkar	314°07.1	4°11.1					
9	127°06.0	352°28.9	11°15.3	296°53.7	-3°49.3	83°42.2	15°10.3	151°53.8	-12°13.6	Mirfak	308°29.6	49°56.6					
10	142°08.4	7°30.5	11°15.5	311°54.7	-3°50.0	98°44.8	15°10.2	166°56.5	-12°13.7	Aldebaran	290°40.8	16°33.5					
11	157°10.9	22°32.0	11°15.6	326°55.7	-3°50.7	113°47.3	15°10.2	181°59.1	-12°13.7	Rigel	281°04.9	-8°10.2					
12	172°13.3	37°33.6	11°15.8	341°56.6	-3°51.3	128°49.8	15°10.2	197°01.7	-12°13.8	Capella	280°23.5	46°01.2					
13	187°15.8	52°35.1	11°15.9	356°57.6	-3°52.0	143°52.4	15°10.2	212°04.3	-12°13.9	Bellatrix	278°24.0	6°22.4					
14	202°18.3	67°36.6	11°16.0	11°58.6	-3°52.6	158°54.9	15°10.1	227°07.0	-12°13.9	Elnath	278°03.3	28°37.6					
15	217°20.7	82°38.2	11°16.2	26°59.5	-3°53.3	173°57.4	15°10.1	242°09.6	-12°14.0	Alnilam	275°38.9	-1°11.0					
16	232°23.2	97°39.7	11°16.3	42°00.5	-3°54.0	188°60.0	15°10.1	257°12.2	-12°14.1	Betelgeuse	270°53.3	7°24.8					
17	247°25.7	112°41.2	11°16.4	57°01.5	-3°54.6	204°02.5	15°10.0	272°14.9	-12°14.1	Canopus	263°53.0	-52°42.1					
18	262°28.1	127°42.7	11°16.6	72°02.4	-3°55.3	219°05.0	15°10.0	287°17.5	-12°14.2	Sirius	258°27.2	-16°44.5					
19	277°30.6	142°44.3	11°16.7	87°03.4	-3°55.9	234°07.6	15°10.0	302°20.1	-12°14.2	Adara	255°06.9	-28°59.9					
20	292°33.1	157°45.8	11°16.8	102°04.4	-3°56.6	249°10.1	15°10.0	317°22.8	-12°14.3	Procyon	244°52.1	5°10.2					
21	307°35.5	172°47.3	11°17.0	117°05.3	-3°57.3	264°12.7	15°09.9	332°25.4	-12°14.4	Pollux	243°18.7	27°58.2					
22	322°38.0	187°48.8	11°17.1	132°06.3	-3°57.9	279°15.2	15°09.9	347°28.0	-12°14.4	Avior	234°15.7	-59°34.8					
23	337°40.5	202°50.3	11°17.2	147°07.3	-3°58.6	294°17.7	15°09.9	2°30.7	-12°14.5	Suhail	222°47.5	-43°31.4					
Mer.pass.:0:32:			v1.6 d0.1 m-4.5			v1.0 d-0.7 m1.7			v2.5 d-0.0 m-2.5			v2.6 d-0.1 m0.5					
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Miaplacidus Alphard Regulus Dubhe Denebola Gienah Acrux Gacrux Alioth Spica Alcaid Hadar Menkent Arcturus Rigel Kent. Zubenelg. Kochab Alphecca Antares Atria Sabik Shaula Rasalhague Etamin Kaus Aust. Vega Nunki Altair Peacock Deneb Enif Alnair Fomalhaut Scheat Markab 2023/9/1 SHA Mer.pass Venus 225°31.1 09:30 Mars 170°01.2 13:12 Jupiter 316°35.6 03:26 Saturn 24°46.4 22:50 2023/9/1 SHA Mer.pass Venus 225°08.9 09:28 Mars 169°25.3 13:11 Jupiter 316°37.4 03:22 Saturn 24°50.4 22:46 2023/9/1 SHA Mer.pass Venus 224°44.9 09:25 Mars 168°49.3 13:09 Jupiter 316°39.3 03:18 Saturn 24°54.3 22:42 Horizontal parallax Venus: 0.4 Mars: 0.1						
0	352°42.9	217°51.8	11°17.3	162°08.2	-3°59.3	309°20.3	15°09.8	17°33.3	-12°14.6								
1	7°45.4	232°53.3	11°17.5	177°09.2	-3°59.9	324°22.8	15°09.8	32°35.9	-12°14.6								
2	22°47.8	247°54.8	11°17.6	192°10.2	-4°00.6	339°25.4	15°09.8	47°38.5	-12°14.7								
3	37°50.3	262°56.3	11°17.7	207°11.1	-4°01.2	354°27.9	15°09.8	62°41.2	-12°14.8								
4	52°52.8	277°57.8	11°17.8	222°12.1	-4°01.9	9°30.4	15°09.7	77°43.8	-12°14.8								
5	67°55.2	292°59.3	11°18.0	237°13.1	-4°02.6	24°33.0	15°09.7	92°46.4	-12°14.9								
6	82°57.7	308°00.8	11°18.1	252°14.0	-4°03.2	39°35.5	15°09.7	107°49.1	-12°14.9								
7	98°00.2	323°02.2	11°18.2	267°15.0	-4°03.9	54°38.1	15°09.6	122°51.7	-12°15.0								
8	113°02.6	338°03.7	11°18.3	282°16.0	-4°04.5	69°40.6	15°09.6	137°54.3	-12°15.1								
9	128°05.1	353°05.2	11°18.4	297°16.9	-4°05.2	84°43.2	15°09.6	152°57.0	-12°15.1								
10	143°07.6	8°06.7	11°18.6	312°17.9	-4°05.9	99°45.7	15°09.5	167°59.6	-12°15.2								
11	158°10.0	23°08.1	11°18.7	327°18.8	-4°06.5	114°48.2	15°09.5	183°02.2	-12°15.3								
12	173°12.5	38°09.6	11°18.8	342°19.8	-4°07.2	129°50.8	15°09.5	198°04.8	-12°15.3								
13	188°14.9	53°11.1	11°18.9	357°20.8	-4°07.8	144°53.3	15°09.4	213°07.5	-12°15.4								
14	203°17.4	68°12.5	11°19.0	12°21.7	-4°08.5	159°55.9	15°09.4	228°10.1	-12°15.4								
15	218°19.9	83°14.0	11°19.1	27°22.7	-4°09.2	174°58.4	15°09.4	243°12.7	-12°15.5								
16	233°22.3	98°15.4	11°19.2	42°23.7	-4°09.8	190°01.0	15°09.4	258°15.4	-12°15.6								
17	248°24.8	113°16.9	11°19.4	57°24.6	-4°10.5	205°03.5	15°09.3	273°18.0	-12°15.6								
18	263°27.3	128°18.3	11°19.5	72°25.6	-4°11.1	220°06.1	15°09.3	288°20.6	-12°15.7								
19	278°29.7	143°19.8	11°19.6	87°26.6	-4°11.8	235°08.6	15°09.3	303°23.3	-12°15.8								
20	293°32.2	158°21.2	11°19.7	102°27.5	-4°12.5	250°11.2	15°09.2	318°25.9	-12°15.8								
21	308°34.7	173°22.7	11°19.8	117°28.5	-4°13.1	265°13.7	15°09.2	333°28.5	-12°15.9								
22	323°37.1	188°24.1	11°19.9	132°29.5	-4°13.8	280°16.2	15°09.2	348°31.1	-12°15.9								
23	338°39.6	203°25.5	11°20.0	147°30.4	-4°14.4	295°18.8	15°09.1	3°33.8	-12°16.0								
Mer.pass.:0:29:			v1.5 d0.1 m-4.5			v1.0 d-0.7 m1.7			v2.5 d-0.0 m-2.5			v2.6 d-0.1 m0.5					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	353°42.1	218°27.0	11°20.1	162°31.4	-4°15.1	310°21.3	15°09.1	18°36.4	-12°16.1								
1	8°44.5	233°28.4	11°20.2	177°32.3	-4°15.8	325°23.9	15°09.1	33°39.0	-12°16.1								
2	23°47.0	248°29.8	11°20.3	192°33.3	-4°16.4	340°26.4	15°09.0	48°41.7	-12°16.2								
3	38°49.4	263°31.2	11°20.4	207°34.3	-4°17.1	355°29.0	15°09.0	63°44.3	-12°16.3								
4	53°51.9	278°32.6	11°20.5	222°35.2	-4°17.7	10°31.5	15°09.0	78°46.9	-12°16.3								
5	68°54.4	293°34.1	11°20.6	237°36.2	-4°18.4	25°34.1	15°08.9	93°49.5	-12°16.4								
6	83°56.8	308°35.5	11°20.7	252°37.2	-4°19.1	40°36.6	15°08.9	108°52.2	-12°16.4								
7	98°59.3	323°36.9	11°20.8	267°38.1	-4°19.7	55°39.2	15°08.9	123°54.8	-12°16.5								
8	114°01.8	338°38.3	11°20.9	282°39.1	-4°20.4	70°41.7	15°08.8	138°57.4	-12°16.6								
9	129°04.2	353°39.7	11°21.0	297°40.0	-4°21.0	85°44.3	15°08.8	154°00.1	-12°16.6								
10	144°06.7	8°41.1	11°21.1	312°41.0	-4°21.7	100°46.8	15°08.8	169°02.7	-12°16.7								
11	159°09.2	23°42.5	11°21.2	327°42.0	-4°22.4	115°49.4	15°08.7	184°05.3	-12°16.8								
12	174°11.6	38°43.9	11°21.3	342°42.9	-4°23.0	130°52.0	15°08.7	199°07.9	-12°16.8								
13	189°14.1	53°45.3	11°21.4	357°43.9	-4°23.7	145°54.5	15°08.7	214°10.6	-12°16.9								
14	204°16.5	68°46.7	11°21.5	12°44.9	-4°24.3	160°57.1	15°08.6	229°13.2	-12°16.9								
15	219°19.0	83°48.0	11°21.6	27°45.8	-4°25.0	175°59.6	15°08.6	244°15.8	-12°17.0								
16	234°21.5	98°49.4	11°21.7	42°46.8	-4°25.7	191°02.2	15°08.6	259°18.4	-12°17.1								
17	249°23.9	113°50.8	11°21.8	57°47.7	-4°26.3	206°04.7	15°08.5	274°21.1	-12°17.1								
18	264°26.4	128°52.2	11°21.8	72°48.7	-4°27.0	221°07.3	15°08.5	289°23.7	-12°17.2								
19	279°28.9	143°53.5	11°21.9	87°49.7	-4°27.6	236°09.8	15°08.5	304°26.3	-12°17.2								
20	294°31.3	158°54.9	11°22.0	102°50.6	-4°28.3	251°12.4	15°08.4	319°29.0	-12°17.3								
21	309°33.8	173°56.3	11°22.1	117°51.6	-4°28.9	266°14.9	15°08.4	334°31.6									

Sun				Moon										
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Sunset	Twilight	
0	180°57.2	3°58.5	200°34.8	15.1	16°29.9	-11.6	54.0	72	01:56	03:48	05:01	18:47	19:59	21:48
1	195°57.4	3°57.6	215°08.9	15.2	16°18.2	-11.7	54.0	70	02:31	04:02	05:07	18:42	19:46	21:15
2	210°57.6	3°56.6	229°43.1	15.2	16°06.5	-11.8	54.0	68	02:55	04:13	05:12	18:37	19:35	20:52
3	240°58.1	3°54.7	258°51.7	15.3	15°42.8	-11.9	54.0	66	03:13	04:23	05:16	18:34	19:26	20:35
5	255°58.3	3°53.7	273°26.0	15.4	15°30.9	-12.0	54.0	64	03:28	04:30	05:19	18:30	19:19	20:21
6	270°58.5	3°52.8	288°00.4	15.4	15°18.9	-12.0	54.0	62	03:40	04:37	05:22	18:28	19:13	20:09
7	285°58.7	3°51.8	302°34.9	15.5	15°06.8	-12.1	54.0	60	03:50	04:42	05:25	18:25	19:07	19:60
8	300°59.0	3°50.9	317°09.4	15.5	14°54.7	-12.1	54.0	58	03:58	04:47	05:27	18:23	19:03	19:51
9	315°59.2	3°49.9	331°44.0	15.6	14°42.5	-12.2	54.0	56	04:05	04:51	05:29	18:21	18:59	19:44
10	330°59.4	3°49.0	346°18.6	15.6	14°30.3	-12.3	54.0	54	04:12	04:55	05:31	18:19	18:55	19:38
11	345°59.6	3°48.0	0°53.2	15.7	14°18.0	-12.3	54.0	52	04:17	04:58	05:32	18:18	18:52	19:33
12	0°59.8	3°47.0	15°27.9	15.7	14°05.7	-12.4	54.0	50	04:22	05:01	05:34	18:17	18:49	19:28
13	16°00.1	3°46.1	30°02.6	15.8	13°53.3	-12.4	54.0	45	04:32	05:07	05:37	18:14	18:43	19:18
14	31°00.3	3°45.1	44°37.4	15.8	13°40.8	-12.5	54.0	40	04:40	05:12	05:40	18:11	18:38	19:10
15	46°00.5	3°44.2	59°12.2	15.8	13°28.3	-12.5	54.0	35	04:47	05:16	05:42	18:09	18:34	19:04
16	61°00.7	3°43.2	73°47.1	15.9	13°15.8	-12.6	54.0	30	04:52	05:20	05:44	18:07	18:31	18:59
17	76°00.9	3°42.3	88°22.0	15.9	13°03.2	-12.6	54.0	20	04:59	05:25	05:47	18:04	18:26	18:52
18	91°01.2	3°41.3	102°57.0	16.0	12°50.5	-12.7	54.0	10	05:04	05:29	05:50	18:01	18:22	18:47
19	106°01.4	3°40.3	117°32.0	16.0	12°37.8	-12.7	54.0	0	05:08	05:32	05:52	17:59	18:20	18:44
20	121°01.6	3°39.4	132°07.0	16.1	12°25.0	-12.8	54.0	-10	05:09	05:34	05:55	17:57	18:18	18:42
21	136°01.8	3°38.4	146°42.1	16.1	12°12.2	-12.8	54.0	-20	05:10	05:35	05:57	17:54	18:16	18:42
22	151°02.1	3°37.5	161°17.2	16.1	11°59.4	-12.9	54.0	-30	05:08	05:36	05:60	17:52	18:16	18:43
23	166°02.3	3°36.5	175°52.3	16.2	11°46.5	-12.9	54.1	-35	05:07	05:36	06:01	17:50	18:16	18:45
	SD.=15.9	d=-1.0	S.D.=14.7					-40	05:05	05:36	06:03	17:49	18:16	18:47
								-45	05:02	05:36	06:05	17:47	18:16	18:50
								-50	04:58	05:35	06:07	17:45	18:17	18:55
								-52	04:56	05:35	06:08	17:44	18:18	18:57
								-54	04:53	05:34	06:09	17:43	18:18	18:59
								-56	04:50	05:34	06:11	17:42	18:19	19:02
								-58	04:47	05:33	06:12	17:41	18:20	19:06
								-60	04:44	05:32	06:13	17:39	18:21	19:09
									Moonrise			Moonset		
								Lat.	Wed	Thu	Fri	Wed	Thu	Fri
								72	00:20	02:59	05:04	20:01	19:21	18:48
								70	01:08	03:18	05:11	19:40	19:11	18:46
								68	01:38	03:33	05:17	19:23	19:02	18:44
								66	02:01	03:44	05:22	19:10	18:55	18:43
								64	02:18	03:54	05:26	18:58	18:50	18:41
								62	02:32	04:03	05:30	18:49	18:44	18:40
								60	02:44	04:10	05:33	18:40	18:40	18:39
								58	02:55	04:16	05:36	18:33	18:36	18:38
								56	03:04	04:22	05:38	18:27	18:32	18:37
								54	03:12	04:26	05:40	18:21	18:29	18:37
								52	03:19	04:31	05:42	18:16	18:26	18:36
								50	03:25	04:35	05:44	18:11	18:24	18:35
								45	03:39	04:44	05:48	18:00	18:18	18:34
								40	03:50	04:51	05:51	17:52	18:13	18:33
								35	03:60	04:57	05:54	17:44	18:09	18:32
								30	04:08	05:02	05:56	17:38	18:05	18:31
								20	04:22	05:12	06:00	17:26	17:58	18:29
								10	04:35	05:20	06:04	17:16	17:52	18:28
								0	04:46	05:28	06:08	17:06	17:47	18:27
								-10	04:58	05:35	06:11	16:57	17:41	18:25
								-20	05:10	05:43	06:15	16:46	17:35	18:24
								-30	05:24	05:52	06:19	16:34	17:28	18:22
								-35	05:32	05:58	06:21	16:27	17:24	18:21
								-40	05:41	06:03	06:24	16:20	17:20	18:20
								-45	05:52	06:10	06:27	16:10	17:15	18:19
								-50	06:05	06:19	06:31	15:59	17:08	18:17
								-52	06:11	06:22	06:32	15:54	17:05	18:16
								-54	06:17	06:26	06:34	15:48	17:02	18:16
								-56	06:25	06:31	06:36	15:41	16:58	18:15
								-58	06:33	06:36	06:38	15:34	16:54	18:14
								-60	06:42	06:42	06:41	15:26	16:50	18:13
								Day	Sun		Mer.	Moon		Age
									Eqn.of Time	12 ^h	Pass	Upper	Lower	
								13	03:49	03:59	11:56	10:56	23:16	28(2%)
								14	04:10	04:21	11:55	11:37	23:57	29(0%)
								15	04:31	04:42	11:55	12:17	00:36	0(0%)
									Sun		Moon			
									Eqn.of Time		Mer.		Age	
									12 ^h		Pass			
									00 ^h		Upper			
									00 ^h		Lower			
									00 ^h		Upper			
									00 ^h		Lower			
									00 ^h		Upper			
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									00 ^h		Lower			
									00 ^h		Upper			

September 16, 17 ,18 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	354°41.2	219°00.4	11°22.4	162°54.5	-4°30.9	311°22.6	15°08.3	19°39.5	-12°17.6				Alpheratz	357°35.6	29°13.4		
1	9°43.7	234°01.7	11°22.4	177°55.4	-4°31.6	326°25.2	15°08.3	34°42.1	-12°17.6				Ankaa	353°07.8	-42°10.5		
2	24°46.1	249°03.1	11°22.5	192°56.4	-4°32.2	341°27.7	15°08.2	49°44.7	-12°17.7				Schedar	349°31.8	56°40.0		
3	39°48.6	264°04.4	11°22.6	207°57.3	-4°32.9	356°30.3	15°08.2	64°47.3	-12°17.7				Diphda	348°48.0	-17°51.3		
4	54°51.0	279°05.8	11°22.7	222°58.3	-4°33.6	11°32.8	15°08.2	79°50.0	-12°17.8				Achernar	335°20.5	-57°06.8		
5	69°53.5	294°07.1	11°22.8	237°59.3	-4°34.2	26°35.4	15°08.1	94°52.6	-12°17.9				Hamal	327°52.2	23°34.5		
6	84°56.0	309°08.5	11°22.8	253°00.2	-4°34.9	41°38.0	15°08.1	109°55.2	-12°17.9				Polaris	314°17.5	89°21.6		
7	99°58.4	324°09.8	11°22.9	268°01.2	-4°35.5	56°40.5	15°08.1	124°57.9	-12°18.0				Akamar	315°12.3	-40°12.3		
8	115°00.9	339°11.1	11°23.0	283°02.1	-4°36.2	71°43.1	15°08.0	140°00.5	-12°18.0				Menkar	314°07.1	4°11.1		
9	130°03.4	354°12.5	11°23.1	298°03.1	-4°36.9	86°45.6	15°08.0	155°03.1	-12°18.1				Mirfak	308°29.6	49°56.6		
10	145°05.8	9°13.8	11°23.1	313°04.1	-4°37.5	101°48.2	15°07.9	170°05.7	-12°18.2				Aldebaran	290°40.8	16°33.5		
11	160°08.3	24°15.1	11°23.2	328°05.0	-4°38.2	116°50.8	15°07.9	185°08.4	-12°18.2				Rigel	281°04.9	-8°10.2		
12	175°10.8	39°16.5	11°23.3	343°06.0	-4°38.8	131°53.3	15°07.9	200°11.0	-12°18.3				Capella	280°23.5	46°01.2		
13	190°13.2	54°17.8	11°23.4	358°06.9	-4°39.5	146°55.9	15°07.8	215°13.6	-12°18.4				Bellatrix	278°24.0	6°22.4		
14	205°15.7	69°19.1	11°23.4	13°07.9	-4°40.2	161°58.4	15°07.8	230°16.2	-12°18.4				Elnath	278°03.2	28°37.6		
15	220°18.1	84°20.4	11°23.5	28°08.8	-4°40.8	177°01.0	15°07.8	245°18.9	-12°18.5				Alnilam	275°38.8	-1°11.0		
16	235°20.6	99°21.7	11°23.6	43°09.8	-4°41.5	192°03.6	15°07.7	260°21.5	-12°18.5				Betelgeuse	270°53.3	7°24.8		
17	250°23.1	114°23.0	11°23.6	58°10.8	-4°42.1	207°06.1	15°07.7	275°24.1	-12°18.6				Canopus	263°53.0	-52°42.1		
18	265°25.5	129°24.3	11°23.7	73°11.7	-4°42.8	222°08.7	15°07.7	290°26.7	-12°18.7				Sirius	258°27.2	-16°44.5		
19	280°28.0	144°25.6	11°23.8	88°12.7	-4°43.5	237°11.2	15°07.6	305°29.4	-12°18.7				Adara	255°06.8	-28°59.9		
20	295°30.5	159°26.9	11°23.8	103°13.6	-4°44.1	252°13.8	15°07.6	320°32.0	-12°18.8				Procyon	244°52.0	5°10.2		
21	310°32.9	174°28.2	11°23.9	118°14.6	-4°44.8	267°16.4	15°07.6	335°34.6	-12°18.8				Pollux	243°18.7	27°58.2		
22	325°35.4	189°29.5	11°24.0	133°15.6	-4°45.4	282°18.9	15°07.5	350°37.2	-12°18.9				Avior	234°15.6	-59°34.8		
23	340°37.9	204°30.8	11°24.0	148°16.5	-4°46.1	297°21.5	15°07.5	5°39.9	-12°19.0				Suhail	222°47.5	-43°31.4		
Mer.pass.:0:21:			v1.4 d0.1 m-4.5			v1.0 d-0.7 m1.7			v2.6 d-0.0 m-2.6			v2.6 d-0.1 m0.5					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	355°40.3	219°32.1	11°24.1	163°17.5	-4°46.7	312°24.1	15°07.4	20°42.5	-12°19.0				Dubhe	193°42.9	61°37.5		
1	10°42.8	234°33.4	11°24.1	178°18.4	-4°47.4	327°26.6	15°07.4	35°45.1	-12°19.1				Denebola	182°26.3	14°26.6		
2	25°45.3	249°34.7	11°24.2	193°19.4	-4°48.1	342°29.2	15°07.4	50°47.7	-12°19.1				Gienah	175°45.0	-17°40.3		
3	40°47.7	264°36.0	11°24.3	208°20.3	-4°48.7	357°31.8	15°07.3	65°50.4	-12°19.2				Acrux	173°02.1	-63°13.8		
4	55°50.2	279°37.3	11°24.3	223°21.3	-4°49.4	12°34.3	15°07.3	80°53.0	-12°19.3				Gacrux	171°53.5	-57°14.7		
5	70°52.6	294°38.5	11°24.4	238°22.3	-4°50.0	27°36.9	15°07.3	95°55.6	-12°19.3				Alioth	166°14.5	55°50.1		
6	85°55.1	309°39.8	11°24.4	253°23.2	-4°50.7	42°39.5	15°07.2	110°58.2	-12°19.4				Spica	158°23.7	-11°17.0		
7	100°57.6	324°41.1	11°24.5	268°24.2	-4°51.4	57°42.0	15°07.2	126°00.9	-12°19.4				Alcaid	152°53.2	49°11.9		
8	116°00.0	339°42.3	11°24.5	283°25.1	-4°52.0	72°44.6	15°07.1	141°03.5	-12°19.5				Hadar	148°38.1	-60°29.3		
9	131°02.5	354°43.6	11°24.6	298°26.1	-4°52.7	87°47.2	15°07.1	156°06.1	-12°19.6				Menkent	147°59.3	-36°29.2		
10	146°05.0	9°44.9	11°24.6	313°27.0	-4°53.3	102°49.7	15°07.1	171°08.7	-12°19.6				Arcturus	145°49.0	19°04.0		
11	161°07.4	24°46.1	11°24.7	328°28.0	-4°54.0	117°52.3	15°07.0	186°11.4	-12°19.7				Rigel Kent.	139°42.3	-60°56.1		
12	176°09.9	39°47.4	11°24.7	343°28.9	-4°54.6	132°54.9	15°07.0	201°14.0	-12°19.7				Zubenelg.	136°57.5	-16°08.3		
13	191°12.4	54°48.6	11°24.8	358°29.9	-4°55.3	147°57.4	15°07.0	216°16.6	-12°19.8				Kochab	137°20.5	74°03.7		
14	206°14.8	69°49.9	11°24.8	13°30.9	-4°56.0	163°00.0	15°06.9	231°19.2	-12°19.9				Alphecca	126°04.9	26°38.3		
15	221°17.3	84°51.1	11°24.9	28°31.8	-4°56.6	178°02.6	15°06.9	246°21.9	-12°19.9				Antares	112°17.3	-26°29.1		
16	236°19.7	99°52.4	11°24.9	43°32.8	-4°57.3	193°05.1	15°06.8	261°24.5	-12°20.0				Atria	107°12.6	-69°04.4		
17	251°22.2	114°53.6	11°25.0	58°33.7	-4°57.9	208°07.7	15°06.8	276°27.1	-12°20.0				Sabik	102°04.1	-15°45.2		
18	266°24.7	129°54.9	11°25.0	73°34.7	-4°58.6	223°10.3	15°06.8	291°29.7	-12°20.1				Shaula	96°11.9	-37°07.3		
19	281°27.1	144°56.1	11°25.1	88°35.6	-4°59.3	238°12.9	15°06.7	306°32.4	-12°20.2				Rasalhague	95°59.6	12°32.8		
20	296°29.6	159°57.3	11°25.1	103°36.6	-4°59.9	253°15.4	15°06.7	321°35.0	-12°20.2				Etamin	90°42.6	51°29.4		
21	311°32.1	174°58.6	11°25.2	118°37.5	-5°00.6	268°18.0	15°06.7	336°37.6	-12°20.3				Kaus Aust.	83°33.9	-34°22.5		
22	326°34.5	189°59.8	11°25.2	133°38.5	-5°01.2	283°20.6	15°06.6	351°40.2	-12°20.3				Vega	80°33.9	38°48.5		
23	341°37.0	205°01.0	11°25.2	148°39.4	-5°01.9	298°23.1	15°06.6	6°42.9	-12°20.4				Nunki	75°49.0	-26°16.1		
Mer.pass.:0:17:			v1.3 d0.1 m-4.5			v1.0 d-0.7 m1.7			v2.6 d-0.0 m-2.6			v2.6 d-0.1 m0.5					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	356°39.5	220°02.3	11°25.3	163°40.4	-5°02.5	313°25.7	15°06.5	21°45.5	-12°20.5				2023/9/1	SHA	Mer.pass		
1	11°41.9	235°03.5	11°25.3	178°41.4	-5°03.2	328°28.3	15°06.5	36°48.1	-12°20.5				Venus	224°19.2	09:23		
2	26°44.4	250°04.7	11°25.4	193°42.3	-5°03.9	343°30.9	15°06.5	51°50.7	-12°20.6				Mars	168°13.3	13:08		
3	41°46.9	265°05.9	11°25.4	208°43.3	-5°04.5	358°33.4	15°06.4	66°53.3	-12°20.6				Jupiter	316°41.4	03:14		
4	56°49.3	280°07.1	11°25.4	223°44.2	-5°05.2	13°36.0	15°06.4	81°56.0	-12°20.7				Saturn	24°58.3	22:37		
5	71°51.8	295°08.3	11°25.5	238°45.2	-5°05.8	28°38.6	15°06.3	96°58.6	-12°20.8				2023/9/1	SHA	Mer.pass		
6	86°54.2	310°09.6	11°25.5	253°46.1	-5°06.5	43°41.2	15°06.3	112°01.2	-12°20.8				Venus	223°51.8	09:21		
7	101°56.7	325°10.8	11°25.5	268°47.1	-5°07.1	58°43.7	15°06.3	127°03.8	-12°20.9				Mars	167°37.1	13:06		
8	116°59.2	340°12.0	11°25.6	283°48.0	-5°07.8	73°46.3	15°06.2	142°06.5	-12°20.9				Jupiter	316°43.7	03:10		
9	132°01.6	355°13.2	11°25.6	298°49.0	-5°08.5	88°48.9	15°06.2	157°09.1	-12°21.0				Saturn	2			

Sun				Moon										
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	181°13.2	2°49.4	171°02.2	16.9	0°32.5	-14.3	54.5	72	02:21	04:04	05:15	18:32	19:42	21:22
1	196°13.4	2°48.5	185°38.1	16.9	0°18.2	-14.3	54.5	70	02:49	04:16	05:19	18:28	19:31	20:55
2	211°13.6	2°47.5	200°13.9	16.9	0°04.0	-14.3	54.5	68	03:10	04:25	05:22	18:25	19:22	20:36
3	226°13.8	2°46.6	214°49.8	16.9	-0°10.3	-14.3	54.5	66	03:26	04:33	05:25	18:22	19:14	20:20
4	241°14.1	2°45.6	229°25.6	16.8	-0°24.6	-14.3	54.5	64	03:39	04:39	05:28	18:20	19:08	20:08
5	256°14.3	2°44.6	244°01.5	16.8	-0°38.9	-14.3	54.5	62	03:49	04:45	05:30	18:18	19:03	19:58
6	271°14.5	2°43.7	258°37.3	16.8	-0°53.2	-14.3	54.6	60	03:58	04:50	05:32	18:16	18:58	19:49
7	286°14.7	2°42.7	273°13.1	16.8	-1°07.5	-14.3	54.6	58	04:05	04:54	05:33	18:15	18:54	19:42
8	301°14.9	2°41.7	287°48.9	16.8	-1°21.8	-14.3	54.6	56	04:12	04:57	05:35	18:13	18:51	19:36
9	316°15.2	2°40.8	302°24.7	16.8	-1°36.1	-14.3	54.6	54	04:18	05:00	05:36	18:12	18:47	19:30
10	331°15.4	2°39.8	317°00.4	16.7	-1°50.4	-14.3	54.6	52	04:23	05:03	05:37	18:11	18:45	19:25
11	346°15.6	2°38.8	331°36.1	16.7	-2°04.7	-14.3	54.6	50	04:27	05:06	05:38	18:10	18:42	19:21
12	1°15.8	2°37.9	346°11.9	16.7	-2°19.0	-14.3	54.6	45	04:36	05:11	05:41	18:08	18:37	19:12
13	16°16.1	2°36.9	0°47.6	16.7	-2°33.3	-14.3	54.7	40	04:43	05:15	05:42	18:06	18:33	19:05
14	31°16.3	2°35.9	15°23.2	16.7	-2°47.6	-14.3	54.7	35	04:49	05:19	05:44	18:05	18:30	18:60
15	46°16.5	2°35.0	29°58.9	16.6	-3°01.9	-14.3	54.7	30	04:53	05:21	05:45	18:03	18:27	18:55
16	61°16.7	2°34.0	44°34.5	16.6	-3°16.2	-14.3	54.7	20	04:60	05:26	05:48	18:01	18:23	18:49
17	76°16.9	2°33.1	59°10.1	16.6	-3°30.5	-14.3	54.7	10	05:04	05:29	05:50	17:59	18:20	18:45
18	91°17.2	2°32.1	73°45.7	16.6	-3°44.8	-14.3	54.7	0	05:07	05:31	05:51	17:58	18:19	18:43
19	106°17.4	2°31.1	88°21.2	16.5	-3°59.1	-14.3	54.7	-10	05:08	05:32	05:53	17:56	18:17	18:42
20	121°17.6	2°30.2	102°56.7	16.5	-4°13.4	-14.3	54.8	-20	05:07	05:33	05:55	17:55	18:17	18:42
21	136°17.8	2°29.2	117°32.2	16.5	-4°27.6	-14.3	54.8	-30	05:05	05:32	05:56	17:53	18:17	18:45
22	151°18.1	2°28.2	132°07.7	16.4	-4°41.9	-14.2	54.8	-35	05:03	05:32	05:57	17:53	18:18	18:47
23	166°18.3	2°27.3	146°43.1	16.4	-4°56.1	-14.2	54.8	-40	04:60	05:31	05:58	17:52	18:19	18:50
SD.=15.9 d=-1.0 S.D.=14.9								-45	04:56	05:30	05:59	17:51	18:20	18:54
								-50	04:51	05:29	06:01	17:49	18:22	18:59
								-52	04:48	05:28	06:01	17:49	18:23	19:02
								-54	04:46	05:27	06:02	17:48	18:24	19:05
								-56	04:42	05:26	06:03	17:48	18:25	19:08
								-58	04:38	05:24	06:03	17:47	18:26	19:12
								-60	04:34	05:23	06:04	17:46	18:28	19:17
								Lat.	Moonrise			Moonset		
								72	07:02	09:04	11:24	18:17	17:41	16:51
								70	07:01	08:53	10:56	18:22	17:55	17:20
								68	06:59	08:43	10:36	18:26	18:07	17:43
								66	06:58	08:36	10:20	18:30	18:16	18:00
								64	06:57	08:30	10:07	18:33	18:24	18:14
								62	06:56	08:24	09:56	18:36	18:31	18:27
								60	06:55	08:19	09:47	18:38	18:37	18:37
								58	06:55	08:15	09:39	18:40	18:43	18:46
								56	06:54	08:12	09:32	18:42	18:47	18:54
								54	06:54	08:08	09:26	18:44	18:52	19:01
								52	06:53	08:05	09:20	18:45	18:56	19:08
								50	06:53	08:03	09:15	18:47	18:59	19:13
								45	06:52	07:57	09:04	18:50	19:07	19:26
								40	06:51	07:52	08:55	18:53	19:13	19:36
								35	06:50	07:48	08:47	18:55	19:19	19:45
								30	06:50	07:44	08:40	18:57	19:24	19:53
								20	06:49	07:38	08:29	19:00	19:33	20:07
								10	06:48	07:33	08:19	19:03	19:40	20:19
								0	06:47	07:27	08:10	19:06	19:47	20:31
								-10	06:46	07:22	08:00	19:09	19:55	20:42
								-20	06:46	07:17	07:50	19:12	20:02	20:54
								-30	06:45	07:11	07:39	19:16	20:11	21:08
								-35	06:44	07:08	07:33	19:18	20:16	21:17
								-40	06:44	07:04	07:26	19:20	20:22	21:26
								-45	06:43	06:59	07:17	19:23	20:29	21:37
								-50	06:42	06:54	07:07	19:26	20:37	21:50
								-52	06:42	06:52	07:03	19:28	20:41	21:57
								-54	06:41	06:49	06:58	19:29	20:45	22:04
								-56	06:41	06:46	06:52	19:31	20:50	22:11
								-58	06:41	06:43	06:46	19:33	20:55	22:20
								-60	06:40	06:39	06:39	19:35	21:01	22:30
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								16	04:53	05:03	11:54	12:56	00:36	1(2%)
								17	05:14	05:25	11:54	13:37	01:16	2(5%)
								18	05:35	05:46	11:54	14:20	01:58	3(11%)
SD.=15.9 d=-1.0 S.D.=15.1														
Mon	GHA	Dec	GHA	ν	Dec	d	HP							
0	181°23.9	2°03.1	151°15.4	15.3	-10°46.2	-13.7	55.2							
1	196°24.1	2°02.1	165°49.7	15.2	-10°59.9	-13.6	55.2							
2	211°24.3	2°01.2	180°23.9	15.1	-11°13.5	-13.6	55.2							
3	226°24.5	2°00.2	194°58.0	15.1	-11°27.1	-13.6	55.3							
4	241°24.7	1°59.2	209°32.0	15.0	-11°40.6	-13.5	55.3							
5	256°25.0	1°58.3	224°06.0	15.0	-11°54.1	-13.5	55.3							
6	271°25.2	1°57.3	238°39.9	14.9	-12°07.6	-13.5	55.3							
7	286°25.4	1°56.3	253°13.8	14.8	-12°21.0	-13.4	55.3							
8	301°25.6	1°55.4	267°47.6	14.8	-12°34.4	-13.4	55.4							
9	316°25.9	1°54.4	282°21.3	14.7	-12°47.8	-13.3	55.4							
10	331°26.1	1°53.4	296°55.0	14.6	-13°01.1	-13.3	55.4							
11	346°26.3	1°52.5	311°28.6	14.6	-13°14.4	-13.2	55.4							
12	1°26.5	1°51.5	326°02.1	14.5	-13°27.6	-13.2	55.4							
13	16°26.7	1°50.5	340°35.5	14.4	-13°40.7	-13.1	55.5							
14	31°27.0	1°49.6	355°08.9	14.3	-13°53.9	-13.1	55.5							
15	46°27.2	1°48.6	9°42.2	14.3	-14°06.9	-13.0	55.5							
16	61°27.4	1°47.6	24°15.4	14.2	-14°19.9	-13.0	55.5							
17	76°27.6	1°46.7	38°48.6	14.1	-14°32.9	-12.9	55.5							
18	91°27.9	1°45.7	53°21.6	14.0	-14°45.8	-12.9	55.6							
19	106°28.1	1°44.7	67°54.6	14.0	-14°58.7	-12.8	55.6							
20	121°28.3	1°43.7	82°27.5	13.9	-15°11.5	-12.8	55.6							
21	136°28.5	1°42.8	97°00.4	13.8	-15°24.3	-12.7	55.6							
22	151°28.8	1°41.8	111°33.1	13.7	-15°36.9	-12.7	55.6							
23	166°29.0	1°40.8	126°05.8	13.6	-15°49.6	-12.6	55.7							
SD.=15.9 d=-1.0 S.D.=15.1														

September 19, 20 ,21 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	357°38.6	220°30.9	11°25.9	164°03.3	-5°18.3	314°27.6	15°05.6	22°48.4	-12°21.9	Alpheratz	357°35.6	29°13.4
1	12°41.1	235°32.0	11°25.9	179°04.2	-5°19.0	329°30.2	15°05.5	37°51.0	-12°21.9	Ankaa	353°07.8	-42°10.5
2	27°43.5	250°33.2	11°26.0	194°05.2	-5°19.6	344°32.7	15°05.5	52°53.7	-12°22.0	Schedar	349°31.8	56°40.0
3	42°46.0	265°34.3	11°26.0	209°06.1	-5°20.3	359°35.3	15°05.4	67°56.3	-12°22.1	Diphda	348°48.0	-17°51.3
4	57°48.5	280°35.5	11°26.0	224°07.1	-5°21.0	14°37.9	15°05.4	82°58.9	-12°22.1	Achernar	335°20.5	-57°06.8
5	72°50.9	295°36.6	11°26.0	239°08.0	-5°21.6	29°40.5	15°05.4	98°01.5	-12°22.2	Hamal	327°52.2	23°34.5
6	87°53.4	310°37.8	11°26.0	254°09.0	-5°22.3	44°43.1	15°05.3	113°04.1	-12°22.2	Polaris	314°16.2	89°21.6
7	102°55.8	325°38.9	11°26.0	269°09.9	-5°22.9	59°45.6	15°05.3	128°06.8	-12°22.3	Akamar	315°12.3	-40°12.3
8	117°58.3	340°40.1	11°26.0	284°10.9	-5°23.6	74°48.2	15°05.2	143°09.4	-12°22.4	Menkar	314°07.1	4°11.1
9	133°00.8	355°41.2	11°26.0	299°11.8	-5°24.2	89°50.8	15°05.2	158°12.0	-12°22.4	Mirfak	308°29.5	49°56.6
10	148°03.2	10°42.3	11°26.0	314°12.8	-5°24.9	104°53.4	15°05.2	173°14.6	-12°22.5	Aldebaran	290°40.8	16°33.5
11	163°05.7	25°43.5	11°26.1	329°13.7	-5°25.6	119°56.0	15°05.1	188°17.2	-12°22.5	Rigel	281°04.9	-8°10.2
12	178°08.2	40°44.6	11°26.1	344°14.7	-5°26.2	134°58.6	15°05.1	203°19.9	-12°22.6	Capella	280°23.5	46°01.2
13	193°10.6	55°45.7	11°26.1	359°15.6	-5°26.9	150°01.2	15°05.0	218°22.5	-12°22.6	Bellatrix	278°24.0	6°22.4
14	208°13.1	70°46.9	11°26.1	14°16.6	-5°27.5	165°03.7	15°05.0	233°25.1	-12°22.7	Elnath	278°03.2	28°37.6
15	223°15.6	85°48.0	11°26.1	29°17.5	-5°28.2	180°06.3	15°04.9	248°27.7	-12°22.8	Alnilam	275°38.8	-1°11.0
16	238°18.0	100°49.1	11°26.1	44°18.5	-5°28.8	195°08.9	15°04.9	263°30.3	-12°22.8	Betelgeuse	270°53.3	7°24.8
17	253°20.5	115°50.2	11°26.1	59°19.4	-5°29.5	210°11.5	15°04.9	278°33.0	-12°22.9	Canopus	263°53.0	-52°42.1
18	268°23.0	130°51.3	11°26.1	74°20.4	-5°30.1	225°14.1	15°04.8	293°35.6	-12°22.9	Sirius	258°27.2	-16°44.5
19	283°25.4	145°52.4	11°26.1	89°21.3	-5°30.8	240°16.7	15°04.8	308°38.2	-12°23.0	Adara	255°06.8	-28°59.9
20	298°27.9	160°53.6	11°26.1	104°22.3	-5°31.5	255°19.3	15°04.7	323°40.8	-12°23.1	Procyon	244°52.0	5°10.2
21	313°30.3	175°54.7	11°26.1	119°23.2	-5°32.1	270°21.8	15°04.7	338°43.4	-12°23.1	Pollux	243°18.7	27°58.2
22	328°32.8	190°55.8	11°26.1	134°24.2	-5°32.8	285°24.4	15°04.6	353°46.1	-12°23.2	Avior	234°15.6	-59°34.7
23	343°35.3	205°56.9	11°26.0	149°25.1	-5°33.4	300°27.0	15°04.6	8°48.7	-12°23.2	Suhail	222°47.5	-43°31.4
Mer.pass.:0:09:		v1.2 d0.0 m-4.5		v1.0 d-0.7 m1.7		v2.6 d-0.0 m-2.6		v2.6 d-0.1 m0.5		Miaplacidus	221°39.3	-69°48.5
										Alphard	217°49.1	-8°45.5
										Regulus	207°35.8	11°51.2
										Dubhe	193°42.9	61°37.5
										Denebola	182°26.3	14°26.6
										Gienah	175°45.0	-17°40.2
										Acrux	173°02.1	-63°13.8
										Gacrux	171°53.5	-57°14.7
										Alioth	166°14.5	55°50.0
										Spica	158°23.8	-11°16.9
										Alcaid	152°53.3	49°11.9
										Hadar	148°38.1	-60°29.3
										Menkent	147°59.3	-36°29.2
										Arcturus	145°49.0	19°04.0
										Rigel Kent.	139°42.3	-60°56.1
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°20.5	74°03.7
										Alphecca	126°04.9	26°38.3
										Antares	112°17.3	-26°29.1
										Atria	107°12.6	-69°04.4
										Sabik	102°04.1	-15°45.2
										Shaula	96°11.9	-37°07.3
										Rasalhague	95°59.6	12°32.8
										Etamin	90°42.7	51°29.4
										Kaus Aust.	83°33.9	-34°22.5
										Vega	80°33.9	38°48.5
										Nunki	75°49.0	-26°16.1
										Altair	62°00.9	8°55.9
										Peacock	53°07.1	-56°39.7
										Deneb	49°26.3	45°22.1
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.8
										Fomalhaut	15°15.4	-29°29.8
										Scheat	13°46.0	28°12.8
										Markab	13°30.7	15°20.1
										2023/9/1	SHA	Mer.pass
										Venus	222°52.3	09:17
										Mars	166°24.7	13:03
										Jupiter	316°49.0	03:02
										Saturn	25°09.8	22:25
										2023/9/2	SHA	Mer.pass
										Venus	222°20.2	09:15
										Mars	165°48.3	13:01
										Jupiter	316°51.9	02:58
										Saturn	25°13.6	22:21
										2023/9/2	SHA	Mer.pass
										Venus	221°46.8	09:14
										Mars	165°11.9	12:60
										Jupiter	316°55.0	02:53
										Saturn	25°17.3	22:17
										Horizontal paralax		
										Venus:	0.3	
										Mars:	0.1	
Mer.pass.:23:57		v1.0 d-0.0 m-4.5		v0.9 d-0.7 m1.7		v2.6 d-0.0 m-2.6		v2.6 d-0.1 m0.5				

Sun				Moon											
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	181°29.2	1°39.9		140°38.4	13.6	-16°02.2	-12.5	55.7		Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	196°29.4	1°38.9		155°10.9	13.5	-16°14.7	-12.5	55.7	72	02:43	04:19	05:28	18:16	19:25	20:59
2	211°29.6	1°37.9		169°43.3	13.4	-16°27.1	-12.4	55.7	70	03:06	04:28	05:31	18:14	19:16	20:36
3	226°29.9	1°37.0		184°15.7	13.3	-16°39.5	-12.4	55.8	68	03:24	04:36	05:33	18:12	19:08	20:20
4	241°30.1	1°36.0		198°47.9	13.2	-16°51.9	-12.3	55.8	66	03:38	04:43	05:35	18:10	19:02	20:06
5	256°30.3	1°35.0		213°20.1	13.1	-17°04.1	-12.2	55.8	64	03:49	04:48	05:36	18:09	18:57	19:56
6	271°30.5	1°34.1		227°52.2	13.0	-17°16.3	-12.2	55.8	62	03:58	04:53	05:38	18:08	18:52	19:47
7	286°30.8	1°33.1		242°24.2	12.9	-17°28.5	-12.1	55.8	60	04:06	04:57	05:39	18:07	18:49	19:39
8	301°31.0	1°32.1		256°56.1	12.9	-17°40.5	-12.0	55.9	58	04:13	05:00	05:40	18:06	18:45	19:33
9	316°31.2	1°31.2		271°27.9	12.8	-17°52.5	-12.0	55.9	56	04:19	05:03	05:41	18:05	18:42	19:27
10	331°31.4	1°30.2		285°59.6	12.7	-18°04.4	-11.9	55.9	54	04:24	05:06	05:41	18:05	18:40	19:22
11	346°31.6	1°29.2		300°31.2	12.6	-18°16.3	-11.8	55.9	52	04:28	05:08	05:42	18:04	18:38	19:18
12	1°31.9	1°28.2		315°02.8	12.5	-18°28.1	-11.7	56.0	50	04:32	05:10	05:43	18:03	18:36	19:14
13	16°32.1	1°27.3		329°34.2	12.4	-18°39.8	-11.7	56.0	45	04:40	05:15	05:44	18:02	18:31	19:06
14	31°32.3	1°26.3		344°05.6	12.3	-18°51.4	-11.6	56.0	40	04:46	05:18	05:45	18:01	18:28	18:60
15	46°32.5	1°25.3		358°36.8	12.2	-19°02.9	-11.5	56.0	35	04:51	05:21	05:46	18:00	18:26	18:55
16	61°32.8	1°24.4		13°08.0	12.1	-19°14.4	-11.4	56.0	30	04:55	05:23	05:47	17:60	18:23	18:51
17	76°33.0	1°23.4		27°39.0	12.0	-19°25.8	-11.3	56.1	20	05:01	05:26	05:48	17:58	18:20	18:46
18	91°33.2	1°22.4		42°10.0	11.9	-19°37.1	-11.3	56.1	10	05:04	05:28	05:49	17:57	18:18	18:43
19	106°33.4	1°21.5		56°40.9	11.8	-19°48.3	-11.2	56.1	0	05:06	05:30	05:50	17:57	18:17	18:41
20	121°33.7	1°20.5		71°11.6	11.7	-19°59.5	-11.1	56.1	-10	05:06	05:30	05:51	17:56	18:17	18:41
21	136°33.9	1°19.5		85°42.3	11.6	-20°10.5	-11.0	56.2	-20	05:04	05:30	05:52	17:56	18:18	18:43
22	151°34.1	1°18.5		100°12.9	11.5	-20°21.5	-10.9	56.2	-30	05:01	05:29	05:53	17:55	18:19	18:47
23	166°34.3	1°17.6		114°43.3	11.4	-20°32.4	-10.8	56.2	-35	04:58	05:28	05:53	17:55	18:20	18:49
	SD.=15.9	d=-1.0	S.D.=15.2						-40	04:55	05:26	05:53	17:54	18:21	18:53
									-45	04:50	05:24	05:54	17:54	18:23	18:58
									-50	04:44	05:22	05:54	17:54	18:26	19:04
									-52	04:41	05:21	05:54	17:54	18:27	19:07
									-54	04:38	05:19	05:54	17:54	18:29	19:11
									-56	04:34	05:18	05:55	17:54	18:31	19:15
									-58	04:30	05:16	05:55	17:53	18:33	19:19
									-60	04:24	05:14	05:55	17:53	18:35	19:24
Wed	GHA	Dec		GHA	ν	Dec	d	HP		Moonrise			Moonset		
0	181°34.5	1°16.6		129°13.7	11.3	-20°43.2	-10.7	56.2	Lat.	Tue	Wed	Thu	Tue	Wed	Thu
1	196°34.8	1°15.6		143°43.9	11.2	-20°53.9	-10.7	56.3	72	--:--	--:--	--:--	--:--	--:--	--:--
2	211°35.0	1°14.7		158°14.1	11.1	-21°04.5	-10.6	56.3	70	13:44	--:--	--:--	16:08	--:--	--:--
3	226°35.2	1°13.7		172°44.2	11.0	-21°15.0	-10.5	56.3	68	12:50	--:--	--:--	17:03	--:--	--:--
4	241°35.4	1°12.7		187°14.1	10.9	-21°25.4	-10.4	56.3	66	12:17	14:56	--:--	17:37	16:42	--:--
5	256°35.7	1°11.8		201°44.0	10.8	-21°35.7	-10.3	56.4	64	11:54	13:57	--:--	18:02	17:41	--:--
6	271°35.9	1°10.8		216°13.7	10.7	-21°45.9	-10.2	56.4	62	11:35	13:23	15:25	18:22	18:16	18:07
7	286°36.1	1°09.8		230°43.4	10.6	-21°56.1	-10.1	56.4	60	11:20	12:59	14:43	18:38	18:41	18:50
8	301°36.3	1°08.8		245°12.9	10.5	-22°06.1	-10.0	56.4	58	11:07	12:40	14:14	18:51	19:01	19:19
9	316°36.5	1°07.9		259°42.3	10.4	-22°16.0	-9.9	56.5	56	10:56	12:24	13:52	19:03	19:17	19:41
10	331°36.8	1°06.9		274°11.6	10.3	-22°25.8	-9.8	56.5	54	10:46	12:10	13:34	19:14	19:32	19:59
11	346°37.0	1°05.9		288°40.9	10.2	-22°35.5	-9.7	56.5	52	10:38	11:58	13:19	19:23	19:44	20:15
12	1°37.2	1°05.0		303°10.0	10.1	-22°45.2	-9.6	56.5	50	10:30	11:48	13:05	19:31	19:55	20:29
13	16°37.4	1°04.0		317°39.0	10.0	-22°54.7	-9.4	56.6	45	10:14	11:26	12:38	19:49	20:18	20:56
14	31°37.7	1°03.0		332°07.9	9.8	-23°04.1	-9.3	56.6	40	10:00	11:08	12:17	20:04	20:37	21:18
15	46°37.9	1°02.0		346°36.7	9.7	-23°13.3	-9.2	56.6	35	09:49	10:53	11:59	20:16	20:52	21:36
16	61°38.1	1°01.1		1°05.4	9.6	-23°22.5	-9.1	56.7	30	09:39	10:41	11:44	20:27	21:06	21:52
17	76°38.3	1°00.1		15°33.9	9.5	-23°31.6	-9.0	56.7	20	09:22	10:19	11:19	20:46	21:29	22:19
18	91°38.5	0°59.1		30°02.4	9.4	-23°40.5	-8.9	56.7	10	09:08	10:00	10:57	21:02	21:49	22:42
19	106°38.8	0°58.2		44°30.8	9.3	-23°49.3	-8.8	56.7	0	08:54	09:43	10:36	21:17	22:08	23:03
20	121°39.0	0°57.2		58°59.0	9.2	-23°58.1	-8.7	56.8	-10	08:41	09:26	10:16	21:33	22:27	23:25
21	136°39.2	0°56.2		73°27.2	9.1	-24°06.6	-8.5	56.8	-20	08:27	09:08	09:54	21:49	22:47	23:48
22	151°39.4	0°55.3		87°55.2	9.0	-24°15.1	-8.4	56.8	-30	08:11	08:47	09:29	22:08	23:11	--:--
23	166°39.7	0°54.3		102°23.1	8.9	-24°23.5	-8.3	56.8	-35	08:01	08:35	09:15	22:20	23:25	--:--
	SD.=15.9	d=-1.0	S.D.=15.3						-40	07:51	08:21	08:58	22:33	23:41	--:--
									-45	07:38	08:04	08:38	22:48	--:--	00:00
									-50	07:23	07:44	08:12	23:07	--:--	00:25
									-52	07:16	07:34	08:00	23:16	--:--	00:36
									-54	07:09	07:24	07:46	23:26	--:--	00:50
									-56	07:00	07:12	07:30	23:37	--:--	01:05
									-58	06:50	06:58	07:11	23:50	--:--	01:24
									-60	06:39	06:42	06:48	--:--	00:06	01:47
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Day	Sun		Mer.	Moon		Age
0	181°39.9	0°53.3		116°51.0	8.8	-24°31.7	-8.2	56.9		Eqn. of Time	12 ^h	Pass	Upper	Lower	
1	196°40.1	0°52.3		131°18.7	8.7	-24°39.8	-8.0	56.9	19	05:57	06:07	11:53	15:05	02:42	4(18%)
2	211°40.3	0°51.4		145°46.3	8.6	-24°47.8	-7.9	56.9	20	06:18	06:29	11:53	15:55	03:30	5(26%)
3	226°40.5	0°50.4		160°13.8	8.5	-24°55.6	-7.8	57.0	21	06:39	06:50	11:53	16:49	04:22	6(36%)
4	241°40.8	0°49.4		174°41.2	8.3	-25°03.3	-7.7	57.0							
5	256°41.0	0°48.5		189°08.5	8.2	-25°10.9	-7.5	57.0							
6	271°41.2	0°47.5		203°35.7	8.1	-25°18.4	-7.4	57.0							
7	286°41.4	0°46.5		218°02.8	8.0	-25°25.7	-7.3	57.1							
8	301°41.6	0°45.5		232°29.7	7.9	-25°32.9	-7.1	57.1							
9	316°41.9	0°44.6		246°56.6	7.8	-25°39.9	-7.0	57.1							
10	331°42.1	0°43.6		261°23.4	7.7	-25°46.9	-6.8	57.2							
11	346°42.3	0°42.6		275°50.0	7.6	-25°53.6	-6.7	57.2							
12	1°42.5	0°41.6		290°16.6	7.5	-26°00.3	-6.6	57.2							
13	16°42.8	0°40.7		304°43.1	7.4	-26°06.8	-6.4	57.2							
14	31°43.0	0°39.7		319°09.4	7.3	-26°13.1	-6.3	57.3							
15	46°43.2	0°38.7		333°35.7	7.2	-26°19.3	-6.1	57.3							
16	61°43.4	0°37.8		348°01.8	7.1	-26°25.4	-6.0	57.3							
17	76°43.6	0°36.8		2°27.9	7.0	-26°31.3	-5.8	57.4							
18	91°43.9	0°35.8		16°53.9	6.9	-26°37.1	-5.7	57.4							
19	106°44.1	0°34.8		31°19.7	6.8	-26°42.7	-5.5	57.4							
20	121°44.3	0°33.9		45°45.5	6.7	-26°48.1	-5.4	57.4							
21	136°44.5	0°32.9		60°11.2	6.6	-26°53.5	-5.2	57.5							
22	151°44.7	0°31.9		74°36.8	6.5	-26°58.6	-5.1	57.5							
23	166°45.0	0°31.0		89°02.2	6.4	-27°03.6	-4.9	57.5							
	SD.=15.9	d=-1.0	S.D.=15.5												

September 22, 23 ,24 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	0°36.0	221°48.0	11°24.6	165°11.4	-6°05.5	317°34.3	15°02.4	25°56.9	-12°26.0	Alpheratz	357°35.6	29°13.4					
1	15°38.5	236°49.0	11°24.6	180°12.4	-6°06.2	332°36.9	15°02.3	40°59.6	-12°26.1	Ankaa	353°07.8	-42°10.5					
2	30°40.9	251°50.0	11°24.5	195°13.3	-6°06.8	347°39.5	15°02.3	56°02.2	-12°26.1	Schedar	349°31.8	56°40.0					
3	45°43.4	266°50.9	11°24.5	210°14.2	-6°07.5	2°42.1	15°02.2	71°04.8	-12°26.2	Diphda	348°47.9	-17°51.3					
4	60°45.9	281°51.9	11°24.4	225°15.2	-6°08.2	17°44.7	15°02.2	86°07.4	-12°26.2	Achernar	335°20.4	-57°06.8					
5	75°48.3	296°52.9	11°24.4	240°16.1	-6°08.8	32°47.3	15°02.1	101°10.0	-12°26.3	Hamal	327°52.2	23°34.5					
6	90°50.8	311°53.9	11°24.3	255°17.1	-6°09.5	47°49.9	15°02.1	116°12.6	-12°26.3	Polaris	314°14.7	89°21.6					
7	105°53.3	326°54.8	11°24.2	270°18.0	-6°10.1	62°52.5	15°02.0	131°25.0	-12°26.4	Akamar	315°12.3	-40°12.3					
8	120°55.7	341°55.8	11°24.2	285°18.9	-6°10.8	77°55.1	15°02.0	146°17.9	-12°26.5	Menkar	314°07.1	4°11.1					
9	135°58.2	356°56.8	11°24.1	300°19.9	-6°11.4	92°57.7	15°01.9	161°20.5	-12°26.5	Mirfak	308°29.5	49°56.6					
10	151°00.7	11°57.7	11°24.1	315°20.8	-6°12.1	108°00.3	15°01.9	176°23.1	-12°26.6	Aldebaran	290°40.8	16°33.5					
11	166°03.1	26°58.7	11°24.0	330°21.8	-6°12.7	123°02.9	15°01.8	191°25.7	-12°26.6	Rigel	281°04.8	-8°10.2					
12	181°05.6	41°59.7	11°23.9	345°22.7	-6°13.4	138°05.5	15°01.8	206°28.3	-12°26.7	Capella	280°23.4	46°01.2					
13	196°08.1	57°00.6	11°23.9	0°23.6	-6°14.0	153°08.2	15°01.7	221°30.9	-12°26.7	Bellatrix	278°24.0	6°22.4					
14	211°10.5	72°01.6	11°23.8	15°24.6	-6°14.7	168°10.8	15°01.7	236°33.5	-12°26.8	Elnath	278°03.2	28°37.6					
15	226°13.0	87°02.5	11°23.7	30°25.5	-6°15.3	183°13.4	15°01.6	251°36.2	-12°26.8	Alnilam	275°38.8	-1°11.0					
16	241°15.4	102°03.5	11°23.7	45°26.5	-6°16.0	198°16.0	15°01.6	266°38.8	-12°26.9	Betelgeuse	270°53.3	7°24.8					
17	256°17.9	117°04.4	11°23.6	60°27.4	-6°16.7	213°18.6	15°01.5	281°41.4	-12°27.0	Canopus	263°52.9	-52°42.1					
18	271°20.4	132°05.4	11°23.5	75°28.3	-6°17.3	228°21.2	15°01.5	296°44.0	-12°27.0	Sirius	258°27.2	-16°44.5					
19	286°22.8	147°06.3	11°23.5	90°29.3	-6°18.0	243°23.8	15°01.4	311°46.6	-12°27.1	Adara	255°06.8	-28°59.9					
20	301°25.3	162°07.3	11°23.4	105°30.2	-6°18.6	258°26.4	15°01.4	326°49.2	-12°27.1	Procyon	244°52.0	5°10.2					
21	316°27.8	177°08.2	11°23.3	120°31.2	-6°19.3	273°29.0	15°01.3	341°51.8	-12°27.2	Pollux	243°18.7	27°58.2					
22	331°30.2	192°09.1	11°23.3	135°32.1	-6°19.9	288°31.6	15°01.3	356°54.4	-12°27.2	Avior	234°15.6	-59°34.7					
23	346°32.7	207°10.1	11°23.2	150°33.0	-6°20.6	303°34.3	15°01.2	11°57.1	-12°27.3	Suhail	222°47.4	-43°31.4					
Mer.pass.:23:53			v1.0 d-0.1 m-4.5	v0.9 d-0.7 m1.7	v2.6 d-0.0 m-2.6	v2.6 d-0.1 m0.5				Miaplacidus	221°39.2	-69°48.8					

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	1°35.2	222°11.0	11°23.1	165°34.0	-6°21.2	318°36.9	15°01.2	26°59.7	-12°27.3
1	16°37.6	237°11.9	11°23.0	180°34.9	-6°21.9	333°39.5	15°01.1	42°02.3	-12°27.4
2	31°40.1	252°12.9	11°22.9	195°35.8	-6°22.5	348°42.1	15°01.1	57°04.9	-12°27.4
3	46°42.5	267°13.8	11°22.9	210°36.8	-6°23.2	3°44.7	15°01.0	72°07.5	-12°27.5
4	61°45.0	282°14.7	11°22.8	225°37.7	-6°23.8	18°47.3	15°01.0	87°10.1	-12°27.6
5	76°47.5	297°15.6	11°22.7	240°38.7	-6°24.5	33°49.9	15°00.9	102°12.7	-12°27.6
6	91°49.9	312°16.6	11°22.6	255°39.6	-6°25.1	48°52.6	15°00.9	117°15.4	-12°27.7
7	106°52.4	327°17.5	11°22.6	270°40.5	-6°25.8	63°55.2	15°00.8	132°18.0	-12°27.7
8	121°54.9	342°18.4	11°22.5	285°41.5	-6°26.5	78°57.8	15°00.8	147°20.6	-12°27.8
9	136°57.3	357°19.3	11°22.4	300°42.4	-6°27.1	94°00.4	15°00.7	162°23.2	-12°27.8
10	151°59.8	12°20.2	11°22.3	315°43.3	-6°27.8	109°03.0	15°00.7	177°25.8	-12°27.9
11	167°02.3	27°21.1	11°22.2	330°44.3	-6°28.4	124°05.6	15°00.6	192°28.4	-12°27.9
12	182°04.7	42°22.0	11°22.1	345°45.2	-6°29.1	139°08.2	15°00.6	207°31.0	-12°28.0
13	197°07.2	57°22.9	11°22.0	0°46.2	-6°29.7	154°10.9	15°00.5	222°33.6	-12°28.0
14	212°09.7	72°23.8	11°22.0	15°47.1	-6°30.4	169°13.5	15°00.5	237°36.2	-12°28.1
15	227°12.1	87°24.7	11°21.9	30°48.0	-6°31.0	184°16.1	15°00.4	252°38.9	-12°28.2
16	242°14.6	102°25.6	11°21.8	45°49.0	-6°31.7	199°18.7	15°00.4	267°41.5	-12°28.2
17	257°17.0	117°26.5	11°21.7	60°49.9	-6°32.3	214°21.3	15°00.3	282°44.1	-12°28.3
18	272°19.5	132°27.4	11°21.6	75°50.8	-6°33.0	229°24.0	15°00.3	297°46.7	-12°28.3
19	287°22.0	147°28.3	11°21.5	90°51.8	-6°33.6	244°26.6	15°00.2	312°49.3	-12°28.4
20	302°24.4	162°29.2	11°21.4	105°52.7	-6°34.3	259°29.2	15°00.2	327°51.9	-12°28.4
21	317°26.9	177°30.1	11°21.3	120°53.6	-6°34.9	274°31.8	15°00.1	342°54.5	-12°28.5
22	332°29.4	192°31.0	11°21.2	135°54.6	-6°35.6	289°34.4	15°00.1	357°57.1	-12°28.5
23	347°31.8	207°31.9	11°21.1	150°55.5	-6°36.2	304°37.0	15°00.0	12°59.7	-12°28.6
Mer.pass.:23:49		v0.9 d-0.1 m-4.5		v0.9 d-0.7 m1.7		v2.6 d-0.1 m-2.6		v2.6 d-0.1 m0.5	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	2°34.3	222°32.7	11°21.0	165°56.4	-6°36.9	319°39.7	14°60.0	28°02.4	-12°28.6
1	17°36.8	237°33.6	11°20.9	180°57.4	-6°37.5	334°42.3	14°59.9	43°05.0	-12°28.7
2	32°39.2	252°34.5	11°20.8	195°58.3	-6°38.2	349°44.9	14°59.8	58°07.6	-12°28.7
3	47°41.7	267°35.4	11°20.7	210°59.3	-6°38.8	4°47.5	14°59.8	73°10.2	-12°28.8
4	62°44.2	282°36.2	11°20.6	226°00.2	-6°39.5	19°50.2	14°59.7	88°12.8	-12°28.8
5	77°46.6	297°37.1	11°20.5	241°01.1	-6°40.1	34°52.8	14°59.7	103°15.4	-12°28.9
6	92°49.1	312°38.0	11°20.4	256°02.1	-6°40.8	49°55.4	14°59.6	118°18.0	-12°29.0
7	107°51.5	327°38.9	11°20.3	271°03.0	-6°41.4	64°58.0	14°59.6	133°20.6	-12°29.0
8	122°54.0	342°39.7	11°20.2	286°03.9	-6°42.1	80°00.6	14°59.5	148°23.2	-12°29.1
9	137°56.5	357°40.6	11°20.1	301°04.9	-6°42.8	95°03.3	14°59.5	163°25.8	-12°29.1
10	152°58.9	12°41.4	11°20.0	316°05.8	-6°43.4	110°05.9	14°59.4	178°28.5	-12°29.2
11	168°01.4	27°42.3	11°19.9	331°06.7	-6°44.1	125°08.5	14°59.4	193°31.1	-12°29.2
12	183°03.9	42°43.2	11°19.8	346°07.7	-6°44.7	140°11.1	14°59.3	208°33.7	-12°29.3
13	198°06.3	57°44.0	11°19.7	1°08.6	-6°45.4	155°13.8	14°59.3	223°36.3	-12°29.3
14	213°08.8	72°44.9	11°19.6	16°09.5	-6°46.0	170°16.4	14°59.2	238°38.9	-12°29.4
15	228°11.3	87°45.7	11°19.4	31°10.5	-6°46.7	185°19.0	14°59.2	253°41.5	-12°29.4
16	243°13.7	102°46.6	11°19.3	46°11.4	-6°47.3	200°21.6	14°59.1	268°44.1	-12°29.5
17	258°16.2	117°47.4	11°19.2	61°12.3	-6°48.0	215°24.3	14°59.0	283°46.7	-12°29.5
18	273°18.7	132°48.3	11°19.1	76°13.3	-6°48.6	230°26.9	14°59.0	298°49.3	-12°29.6
19	288°21.1	147°49.1	11°19.0	91°14.2	-6°49.3	245°29.5	14°58.9	313°51.9	-12°29.6
20	303°23.6	162°49.9	11°18.9	106°15.1	-6°49.9	260°32.1	14°58.9	328°54.5	-12°29.7
21	318°26.0	177°50.8	11°18.7	121°16.1	-6°50.6	275°34.8	14°58.8	343°57.2	-12°29.8
22	333°28.5	192°51.6	11°18.6	136°17.0	-6°51.2	290°37.4	14°58.8	358°59.8	-12°29.8
23	348°31.0	207°52.4	11°18.5	151°17.9	-6°51.9	305°40.0	14°58.7	14°02.4	-12°29.9
Mer.pass.:23:45		v0.9 d-0.1 m-4.4		v0.9 d-0.7 m1.7		v2.6 d-0.1 m-2.6		v2.6 d-0.1 m0.5	

Stars		
	SHA	Dec
Alpheratz	357° 35.6	29° 13.4
Ankaa	353° 07.8	-42° 10.5
Schedar	349° 31.8	56° 40.0
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 06.8
Hamal	327° 52.2	23° 34.5
Polaris	314° 14.7	89° 21.6
Akamar	315° 12.3	-40° 12.3
Menkar	314° 07.1	4° 11.1
Mirfak	308° 29.5	49° 56.6
Aldebaran	290° 40.8	16° 33.5
Rigel	281° 04.8	-8° 10.2
Capella	280° 23.4	46° 01.2
Bellatrix	278° 24.0	6° 22.4
Elnath	278° 03.2	28° 37.6
Anilam	275° 38.8	-1° 11.0
Betelgeuse	270° 53.3	7° 24.8
Canopus	263° 52.9	-52° 42.1
Sirius	258° 27.2	-16° 44.5
Adara	255° 06.8	-28° 59.9
Procyon	244° 52.0	5° 10.2
Pollux	243° 18.7	27° 58.2
Avior	234° 15.6	-59° 34.7
Suhail	222° 47.4	-43° 31.4
Miaplacidus	221° 39.2	-69° 48.5
Alphard	217° 49.1	-8° 45.5
Regulus	207° 35.8	11° 51.2
Dubhe	193° 42.9	61° 37.4
Denebola	182° 26.3	14° 26.6
Genah	175° 45.0	-17° 40.2
Acrux	173° 02.1	-63° 13.7
Gacrux	171° 53.5	-57° 14.7
Alioth	166° 14.5	55° 50.0
Spica	158° 23.7	-11° 16.9
Alcaid	152° 53.3	49° 11.9
Hadar	148° 38.1	-60° 29.3
Menkent	147° 59.3	-36° 29.2
Arcturus	145° 49.0	19° 04.0
Rigel Kent.	139° 42.3	-60° 56.1
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.6	74° 03.7
Alphecca	126° 04.9	26° 38.3
Antares	112° 17.3	-26° 29.1
Atria	107° 12.7	-69° 04.4
Sabik	102° 04.1	-15° 45.2
Shaula	96° 11.9	-37° 07.3
Rasalhague	95° 59.6	12° 32.8
Etamin	90° 42.7	51° 29.4
Kaus Aust.	83° 33.9	-34° 22.5
Vega	80° 33.9	38° 48.5
Nunki	75° 49.0	-26° 16.1
Altair	62° 00.9	8° 55.9
Peacock	53° 07.1	-56° 39.7
Deneb	49° 26.3	45° 22.1
Enif	33° 39.6	9° 59.1
Alnair	27° 33.9	-46° 50.8
Fomalhaut	15° 15.4	-29° 29.8
Scheat	13° 46.0	28° 12.8
Markab	13° 30.7	15° 20.1
2023/9/2	SHA	Mer.pass
Venus	221° 12.0	09:12
Mars	164° 35.4	12:58
Jupiter	316° 58.2	02:49
Saturn	25° 20.9	22:12
2023/9/2	SHA	Mer.pass
Venus	220° 35.8	09:11
Mars	163° 58.8	12:57
Jupiter	317° 01.7	02:45
Saturn	25° 24.5	22:08
2023/9/2	SHA	Mer.pass
Venus	219° 58.4	09:09
Mars	163° 22.2	12:55
Jupiter	317° 05.4	02:41
Saturn	25° 28.1	22:04
Horizontal paralax		
	Venus:	0.3
	Mars:	0.1

Sun							Moon							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	181°45.2	0°30.0	103°27.6	6.3	-27°08.5	-4.8	57.6	72	03:02	04:33	05:42	18:01	19:09	20:38
1	196°45.4	0°29.0	117°52.9	6.3	-27°13.2	-4.6	57.6	70	03:22	04:41	05:43	18:00	19:01	20:19
2	211°45.6	0°28.0	132°18.1	6.2	-27°17.7	-4.4	57.6	68	03:37	04:47	05:44	17:59	18:55	20:05
3	226°45.9	0°27.1	146°43.3	6.1	-27°22.1	-4.3	57.7	66	03:49	04:53	05:44	17:59	18:50	19:53
4	241°46.1	0°26.1	161°08.3	6.0	-27°26.3	-4.1	57.7	64	03:59	04:57	05:45	17:58	18:46	19:44
5	256°46.3	0°25.1	175°33.3	5.9	-27°30.3	-4.0	57.7	62	04:07	05:01	05:45	17:58	18:42	19:36
6	271°46.5	0°24.2	189°58.1	5.8	-27°34.2	-3.8	57.8	60	04:14	05:04	05:46	17:58	18:39	19:29
7	286°46.7	0°23.2	204°22.9	5.7	-27°37.9	-3.6	57.8	58	04:20	05:07	05:46	17:57	18:37	19:23
8	301°47.0	0°22.2	218°47.6	5.7	-27°41.4	-3.5	57.8	56	04:25	05:09	05:47	17:57	18:34	19:18
9	316°47.2	0°21.2	233°12.3	5.6	-27°44.8	-3.3	57.8	54	04:30	05:11	05:47	17:57	18:32	19:14
10	331°47.4	0°20.3	247°36.8	5.5	-27°48.0	-3.1	57.9	52	04:33	05:13	05:47	17:57	18:30	19:10
11	346°47.6	0°19.3	262°01.3	5.4	-27°51.1	-3.0	57.9	50	04:37	05:15	05:47	17:57	18:29	19:07
12	1°47.8	0°18.3	276°25.7	5.4	-27°54.0	-2.8	57.9	45	04:44	05:18	05:48	17:56	18:26	18:60
13	16°48.1	0°17.3	290°50.0	5.3	-27°56.7	-2.6	58.0	40	04:49	05:21	05:48	17:56	18:23	18:55
14	31°48.3	0°16.4	305°14.2	5.2	-27°59.2	-2.4	58.0	35	04:54	05:23	05:48	17:56	18:21	18:51
15	46°48.5	0°15.4	319°38.4	5.1	-28°01.5	-2.3	58.0	30	04:57	05:25	05:49	17:56	18:20	18:47
16	61°48.7	0°14.4	334°02.5	5.1	-28°03.7	-2.1	58.1	20	05:01	05:27	05:49	17:56	18:18	18:43
17	76°48.9	0°13.5	348°26.6	5.0	-28°05.7	-1.9	58.1	10	05:04	05:28	05:49	17:56	18:17	18:41
18	91°49.2	0°12.5	2°50.6	5.0	-28°07.6	-1.7	58.1	0	05:05	05:29	05:49	17:56	18:16	18:40
19	106°49.4	0°11.5	17°14.5	4.9	-28°09.2	-1.6	58.2	-10	05:04	05:28	05:49	17:56	18:17	18:41
20	121°49.6	0°10.5	31°38.3	4.8	-28°10.7	-1.4	58.2	-20	05:01	05:27	05:49	17:56	18:18	18:44
21	136°49.8	0°09.6	46°02.2	4.8	-28°12.0	-1.2	58.2	-30	04:57	05:25	05:49	17:57	18:21	18:48
22	151°50.0	0°08.6	60°25.9	4.7	-28°13.1	-1.0	58.3	-35	04:54	05:23	05:49	17:57	18:22	18:52
23	166°50.3	0°07.6	74°49.6	4.7	-28°14.0	-0.8	58.3	-40	04:50	05:21	05:48	17:57	18:24	18:56
SD.=15.9 d=-1.0 S.D.=15.7							-45	04:44	05:19	05:48	17:58	18:27	19:02	
							-50	04:37	05:15	05:47	17:58	18:31	19:09	
							-52	04:34	05:14	05:47	17:59	18:32	19:12	
							-54	04:30	05:12	05:47	17:59	18:34	19:16	
							-56	04:26	05:10	05:47	17:59	18:37	19:21	
							-58	04:20	05:07	05:46	17:60	18:39	19:26	
							-60	04:15	05:05	05:46	18:00	18:42	19:32	
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	181°50.5	0°06.6	89°13.2	4.6	-28°14.8	-0.7	58.3	72	--	--	--	--	--	--
1	196°50.7	0°05.7	103°36.8	4.6	-28°15.3	-0.5	58.3	70	--	--	--	--	--	--
2	211°50.9	0°04.7	118°00.4	4.5	-28°15.7	-0.3	58.4	68	--	--	--	--	--	--
3	226°51.2	0°03.7	132°23.9	4.5	-28°15.9	-0.1	58.4	66	--	--	--	--	--	--
4	241°51.4	0°02.8	146°47.3	4.4	-28°16.0	0.1	58.4	64	--	--	19:31	--	--	20:21
5	256°51.6	0°01.8	161°10.7	4.4	-28°15.8	0.3	58.5	62	--	--	18:15	--	--	21:36
6	271°51.8	0°00.8	175°34.1	4.4	-28°15.4	0.4	58.5	60	16:18	17:16	17:38	19:16	20:26	22:12
7	286°52.0	-0°00.2	189°57.4	4.3	-28°14.9	0.6	58.5	58	15:39	16:39	17:12	19:55	21:02	22:38
8	301°52.3	-0°01.1	204°20.7	4.3	-28°14.2	0.8	58.6	56	15:12	16:13	16:51	20:22	21:29	22:58
9	316°52.5	-0°02.1	218°44.0	4.2	-28°13.3	1.0	58.6	54	14:51	15:52	16:34	20:43	21:49	23:15
10	331°52.7	-0°03.1	233°07.2	4.2	-28°12.2	1.2	58.6	52	14:33	15:35	16:19	21:01	22:07	23:30
11	346°52.9	-0°04.1	247°30.4	4.2	-28°10.9	1.4	58.7	50	14:18	15:20	16:06	21:16	22:22	23:42
12	1°53.1	-0°05.0	261°53.6	4.2	-28°09.4	1.6	58.7	45	13:48	14:49	15:40	21:47	22:51	--
13	16°53.4	-0°06.0	276°16.8	4.1	-28°07.7	1.8	58.7	40	13:24	14:26	15:18	22:11	23:15	--
14	31°53.6	-0°07.0	290°39.9	4.1	-28°05.9	1.9	58.8	35	13:05	14:06	15:01	22:30	23:34	--
15	46°53.8	-0°08.0	305°03.0	4.1	-28°03.8	2.1	58.8	30	12:48	13:50	14:45	22:47	23:50	--
16	61°54.0	-0°08.9	319°26.1	4.1	-28°01.6	2.3	58.8	20	12:20	13:21	14:19	23:16	--	00:18
17	76°54.2	-0°09.9	333°49.2	4.1	-27°59.2	2.5	58.8	10	11:56	12:57	13:57	23:40	--	00:42
18	91°54.4	-0°10.9	348°12.3	4.1	-27°56.6	2.7	58.9	0	11:34	12:34	13:36	--	00:03	01:04
19	106°54.7	-0°11.8	2°35.3	4.1	-27°53.8	2.9	58.9	-10	11:12	12:12	13:15	--	00:25	01:26
20	121°54.9	-0°12.8	16°58.4	4.1	-27°50.8	3.1	58.9	-20	10:48	11:48	12:52	--	00:50	01:49
21	136°55.1	-0°13.8	31°21.4	4.0	-27°47.6	3.3	59.0	-30	10:20	11:20	12:26	00:15	01:18	02:17
22	151°55.3	-0°14.8	45°44.5	4.0	-27°44.2	3.5	59.0	-35	10:04	11:03	12:11	00:31	01:35	02:33
23	166°55.5	-0°15.7	60°07.5	4.0	-27°40.7	3.7	59.0	-40	09:45	10:43	11:53	00:49	01:54	02:51
SD.=15.9 d=-1.0 S.D.=15.9							-45	09:22	10:20	11:31	01:12	02:18	03:14	
							-50	08:53	09:49	11:03	01:41	02:48	03:42	
							-52	08:39	09:34	10:49	01:55	03:03	03:56	
							-54	08:22	09:17	10:34	02:11	03:21	04:12	
							-56	08:02	08:56	10:15	02:30	03:42	04:31	
							-58	07:38	08:29	09:52	02:55	04:08	04:54	
							-60	07:05	07:52	09:22	03:27	04:46	05:24	
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun		Mer.	Moon		Age
									Eqn.of Time	12 ^h	Pass	Mer.Pass.	Lower	
0	181°55.8	-0°16.7	74°30.6	4.0	-27°36.9	3.8	59.1	22	07:01	07:11	11:52	17:48	05:18	7(47%)
1	196°56.0	-0°17.7	88°53.6	4.1	-27°33.0	4.0	59.1	23	07:22	07:32	11:52	18:49	06:18	8(58%)
2	211°56.2	-0°18.7	103°16.7	4.1	-27°28.8	4.2	59.1	24	07:43	07:53	11:52	19:50	07:20	9(69%)
3	226°56.4	-0°19.6	117°39.7	4.1	-27°24.5	4.4	59.2							
4	241°56.6	-0°20.6	132°02.8	4.1	-27°20.0	4.6	59.2							
5	256°56.9	-0°21.6	146°25.9	4.1	-27°15.3	4.8	59.2							
6	271°57.1	-0°22.5	160°49.0	4.1	-27°10.4	5.0	59.2							
7	286°57.3	-0°23.5	175°12.1	4.1	-27°05.3	5.2	59.3							
8	301°57.5	-0°24.5	189°35.2	4.1	-27°00.1	5.4	59.3							
9	316°57.7	-0°25.5	203°58.4	4.2	-26°54.6	5.5	59.3							
10	331°58.0	-0°26.4	218°21.6	4.2	-26°49.0	5.7	59.4							
11	346°58.2	-0°27.4	232°44.8	4.2	-26°43.1	5.9	59.4							
12	1°58.4	-0°28.4	247°08.0	4.2	-26°37.1	6.1	59.4							
13	16°58.6	-0°29.4	261°31.3	4.3	-26°30.9	6.3	59.5							
14	31°58.8	-0°30.3	275°54.5	4.3	-26°24.6	6.5	59.5							
15	46°59.0	-0°31.3	290°17.9	4.3	-26°18.0	6.7	59.5							
16	61°59.3	-0°32.3	304°41.2	4.4	-26°11.2	6.8	59.5							
17	76°59.5	-0°33.3	319°04.6	4.4	-26°04.3	7.0	59.6							
18	91°59.7	-0°34.2	333°28.0	4.5	-25°57.2	7.2	59.6							
19	106°59.9	-0°35.2	347°51.5	4.5	-25°49.9	7.4	59.6							
20	122°00.1	-0°36.2	2°15.0	4.5	-25°42.4	7.6	59.7							
21	137°00.4	-0°37.1	16°38.6	4.6	-25°34.7	7.7	59.7							
22	152°00.6	-0°38.1	31°02.2	4.6	-25°26.9	7.9	59.7							
23	167°00.8	-0°39.1	45°25.8	4.7	-25°18.9	8.1	59.7							
SD.=15.9 d=-1.0 S.D.=16.1														

September 25, 26 ,27 (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	3°33.4	222°53.3	11°18.4	166°18.8	-6°52.5	320°42.6	14°58.7	29°05.0	-12°29.9	Alpheratz	357°35.6	29°13.4
1	18°35.9	237°54.1	11°18.3	181°19.8	-6°53.2	335°45.3	14°58.6	44°07.6	-12°30.0	Ankaa	353°07.7	-42°10.5
2	33°38.4	252°54.9	11°18.1	196°20.7	-6°53.8	350°47.9	14°58.6	59°10.2	-12°30.0	Schedar	349°31.7	56°40.1
3	48°40.8	267°55.8	11°18.0	211°21.6	-6°54.5	5°50.5	14°58.5	74°12.8	-12°30.1	Diphda	348°47.9	-17°51.3
4	63°43.3	282°56.6	11°17.9	226°22.6	-6°55.1	20°53.2	14°58.5	89°15.4	-12°30.1	Achernar	335°20.4	-57°06.8
5	78°45.8	297°57.4	11°17.8	241°23.5	-6°55.8	35°55.8	14°58.4	104°18.0	-12°30.2	Hamal	327°52.1	23°34.5
6	93°48.2	312°58.2	11°17.6	256°24.4	-6°56.4	50°58.4	14°58.3	119°20.6	-12°30.2	Polaris	314°13.4	89°21.6
7	108°50.7	327°59.0	11°17.5	271°25.4	-6°57.1	66°01.0	14°58.3	134°23.2	-12°30.3	Akamar	315°12.3	-40°12.3
8	123°53.2	342°59.9	11°17.4	286°26.3	-6°57.7	81°03.7	14°58.2	149°25.8	-12°30.3	Menkar	314°07.0	4°11.1
9	138°55.6	358°00.7	11°17.3	301°27.2	-6°58.4	96°06.3	14°58.2	164°28.4	-12°30.4	Mirfak	308°29.5	49°56.6
10	153°58.1	13°01.5	11°17.1	316°28.2	-6°59.0	111°08.9	14°58.1	179°31.1	-12°30.4	Aldebaran	290°40.7	16°33.5
11	169°00.5	28°02.3	11°17.0	331°29.1	-6°59.7	126°11.6	14°58.1	194°33.7	-12°30.5	Rigel	281°04.8	-8°10.2
12	184°03.0	43°03.1	11°16.9	346°30.0	-7°00.3	141°14.2	14°58.0	209°36.3	-12°30.5	Capella	280°23.4	46°01.3
13	199°05.5	58°03.9	11°16.7	1°30.9	-7°01.0	156°16.8	14°58.0	224°38.9	-12°30.6	Bellatrix	278°24.0	6°22.4
14	214°07.9	73°04.7	11°16.6	16°31.9	-7°01.6	171°19.5	14°57.9	239°41.5	-12°30.6	Elnath	278°03.2	28°37.6
15	229°10.4	88°05.5	11°16.5	31°32.8	-7°02.3	186°22.1	14°57.8	254°44.1	-12°30.7	Alnilam	275°38.8	-1°11.0
16	244°12.9	103°06.3	11°16.3	46°33.7	-7°02.9	201°24.7	14°57.8	269°46.7	-12°30.7	Betelgeuse	270°53.2	7°24.8
17	259°15.3	118°07.1	11°16.2	61°34.7	-7°03.6	216°27.4	14°57.7	284°49.3	-12°30.8	Canopus	263°52.9	-52°42.1
18	274°17.8	133°07.9	11°16.1	76°35.6	-7°04.2	231°30.0	14°57.7	299°51.9	-12°30.8	Sirius	258°27.1	-16°44.5
19	289°20.3	148°08.7	11°15.9	91°36.5	-7°04.9	246°32.6	14°57.6	314°54.5	-12°30.9	Adara	255°06.8	-28°59.9
20	304°22.7	163°09.5	11°15.8	106°37.4	-7°05.5	261°35.3	14°57.6	329°57.1	-12°31.0	Procyon	244°52.0	5°10.2
21	319°25.2	178°10.3	11°15.6	121°38.4	-7°06.2	276°37.9	14°57.5	344°59.7	-12°31.0	Pollux	243°18.6	27°58.2
22	334°27.6	193°11.1	11°15.5	136°39.3	-7°06.8	291°40.5	14°57.5	0°02.3	-12°31.1	Avior	234°15.5	-59°34.7
23	349°30.1	208°11.9	11°15.3	151°40.2	-7°07.5	306°43.2	14°57.4	15°04.9	-12°31.1	Suhail	222°47.4	-43°31.4
Mer.pass.:23:41		v0.8 d-0.1 m-4.4		v0.9 d-0.7 m1.7		v2.6 d-0.1 m-2.6		v2.6 d-0.1 m0.5		Miaplacidus	221°39.2	-69°48.5
										Alphard	217°49.0	-8°45.5
										Regulus	207°35.8	11°51.2
										Dubhe	193°42.9	61°37.4
										Denebola	182°26.3	14°26.5
										Gienah	175°45.0	-17°40.2
										Acrux	173°02.1	-63°13.7
										Gacrux	171°53.5	-57°14.7
										Alioth	166°14.5	55°50.0
										Spica	158°23.7	-11°17.0
										Alcaid	152°53.3	49°11.9
										Hadar	148°38.1	-60°29.3
										Menkent	147°59.3	-36°29.1
										Arcturus	145°49.0	19°04.0
										Rigel Kent.	139°42.3	-60°56.1
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°20.6	74°03.7
										Alphecca	126°04.9	26°38.3
										Antares	112°17.3	-26°29.1
										Atria	107°12.7	-69°04.4
										Sabik	102°04.1	-15°45.2
										Shaula	96°11.9	-37°07.3
										Rasalhague	95°59.6	12°32.8
										Etamin	90°42.7	51°29.4
										Kaus Aust.	83°33.9	-34°22.5
										Vega	80°34.0	38°48.5
										Nunki	75°49.0	-26°16.1
										Altair	62°01.0	8°55.9
										Peacock	53°07.1	-56°39.7
										Deneb	49°26.3	45°22.1
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.8
										Fomalhaut	15°15.4	-29°29.8
										Scheat	13°46.0	28°12.8
										Markab	13°30.7	15°20.1
										2023/9/2	SHA	Mer.pass
										Venus	219°19.8	09:08
										Mars	162°45.4	12:54
										Jupiter	317°09.2	02:37
										Saturn	25°31.5	21:60
										2023/9/2	SHA	Mer.pass
										Venus	218°40.1	09:07
										Mars	162°08.6	12:52
										Jupiter	317°13.2	02:32
										Saturn	25°35.0	21:56
										2023/9/2	SHA	Mer.pass
										Venus	217°59.2	09:05
										Mars	161°31.7	12:51
										Jupiter	317°17.4	02:28
										Saturn	25°38.3	21:52
										Horizontal paralax		
										Venus:	0.3	
										Mars:	0.1	
</												

Sun				Moon											
Mon	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	182°01.0	-0°40.1		59°49.5	4.7	-25°10.7	8.3	59.8		Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	197°01.2	-0°41.0		74°13.3	4.8	-25°02.3	8.5	59.8	72	03:20	04:47	05:55	17:46	18:53	20:18
2	212°01.4	-0°42.0		88°37.1	4.8	-24°53.8	8.6	59.8	70	03:37	04:53	05:54	17:46	18:47	20:02
3	227°01.7	-0°43.0		103°00.9	4.9	-24°45.1	8.8	59.9	68	03:50	04:58	05:54	17:47	18:42	19:50
4	242°01.9	-0°44.0		117°24.8	4.9	-24°36.2	9.0	59.9	66	04:00	05:02	05:54	17:47	18:38	19:40
5	257°02.1	-0°44.9		131°48.8	5.0	-24°27.1	9.2	59.9	64	04:09	05:06	05:53	17:48	18:35	19:32
6	272°02.3	-0°45.9		146°12.8	5.0	-24°17.9	9.3	59.9	62	04:16	05:09	05:53	17:48	18:32	19:25
7	287°02.5	-0°46.9		160°36.9	5.1	-24°08.5	9.5	60.0	60	04:22	05:11	05:53	17:49	18:30	19:19
8	302°02.8	-0°47.9		175°01.0	5.2	-23°58.9	9.7	60.0	58	04:27	05:13	05:53	17:49	18:28	19:14
9	317°03.0	-0°48.8		189°25.2	5.2	-23°49.1	9.8	60.0	56	04:31	05:15	05:52	17:49	18:26	19:10
10	332°03.2	-0°49.8		203°49.4	5.3	-23°39.2	10.0	60.0	54	04:35	05:17	05:52	17:50	18:25	19:06
11	347°03.4	-0°50.8		218°13.8	5.3	-23°29.2	10.2	60.1	52	04:39	05:18	05:52	17:50	18:23	19:03
12	2°03.6	-0°51.7		232°38.1	5.4	-23°18.9	10.3	60.1	50	04:42	05:20	05:52	17:50	18:22	18:60
13	17°03.8	-0°52.7		247°02.6	5.5	-23°08.5	10.5	60.1	45	04:48	05:22	05:51	17:51	18:20	18:54
14	32°04.1	-0°53.7		261°27.1	5.5	-22°58.0	10.6	60.1	40	04:52	05:24	05:51	17:51	18:18	18:50
15	47°04.3	-0°54.7		275°51.7	5.6	-22°47.2	10.8	60.2	35	04:56	05:25	05:51	17:52	18:17	18:46
16	62°04.5	-0°55.6		290°16.3	5.7	-22°36.3	11.0	60.2	30	04:59	05:26	05:50	17:52	18:16	18:44
17	77°04.7	-0°56.6		304°41.0	5.7	-22°25.3	11.1	60.2	20	05:02	05:28	05:50	17:53	18:15	18:40
18	92°04.9	-0°57.6		319°05.8	5.8	-22°14.1	11.3	60.2	10	05:04	05:28	05:49	17:54	18:15	18:39
19	107°05.1	-0°58.6		333°30.6	5.9	-22°02.8	11.4	60.3	0	05:04	05:28	05:48	17:55	18:15	18:39
20	122°05.4	-0°59.5		347°55.6	6.0	-21°51.3	11.6	60.3	-10	05:02	05:26	05:47	17:56	18:17	18:41
21	137°05.6	-1°00.5		2°20.5	6.0	-21°39.6	11.7	60.3	-20	04:59	05:24	05:46	17:57	18:19	18:44
22	152°05.8	-1°01.5		16°45.6	6.1	-21°27.8	11.9	60.3	-30	04:53	05:21	05:45	17:58	18:22	18:50
23	167°06.0	-1°02.5		31°10.7	6.2	-21°15.9	12.0	60.3	-35	04:49	05:19	05:44	17:59	18:24	18:54
	SD.=15.9	d=-1.0		S.D.=16.3					-40	04:45	05:16	05:43	18:00	18:27	18:59
									-45	04:38	05:13	05:42	18:01	18:31	19:05
									-50	04:30	05:09	05:41	18:03	18:35	19:14
									-52	04:26	05:06	05:40	18:04	18:37	19:18
									-54	04:22	05:04	05:40	18:04	18:40	19:22
									-56	04:17	05:02	05:39	18:05	18:43	19:27
									-58	04:11	04:59	05:38	18:06	18:46	19:33
									-60	04:05	04:55	05:37	18:07	18:49	19:40
										Moonrise			Moonset		
									Lat.	Mon	Tue	Wed	Mon	Tue	Wed
									72	--	20:12	18:55	--	23:50	--
									70	--	19:27	18:38	--	--	00:33
									68	20:29	18:57	18:25	21:30	--	01:01
									66	19:11	18:34	18:14	22:46	--	01:22
									64	18:34	18:16	18:04	23:23	--	01:39
									62	18:07	18:01	17:56	23:49	--	01:52
									60	17:46	17:48	17:49	--	00:09	02:04
									58	17:29	17:37	17:43	--	00:26	02:14
									56	17:14	17:28	17:37	--	00:39	02:22
									54	17:01	17:19	17:32	--	00:51	02:30
									52	16:50	17:12	17:28	--	01:02	02:37
									50	16:40	17:05	17:24	--	01:11	02:43
									45	16:19	16:50	17:15	00:08	01:31	02:56
									40	16:02	16:37	17:07	00:28	01:47	03:07
									35	15:47	16:27	17:01	00:45	02:00	03:16
									30	15:35	16:17	16:55	00:60	02:12	03:24
									20	15:13	16:01	16:45	01:24	02:31	03:37
									10	14:54	15:47	16:36	01:45	02:48	03:49
									0	14:36	15:34	16:28	02:05	03:04	03:60
									-10	14:19	15:20	16:20	02:25	03:20	04:11
									-20	13:59	15:06	16:11	02:45	03:36	04:22
									-30	13:37	14:49	16:01	03:09	03:55	04:35
									-35	13:24	14:40	15:55	03:23	04:06	04:43
									-40	13:09	14:29	15:48	03:39	04:18	04:51
									-45	12:51	14:16	15:40	03:58	04:33	05:01
									-50	12:29	13:60	15:30	04:22	04:51	05:12
									-52	12:18	13:52	15:26	04:33	04:59	05:18
									-54	12:06	13:44	15:21	04:46	05:08	05:24
									-56	11:52	13:34	15:16	05:01	05:19	05:30
									-58	11:35	13:23	15:10	05:18	05:30	05:38
									-60	11:15	13:11	15:03	05:39	05:44	05:46
										Sun			Moon		
									Day	Eqn.of Time	Mer.		Mer.Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									25	08:04	08:14	11:51	20:50	08:20	10(79%)
									26	08:25	08:35	11:51	21:46	09:18	11(88%)
									27	08:45	08:56	11:51	22:40	10:14	12(95%)
										Sun			Moon		
										Eqn.of Time			Mer.Pass.		
										00 ^h			Upper		
										12 ^h			Lower		
										11:51			10(79%)		
										11:51			11(88%)		
										11:51			12(95%)		
										Sun			Moon		
										Eqn.of Time			Mer.Pass.		
										00 ^h			Upper		
										12 ^h			Lower		
										11:51			10(79%)		
										11:51			11(88%)		
										11:51			12(95%)		
										Sun			Moon		
										Eqn.of Time			Mer.Pass.		
										00 ^h			Upper		
										12 ^h			Lower		
										11:51			10(79%)		
										11:51			11(88%)		
										11:51			12(95%)		
										Sun			Moon		
										Eqn.of Time			Mer.Pass.		
										00 ^h			Upper		
										12 ^h			Lower		
										11:51			10(79%)		
										11:51			11(88%)		
										11:51			12(95%)		
										Sun			Moon		

September 28, 29 ,30 (Thu., Fri., Sat.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	6°30.9	223°48.1	11°07.2	167°25.5	-7°39.2	323°52.7	14°54.5	32°12.5	-12°33.6	Alpheratz	357°35.6	29°13.4	
1	21°33.3	238°48.8	11°07.0	182°26.5	-7°39.8	338°55.3	14°54.5	47°15.1	-12°33.6	Ankaa	353°07.7	-42°10.6	
2	36°35.8	253°49.5	11°06.8	197°27.4	-7°40.5	353°58.0	14°54.4	62°17.7	-12°33.7	Schedar	349°31.7	56°40.1	
3	51°38.2	268°50.2	11°06.6	212°28.3	-7°41.1	9°00.6	14°54.3	77°20.3	-12°33.7	Diphda	348°47.9	-17°51.3	
4	66°40.7	283°50.9	11°06.4	227°29.2	-7°41.8	24°03.3	14°54.3	92°22.9	-12°33.8	Achernar	335°20.4	-57°06.8	
5	81°43.2	298°51.6	11°06.2	242°30.1	-7°42.4	39°05.9	14°54.2	107°25.5	-12°33.8	Hamal	327°52.1	23°34.5	
6	96°45.6	313°52.2	11°06.0	257°31.1	-7°43.1	54°08.6	14°54.2	122°28.1	-12°33.9	Polaris	314°12.5	89°21.7	
7	111°48.1	328°52.9	11°05.8	272°32.0	-7°43.7	69°11.2	14°54.1	137°30.7	-12°33.9	Akamar	315°12.2	-40°12.3	
8	126°50.6	343°53.6	11°05.6	287°32.9	-7°44.4	84°13.9	14°54.0	152°33.3	-12°34.0	Menkar	314°07.0	4°11.1	
9	141°53.0	358°54.3	11°05.4	302°33.8	-7°45.0	99°16.5	14°54.0	167°35.9	-12°34.0	Mirfak	308°29.5	49°56.6	
10	156°55.5	13°55.0	11°05.2	317°34.7	-7°45.7	114°19.2	14°53.9	182°38.5	-12°34.1	Aldebaran	290°40.7	16°33.5	
11	171°58.0	28°55.6	11°05.0	332°35.7	-7°46.3	129°21.8	14°53.9	197°41.1	-12°34.1	Rigel	281°04.8	-8°10.2	
12	187°00.4	43°56.3	11°04.8	347°36.6	-7°46.9	144°24.5	14°53.8	212°43.7	-12°34.2	Capella	280°23.4	46°01.3	
13	202°02.9	58°57.0	11°04.6	2°37.5	-7°47.6	159°27.1	14°53.7	227°46.3	-12°34.2	Bellatrix	278°23.9	6°22.4	
14	217°05.3	73°57.7	11°04.4	17°38.4	-7°48.2	174°29.8	14°53.7	242°48.9	-12°34.3	Elnath	278°03.1	28°37.6	
15	232°07.8	88°58.3	11°04.2	32°39.3	-7°48.9	189°32.4	14°53.6	257°51.5	-12°34.3	Alnilam	275°38.8	-1°11.0	
16	247°10.3	103°59.0	11°04.0	47°40.2	-7°49.5	204°35.1	14°53.5	272°54.1	-12°34.4	Betelgeuse	270°53.2	7°24.8	
17	262°12.7	118°59.7	11°03.8	62°41.2	-7°50.2	219°37.7	14°53.5	287°56.7	-12°34.4	Canopus	263°52.9	-52°42.1	
18	277°15.2	134°00.3	11°03.6	77°42.1	-7°50.8	234°40.4	14°53.4	302°59.3	-12°34.5	Sirius	258°27.1	-16°44.5	
19	292°17.7	149°01.0	11°03.4	92°43.0	-7°51.5	249°43.1	14°53.4	318°01.9	-12°34.5	Adara	255°06.7	-28°59.9	
20	307°20.1	164°01.6	11°03.2	107°43.9	-7°52.1	264°45.7	14°53.3	333°04.5	-12°34.6	Procyon	244°52.0	5°10.2	
21	322°22.6	179°02.3	11°03.0	122°44.8	-7°52.8	279°48.4	14°53.2	348°07.1	-12°34.6	Pollux	243°18.6	27°58.2	
22	337°25.1	194°03.0	11°02.7	137°45.8	-7°53.4	294°51.0	14°53.2	3°09.7	-12°34.6	Avior	234°15.5	-59°34.7	
23	352°27.5	209°03.6	11°02.5	152°46.7	-7°54.0	309°53.7	14°53.1	18°12.3	-12°34.7	Suhail	222°47.4	-43°31.4	
Mer.pass.:23:30		v0.7 d-0.2 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.6		v2.6 d-0.0 m0.5					
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	7°30.0	224°04.3	11°02.3	167°47.6	-7°54.7	324°56.3	14°53.0	33°14.9	-12°34.7	Miaphlacidus	221°39.2	-69°48.5	
1	22°32.5	239°04.9	11°02.1	182°48.5	-7°55.3	339°59.0	14°53.0	48°17.5	-12°34.8	Alphard	217°49.0	-8°45.5	
2	37°34.9	254°05.6	11°01.9	197°49.4	-7°56.0	355°01.7	14°52.9	63°20.1	-12°34.8	Regulus	207°35.8	11°51.2	
3	52°37.4	269°06.2	11°01.7	212°50.3	-7°56.6	10°04.3	14°52.9	78°22.7	-12°34.9	Dubhe	193°42.9	61°37.4	
4	67°39.8	284°06.9	11°01.5	227°51.3	-7°57.3	25°07.0	14°52.8	93°25.3	-12°34.9	Denebola	182°26.3	14°26.5	
5	82°42.3	299°07.5	11°01.2	242°52.2	-7°57.9	40°09.6	14°52.7	108°27.9	-12°35.0	Gienah	175°45.0	-17°40.2	
6	97°44.8	314°08.2	11°01.0	257°53.1	-7°58.6	55°12.3	14°52.7	123°30.4	-12°35.0	Acrux	173°02.1	-63°13.7	
7	112°47.2	329°08.8	11°00.8	272°54.0	-7°59.2	70°14.9	14°52.6	138°33.0	-12°35.1	Gacrux	171°53.5	-57°14.6	
8	127°49.7	344°09.4	11°00.6	287°54.9	-7°59.8	85°17.6	14°52.5	153°35.6	-12°35.1	Alioth	166°14.5	55°50.0	
9	142°52.2	359°10.1	11°00.4	302°55.8	-8°00.5	100°20.3	14°52.5	168°38.2	-12°35.2	Spica	158°23.7	-11°16.9	
10	157°54.6	14°10.7	11°00.1	317°56.8	-8°01.1	115°22.9	14°52.4	183°40.8	-12°35.2	Alcaid	152°53.3	49°11.9	
11	172°57.1	29°11.3	10°59.9	332°57.7	-8°01.8	130°25.6	14°52.4	198°43.4	-12°35.3	Hadar	148°38.2	-60°29.3	
12	187°59.6	44°12.0	10°59.7	347°58.6	-8°02.4	145°28.2	14°52.3	213°46.0	-12°35.3	Menkent	147°59.3	-36°29.1	
13	203°02.0	59°12.6	10°59.5	2°59.5	-8°03.1	160°30.9	14°52.2	228°48.6	-12°35.4	Arcturus	145°49.0	19°04.0	
14	218°04.5	74°13.2	10°59.2	18°00.4	-8°03.7	175°33.6	14°52.2	243°51.2	-12°35.4	Rigil Kent.	139°42.4	-60°56.1	
15	233°06.9	89°13.9	10°59.0	33°01.3	-8°04.3	190°36.2	14°52.1	258°53.8	-12°35.5	Zubenelg.	136°57.5	-16°08.3	
16	248°09.4	104°14.5	10°58.8	48°02.2	-8°05.0	205°38.9	14°52.0	273°56.4	-12°35.5	Kochab	137°20.6	74°03.7	
17	263°11.9	119°15.1	10°58.5	63°03.2	-8°05.6	220°41.6	14°52.0	288°59.0	-12°35.6	Alphecca	126°04.9	26°38.3	
18	278°14.3	134°15.7	10°58.3	78°04.1	-8°06.3	235°44.2	14°51.9	304°01.6	-12°35.6	Antares	112°17.3	-26°29.1	
19	293°16.8	149°16.4	10°58.1	93°05.0	-8°06.9	250°46.9	14°51.8	319°04.2	-12°35.6	Atria	107°12.7	-69°04.4	
20	308°19.3	164°17.0	10°57.8	108°05.9	-8°07.6	265°49.5	14°51.8	334°06.8	-12°35.7	Sabik	102°04.1	-15°45.2	
21	323°21.7	179°17.6	10°57.6	123°06.8	-8°08.2	280°52.2	14°51.7	349°09.4	-12°35.7	Shaula	96°11.9	-37°07.3	
22	338°24.2	194°18.2	10°57.4	138°07.7	-8°08.8	295°54.9	14°51.7	4°12.0	-12°35.8	Rasalhague	95°59.6	12°32.8	
23	353°26.7	209°18.8	10°57.1	153°08.6	-8°09.5	310°57.5	14°51.6	19°14.6	-12°35.8	Etamin	90°42.7	51°29.4	
Mer.pass.:23:26		v0.7 d-0.2 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.6		v2.6 d-0.0 m0.6		Kaus Aust.	83°33.9	-34°22.5	
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	8°29.1	224°19.4	10°56.9	168°09.6	-8°10.1	326°00.2	14°51.5	34°17.2	-12°35.9	Vega	80°34.0	38°48.5	
1	23°31.6	239°20.1	10°56.7	183°10.5	-8°10.8	341°02.9	14°51.5	49°19.8	-12°35.9	Nunki	75°49.1	-26°16.1	
2	38°34.1	254°20.7	10°56.4	198°11.4	-8°11.4	356°05.5	14°51.4	64°22.4	-12°36.0	Altair	62°01.0	8°55.9	
3	53°36.5	269°21.3	10°56.2	213°12.3	-8°12.1	11°08.2	14°51.3	79°25.0	-12°36.0	Peacock	53°07.1	-56°39.7	
4	68°39.0	284°21.9	10°56.0	228°13.2	-8°12.7	26°10.9	14°51.3	94°27.6	-12°36.1	Deneb	49°26.3	45°22.1	
5	83°41.4	299°22.5	10°55.7	243°14.1	-8°13.3	41°13.5	14°51.2	109°30.1	-12°36.1	Enif	33°39.6	9°59.1	
6	98°43.9	314°23.1	10°55.5	258°15.0	-8°14.0	56°16.2	14°51.1	124°32.7	-12°36.2	Alnair	27°33.9	-46°50.8	
7	113°46.4	329°23.7	10°55.2	273°15.9	-8°14.6	71°18.9	14°51.1	139°35.3	-12°36.2	Fomalhaut	15°15.4	-29°29.8	
8	128°48.8	344°24.3	10°55.0	288°16.9	-8°15.3	86°21.5	14°51.0	154°37.9	-12°36.3	Scheat	13°46.0	28°12.8	
9	143°51.3	359°24.9	10°54.7	303°17.8	-8°15.9	101°24.2	14°50.9	169°40.5	-12°36.3	Markab	13°30.7	15°20.1	
10	158°53.8	14°25.5	10°54.5	318°18.7	-8°16.6	116°26.9	14°50.9	184°43.1	-12°36.4	2023/9/2		SHA	Mer.pass
11	173°56.2	29°26.1	10°54.2	333°19.6	-8°17.2	131°29.5	14°50.8	199°45.7	-12°36.4	Venus	217°17.2	09:04	
12	188°58.7	44°26.7	10°54.0	348°20.5	-8°17.8	146°32.2	14°50.7	214°48.3	-12°36.4	Mars	160°54.7	12:50	
13	204°01.2	59°27.3	10°53.7	3°21.4	-8°18.5	161°34.9	14°50.7	229°50.9	-12°36.5	Jupiter	317°21.8	02:24	
14	219°03.6	74°27.9	10°53.5	18°22.3	-8°19.1	176°37.5	14°50.6	244°53.5	-12°36.5	Saturn	25°41.6	21:47	
15	234°06.1	89°28.5	10°53.2	33°23.2	-8°19.8	191°40.2	14°50.5	259°56.1	-12°36.6	2023/9/2		SHA	Mer.pass
16	249°08.5	104°29.0	10°53.0	48°24.1	-8°20.4	206°42.9	14°50.5	274°58.7	-12°36.6	Venus	216°34.3	09:03	
17	264°11.0	119°29.6	10°52.7	63°25.1	-8°21.1	221°45.5	14°50.4	290°01.3	-12°36.7	Mars	160°17.6	12:48	
18	279°13.5	134°30.2	10°52.5	78°26.0	-8°21.7	236°48.2	14°50.3	305°03.9	-12°36.7	Jupiter	317°26.4	02:20	
19	294°15.9	149°30.8	10°52.2	93°26.9	-8°22.3	251°50.9	14°50.3	320°06.5	-12°36.8	Saturn	25°44.9	21:43	
20	309°18.4	164°31.4	10°52.0	108°27.8	-8°23.0	266°53.5	14°50.2	335°09.1	-12°36.8	2023/9/3		SHA	Mer.pass
21	324°20.9	179°32.0	10°51.7	123°28.7	-8°23.6	281°56.2	14°50.1	350°11.6	-12°36.9	Venus	215°50.3	09:02	
22	339°23.3	194°32.5	10°51.5	138°29.6	-8°24.3	296°58.9	14°50.0	5°14.2	-12°36.9	Mars	159°40.4	12:47	
23	354°25.8	209°33.1	10°51.2	153°30.5	-8°24.9	312°01.6	14°50.0	20°16.8	-12°36.9	Jupiter	317°31.1	02:16	
Mer.pass.:23:22		v0.6 d-0.2 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.6		v2.6 d-0.0 m0.6		Saturn	25°48.0	21:39	
Horizontal parallax													
Venus:											0.3		
Mars:											0.1		

Sun				Moon											
Thu	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Sunset	Twilight	
0	182°16.5	-1°50.1		19°10.0	9.5	-9°06.0	17.0	60.9							
1	197°16.7	-1°51.1		33°38.5	9.6	-8°49.0	17.1	60.9	72	03:37	05:01	06:08	17:30	18:37	20:00
2	212°16.9	-1°52.1		48°07.1	9.6	-8°31.9	17.1	60.9	70	03:51	05:05	06:06	17:32	18:33	19:47
3	227°17.1	-1°53.0		62°35.7	9.7	-8°14.8	17.2	60.9	68	04:02	05:09	06:05	17:34	18:29	19:36
4	242°17.4	-1°54.0		77°04.4	9.7	-7°57.6	17.2	60.9	66	04:11	05:12	06:03	17:36	18:27	19:28
5	257°17.6	-1°55.0		91°33.1	9.7	-7°40.4	17.2	60.9	64	04:18	05:15	06:02	17:37	18:24	19:21
6	272°17.8	-1°56.0		106°01.9	9.8	-7°23.1	17.3	60.9	62	04:24	05:17	06:01	17:38	18:22	19:15
7	287°18.0	-1°56.9		120°30.7	9.8	-7°05.8	17.3	60.9	60	04:29	05:18	05:60	17:40	18:21	19:10
8	302°18.2	-1°57.9		134°59.6	9.9	-6°48.5	17.4	60.9	58	04:34	05:20	05:59	17:41	18:19	19:05
9	317°18.4	-1°58.9		149°28.5	9.9	-6°31.1	17.4	60.9	56	04:38	05:21	05:58	17:41	18:18	19:02
10	332°18.6	-1°59.9		163°57.4	10.0	-6°13.7	17.4	60.9	54	04:41	05:22	05:58	17:42	18:17	18:58
11	347°18.8	-2°00.8		178°26.4	10.0	-5°56.2	17.5	60.9	52	04:44	05:23	05:57	17:43	18:16	18:56
12	2°19.1	-2°01.8		192°55.5	10.0	-5°38.7	17.5	60.9	50	04:46	05:24	05:56	17:44	18:16	18:53
13	17°19.3	-2°02.8		207°24.5	10.1	-5°21.2	17.5	60.9	45	04:52	05:26	05:55	17:45	18:14	18:48
14	32°19.5	-2°03.7		221°53.6	10.1	-5°03.7	17.6	60.9	40	04:55	05:27	05:54	17:46	18:13	18:45
15	47°19.7	-2°04.7		236°22.8	10.2	-4°46.1	17.6	60.9	35	04:58	05:28	05:53	17:47	18:13	18:42
16	62°19.9	-2°05.7		250°51.9	10.2	-4°28.5	17.6	60.9	30	05:00	05:28	05:52	17:48	18:12	18:40
17	77°20.1	-2°06.7		265°21.2	10.2	-4°10.9	17.6	60.9	20	05:03	05:28	05:50	17:50	18:12	18:38
18	92°20.3	-2°07.6		279°50.4	10.3	-3°53.2	17.6	60.8	10	05:03	05:28	05:49	17:52	18:13	18:37
19	107°20.5	-2°08.6		294°19.7	10.3	-3°35.6	17.7	60.8	0	05:02	05:26	05:47	17:54	18:14	18:38
20	122°20.7	-2°09.6		308°49.0	10.3	-3°17.9	17.7	60.8	-10	05:00	05:24	05:45	17:55	18:16	18:41
21	137°21.0	-2°10.5		323°18.3	10.4	-3°00.3	17.7	60.8	-20	04:56	05:22	05:44	17:58	18:20	18:45
22	152°21.2	-2°11.5		337°47.7	10.4	-2°42.6	17.7	60.8	-30	04:49	05:17	05:41	17:60	18:24	18:52
23	167°21.4	-2°12.5		352°17.1	10.4	-2°24.9	17.7	60.8	-35	04:45	05:15	05:40	18:01	18:27	18:57
	SD.=16.0	d=-1.0		S.D.=16.6					-40	04:39	05:11	05:38	18:03	18:30	19:02
									-45	04:32	05:07	05:37	18:05	18:35	19:09
									-50	04:23	05:02	05:34	18:08	18:40	19:19
									-52	04:19	04:59	05:33	18:09	18:43	19:23
									-54	04:14	04:57	05:32	18:10	18:46	19:28
									-56	04:08	04:53	05:31	18:11	18:49	19:34
									-58	04:02	04:50	05:29	18:13	18:52	19:41
									-60	03:54	04:46	05:28	18:14	18:57	19:48

October 01, 02 ,03 (Sun., Mon., Tue.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	9°28.3	224°33.7	10°50.9	168°31.4	-8°25.5	327°04.2	14°49.9	35°19.4	-12°37.0	Alpheratz	357°35.6	29°13.4	
1	24°30.7	239°34.3	10°50.7	183°32.3	-8°26.2	342°06.9	14°49.9	50°22.0	-12°37.0	Ankaa	353°07.7	-42°10.6	
2	39°33.2	254°34.8	10°50.4	198°33.2	-8°26.8	357°09.6	14°49.8	65°24.6	-12°37.1	Schedar	349°31.7	56°40.1	
3	54°35.7	269°35.4	10°50.2	213°34.2	-8°27.5	12°12.2	14°49.7	80°27.2	-12°37.1	Diphda	348°47.9	-17°51.3	
4	69°38.1	284°36.0	10°49.9	228°35.1	-8°28.1	27°14.9	14°49.7	95°29.8	-12°37.2	Achernar	335°20.4	-57°06.9	
5	84°40.6	299°36.5	10°49.6	243°36.0	-8°28.7	42°17.6	14°49.6	110°32.4	-12°37.2	Hamal	327°52.1	23°34.6	
6	99°43.0	314°37.1	10°49.4	258°36.9	-8°29.4	57°20.3	14°49.5	125°35.0	-12°37.3	Polaris	314°11.4	89°21.7	
7	114°45.5	329°37.7	10°49.1	273°37.8	-8°30.0	72°22.9	14°49.5	140°37.6	-12°37.3	Akamar	315°12.2	-40°12.4	
8	129°48.0	344°38.2	10°48.8	288°38.7	-8°30.7	87°25.6	14°49.4	155°40.2	-12°37.4	Menkar	314°07.0	4°11.1	
9	144°50.4	359°38.8	10°48.6	303°39.6	-8°31.3	102°28.3	14°49.3	170°42.7	-12°37.4	Mirfak	308°29.4	49°56.6	
10	159°52.9	14°39.4	10°48.3	318°40.5	-8°31.9	117°31.0	14°49.3	185°45.3	-12°37.4	Aldebaran	290°40.7	16°33.5	
11	174°55.4	29°39.9	10°48.0	333°41.4	-8°32.6	132°33.6	14°49.2	200°47.9	-12°37.5	Rigel	281°04.8	-8°10.2	
12	189°57.8	44°40.5	10°47.8	348°42.3	-8°33.2	147°36.3	14°49.1	215°50.5	-12°37.5	Capella	280°23.3	46°01.3	
13	205°00.3	59°41.0	10°47.5	3°43.2	-8°33.9	162°39.0	14°49.1	230°53.1	-12°37.6	Bellatrix	278°23.9	6°22.4	
14	220°02.8	74°41.6	10°47.2	18°44.1	-8°34.5	177°41.6	14°49.0	245°55.7	-12°37.6	Elnath	278°03.1	28°37.6	
15	235°05.2	89°42.1	10°46.9	33°45.0	-8°35.1	192°44.3	14°48.9	260°58.3	-12°37.7	Alnilam	275°38.7	-1°11.0	
16	250°07.7	104°42.7	10°46.7	48°46.0	-8°35.8	207°47.0	14°48.9	276°00.9	-12°37.7	Betelgeuse	270°53.2	7°24.8	
17	265°10.2	119°43.2	10°46.4	63°46.9	-8°36.4	222°49.7	14°48.8	291°03.5	-12°37.8	Canopus	263°52.8	-52°42.1	
18	280°12.6	134°43.8	10°46.1	78°47.8	-8°37.1	237°52.4	14°48.7	306°06.1	-12°37.8	Sirius	258°27.1	-16°44.5	
19	295°15.1	149°44.3	10°45.8	93°48.7	-8°37.7	252°55.0	14°48.7	321°08.6	-12°37.9	Adara	255°06.7	-28°59.9	
20	310°17.5	164°44.9	10°45.6	108°49.6	-8°38.3	267°57.7	14°48.6	336°11.2	-12°37.9	Procyon	244°51.9	5°10.2	
21	325°20.0	179°45.4	10°45.3	123°50.5	-8°39.0	283°00.4	14°48.5	351°13.8	-12°37.9	Pollux	243°18.6	27°58.2	
22	340°22.5	194°46.0	10°45.0	138°51.4	-8°39.6	298°03.1	14°48.5	6°16.4	-12°38.0	Avior	234°15.5	-59°34.7	
23	355°24.9	209°46.5	10°44.7	153°52.3	-8°40.3	313°05.7	14°48.4	21°19.0	-12°38.0	Suhail	222°47.4	-43°31.4	
Mer.pass.:23:18		v0.6 d-0.3 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.6		v2.6 d-0.0 m0.6		Miaplacidus		221°39.1	-69°48.8

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	10°27.4	224°47.0	10°44.4	168°53.2	-8°40.9	328°08.4	14°48.3	36°21.6	-12°38.1
1	25°29.9	239°47.6	10°44.2	183°54.1	-8°41.5	343°11.1	14°48.3	51°24.2	-12°38.1
2	40°32.3	254°48.1	10°43.9	198°55.0	-8°42.2	358°13.8	14°48.2	66°26.8	-12°38.2
3	55°34.8	269°48.6	10°43.6	213°55.9	-8°42.8	13°16.5	14°48.1	81°29.4	-12°38.2
4	70°37.3	284°49.2	10°43.3	228°56.8	-8°43.5	28°19.1	14°48.0	96°32.0	-12°38.3
5	85°39.7	299°49.7	10°43.0	243°57.7	-8°44.1	43°21.8	14°48.0	111°34.5	-12°38.3
6	100°42.2	314°50.2	10°42.7	258°58.6	-8°44.7	58°24.5	14°47.9	126°37.1	-12°38.3
7	115°44.6	329°50.8	10°42.4	273°59.5	-8°45.4	73°27.2	14°47.8	141°39.7	-12°38.4
8	130°47.1	344°51.3	10°42.1	289°00.4	-8°46.0	88°29.8	14°47.8	156°42.3	-12°38.4
9	145°49.6	359°51.8	10°41.9	304°01.3	-8°46.7	103°32.5	14°47.7	171°44.9	-12°38.5
10	160°52.0	14°52.3	10°41.6	319°02.2	-8°47.3	118°35.2	14°47.6	186°47.5	-12°38.5
11	175°54.5	29°52.9	10°41.3	334°03.1	-8°47.9	133°37.9	14°47.6	201°50.1	-12°38.6
12	190°57.0	44°53.4	10°41.0	349°04.0	-8°48.6	148°40.6	14°47.5	216°52.7	-12°38.6
13	205°59.4	59°53.9	10°40.7	4°05.0	-8°49.2	163°43.3	14°47.4	231°55.2	-12°38.6
14	221°01.9	74°54.4	10°40.4	19°05.9	-8°49.8	178°45.9	14°47.4	246°57.8	-12°38.7
15	236°04.4	89°54.9	10°40.1	34°06.8	-8°50.5	193°48.6	14°47.3	262°00.4	-12°38.7
16	251°06.8	104°55.5	10°39.8	49°07.7	-8°51.1	208°51.3	14°47.2	277°03.0	-12°38.8
17	266°09.3	119°56.0	10°39.5	64°08.6	-8°51.8	223°54.0	14°47.1	292°05.6	-12°38.8
18	281°11.8	134°56.5	10°39.2	79°09.5	-8°52.4	238°56.7	14°47.1	307°08.2	-12°38.9
19	296°14.2	149°57.0	10°38.9	94°10.4	-8°53.0	253°59.3	14°47.0	322°10.8	-12°38.9
20	311°16.7	164°57.5	10°38.6	109°11.3	-8°53.7	269°02.0	14°46.9	337°13.4	-12°39.0
21	326°19.1	179°58.0	10°38.3	124°12.2	-8°54.3	284°04.7	14°46.9	352°15.9	-12°39.0
22	341°21.6	194°58.5	10°38.0	139°13.1	-8°54.9	299°07.4	14°46.8	7°18.5	-12°39.0
23	356°24.1	209°59.0	10°37.7	154°14.0	-8°55.6	314°10.1	14°46.7	22°21.1	-12°39.1
Mer.pass.:23:14		v0.5 d-0.3 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6	

Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	11°26.5	224°59.5	10°37.4	169°14.9	-8°56.2	329°12.8	14°46.7	37°23.7	-12°39.1
1	26°29.0	240°00.0	10°37.1	184°15.8	-8°56.9	344°15.5	14°46.6	52°26.3	-12°39.2
2	41°31.5	255°00.5	10°36.8	199°16.7	-8°57.5	359°18.1	14°46.5	67°28.9	-12°39.2
3	56°33.9	270°01.0	10°36.5	214°17.6	-8°58.1	14°20.8	14°46.4	82°31.5	-12°39.3
4	71°36.4	285°01.5	10°36.1	229°18.5	-8°58.8	29°23.5	14°46.4	97°34.0	-12°39.3
5	86°38.9	300°02.0	10°35.8	244°19.4	-8°59.4	44°26.2	14°46.3	112°36.6	-12°39.3
6	101°41.3	315°02.5	10°35.5	259°20.3	-9°00.0	59°28.9	14°46.2	127°39.2	-12°39.4
7	116°43.8	330°03.0	10°35.2	274°21.2	-9°00.7	74°31.6	14°46.2	142°41.8	-12°39.4
8	131°46.3	345°03.5	10°34.9	289°22.1	-9°01.3	89°34.3	14°46.1	157°44.4	-12°39.5
9	146°48.7	0°04.0	10°34.6	304°23.0	-9°02.0	104°36.9	14°46.0	172°47.0	-12°39.5
10	161°51.2	15°04.5	10°34.3	319°23.9	-9°02.6	119°39.6	14°45.9	187°49.6	-12°39.6
11	176°53.6	30°05.0	10°34.0	334°24.8	-9°03.2	134°42.3	14°45.9	202°52.1	-12°39.6
12	191°56.1	45°05.5	10°33.6	349°25.7	-9°03.9	149°45.0	14°45.8	217°54.7	-12°39.6
13	206°58.6	60°05.9	10°33.3	4°26.6	-9°04.5	164°47.7	14°45.7	232°57.3	-12°39.7
14	222°01.0	75°06.4	10°33.0	19°27.5	-9°05.1	179°50.4	14°45.7	247°59.9	-12°39.7
15	237°03.5	90°06.9	10°32.7	34°28.4	-9°05.8	194°53.1	14°45.6	263°02.5	-12°39.8
16	252°06.0	105°07.4	10°32.4	49°29.3	-9°06.4	209°55.8	14°45.5	278°05.1	-12°39.8
17	267°08.4	120°07.9	10°32.0	64°30.2	-9°07.0	224°58.5	14°45.4	293°07.7	-12°39.8
18	282°10.9	135°08.4	10°31.7	79°31.1	-9°07.7	240°01.1	14°45.4	308°10.2	-12°39.9
19	297°13.4	150°08.8	10°31.4	94°32.0	-9°08.3	255°03.8	14°45.3	323°12.8	-12°39.9
20	312°15.8	165°09.3	10°31.1	109°32.9	-9°09.0	270°06.5	14°45.2	338°15.4	-12°40.0
21	327°18.3	180°09.8	10°30.7	124°33.8	-9°09.6	285°09.2	14°45.2	353°18.0	-12°40.0
22	342°20.8	195°10.3	10°30.4	139°34.7	-9°10.2	300°11.9	14°45.1	8°20.6	-12°40.1
23	357°23.2	210°10.7	10°30.1	154°35.6	-9°10.9	315°14.6	14°45.0	23°23.2	-12°40.1
Mer.pass.:23:10		v0.5 d-0.3 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6	

	SHA	Dec
Alpheratz	357° 35.6	29° 13.4
Ankaa	353° 07.7	-42° 10.6
Schedar	349° 31.7	56° 40.1
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 06.9
Hamal	327° 52.1	23° 34.6
Polaris	314° 11.4	89° 21.7
Akamar	315° 12.2	-40° 12.4
Menkar	314° 07.0	4° 11.
Mirfak	308° 29.4	49° 56.6
Aldebaran	290° 40.7	16° 33.5
Rigel	281° 04.8	-8° 10.2
Capella	280° 23.3	46° 01.3
Bellatrix	278° 23.9	6° 22.4
Elnath	278° 03.1	28° 37.6
Alnilam	275° 38.7	-1° 11.0
Betelgeuse	270° 53.2	7° 24.8
Canopus	263° 52.8	-52° 42.1
Sirius	258° 27.1	-16° 44.5
Adara	255° 06.7	-28° 59.9
Procyon	244° 51.9	5° 10.2
Pollux	243° 18.6	27° 58.2
Avior	234° 15.5	-59° 34.7
Suhail	222° 47.4	-43° 31.4
Miaplacidus	221° 39.1	-69° 48.5
Alphard	217° 49.0	-8° 45.5
Regulus	207° 35.8	11° 51.2
Dubhe	193° 42.9	61° 37.4
Deneb	182° 26.3	14° 26.5
Genah	175° 45.0	-17° 40.2
Acrux	173° 02.1	-63° 13.7
Gacrux	171° 53.5	-57° 14.6
Alioth	166° 14.5	55° 50.0
Spica	158° 23.8	-11° 16.9
Alcaid	152° 53.3	49° 11.9
Hadar	148° 38.2	-60° 29.2
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 04.0
Rigel Kent.	139° 42.4	-60° 56.0
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.7	74° 03.6
Alphecca	126° 04.9	26° 38.3
Antares	112° 17.3	-26° 29.1
Atria	107° 12.8	-69° 04.4
Sabik	102° 04.1	-15° 45.2
Shaula	96° 11.9	-37° 07.3
Rasalhague	95° 59.7	12° 32.8
Etamin	90° 42.8	51° 29.4
Kaus Aust.	83° 33.9	-34° 22.5
Vega	80° 34.0	38° 48.5
Nunki	75° 49.1	-26° 16.1
Altair	62° 01.0	8° 55.9
Peacock	53° 07.1	-56° 39.7
Deneb	49° 26.3	45° 22.1
Enif	33° 39.6	9° 59.1
Alnair	27° 33.9	-46° 50.8
Fomalhaut	15° 15.4	-29° 29.8
Scheat	13° 46.0	28° 12.8
Markab	13° 30.7	15° 20.2

2023/10/	SHA	Mer.pass
Venus	215°05.4	09:01
Mars	159°03.2	12:45
Jupiter	317°36.0	02:11
Saturn	25°51.2	21:35

2023/10/	SHA	Mer.pass
Venus	214° 19.6	09:01
Mars	158° 25.8	12:44
Jupiter	317° 41.0	02:07
Saturn	25° 54.2	21:31

2023/10/	SHA	Mer.pass
Venus	213° 33.0	08:60
Mars	157° 48.3	12:42
Jupiter	317° 46.2	02:03
Saturn	25° 57.2	21:27

Horizontal parallax	
Venus:	0.3
Mars:	0.1

Sun			Moon											
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	182°31.5	-3°00.1	342°26.8	10.3	11°34.2	15.8	59.7	72	03:53	05:15	06:22	17:15	18:22	19:43
1	197°31.7	-3°01.0	356°56.2	10.3	11°50.0	15.7	59.7	70	04:04	05:17	06:18	17:19	18:19	19:31
2	212°32.0	-3°02.0	11°25.5	10.3	12°05.7	15.7	59.6	68	04:14	05:20	06:15	17:22	18:17	19:23
3	227°32.2	-3°03.0	25°54.7	10.3	12°21.3	15.6	59.6	66	04:21	05:22	06:13	17:24	18:15	19:15
4	242°32.4	-3°03.9	40°24.0	10.2	12°36.8	15.5	59.6	64	04:27	05:23	06:11	17:27	18:14	19:09
5	257°32.6	-3°04.9	54°53.2	10.2	12°52.3	15.4	59.5	62	04:32	05:25	06:09	17:29	18:13	19:05
6	272°32.8	-3°05.9	69°22.4	10.2	13°07.6	15.3	59.5	60	04:37	05:26	06:07	17:31	18:12	19:00
7	287°33.0	-3°06.8	83°51.5	10.1	13°22.9	15.2	59.5	58	04:41	05:26	06:06	17:32	18:11	18:57
8	302°33.2	-3°07.8	98°20.7	10.1	13°38.1	15.1	59.4	56	04:44	05:27	06:04	17:33	18:10	18:54
9	317°33.4	-3°08.8	112°49.8	10.1	13°53.2	15.0	59.4	54	04:47	05:28	06:03	17:35	18:10	18:51
10	332°33.6	-3°09.7	127°18.8	10.0	14°08.2	15.0	59.4	52	04:49	05:28	06:02	17:36	18:09	18:49
11	347°33.8	-3°10.7	141°47.9	10.0	14°23.1	14.9	59.3	50	04:51	05:29	06:01	17:37	18:09	18:47
12	2°34.0	-3°11.7	156°16.9	10.0	14°37.9	14.8	59.3	45	04:55	05:29	05:59	17:39	18:09	18:43
13	17°34.2	-3°12.7	170°45.8	9.9	14°52.6	14.7	59.3	40	04:58	05:30	05:57	17:41	18:08	18:40
14	32°34.4	-3°13.6	185°14.8	9.9	15°07.2	14.6	59.2	35	05:01	05:30	05:55	17:43	18:08	18:38
15	47°34.6	-3°14.6	199°43.7	9.9	15°21.7	14.5	59.2	30	05:02	05:30	05:54	17:45	18:09	18:36
16	62°34.8	-3°15.6	214°12.5	9.8	15°36.1	14.4	59.2	20	05:03	05:29	05:51	17:48	18:10	18:35
17	77°35.0	-3°16.5	228°41.4	9.8	15°50.4	14.3	59.1	10	05:03	05:28	05:49	17:50	18:11	18:36
18	92°35.2	-3°17.5	243°10.1	9.8	16°04.6	14.1	59.1	0	05:01	05:25	05:46	17:53	18:13	18:37
19	107°35.4	-3°18.5	257°38.9	9.7	16°18.7	14.0	59.1	-10	04:58	05:23	05:44	17:55	18:16	18:41
20	122°35.6	-3°19.4	272°07.6	9.7	16°32.7	13.9	59.0	-20	04:53	05:19	05:41	17:58	18:20	18:46
21	137°35.8	-3°20.4	286°36.3	9.7	16°46.6	13.8	59.0	-30	04:46	05:14	05:38	18:02	18:26	18:54
22	152°36.0	-3°21.4	301°04.9	9.6	17°00.4	13.7	58.9	-35	04:40	05:10	05:36	18:04	18:29	18:59
23	167°36.2	-3°22.3	315°33.5	9.6	17°14.0	13.6	58.9	-40	04:34	05:06	05:33	18:06	18:33	19:05
SD.=16.0 d=-1.0 S.D.=16.3								-45	04:26	05:01	05:31	18:09	18:38	19:14
								-50	04:16	04:55	05:28	18:12	18:45	19:24
								-52	04:11	04:52	05:26	18:14	18:48	19:29
								-54	04:06	04:49	05:25	18:15	18:51	19:35
								-56	03:59	04:45	05:23	18:17	18:55	19:41
								-58	03:52	04:41	05:21	18:19	18:59	19:48
								-60	03:44	04:36	05:19	18:22	19:04	19:57
								Lat.	Moonrise			Moonset		
								Sun	Mon	Tue	Sun	Mon	Tue	
								72	15:51	--	--	10:58	--	--
								70	16:25	--	--	10:26	--	--
								68	16:49	15:58	--	10:03	12:44	--
								66	17:09	16:41	--	09:46	12:03	--
								64	17:24	17:10	16:45	09:31	11:34	13:53
								62	17:38	17:33	17:27	09:19	11:13	13:11
								60	17:49	17:51	17:56	09:09	10:56	12:42
								58	17:59	18:06	18:19	09:01	10:41	12:21
								56	18:07	18:19	18:37	08:53	10:29	12:03
								54	18:15	18:31	18:53	08:46	10:18	11:48
								52	18:22	18:41	19:06	08:40	10:09	11:35
								50	18:28	18:50	19:18	08:35	10:00	11:23
								45	18:42	19:09	19:42	08:23	09:43	10:60
								40	18:53	19:25	20:02	08:13	09:28	10:41
								35	19:03	19:38	20:19	08:05	09:16	10:25
								30	19:12	19:50	20:33	07:58	09:05	10:12
								20	19:26	20:10	20:58	07:46	08:47	09:49
								10	19:39	20:28	21:19	07:35	08:31	09:29
								0	19:52	20:45	21:39	07:25	08:17	09:10
								-10	20:04	21:01	21:59	07:15	08:02	08:52
								-20	20:18	21:19	22:20	07:04	07:47	08:32
								-30	20:33	21:40	22:46	06:52	07:29	08:09
								-35	20:42	21:52	23:00	06:45	07:19	07:56
								-40	20:53	22:07	23:18	06:37	07:07	07:41
								-45	21:05	22:24	23:39	06:28	06:53	07:23
								-50	21:20	22:45	--	06:17	06:36	07:01
								-52	21:27	22:55	--	06:12	06:29	06:50
								-54	21:35	23:06	--	06:07	06:20	06:38
								-56	21:44	23:19	--	06:00	06:10	06:24
								-58	21:54	23:34	--	05:54	05:59	06:09
								-60	22:05	23:53	--	05:46	05:47	05:50
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								1	10:06	10:16	11:49	01:12	13:38	16(94%)
								2	10:26	10:35	11:49	02:04	14:30	17(88%)
								3	10:45	10:54	11:49	02:57	15:24	18(80%)

October 04, 05 ,06 (Wed., Thu., Fri.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	12°25.7	225°11.2	10°29.8	169°36.5	-9°11.5	330°17.3	14°44.9	38°25.7	-12°40.1	Alpheratz	357°35.5	29°13.4
1	27°28.1	240°11.7	10°29.4	184°37.4	-9°12.1	345°20.0	14°44.9	53°28.3	-12°40.2	Ankaa	353°07.7	-42°10.6
2	42°30.6	255°12.1	10°29.1	199°38.2	-9°12.8	0°22.7	14°44.8	68°30.9	-12°40.2	Schedar	349°31.7	56°40.1
3	57°33.1	270°12.6	10°28.8	214°39.1	-9°13.4	15°25.4	14°44.7	83°33.5	-12°40.3	Diphda	348°47.9	-17°51.3
4	72°35.5	285°13.1	10°28.4	229°40.0	-9°14.0	30°28.1	14°44.6	98°36.1	-12°40.3	Achernar	335°20.4	-57°06.9
5	87°38.0	300°13.5	10°28.1	244°40.9	-9°14.7	45°30.7	14°44.6	113°38.7	-12°40.4	Hamal	327°52.1	23°34.6
6	102°40.5	315°14.0	10°27.8	259°41.8	-9°15.3	60°33.4	14°44.5	128°41.2	-12°40.4	Polaris	314°10.1	89°21.7
7	117°42.9	330°14.5	10°27.4	274°42.7	-9°15.9	75°36.1	14°44.4	143°43.8	-12°40.4	Akamar	315°12.2	-40°12.4
8	132°45.4	345°14.9	10°27.1	289°43.6	-9°16.6	90°38.8	14°44.4	158°46.4	-12°40.5	Menkar	314°07.0	4°11.1
9	147°47.9	0°15.4	10°26.8	304°44.5	-9°17.2	105°41.5	14°44.3	173°49.0	-12°40.5	Mirfak	308°29.4	49°56.6
10	162°50.3	15°15.8	10°26.4	319°45.4	-9°17.8	120°44.2	14°44.2	188°51.6	-12°40.6	Aldebaran	290°40.7	16°33.5
11	177°52.8	30°16.3	10°26.1	334°46.3	-9°18.5	135°46.9	14°44.1	203°54.1	-12°40.6	Rigel	281°04.8	-8°10.3
12	192°55.2	45°16.7	10°25.8	349°47.2	-9°19.1	150°49.6	14°44.1	218°56.7	-12°40.6	Capella	280°23.3	46°01.3
13	207°57.7	60°17.2	10°25.4	4°48.1	-9°19.7	165°52.3	14°44.0	233°59.3	-12°40.7	Bellatrix	278°23.9	6°22.4
14	223°00.2	75°17.6	10°25.1	19°49.0	-9°20.4	180°55.0	14°43.9	249°01.9	-12°40.7	Elnath	278°03.1	28°37.6
15	238°02.6	90°18.1	10°24.7	34°49.9	-9°21.0	195°57.7	14°43.8	264°04.5	-12°40.8	Alnilam	275°38.7	-1°11.0
16	253°05.1	105°18.5	10°24.4	49°50.8	-9°21.6	211°00.4	14°43.8	279°07.1	-12°40.8	Betelgeuse	270°53.2	7°24.8
17	268°07.6	120°19.0	10°24.0	64°51.7	-9°22.3	226°03.1	14°43.7	294°09.6	-12°40.8	Canopus	263°52.8	-52°42.1
18	283°10.0	135°19.4	10°23.7	79°52.6	-9°22.9	241°05.8	14°43.6	309°12.2	-12°40.9	Sirius	258°27.1	-16°44.5
19	298°12.5	150°19.9	10°23.4	94°53.5	-9°23.6	256°08.5	14°43.5	324°14.8	-12°40.9	Adara	255°06.7	-28°59.9
20	313°15.0	165°20.3	10°23.0	109°54.4	-9°24.2	271°11.2	14°43.5	339°17.4	-12°41.0	Procyon	244°51.9	5°10.1
21	328°17.4	180°20.8	10°22.7	124°55.3	-9°24.8	286°13.9	14°43.4	354°20.0	-12°41.0	Pollux	243°18.6	27°58.1
22	343°19.9	195°21.2	10°22.3	139°56.1	-9°25.5	301°16.6	14°43.3	9°22.5	-12°41.1	Avior	234°15.4	-59°34.7
23	358°22.4	210°21.6	10°22.0	154°57.0	-9°26.1	316°19.3	14°43.3	24°25.1	-12°41.1	Suhail	222°47.3	-43°31.3
Mer.pass.:23:06		v0.5 d-0.3 m-4.4		v0.9 d-0.6 m1.7		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6		Miaplacidus	221°39.1	-69°48.5
										Alphard	217°49.0	-8°45.5
										Regulus	207°35.8	11°51.2
										Dubhe	193°42.8	61°37.4
										Denebola	182°26.3	14°26.5
										Gienah	175°45.0	-17°40.2
										Acrux	173°02.0	-63°13.7
										Gacrux	171°53.5	-57°14.6
										Alioth	166°14.5	55°50.0
										Spica	158°23.7	-11°16.9
										Alcaid	152°53.3	49°11.8
										Hadar	148°38.2	-60°29.2
										Menkent	147°59.3	-36°29.1
										Arcturus	145°49.0	19°04.0
										Rigel Kent.	139°42.4	-60°56.0
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°20.7	74°03.6
										Alphecca	126°04.9	26°38.3
										Antares	112°17.3	-26°29.1
										Atria	107°12.8	-69°04.4
										Sabik	102°04.1	-15°45.2
										Shaula	96°12.0	-37°07.3
										Rasalhague	95°59.7	12°32.8
										Etamin	90°42.8	51°29.4
										Kaus Aust.	83°34.0	-34°22.5
										Vega	80°34.0	38°48.5
										Nunki	75°49.1	-26°16.1
										Altair	62°01.0	8°55.9
										Peacock	53°07.1	-56°39.7
										Deneb	49°26.3	45°22.1
										Enif	33°39.6	9°59.1
										Alnair	27°33.9	-46°50.8
										Fomalhaut	15°15.4	-29°29.8
										Scheat	13°46.0	28°12.8
										Markab	13°30.7	15°20.1
										2023/10/	SHA	Mer.pass
										Venus	212°45.5	08:59
										Mars	157°10.8	12:41
										Jupiter	317°51.6	01:58
										Saturn	26°00.1	21:23
										2023/10/	SHA	Mer.pass
										Venus	211°57.3	08:58
										Mars	156°33.1	12:39
										Jupiter	317°57.1	01:54
										Saturn	26°02.9	21:18
										2023/10/	SHA	Mer.pass
										Venus	211°08.3	08:58
										Mars	155°55.3	12:38
										Jupiter	318°02.8	01:50
										Saturn	26°05.6	21:14
										Horizontal parallax		
										Venus:		0.3
										Mars:		0.1

hSunMoon														
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	182°45.9	-4°09.7	304°08.9	7.9	25°44.9	6.9	57.0	72	04:08	05:28	06:35	16:59	18:06	19:26
1	197°46.1	-4°10.7	318°35.8	7.9	25°51.7	6.8	57.0	70	04:17	05:29	06:30	17:05	18:05	19:17
2	212°46.3	-4°11.6	333°02.7	7.8	25°58.4	6.6	57.0	68	04:25	05:30	06:26	17:09	18:05	19:10
3	227°46.5	-4°12.6	347°29.5	7.8	26°04.9	6.5	56.9	66	04:31	05:31	06:22	17:13	18:04	19:04
4	242°46.7	-4°13.6	1°56.3	7.8	26°11.3	6.3	56.9	64	04:36	05:32	06:19	17:16	18:03	18:59
5	257°46.9	-4°14.5	16°23.1	7.8	26°17.5	6.1	56.8	62	04:41	05:32	06:17	17:19	18:03	18:55
6	272°47.1	-4°15.5	30°49.9	7.8	26°23.6	6.0	56.8	60	04:44	05:33	06:14	17:22	18:03	18:51
7	287°47.3	-4°16.5	45°16.7	7.8	26°29.5	5.8	56.8	58	04:47	05:33	06:12	17:24	18:03	18:48
8	302°47.5	-4°17.4	59°43.5	7.8	26°35.3	5.7	56.7	56	04:50	05:33	06:10	17:26	18:03	18:46
9	317°47.7	-4°18.4	74°10.2	7.8	26°40.9	5.5	56.7	54	04:52	05:33	06:09	17:27	18:03	18:44
10	332°47.9	-4°19.3	88°37.0	7.7	26°46.3	5.4	56.7	52	04:54	05:33	06:07	17:29	18:03	18:42
11	347°48.1	-4°20.3	103°03.7	7.7	26°51.6	5.2	56.6	50	04:56	05:33	06:06	17:31	18:03	18:40
12	2°48.3	-4°21.3	117°30.5	7.7	26°56.7	5.0	56.6	45	04:59	05:33	06:02	17:34	18:03	18:37
13	17°48.4	-4°22.2	131°57.2	7.7	27°01.7	4.9	56.6	40	05:01	05:33	05:60	17:37	18:04	18:35
14	32°48.6	-4°23.2	146°23.9	7.7	27°06.5	4.7	56.5	35	05:03	05:32	05:58	17:39	18:04	18:33
15	47°48.8	-4°24.2	160°50.6	7.7	27°11.1	4.6	56.5	30	05:04	05:32	05:55	17:41	18:05	18:33
16	62°49.0	-4°25.1	175°17.3	7.7	27°15.6	4.4	56.5	20	05:04	05:30	05:52	17:45	18:07	18:32
17	77°49.2	-4°26.1	189°44.0	7.7	27°20.0	4.3	56.4	10	05:03	05:27	05:48	17:48	18:09	18:34
18	92°49.4	-4°27.1	204°10.8	7.7	27°24.2	4.1	56.4	0	05:00	05:24	05:45	17:52	18:12	18:37
19	107°49.6	-4°28.0	218°37.5	7.7	27°28.2	4.0	56.4	-10	04:56	05:21	05:42	17:55	18:16	18:41
20	122°49.8	-4°29.0	233°04.2	7.7	27°32.1	3.8	56.3	-20	04:50	05:16	05:38	17:59	18:21	18:47
21	137°50.0	-4°29.9	247°30.9	7.7	27°35.8	3.6	56.3	-30	04:42	05:10	05:34	18:03	18:28	18:56
22	152°50.2	-4°30.9	261°57.6	7.7	27°39.3	3.5	56.2	-35	04:36	05:06	05:31	18:06	18:32	19:02
23	167°50.4	-4°31.9	276°24.4	7.7	27°42.7	3.3	56.2	-40	04:29	05:01	05:29	18:09	18:36	19:09
SD.=16.0 d=-1.0 S.D.=15.6								-45	04:20	04:56	05:25	18:13	18:42	19:18
								-50	04:09	04:48	05:21	18:17	18:50	19:29
Thu	GHA	Dec	GHA	ν	Dec	d	HP	-52	04:04	04:45	05:19	18:19	18:53	19:35
0	182°50.6	-4°32.8	290°51.1	7.7	27°46.0	3.2	56.2	-54	03:58	04:41	05:17	18:21	18:57	19:41
1	197°50.7	-4°33.8	305°17.9	7.8	27°49.1	3.0	56.1	-56	03:51	04:37	05:15	18:23	19:01	19:48
2	212°50.9	-4°34.8	319°44.6	7.8	27°52.0	2.9	56.1	-58	03:43	04:32	05:12	18:26	19:06	19:56
3	227°51.1	-4°35.7	334°11.4	7.8	27°54.8	2.7	56.1	-60	03:33	04:27	05:10	18:29	19:12	20:06
4	242°51.3	-4°36.7	348°38.2	7.8	27°57.4	2.5	56.0							
5	257°51.5	-4°37.6	3°05.0	7.8	27°59.9	2.4	56.0	MoonriseMoonset						
6	272°51.7	-4°38.6	17°31.8	7.8	28°02.2	2.2	56.0	Lat.	Wed	Thu	Fri	Wed	Thu	Fri
7	287°51.9	-4°39.6	31°58.7	7.8	28°04.3	2.1	56.0	72	-:-	-:-	-:-	-:-	-:-	-:-
8	302°52.1	-4°40.5	46°25.5	7.9	28°06.3	1.9	55.9	70	-:-	-:-	-:-	-:-	-:-	-:-
9	317°52.3	-4°41.5	60°52.4	7.9	28°08.1	1.8	55.9	68	-:-	-:-	-:-	-:-	-:-	-:-
10	332°52.5	-4°42.5	75°19.3	7.9	28°09.8	1.6	55.9	66	-:-	-:-	-:-	-:-	-:-	-:-
11	347°52.6	-4°43.4	89°46.2	7.9	28°11.4	1.5	55.8	64	-:-	-:-	-:-	-:-	-:-	-:-
12	2°52.8	-4°44.4	104°13.2	8.0	28°12.7	1.3	55.8	62	17:20	-:-	18:52	15:14	-:-	17:29
13	17°53.0	-4°45.3	118°40.1	8.0	28°13.9	1.1	55.8	60	18:10	18:45	19:54	14:23	15:43	16:27
14	32°53.2	-4°46.3	133°07.1	8.0	28°15.0	1.0	55.7	58	18:42	19:23	20:28	13:52	15:06	15:53
15	47°53.4	-4°47.3	147°34.2	8.0	28°15.9	0.8	55.7	56	19:05	19:50	20:52	13:29	14:39	15:28
16	62°53.6	-4°48.2	162°01.2	8.1	28°16.7	0.7	55.7	54	19:25	20:11	21:12	13:10	14:18	15:08
17	77°53.8	-4°49.2	176°28.3	8.1	28°17.3	0.5	55.6	52	19:41	20:28	21:29	12:54	14:00	14:51
18	92°54.0	-4°50.1	190°55.4	8.1	28°17.7	0.4	55.6	50	19:55	20:44	21:43	12:40	13:45	14:36
19	107°54.2	-4°51.1	205°22.6	8.2	28°18.0	0.2	55.6	45	20:24	21:14	22:12	12:12	13:15	14:07
20	122°54.3	-4°52.1	219°49.8	8.2	28°18.2	0.1	55.6	40	20:46	21:37	22:35	11:50	12:51	13:44
21	137°54.5	-4°53.0	234°17.0	8.2	28°18.2	-0.1	55.5	35	21:05	21:57	22:54	11:31	12:32	13:25
22	152°54.7	-4°54.0	248°44.3	8.3	28°18.0	-0.2	55.5	30	21:21	22:14	23:10	11:16	12:15	13:09
23	167°54.9	-4°54.9	263°11.6	8.3	28°17.7	-0.4	55.5	20	21:48	22:42	23:37	10:49	11:47	12:41
SD.=16.0 d=-1.0 S.D.=15.3								10	22:12	23:06	-:-	10:26	11:23	12:17
								0	22:34	23:29	-:-	10:05	11:00	11:55
Fri	GHA	Dec	GHA	ν	Dec	d	HP	-10	22:56	23:51	-:-	09:44	10:38	11:32
0	182°55.1	-4°55.9	277°38.9	8.4	28°17.3	-0.5	55.4	-20	23:20	-:-	00:16	09:21	10:14	11:08
1	197°55.3	-4°56.9	292°06.3	8.4	28°16.7	-0.7	55.4	-30	23:48	-:-	00:44	08:55	09:46	10:40
2	212°55.5	-4°57.8	306°33.7	8.5	28°15.9	-0.8	55.4	-35	-:-	00:04	01:01	08:40	09:29	10:24
3	227°55.6	-4°58.8	321°01.2	8.5	28°15.0	-1.0	55.4	-40	-:-	00:23	01:20	08:22	09:09	10:04
4	242°55.8	-4°59.7	335°28.7	8.5	28°14.0	-1.1	55.3	-45	-:-	00:46	01:44	08:00	08:46	09:41
5	257°56.0	-5°00.7	349°56.3	8.6	28°12.8	-1.3	55.3	-50	00:05	01:16	02:15	07:33	08:16	09:10
6	272°56.2	-5°01.7	4°23.9	8.6	28°11.5	-1.4	55.3	-52	00:18	01:31	02:30	07:20	08:01	08:55
7	287°56.4	-5°02.6	18°51.6	8.7	28°10.0	-1.6	55.3	-54	00:33	01:49	02:47	07:04	07:43	08:37
8	302°56.6	-5°03.6	33°19.3	8.7	28°08.4	-1.7	55.2	-56	00:50	02:09	03:09	06:47	07:22	08:16
9	317°56.8	-5°04.5	47°47.0	8.8	28°06.6	-1.8	55.2	-58	01:11	02:36	03:36	06:25	06:56	07:49
10	332°56.9	-5°05.5	62°14.8	8.8	28°04.7	-2.0	55.2	-60	01:39	03:13	04:15	05:57	06:19	07:10
11	347°57.1	-5°06.5	76°42.7	8.9	28°02.6	-2.1	55.2							
12	2°57.3	-5°07.4	91°10.6	8.9	28°00.4	-2.3	55.1	SunMoon						
13	17°57.5	-5°08.4	105°38.6	9.0	27°58.1	-2.4	55.1	Day	Eqn.of Time			Mer.Pass.		
14	32°57.7	-5°09.3	120°06.6	9.1	27°55.6	-2.6	55.1		00 ^h	12 ^h	Mer. Pass	Upper	Lower	Age
15	47°57.9	-5°10.3	134°34.7	9.1	27°53.0	-2.7	55.1	4	11:04	11:13	11:48	03:51	16:19	19(70%)
16	62°58.1	-5°11.3	149°02.9	9.2	27°50.2	-2.8	55.0	5	11:22	11:31	11:48	04:47	17:14	20(61%)
17	77°58.2	-5°12.2	163°31.1	9.2	27°47.3	-3.0	55.0	6	11:40	11:49	11:48	05:41	18:08	21(51%)
18	92°58.4	-5°13.2	177°59.3	9.3	27°44.3	-3.1	55.0							
19	107°58.6	-5°14.1	192°27.7	9.4	27°41.1	-3.2	55.0							
20	122°58.8	-5°15.1	206°56.1	9.4	27°37.8	-3.4	54.9							
21	137°59.0	-5°16.1	221°24.5	9.5	27°34.3	-3.5	54.9							
22	152°59.2	-5°17.0	235°53.0	9.5	27°30.7	-3.7	54.9							
23	167°59.3	-5°18.0	250°21.6	9.6	27°27.0	-3.8	54.9							
SD.=16.0 d=-1.0 S.D.=15.1														

October 07, 08 ,09 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	15°23.1	225°41.7	10°03.7	170°40.6	-9°57.0	333°31.8	14°39.5	41°31.4	-12°43.0	Alpheratz	357°35.5	29°13.4					
1	30°25.6	240°42.0	10°03.3	185°41.5	-9°57.6	348°34.5	14°39.4	56°34.0	-12°43.1	Ankaa	353°07.7	-42°10.6					
2	45°28.0	255°42.4	10°02.9	200°42.3	-9°58.3	3°37.2	14°39.4	71°36.5	-12°43.1	Schedar	349°31.7	56°40.1					
3	60°30.5	270°42.8	10°02.5	215°43.2	-9°58.9	18°39.9	14°39.3	86°39.1	-12°43.1	Diphda	348°47.9	-17°51.3					
4	75°33.0	285°43.2	10°02.1	230°44.1	-9°59.5	33°42.6	14°39.2	101°41.7	-12°43.2	Achernar	335°20.4	-57°06.9					
5	90°35.4	300°43.5	10°01.7	245°45.0	-10°00.2	48°45.3	14°39.1	116°44.3	-12°43.2	Hamal	327°52.1	23°34.6					
6	105°37.9	315°43.9	10°01.3	260°45.9	-10°00.8	63°48.0	14°39.1	131°46.8	-12°43.2	Polaris	314°09.1	89°21.7					
7	120°40.3	330°44.3	10°00.9	275°46.8	-10°01.4	78°50.7	14°39.0	146°49.4	-12°43.3	Akamar	315°12.2	-40°12.4					
8	135°42.8	345°44.7	10°00.5	290°47.6	-10°02.0	93°53.5	14°38.9	161°52.0	-12°43.3	Menkar	314°07.0	4°11.1					
9	150°45.3	0°45.0	10°00.1	305°48.5	-10°02.7	108°56.2	14°38.8	176°54.6	-12°43.4	Mirfak	308°29.4	49°56.7					
10	165°47.7	15°45.4	9°59.7	320°49.4	-10°03.3	123°58.9	14°38.7	191°57.1	-12°43.4	Aldebaran	290°40.6	16°33.5					
11	180°50.2	30°45.8	9°59.3	335°50.3	-10°03.9	139°01.6	14°38.7	206°59.7	-12°43.4	Rigel	281°04.7	-8°10.3					
12	195°52.7	45°46.1	9°58.9	350°51.2	-10°04.6	154°04.3	14°38.6	222°02.3	-12°43.5	Capella	280°23.3	46°01.3					
13	210°55.1	60°46.5	9°58.5	5°52.1	-10°05.2	169°07.0	14°38.5	237°04.8	-12°43.5	Bellatrix	278°23.9	6°22.4					
14	225°57.6	75°46.9	9°58.1	20°52.9	-10°05.8	184°09.7	14°38.4	252°07.4	-12°43.5	Elnath	278°03.1	28°37.6					
15	241°00.1	90°47.2	9°57.7	35°53.8	-10°06.4	199°12.4	14°38.4	267°10.0	-12°43.6	Alnilam	275°38.7	-1°11.0					
16	256°02.5	105°47.6	9°57.3	50°54.7	-10°07.1	214°15.2	14°38.3	282°12.6	-12°43.6	Betelgeuse	270°53.1	7°24.8					
17	271°05.0	120°47.9	9°56.8	65°55.6	-10°07.7	229°17.9	14°38.2	297°15.1	-12°43.7	Canopus	263°52.8	-52°42.1					
18	286°07.5	135°48.3	9°56.4	80°56.5	-10°08.3	244°20.6	14°38.1	312°17.7	-12°43.7	Sirius	258°27.0	-16°44.5					
19	301°09.9	150°48.7	9°56.0	95°57.3	-10°08.9	259°23.3	14°38.0	327°20.3	-12°43.7	Adara	255°06.7	-28°59.9					
20	316°12.4	165°49.0	9°55.6	110°58.2	-10°09.6	274°26.0	14°38.0	342°22.8	-12°43.8	Procyon	244°51.9	5°10.1					
21	331°14.8	180°49.4	9°55.2	125°59.1	-10°10.2	289°28.7	14°37.9	357°25.4	-12°43.8	Pollux	243°18.5	27°58.1					
22	346°17.3	195°49.7	9°54.8	140°60.0	-10°10.8	304°31.4	14°37.8	12°28.0	-12°43.8	Avior	234°15.4	-59°34.7					
23	1°19.8	210°50.1	9°54.4	156°00.9	-10°11.5	319°34.2	14°37.7	27°30.6	-12°43.9	Suhail	222°47.3	-43°31.3					
Mer.pass.:22:54			v0.4 d-0.4 m-4.4	v0.9 d-0.6 m1.6			v2.7 d-0.1 m-2.7	v2.6 d-0.0 m0.6			Miaplacidus		221°39.0	-69°48.8			

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	16°22.2	225°50.4	9°54.0	171°01.7	-10°12.1	334°36.9	14°37.6	42°33.1	-12°43.9
1	31°24.7	240°50.8	9°53.5	186°02.6	-10°12.7	349°39.6	14°37.6	57°35.7	-12°43.9
2	46°27.2	255°51.1	9°53.1	201°03.5	-10°13.3	4°42.3	14°37.5	72°38.3	-12°44.0
3	61°29.6	270°51.5	9°52.7	216°04.4	-10°14.0	19°45.0	14°37.4	87°40.8	-12°44.0
4	76°32.1	285°51.8	9°52.3	231°05.3	-10°14.6	34°47.7	14°37.3	102°43.4	-12°44.1
5	91°34.6	300°52.2	9°51.9	246°06.1	-10°15.2	49°50.5	14°37.2	117°46.0	-12°44.1
6	106°37.0	315°52.5	9°51.4	261°07.0	-10°15.8	64°53.2	14°37.2	132°48.6	-12°44.1
7	121°39.5	330°52.9	9°51.0	276°07.9	-10°16.5	79°55.9	14°37.1	147°51.1	-12°44.2
8	136°42.0	345°53.2	9°50.6	291°08.8	-10°17.1	94°58.6	14°37.0	162°53.7	-12°44.2
9	151°44.4	0°53.6	9°50.2	306°09.6	-10°17.7	110°01.3	14°36.9	177°56.3	-12°44.2
10	166°46.9	15°53.9	9°49.7	321°10.5	-10°18.3	125°04.1	14°36.8	192°58.8	-12°44.3
11	181°49.3	30°54.2	9°49.3	336°11.4	-10°19.0	140°06.8	14°36.8	208°01.4	-12°44.3
12	196°51.8	45°54.6	9°48.9	351°12.3	-10°19.6	155°09.5	14°36.7	223°04.0	-12°44.3
13	211°54.3	60°54.9	9°48.5	6°13.2	-10°20.2	170°12.2	14°36.6	238°06.5	-12°44.4
14	226°56.7	75°55.2	9°48.0	21°14.0	-10°20.8	185°14.9	14°36.5	253°09.1	-12°44.4
15	241°59.2	90°55.6	9°47.6	36°14.9	-10°21.5	200°17.7	14°36.4	268°11.7	-12°44.5
16	257°01.7	105°55.9	9°47.2	51°15.8	-10°22.1	215°20.4	14°36.4	283°14.2	-12°44.5
17	272°04.1	120°56.2	9°46.7	66°16.7	-10°22.7	230°23.1	14°36.3	298°16.8	-12°44.5
18	287°06.6	135°56.6	9°46.3	81°17.5	-10°23.3	245°25.8	14°36.2	313°19.4	-12°44.6
19	302°09.1	150°56.9	9°45.9	96°18.4	-10°24.0	260°28.5	14°36.1	328°21.9	-12°44.6
20	317°11.5	165°57.2	9°45.4	111°19.3	-10°24.6	275°31.3	14°36.0	343°24.5	-12°44.6
21	332°14.0	180°57.6	9°45.0	126°20.2	-10°25.2	290°34.0	14°36.0	358°27.1	-12°44.7
22	347°16.4	195°57.9	9°44.6	141°21.0	-10°25.8	305°36.7	14°35.9	13°29.6	-12°44.7
23	2°18.9	210°58.2	9°44.1	156°21.9	-10°26.5	320°39.4	14°35.8	28°32.2	-12°44.7
Mer.pass.:22:50		v0.4 d-0.4 m-4.4		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6	

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	17°21.4	225°58.6	9°43.7	171°22.8	-10°27.1	335°42.1	14°35.7	43°34.8	-12°44.8
1	32°23.8	240°58.9	9°43.2	186°23.7	-10°27.7	350°44.9	14°35.6	58°37.4	-12°44.8
2	47°26.3	255°59.2	9°42.8	201°24.5	-10°28.3	5°47.6	14°35.5	73°39.9	-12°44.8
3	62°28.8	270°59.5	9°42.4	216°25.4	-10°29.0	20°50.3	14°35.5	88°42.5	-12°44.9
4	77°31.2	285°59.8	9°41.9	231°26.3	-10°29.6	35°53.0	14°35.4	103°45.1	-12°44.9
5	92°33.7	301°00.2	9°41.5	246°27.2	-10°30.2	50°55.8	14°35.3	118°47.6	-12°44.9
6	107°36.2	316°00.5	9°41.0	261°28.0	-10°30.8	65°58.5	14°35.2	133°50.2	-12°45.0
7	122°38.6	331°00.8	9°40.6	276°28.9	-10°31.5	81°01.2	14°35.1	148°52.8	-12°45.0
8	137°41.1	346°01.1	9°40.1	291°29.8	-10°32.1	96°03.9	14°35.1	163°55.3	-12°45.1
9	152°43.6	1°01.4	9°39.7	306°30.7	-10°32.7	111°06.7	14°35.0	178°57.9	-12°45.1
10	167°46.0	16°01.8	9°39.2	321°31.5	-10°33.3	126°09.4	14°34.9	194°00.4	-12°45.1
11	182°48.5	31°02.1	9°38.8	336°32.4	-10°34.0	141°12.1	14°34.8	209°03.0	-12°45.2
12	197°50.9	46°02.4	9°38.4	351°33.3	-10°34.6	156°14.8	14°34.7	224°05.6	-12°45.2
13	212°53.4	61°02.7	9°37.9	6°34.2	-10°35.2	171°17.6	14°34.6	239°08.1	-12°45.2
14	227°55.9	76°03.0	9°37.5	21°35.0	-10°35.8	186°20.3	14°34.6	254°10.7	-12°45.3
15	242°58.3	91°03.3	9°37.0	36°35.9	-10°36.4	201°23.0	14°34.5	269°13.3	-12°45.3
16	258°00.8	106°03.6	9°36.5	51°36.8	-10°37.1	216°25.7	14°34.4	284°15.8	-12°45.3
17	273°03.3	121°03.9	9°36.1	66°37.6	-10°37.7	231°28.5	14°34.3	299°18.4	-12°45.4
18	288°05.7	136°04.2	9°35.6	81°38.5	-10°38.3	246°31.2	14°34.2	314°21.0	-12°45.4
19	303°08.2	151°04.6	9°35.2	96°39.4	-10°38.9	261°33.9	14°34.2	329°23.5	-12°45.4
20	318°10.7	166°04.9	9°34.7	111°40.3	-10°39.6	276°36.6	14°34.1	344°26.1	-12°45.5
21	333°13.1	181°05.2	9°34.3	126°41.1	-10°40.2	291°39.4	14°34.0	359°28.7	-12°45.5
22	348°15.6	196°05.5	9°33.8	141°42.0	-10°40.8	306°42.1	14°33.9	14°31.2	-12°45.5
23	3°18.1	211°05.8	9°33.4	156°42.9	-10°41.4	321°44.8	14°33.8	29°33.8	-12°45.6
Mer.pass.:22:46		v0.3 d-0.4 m-4.3		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6	

Stars		
	SHA	Dec
Alpheratz	357° 35.5	29° 13.4
Ankaa	353° 07.7	-42° 10.6
Schedar	349° 31.7	56° 40.1
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 06.9
Hamal	327° 52.1	23° 34.6
Polaris	314° 09.1	89° 21.7
Akamar	315° 12.2	-40° 12.4
Menkar	314° 07.0	4° 11.
Mirfak	308° 29.4	49° 56.7
Aldebaran	290° 40.6	16° 33.5
Rigel	281° 04.7	-8° 10.3
Capella	280° 23.3	46° 01.3
Bellatrix	278° 23.9	6° 22.4
Elnath	278° 03.1	28° 37.6
Anilam	275° 38.7	-1° 11.0
Betelgeuse	270° 53.1	7° 24.8
Canopus	263° 52.8	-52° 42.1
Sirius	258° 27.0	-16° 44.5
Adara	255° 06.7	-28° 59.9
Procyon	244° 51.9	5° 10.1
Pollux	243° 18.5	27° 58.1
Avior	234° 15.4	-59° 34.7
Suhail	222° 47.3	-43° 31.3
Miaplacidus	221° 39.0	-69° 48.5
Alphard	217° 49.0	-8° 45.5
Regulus	207° 35.7	11° 51.2
Dubhe	193° 42.8	61° 37.3
Denebola	182° 26.3	14° 26.5
Gienah	175° 45.0	-17° 40.2
Acrux	173° 02.0	-63° 13.7
Gacrux	171° 53.4	-57° 14.6
Alioth	166° 14.5	55° 49.9
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.3	-48° 11.8
Hadar	148° 38.2	-60° 29.2
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 04.0
Rigel Kent.	139° 42.4	-60° 56.0
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.7	74° 03.6
Alphecca	126° 04.9	26° 38.3
Antares	112° 17.4	-26° 29.1
Atria	107° 12.8	-69° 04.4
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.0	-37° 07.3
Rasalhague	95° 59.7	12° 32.7
Etamin	90° 42.8	51° 29.4
Kaus Aust.	83° 34.0	-34° 22.5
Vega	80° 34.0	38° 45.8
Nunki	75° 49.1	-26° 16.1
Altair	62° 01.0	8° 55.9
Peacock	53° 07.2	-56° 39.7
Deneb	49° 26.4	45° 22.1
Enif	33° 39.6	9° 59.1
Alnair	27° 33.9	-46° 50.9
Fomalhaut	15° 15.4	-29° 29.8
Scheat	13° 46.0	28° 12.8
Markab	13° 30.7	15° 20.3

2023/10/	SHA	Mer.pass
Venus	210° 18.6	08:57
Mars	155° 17.5	12:37
Jupiter	318° 08.7	01:46
Saturn	26° 08.3	21:10

2023/10/	SHA	Mer.pass
Venus	209° 28.2	08:56
Mars	154° 39.5	12:35
Jupiter	318° 14.6	01:41
Saturn	26° 10.9	21:06

2023/10/	SHA	Mer.pass
Venus	208° 37.2	08:56
Mars	154° 01.4	12:34
Jupiter	318° 20.8	01:37
Saturn	26° 13.4	21:02

Horizontal parallax	
Venus:	0.3
Mars:	0.1

Sun				Moon										
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
									Naut.	Civil	Sunrise	Sunset	Civil	Naut.
0	182°59.5	-5°18.9	264°50.2	9.7	27°23.2	-3.9	54.9	72	04:22	05:41	06:49	16:44	17:52	19:10
1	197°59.7	-5°19.9	279°18.9	9.7	27°19.2	-4.1	54.8	70	04:30	05:41	06:42	16:51	17:52	19:03
2	212°59.9	-5°20.8	293°47.7	9.8	27°15.1	-4.2	54.8	68	04:36	05:41	06:37	16:57	17:52	18:57
3	228°00.1	-5°21.8	308°16.5	9.9	27°10.8	-4.3	54.8	66	04:41	05:41	06:32	17:02	17:53	18:52
4	243°00.3	-5°22.8	322°45.5	9.9	27°06.4	-4.4	54.8	64	04:45	05:40	06:28	17:06	17:53	18:48
5	258°00.4	-5°23.7	337°14.4	10.0	27°01.9	-4.6	54.8	62	04:49	05:40	06:24	17:09	17:54	18:45
6	273°00.6	-5°24.7	351°43.5	10.1	26°57.3	-4.7	54.7	60	04:52	05:40	06:21	17:13	17:54	18:42
7	288°00.8	-5°25.6	6°12.6	10.1	26°52.5	-4.8	54.7	58	04:54	05:39	06:19	17:15	17:55	18:40
8	303°01.0	-5°26.6	20°41.8	10.2	26°47.6	-5.0	54.7	56	04:56	05:39	06:16	17:18	17:55	18:38
9	318°01.2	-5°27.5	35°11.0	10.3	26°42.6	-5.1	54.7	54	04:58	05:39	06:14	17:20	17:55	18:36
10	333°01.3	-5°28.5	49°40.3	10.4	26°37.5	-5.2	54.7	52	04:59	05:38	06:12	17:22	17:56	18:35
11	348°01.5	-5°29.5	64°09.7	10.4	26°32.2	-5.3	54.6	50	05:00	05:38	06:10	17:24	17:56	18:34
12	3°01.7	-5°30.4	78°39.2	10.5	26°26.8	-5.5	54.6	48	05:03	05:37	06:06	17:28	17:58	18:31
13	18°01.9	-5°31.4	93°08.7	10.6	26°21.3	-5.6	54.6	46	05:04	05:36	06:03	17:32	17:59	18:30
14	33°02.1	-5°32.3	107°38.4	10.6	26°15.7	-5.7	54.6	40	05:05	05:35	05:60	17:35	18:00	18:29
15	48°02.2	-5°33.3	122°08.0	10.7	26°09.9	-5.8	54.6	35	05:06	05:33	05:57	17:38	18:01	18:29
16	63°02.4	-5°34.2	136°37.8	10.8	26°04.0	-5.9	54.6	20	05:05	05:30	05:53	17:42	18:04	18:30
17	78°02.6	-5°35.2	151°07.6	10.9	25°58.0	-6.1	54.5	10	05:03	05:27	05:48	17:47	18:08	18:32
18	93°02.8	-5°36.1	165°37.5	10.9	25°51.9	-6.2	54.5	0	04:59	05:24	05:44	17:51	18:12	18:36
19	108°03.0	-5°37.1	180°07.5	11.0	25°45.7	-6.3	54.5	-10	04:54	05:19	05:40	17:55	18:16	18:41
20	123°03.1	-5°38.1	194°37.6	11.1	25°39.3	-6.4	54.5	-20	04:48	05:13	05:36	17:60	18:22	18:48
21	138°03.3	-5°39.0	209°07.7	11.2	25°32.9	-6.5	54.5	-30	04:38	05:06	05:30	18:05	18:29	18:58
22	153°03.5	-5°40.0	223°37.9	11.2	25°26.3	-6.6	54.5	-35	04:32	05:02	05:27	18:08	18:34	19:04
23	168°03.7	-5°40.9	238°08.2	11.3	25°19.6	-6.7	54.5	-40	04:24	04:56	05:24	18:12	18:40	19:12
SD.=16.0 d=-1.0 S.D.=15.0								-45	04:14	04:50	05:20	18:16	18:46	19:22
								-50	04:02	04:42	05:15	18:22	18:55	19:35
								-52	03:56	04:38	05:12	18:24	18:59	19:41
								-54	03:49	04:34	05:10	18:27	19:03	19:48
								-56	03:42	04:29	05:07	18:29	19:08	19:56
								-58	03:33	04:23	05:04	18:33	19:14	20:05
								-60	03:22	04:17	05:01	18:36	19:20	20:15
								Lat.	Moonrise			Moonset		
									Sat	Sun	Mon	Sat	Sun	Mon
								72	--	--	--	--	--	--
								70	--	--	22:21	--	--	19:03
								68	--	--	23:04	--	--	18:18
								66	--	21:23	23:33	--	18:25	17:49
								64	19:45	22:05	23:54	18:23	17:42	17:26
								62	20:49	22:34	--	17:19	17:13	17:08
								60	21:23	22:55	--	16:44	16:51	16:53
								58	21:48	23:13	--	16:19	16:32	16:40
								56	22:08	23:28	--	15:58	16:17	16:29
								54	22:24	23:40	--	15:41	16:04	16:19
								52	22:38	23:51	--	15:27	15:52	16:10
								50	22:50	--	00:01	15:14	15:42	16:03
								45	23:16	--	00:22	14:48	15:20	15:46
								40	23:36	--	00:38	14:27	15:03	15:32
								35	23:53	--	00:52	14:10	14:48	15:20
								30	--	00:07	01:04	13:55	14:35	15:10
								20	--	00:32	01:25	13:29	14:13	14:52
								10	00:00	00:53	01:43	13:07	13:54	14:36
								0	00:22	01:12	01:59	12:47	13:35	14:21
								-10	00:44	01:32	02:16	12:26	13:17	14:06
								-20	01:07	01:53	02:34	12:03	12:58	13:50
								-30	01:34	02:17	02:54	11:37	12:35	13:32
								-35	01:50	02:31	03:06	11:22	12:21	13:21
								-40	02:08	02:47	03:19	11:04	12:06	13:08
								-45	02:30	03:07	03:35	10:42	11:47	12:54
								-50	02:59	03:31	03:54	10:14	11:24	12:35
								-52	03:12	03:42	04:03	10:01	11:13	12:27
								-54	03:28	03:56	04:14	09:45	11:00	12:17
								-56	03:47	04:11	04:25	09:26	10:45	12:06
								-58	04:11	04:29	04:39	09:04	10:28	11:54
								-60	04:41	04:51	04:54	08:33	10:07	11:39
								Day	Sun			Moon		Age
									Eqn.of Time	Mer.	Mer.Pass.			
									00 ^h	12 ^h	Pass	Upper	Lower	
								7	11:58	12:07	11:47	06:34	18:59	22(41%)
								8	12:15	12:24	11:47	07:23	19:47	23(32%)
								9	12:32	12:40	11:47	08:10	20:32	24(24%)
								SD.=16.0 d=-1.0 S.D.=14.8						

October 10, 11 ,12 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	18°20.5	226°06.1	9°32.9	171°43.7	-10°42.0	336°47.6	14°33.7	44°36.4	-12°45.6	Alpheratz	357°35.5	29°13.4	
1	33°23.0	241°06.4	9°32.4	186°44.6	-10°42.7	351°50.3	14°33.7	59°38.9	-12°45.6	Ankaa	353°07.7	-42°10.6	
2	48°25.4	256°06.7	9°32.0	201°45.5	-10°43.3	6°53.0	14°33.6	74°41.5	-12°45.7	Schedar	349°31.7	56°40.1	
3	63°27.9	271°07.0	9°31.5	216°46.3	-10°43.9	21°55.7	14°33.5	89°44.0	-12°45.7	Diphda	348°47.9	-17°51.3	
4	78°30.4	286°07.3	9°31.0	231°47.2	-10°44.5	36°58.5	14°33.4	104°46.6	-12°45.7	Achernar	335°20.4	-57°06.9	
5	93°32.8	301°07.6	9°30.6	246°48.1	-10°45.1	52°01.2	14°33.3	119°49.2	-12°45.8	Hamal	327°52.1	23°34.6	
6	108°35.3	316°07.9	9°30.1	261°49.0	-10°45.8	67°03.9	14°33.2	134°51.7	-12°45.8	Polaris	314°08.3	89°21.7	
7	123°37.8	331°08.1	9°29.7	276°49.8	-10°46.4	82°06.7	14°33.2	149°54.3	-12°45.8	Akamar	315°12.2	-40°12.4	
8	138°40.2	346°08.4	9°29.2	291°50.7	-10°47.0	97°09.4	14°33.1	164°56.9	-12°45.9	Menkar	314°07.0	4°11.1	
9	153°42.7	1°08.7	9°28.7	306°51.6	-10°47.6	112°12.1	14°33.0	179°59.4	-12°45.9	Mirfak	308°29.4	49°56.7	
10	168°45.2	16°09.0	9°28.3	321°52.4	-10°48.3	127°14.8	14°32.9	195°02.0	-12°45.9	Aldebaran	290°40.6	16°33.5	
11	183°47.6	31°09.3	9°27.8	336°53.3	-10°48.9	142°17.6	14°32.8	210°04.6	-12°46.0	Rigel	281°04.7	-8°10.3	
12	198°50.1	46°09.6	9°27.3	351°54.2	-10°49.5	157°20.3	14°32.7	225°07.1	-12°46.0	Capella	280°23.2	46°01.3	
13	213°52.5	61°09.9	9°26.8	6°55.0	-10°50.1	172°23.0	14°32.7	240°09.7	-12°46.0	Bellatrix	278°23.8	6°22.4	
14	228°55.0	76°10.2	9°26.4	21°55.9	-10°50.7	187°25.8	14°32.6	255°12.2	-12°46.1	Elnath	278°03.0	28°37.7	
15	243°57.5	91°10.5	9°25.9	36°56.8	-10°51.4	202°28.5	14°32.5	270°14.8	-12°46.1	Alnilam	275°38.7	-1°11.0	
16	258°59.9	106°10.8	9°25.4	51°57.6	-10°52.0	217°31.2	14°32.4	285°17.4	-12°46.1	Betelgeuse	270°53.1	7°24.8	
17	274°02.4	121°11.0	9°24.9	66°58.5	-10°52.6	232°34.0	14°32.3	300°19.9	-12°46.2	Canopus	263°52.7	-52°42.1	
18	289°04.9	136°11.3	9°24.5	81°59.4	-10°53.2	247°36.7	14°32.2	315°22.5	-12°46.2	Sirius	258°27.0	-16°44.5	
19	304°07.3	151°11.6	9°24.0	97°00.2	-10°53.8	262°39.4	14°32.2	330°25.0	-12°46.2	Adara	255°06.7	-28°59.9	
20	319°09.8	166°11.9	9°23.5	112°01.1	-10°54.5	277°42.2	14°32.1	345°27.6	-12°46.3	Procyon	244°51.9	5°10.1	
21	334°12.3	181°12.2	9°23.0	127°02.0	-10°55.1	292°44.9	14°32.0	0°30.2	-12°46.3	Pollux	243°18.5	27°58.1	
22	349°14.7	196°12.4	9°22.6	142°02.8	-10°55.7	307°47.6	14°31.9	15°32.7	-12°46.3	Avior	234°15.4	-59°34.7	
23	4°17.2	211°12.7	9°22.1	157°03.7	-10°56.3	322°50.4	14°31.8	30°35.3	-12°46.4	Suhail	222°47.3	-43°31.3	
Mer.pass.:22:42		v0.3 d-0.5 m-4.3		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v0.6 d-0.0 m0.6		Miaplacidus		221°39.0	-69°48.8

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	19°19.7	226°13.0	9°21.6	172°04.6	-10°56.9	337°53.1	14°31.7	45°37.8	-12°46.4
1	34°22.1	241°13.3	9°21.1	187°05.4	-10°57.6	352°55.8	14°31.6	60°40.4	-12°46.4
2	49°24.6	256°13.6	9°20.6	202°06.3	-10°58.2	7°58.6	14°31.6	75°43.0	-12°46.5
3	64°27.0	271°13.8	9°20.2	217°07.2	-10°58.8	23°01.3	14°31.5	90°45.5	-12°46.5
4	79°29.5	286°14.1	9°19.7	232°08.0	-10°59.4	38°04.0	14°31.4	105°48.1	-12°46.5
5	94°32.0	301°14.4	9°19.2	247°08.9	-11°00.0	53°06.8	14°31.3	120°50.6	-12°46.6
6	109°34.4	316°14.6	9°18.7	262°09.8	-11°00.6	68°09.5	14°31.2	135°53.2	-12°46.6
7	124°36.9	331°14.9	9°18.2	277°10.6	-11°01.3	83°12.2	14°31.1	150°55.8	-12°46.6
8	139°39.4	346°15.2	9°17.7	292°11.5	-11°01.9	98°15.0	14°31.1	165°58.3	-12°46.7
9	154°41.8	1°15.5	9°17.2	307°12.4	-11°02.5	113°17.7	14°31.0	181°00.9	-12°46.7
10	169°44.3	16°15.7	9°16.7	322°13.2	-11°03.1	128°20.4	14°30.9	196°03.4	-12°46.7
11	184°46.8	31°16.0	9°16.3	337°14.1	-11°03.7	143°23.2	14°30.8	211°06.0	-12°46.8
12	199°49.2	46°16.3	9°15.8	352°14.9	-11°04.4	158°25.9	14°30.7	226°08.6	-12°46.8
13	214°51.7	61°16.5	9°15.3	7°15.8	-11°05.0	173°28.6	14°30.6	241°11.1	-12°46.8
14	229°54.1	76°16.8	9°14.8	22°16.7	-11°05.6	188°31.4	14°30.5	256°13.7	-12°46.8
15	244°56.6	91°17.1	9°14.3	37°17.5	-11°06.2	203°34.1	14°30.5	271°16.2	-12°46.9
16	259°59.1	106°17.3	9°13.8	52°18.4	-11°06.8	218°36.9	14°30.4	286°18.8	-12°46.9
17	275°01.5	121°17.6	9°13.3	67°19.3	-11°07.4	233°39.6	14°30.3	301°21.4	-12°46.9
18	290°04.0	136°17.8	9°12.8	82°20.1	-11°08.1	248°42.3	14°30.2	316°23.9	-12°47.0
19	305°06.5	151°18.1	9°12.3	97°21.0	-11°08.7	263°45.1	14°30.1	331°26.5	-12°47.0
20	320°08.9	166°18.4	9°11.8	112°21.8	-11°09.3	278°47.8	14°30.0	346°29.0	-12°47.0
21	335°11.4	181°18.6	9°11.3	127°22.7	-11°09.9	293°50.5	14°29.9	1°31.6	-12°47.1
22	350°13.9	196°18.9	9°10.8	142°23.6	-11°10.5	308°53.3	14°29.9	16°34.1	-12°47.1
23	5°16.3	211°19.1	9°10.3	157°24.4	-11°11.1	323°56.0	14°29.8	31°36.7	-12°47.1
Mer.pass.:22:38		v0.3 d-0.5 m-4.3		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6	

[illegible]

	SHA	Dec
Alpheratz	357° 35.5	29° 13.4
Ankaa	353° 07.7	-42° 10.6
Schedar	349° 31.7	56° 40.1
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 06.9
Hamal	327° 52.1	23° 34.6
Polaris	314° 08.3	89° 21.7
Akamar	315° 12.2	-40° 12.4
Menkar	314° 07.0	4° 11.
Mirfak	308° 29.4	49° 56.7
Aldebaran	290° 40.6	16° 33.5
Rigel	281° 04.7	-8° 10.3
Capella	280° 23.2	46° 01.3
Bellatrix	278° 23.8	6° 22.4
Elnath	278° 03.0	28° 37.7
Anilam	275° 38.7	-1° 11.0
Betelgeuse	270° 53.1	7° 24.8
Canopus	263° 52.7	-52° 42.1
Sirius	258° 27.0	-16° 44.5
Adara	255° 06.7	-28° 59.9
Procyon	244° 51.9	5° 10.1
Pollux	243° 18.5	27° 58.1
Avior	234° 15.4	-59° 34.7
Suhail	222° 47.3	-43° 31.3
Miaplacidus	221° 39.0	-69° 48.5
Alphard	217° 49.0	-8° 45.5
Regulus	207° 35.7	11° 51.2
Dubhe	193° 42.8	61° 37.3
Denebola	182° 26.2	14° 26.5
Gienah	175° 45.0	-17° 40.2
Acrux	173° 02.0	-63° 13.7
Gacrux	171° 53.4	-57° 14.6
Alioth	166° 14.5	55° 49.9
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.3	49° 11.8
Hadar	148° 38.2	-60° 29.2
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 04.0
Rigil Kent.	139° 42.4	-60° 56.0
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.8	74° 03.6
Alphecca	126° 04.9	26° 38.3
Antares	112° 17.4	-26° 29.1
Atria	107° 12.9	-69° 04.4
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.0	-37° 07.3
Rasalhague	95° 59.7	12° 32.7
Etamin	90° 42.8	51° 29.4
Kaus Aust.	83° 34.0	-34° 22.5
Vega	80° 34.0	38° 48.5
Nunki	75° 49.1	-26° 16.1
Altair	62° 01.0	8° 55.9
Peacock	53° 07.2	-56° 39.7
Deneb	49° 26.4	45° 22.1
Enif	33° 39.7	9° 59.1
Alnair	27° 33.9	-46° 50.9
Fomalhaut	15° 15.4	-29° 29.8
Scheat	13° 46.0	28° 12.8
Markab	13° 30.7	15° 20.

2023/10/	SHA	Mer.pass
Venus	207°45.6	08:55
Mars	153°23.2	12:32
Jupiter	318°27.0	01:33
Saturn	26°15.8	20:58

2023/10/	SHA	Mer.pass
Venus	206° 53.3	08:55
Mars	152° 44.9	12:31
Jupiter	318° 33.4	01:28
Saturn	26° 18.2	20:54

2023/10/	SHA	Mer.pass
Venus	206° 00.6	08:55
Mars	152° 06.5	12:30
Jupiter	318° 40.0	01:24
Saturn	26° 20.5	20:50

Horizontal parallax	
Venus:	0.2
Mars:	0.1

Sun				Moon												
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Sunrise	Sunset	Civil	Naut.
0	183°12.2	-6°27.6		230°21.7	14.8	17°50.7	-11.2	54.1	72	04:36	05:55	07:03		16:28	17:37	18:55
1	198°12.4	-6°28.5		244°55.5	14.8	17°39.4	-11.3	54.1	70	04:42	05:53	06:55		16:37	17:39	18:49
2	213°12.5	-6°29.5		259°29.4	14.9	17°28.1	-11.4	54.1	68	04:47	05:51	06:48		16:44	17:40	18:45
3	228°12.7	-6°30.4		274°03.3	14.9	17°16.7	-11.4	54.1	66	04:51	05:50	06:42		16:50	17:42	18:41
4	243°12.9	-6°31.4		288°37.3	15.0	17°05.2	-11.5	54.1	64	04:54	05:49	06:37		16:55	17:43	18:38
5	258°13.0	-6°32.3		303°11.3	15.1	16°53.7	-11.6	54.1	62	04:57	05:48	06:32		16:60	17:44	18:35
6	273°13.2	-6°33.3		317°45.4	15.1	16°42.1	-11.6	54.1	60	04:59	05:47	06:29		17:04	17:45	18:33
7	288°13.4	-6°34.2		332°19.5	15.2	16°30.4	-11.7	54.1	58	05:00	05:46	06:25		17:07	17:46	18:32
8	303°13.5	-6°35.1		346°53.7	15.2	16°18.7	-11.8	54.1	56	05:02	05:45	06:22		17:10	17:47	18:30
9	318°13.7	-6°36.1		1°27.9	15.3	16°06.9	-11.8	54.1	54	05:03	05:44	06:20		17:13	17:48	18:29
10	333°13.9	-6°37.0		16°02.2	15.3	15°55.1	-11.9	54.1	52	05:04	05:43	06:17		17:15	17:49	18:28
11	348°14.0	-6°38.0		30°36.6	15.4	15°43.1	-12.0	54.1	50	05:05	05:43	06:15		17:18	17:50	18:27
12	3°14.2	-6°38.9		45°11.0	15.4	15°31.2	-12.0	54.1	45	05:07	05:41	06:10		17:23	17:52	18:26
13	18°14.4	-6°39.9		59°45.4	15.5	15°19.1	-12.1	54.1	40	05:07	05:39	06:06		17:27	17:54	18:26
14	33°14.5	-6°40.8		74°19.9	15.5	15°07.0	-12.1	54.1	35	05:08	05:37	06:02		17:31	17:56	18:25
15	48°14.7	-6°41.8		88°54.5	15.6	14°54.8	-12.2	54.1	30	05:07	05:35	05:59		17:34	17:58	18:26
16	63°14.9	-6°42.7		103°29.1	15.6	14°42.6	-12.3	54.1	20	05:06	05:31	05:53		17:40	18:02	18:28
17	78°15.0	-6°43.7		118°03.7	15.7	14°30.3	-12.3	54.1	10	05:03	05:27	05:48		17:45	18:06	18:31
18	93°15.2	-6°44.6		132°38.4	15.7	14°18.0	-12.4	54.1	0	04:59	05:23	05:44		17:50	18:11	18:35
19	108°15.4	-6°45.6		147°13.1	15.8	14°05.6	-12.4	54.1	-10	04:53	05:17	05:39		17:55	18:16	18:41
20	123°15.5	-6°46.5		161°47.9	15.8	13°53.2	-12.5	54.1	-20	04:45	05:11	05:33		18:01	18:23	18:49
21	138°15.7	-6°47.4		176°22.7	15.8	13°40.6	-12.5	54.1	-30	04:34	05:03	05:27		18:07	18:31	18:60
22	153°15.8	-6°48.4		190°57.6	15.9	13°28.1	-12.6	54.1	-35	04:27	04:58	05:23		18:11	18:37	19:07
23	168°16.0	-6°49.3		205°32.5	15.9	13°15.5	-12.6	54.1	-40	04:19	04:52	05:19		18:15	18:43	19:16
	SD.=16.0	d=-0.9		S.D.=14.8					-45	04:08	04:44	05:14		18:20	18:50	19:26
									-50	03:55	04:35	05:08		18:26	18:60	19:40
									-52	03:48	04:31	05:06		18:29	19:04	19:47
									-54	03:41	04:26	05:03		18:32	19:09	19:54
									-56	03:32	04:21	04:59		18:36	19:15	20:03
									-58	03:23	04:14	04:56		18:39	19:21	20:13
									-60	03:11	04:07	04:51		18:44	19:28	20:25
				</												

October 13, 14 ,15 (Fri., Sat., Sun.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	21° 17.9	226° 25.2	8° 57.5	172° 45.9	-11° 26.5	340° 04.5	14° 27.6	47° 40.6	-12° 47.9	Alpheratz	357° 35.6	29° 13.4	
1	36° 20.4	241° 25.5	8° 57.0	187° 46.8	-11° 27.1	355° 07.3	14° 27.5	62° 43.1	-12° 47.9	Ankaa	353° 07.7	-42° 10.6	
2	51° 22.9	256° 25.7	8° 56.5	202° 47.6	-11° 27.7	10° 10.0	14° 27.4	77° 45.7	-12° 48.0	Schedar	349° 31.7	56° 40.2	
3	66° 25.3	271° 25.9	8° 55.9	217° 48.5	-11° 28.4	25° 12.8	14° 27.3	92° 48.2	-12° 48.0	Diphda	348° 47.9	-17° 51.3	
4	81° 27.8	286° 26.2	8° 55.4	232° 49.3	-11° 29.0	40° 15.5	14° 27.3	107° 50.8	-12° 48.0	Achernar	335° 20.4	-57° 06.9	
5	96° 30.2	301° 26.4	8° 54.9	247° 50.2	-11° 29.6	55° 18.3	14° 27.2	122° 53.3	-12° 48.0	Hamal	327° 52.1	23° 34.6	
6	111° 32.7	316° 26.6	8° 54.4	262° 51.0	-11° 30.2	70° 21.0	14° 27.1	137° 55.9	-12° 48.1	Polaris	314° 07.6	89° 21.7	
7	126° 35.2	331° 26.9	8° 53.8	277° 51.9	-11° 30.8	85° 23.8	14° 27.0	152° 58.5	-12° 48.1	Akamars	315° 12.2	-40° 12.4	
8	141° 37.6	346° 27.1	8° 53.3	292° 52.7	-11° 31.4	100° 26.5	14° 26.9	168° 01.0	-12° 48.1	Menkar	314° 06.9	4° 11.1	
9	156° 40.1	1° 27.3	8° 52.8	307° 53.6	-11° 32.0	115° 29.3	14° 26.8	183° 03.6	-12° 48.2	Mirfak	308° 29.3	49° 56.7	
10	171° 42.6	16° 27.5	8° 52.3	322° 54.5	-11° 32.6	130° 32.0	14° 26.7	198° 06.1	-12° 48.2	Aldebaran	290° 40.6	16° 33.5	
11	186° 45.0	31° 27.8	8° 51.7	337° 55.3	-11° 33.3	145° 34.7	14° 26.6	213° 08.7	-12° 48.2	Rigel	281° 04.7	-8° 10.3	
12	201° 47.5	46° 28.0	8° 51.2	352° 56.2	-11° 33.9	160° 37.5	14° 26.6	228° 11.2	-12° 48.2	Capella	280° 23.2	46° 01.3	
13	216° 50.0	61° 28.2	8° 50.7	7° 57.0	-11° 34.5	175° 40.2	14° 26.5	243° 13.8	-12° 48.3	Bellatrix	278° 23.8	6° 22.4	
14	231° 52.4	76° 28.4	8° 50.1	22° 57.9	-11° 35.1	190° 43.0	14° 26.4	258° 16.3	-12° 48.3	Elnath	278° 03.0	28° 37.7	
15	246° 54.9	91° 28.6	8° 49.6	37° 58.7	-11° 35.7	205° 45.7	14° 26.3	273° 18.9	-12° 48.3	Alnilam	275° 38.6	-1° 11.0	
16	261° 57.4	106° 28.9	8° 49.1	52° 59.6	-11° 36.3	220° 48.5	14° 26.2	288° 21.4	-12° 48.4	Betelgeuse	270° 53.1	7° 24.8	
17	276° 59.8	121° 29.1	8° 48.5	68° 00.4	-11° 36.9	235° 51.2	14° 26.1	303° 24.0	-12° 48.4	Canopus	263° 52.7	-52° 42.1	
18	292° 02.3	136° 29.3	8° 48.0	83° 01.3	-11° 37.5	250° 54.0	14° 26.0	318° 26.5	-12° 48.4	Sirius	258° 27.0	-16° 44.5	
19	307° 04.7	151° 29.5	8° 47.4	98° 02.1	-11° 38.2	265° 56.7	14° 25.9	333° 29.1	-12° 48.4	Adara	255° 06.6	-28° 59.9	
20	322° 07.2	166° 29.7	8° 46.9	113° 03.0	-11° 38.8	280° 59.5	14° 25.8	348° 31.6	-12° 48.5	Procyon	244° 51.9	5° 10.1	
21	337° 09.7	181° 30.0	8° 46.4	128° 03.8	-11° 39.4	296° 02.2	14° 25.8	3° 34.2	-12° 48.5	Pollux	243° 18.5	27° 58.1	
22	352° 12.1	196° 30.2	8° 45.8	143° 04.7	-11° 40.0	311° 05.0	14° 25.7	18° 36.7	-12° 48.5	Avior	234° 15.3	-59° 34.7	
23	7° 14.6	211° 30.4	8° 45.3	158° 05.5	-11° 40.6	326° 07.7	14° 25.6	33° 39.3	-12° 48.6	Suhail	222° 47.3	-43° 31.3	
Mer.pass.:22:31		v0.2 d-0.5 m-4.3		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v2.6 d-0.0 m0.6		Miaplacidus		221° 39.0	-69° 48.8

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	22°17.1	226°30.6	8°44.7	173°06.4	-11°41.2	341°10.5	14°25.5	48°41.8	-12°48.6
1	37°19.5	241°30.8	8°44.2	188°07.2	-11°41.8	356°13.2	14°25.4	63°44.4	-12°48.6
2	52°22.0	256°31.0	8°43.7	203°08.1	-11°42.4	11°16.0	14°25.3	78°46.9	-12°48.6
3	67°24.5	271°31.2	8°43.1	218°08.9	-11°43.0	26°18.7	14°25.2	93°49.5	-12°48.7
4	82°26.9	286°31.4	8°42.6	233°09.8	-11°43.7	41°21.5	14°25.1	108°52.0	-12°48.7
5	97°29.1	301°31.7	8°42.0	248°10.7	-11°44.3	56°24.2	14°25.0	123°54.6	-12°48.7
6	112°31.8	316°31.9	8°41.5	263°11.5	-11°44.9	71°27.0	14°25.0	138°57.1	-12°48.8
7	127°34.3	331°32.1	8°40.9	278°12.4	-11°45.5	86°29.7	14°24.9	153°59.7	-12°48.8
8	142°36.8	346°32.3	8°40.4	293°13.2	-11°46.1	101°32.5	14°24.8	169°02.2	-12°48.8
9	157°39.2	1°32.5	8°39.8	308°14.1	-11°46.7	116°35.2	14°24.7	184°04.8	-12°48.8
10	172°41.7	16°32.7	8°39.3	323°14.9	-11°47.3	131°38.0	14°24.6	199°07.3	-12°48.9
11	187°44.2	31°32.9	8°38.7	338°15.7	-11°47.9	146°40.7	14°24.5	214°09.9	-12°48.9
12	202°46.6	46°33.1	8°38.2	353°16.6	-11°48.5	161°43.5	14°24.4	229°12.4	-12°48.9
13	217°49.1	61°33.3	8°37.6	8°17.4	-11°49.1	176°46.2	14°24.3	244°15.0	-12°48.9
14	232°51.6	76°33.5	8°37.1	23°18.3	-11°49.7	191°49.0	14°24.2	259°17.5	-12°49.0
15	247°54.0	91°33.7	8°36.5	38°19.1	-11°50.4	206°51.7	14°24.2	274°20.1	-12°49.0
16	262°56.5	106°33.9	8°36.0	53°20.0	-11°51.0	221°54.5	14°24.1	289°22.6	-12°49.0
17	277°59.0	121°34.1	8°35.4	68°20.8	-11°51.6	236°57.2	14°24.0	304°25.1	-12°49.1
18	293°01.4	136°34.3	8°34.8	83°21.7	-11°52.2	251°60.0	14°23.9	319°27.7	-12°49.1
19	308°03.9	151°34.5	8°34.3	98°22.5	-11°52.8	267°02.7	14°23.8	334°30.2	-12°49.1
20	323°06.3	166°34.7	8°33.7	113°23.4	-11°53.4	282°05.5	14°23.7	349°32.8	-12°49.1
21	338°08.8	181°34.9	8°33.2	128°24.2	-11°54.0	297°08.2	14°23.6	4°35.3	-12°49.2
22	353°11.3	196°35.1	8°32.6	143°25.1	-11°54.6	312°11.0	14°23.5	19°37.9	-12°49.2
23	8°13.7	211°35.3	8°32.0	158°25.9	-11°55.2	327°13.7	14°23.4	34°40.4	-12°49.2
Mer.pass.:22:27		v0.2 d-0.5 m-4.3		v0.9 d-0.6 m1.6		v2.7 d-0.1 m-2.7		v2.5 d-0.0 m0.6	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	23°16.2	226°35.5	8°31.5	173°26.8	-11°55.8	342°16.5	14°23.3	49°43.0	-12°49.2
1	38°18.7	241°35.7	8°30.9	188°27.6	-11°56.4	357°19.2	14°23.3	64°45.5	-12°49.3
2	53°21.1	256°35.9	8°30.4	203°28.5	-11°57.0	12°22.0	14°23.2	79°48.1	-12°49.3
3	68°23.6	271°36.1	8°29.8	218°29.3	-11°57.7	27°24.7	14°23.1	94°50.6	-12°49.3
4	83°26.1	286°36.2	8°29.2	233°30.2	-11°58.3	42°27.5	14°23.0	109°53.2	-12°49.4
5	98°28.5	301°36.4	8°28.7	248°31.0	-11°58.9	57°30.3	14°22.9	124°55.7	-12°49.4
6	113°31.0	316°36.6	8°28.1	263°31.8	-11°59.5	72°33.0	14°22.8	139°58.2	-12°49.4
7	128°33.4	331°36.8	8°27.5	278°32.7	-12°00.7	87°35.8	14°22.7	155°00.8	-12°49.4
8	143°35.9	346°37.0	8°27.0	293°33.5	-12°01.3	102°38.5	14°22.6	170°03.3	-12°49.5
9	158°38.4	1°37.2	8°26.4	308°34.4	-12°01.3	117°41.3	14°22.5	185°05.9	-12°49.5
10	173°40.8	16°37.4	8°25.8	323°35.2	-12°01.9	132°44.0	14°22.4	200°08.4	-12°49.5
11	188°43.3	31°37.6	8°25.3	338°36.1	-12°02.5	147°46.8	14°22.3	215°11.0	-12°49.5
12	203°45.8	46°37.8	8°24.7	353°36.9	-12°03.1	162°49.5	14°22.3	230°13.5	-12°49.6
13	218°48.2	61°37.9	8°24.1	8°37.8	-12°03.7	177°52.3	14°22.2	245°16.1	-12°49.6
14	233°50.7	76°38.1	8°23.5	23°38.6	-12°04.3	192°55.1	14°22.1	260°18.6	-12°49.6
15	248°53.2	91°38.3	8°23.0	38°39.4	-12°04.9	207°57.8	14°22.0	275°21.1	-12°49.6
16	263°55.6	106°38.5	8°22.4	53°40.3	-12°05.5	223°00.6	14°21.9	290°23.7	-12°49.7
17	278°58.1	121°38.7	8°21.8	68°41.1	-12°06.1	238°03.3	14°21.8	305°26.2	-12°49.7
18	294°00.6	136°38.8	8°21.2	83°42.0	-12°06.7	253°06.1	14°21.7	320°28.8	-12°49.7
19	309°03.0	151°39.0	8°20.7	98°42.8	-12°07.4	268°08.8	14°21.6	335°31.3	-12°49.7
20	324°05.5	166°39.2	8°20.1	113°43.7	-12°08.0	283°11.6	14°21.5	350°33.9	-12°49.8
21	339°07.9	181°39.4	8°19.5	128°44.5	-12°08.6	298°14.4	14°21.4	5°36.4	-12°49.8
22	354°10.4	196°39.6	8°18.9	143°45.3	-12°09.2	313°17.1	14°21.3	20°39.0	-12°49.8
23	9°12.9	211°39.7	8°18.3	158°46.2	-12°09.8	328°19.9	14°21.3	35°41.5	-12°49.8
Mer.pass.:22:23		v0.2 d-0.6 m-4.3		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.7		v2.5 d-0.0 m0.6	

	SHA	Dec
Alpheratz	357° 35.6	29° 13.4
Ankaa	353° 07.7	-42° 10.6
Schedar	349° 31.7	56° 40.2
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 06.9
Hamal	327° 52.1	23° 34.6
Polaris	314° 07.6	89° 21.7
Akamar	315° 12.2	-40° 12.4
Menkar	314° 06.9	4° 11.
Mirfak	308° 29.3	49° 56.
Aldebaran	290° 40.6	16° 33.5
Rigel	281° 04.7	-8° 10.3
Capella	280° 23.2	46° 01.3
Bellatrix	278° 23.8	6° 22.4
Elnath	278° 03.0	28° 37.7
Alnilam	275° 38.6	-1° 11.0
Betelgeuse	270° 53.1	7° 24.8
Canopus	263° 52.7	-52° 42.1
Sirius	258° 27.0	-16° 44.5
Adara	255° 06.6	-28° 59.9
Procyon	244° 51.9	5° 10.1
Pollux	243° 18.5	27° 58.1
Avior	234° 15.3	-49° 31.7
Suhail	222° 47.3	-43° 31.3
Miaplacidus	221° 39.0	-69° 48.5
Alphard	217° 48.9	-8° 45.5
Regulus	207° 35.7	11° 51.2
Dubhe	193° 42.8	61° 37.3
Deneb	182° 26.2	14° 26.2
Genah	175° 45.0	-17° 40.2
Acrux	173° 02.0	-63° 13.7
Gacrux	171° 53.4	-57° 14.6
Alioth	166° 14.5	55° 49.9
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.3	49° 11.8
Hadar	148° 38.2	-60° 29.2
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 04.0
Rigel Kent.	139° 42.4	-60° 56.0
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.8	74° 03.6
Alphecca	126° 05.0	26° 38.3
Antares	112° 17.4	-26° 29.1
Atria	107° 12.9	-69° 04.4
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.0	-37° 07.3
Rasalhague	95° 59.7	12° 32.7
Etamin	90° 42.9	51° 29.4
Kaus Aust.	83° 34.0	-34° 22.5
Vega	80° 34.1	38° 48.5
Nunki	75° 49.1	-26° 16.1
Altair	62° 01.0	8° 55.9
Peacock	53° 07.2	-56° 39.7
Deneb	49° 26.4	45° 22.1
Enif	33° 39.7	9° 59.1
Alnair	27° 33.9	-46° 50.9
Fomalhaut	15° 15.4	-29° 29.8
Scheat	13° 46.0	28° 12.8
Markab	13° 30.7	15° 20.0

2023/10/	SHA	Mer.pass
Venus	205°07.3	08:54
Mars	151°28.0	12:28
Jupiter	318°46.6	01:19
Saturn	26°22.7	20:46

2023/10/	SHA	Mer.pass
Venus	204° 13.5	08:54
Mars	150° 49.3	12:27
Jupiter	318° 53.4	01:15
Saturn	26° 24.8	20:42

2023/10/	SHA	Mer.pass
Venus	203° 19.3	08:54
Mars	150° 10.6	12:26
Jupiter	319° 00.3	01:11
Saturn	26° 26.8	20:38

Horizontal parallax	
Venus:	0.2
Mars:	0.1

Sun				Moon				
Fri	GHA	Dec		GHA	ν	Dec	d	HP
0	183°23.8	-7°35.4		200°34.5	16.8	2°07.9	-14.3	54.6
1	198°23.9	-7°36.4		215°10.3	16.8	1°53.5	-14.3	54.6
2	213°24.1	-7°37.3		229°46.1	16.8	1°39.2	-14.3	54.6
3	228°24.3	-7°38.3		244°21.9	16.8	1°24.9	-14.4	54.6
4	243°24.4	-7°39.2		258°57.7	16.8	1°10.5	-14.4	54.6
5	258°24.6	-7°40.1		273°33.5	16.8	0°56.1	-14.4	54.6
6	273°24.7	-7°41.1		288°09.2	16.7	0°41.8	-14.4	54.7
7	288°24.9	-7°42.0		302°44.9	16.7	0°27.4	-14.4	54.7
8	303°25.0	-7°42.9		317°20.7	16.7	0°13.0	-14.4	54.7
9	318°25.2	-7°43.9		331°56.4	16.7	-0°01.4	-14.4	54.7
10	333°25.3	-7°44.8		346°32.1	16.7	-0°15.9	-14.4	54.7
11	348°25.5	-7°45.7		1°07.8	16.7	-0°30.3	-14.4	54.7
12	3°25.6	-7°46.7		15°43.4	16.7	-0°44.7	-14.4	54.7
13	18°25.8	-7°47.6		30°19.1	16.6	-0°59.2	-14.4	54.8
14	33°25.9	-7°48.5		44°54.7	16.6	-1°13.6	-14.4	54.8
15	48°26.1	-7°49.5		59°30.3	16.6	-1°28.1	-14.4	54.8
16	63°26.2	-7°50.4		74°05.9	16.6	-1°42.5	-14.5	54.8
17	78°26.4	-7°51.3		88°41.4	16.5	-1°57.0	-14.5	54.8
18	93°26.5	-7°52.3		103°17.0	16.5	-2°11.4	-14.5	54.8
19	108°26.7	-7°53.2		117°52.5	16.5	-2°25.9	-14.5	54.8
20	123°26.8	-7°54.1		132°28.0	16.5	-2°40.3	-14.5	54.9
21	138°27.0	-7°55.1		147°03.4	16.4	-2°54.8	-14.5	54.9
22	153°27.1	-7°56.0		161°38.9	16.4	-3°09.2	-14.5	54.9
23	168°27.3	-7°56.9		176°14.3	16.4	-3°23.7	-14.4	54.9
	SD.=16.0	d=-0.9		S.D.=14.9				
Sat	GHA	Dec		GHA	ν	Dec	d	HP
0	183°27.4	-7°57.9		190°49.6	16.4	-3°38.1	-14.4	54.9
1	198°27.6	-7°58.8		205°25.0	16.3	-3°52.6	-14.4	54.9
2	213°27.7	-7°59.7		220°00.3	16.3	-4°07.0	-14.4	55.0
3	228°27.8	-8°00.7		234°35.6	16.3	-4°21.4	-14.4	55.0
4	243°28.0	-8°01.6		249°10.8	16.2	-4°35.9	-14.4	55.0
5	258°28.1	-8°02.5		263°46.0	16.2	-4°50.3	-14.4	55.0
6	273°28.3	-8°03.5		278°21.2	16.2	-5°04.7	-14.4	55.0
7	288°28.4	-8°04.4		292°56.3	16.1	-5°19.1	-14.4	55.0
8	303°28.6	-8°05.3		307°31.4	16.1	-5°33.4	-14.4	55.1
9	318°28.7	-8°06.3		322°06.5	16.0	-5°47.8	-14.4	55.1
10	333°28.9	-8°07.2		336°41.5	16.0	-6°02.2	-14.3	55.1
11	348°29.0	-8°08.1		351°16.5	16.0	-6°16.5	-14.3	55.1
12	3°29.2	-8°09.0		5°51.4	15.9	-6°30.8	-14.3	55.1
13	18°29.3	-8°10.0		20°26.3	15.9	-6°45.2	-14.3	55.1
14	33°29.5	-8°10.9		35°01.2	15.8	-6°59.5	-14.3	55.2
15	48°29.6	-8°11.8		49°36.0	15.8	-7°13.7	-14.3	55.2
16	63°29.7	-8°12.8		64°10.7	15.7	-7°28.0	-14.2	55.2
17	78°29.9	-8°13.7		78°45.4	15.7	-7°42.2	-14.2	55.2
18	93°30.0	-8°14.6		93°20.1	15.6	-7°56.4	-14.2	55.2
19	108°30.2	-8°15.6		107°54.7	15.6	-8°10.6	-14.2	55.2
20	123°30.3	-8°16.5		122°29.2	15.5	-8°24.8	-14.2	55.3
21	138°30.5	-8°17.4		137°03.7	15.5	-8°39.0	-14.1	55.3
22	153°30.6	-8°18.3		151°38.2	15.4	-8°53.1	-14.1	55.3
23	168°30.7	-8°19.3		166°12.6	15.4	-9°07.2	-14.1	55.3
	SD.=16.0	d=-0.9		S.D.=15.0				
Sun	GHA	Dec		GHA	ν	Dec	d	HP
0	183°30.9	-8°20.2		180°46.9	15.3	-9°21.3	-14.1	55.3
1	198°31.0	-8°21.1		195°21.2	15.3	-9°35.3	-14.0	55.4
2	213°31.2	-8°22.0		209°55.5	15.2	-9°49.3	-14.0	55.4
3	228°31.3	-8°23.0		224°29.6	15.1	-10°03.3	-14.0	55.4
4	243°31.5	-8°23.9		239°03.7	15.1	-10°17.3	-13.9	55.4
5	258°31.6	-8°24.8		253°37.8	15.0	-10°31.2	-13.9	55.4
6	273°31.7	-8°25.8		268°11.8	15.0	-10°45.1	-13.9	55.4
7	288°31.9	-8°26.7		282°45.7	14.9	-10°58.9	-13.8	55.5
8	303°32.0	-8°27.6		297°19.6	14.8	-11°12.7	-13.8	55.5
9	318°32.2	-8°28.5		311°53.4	14.8	-11°26.5	-13.8	55.5
10	333°32.3	-8°29.5		326°27.1	14.7	-11°40.3	-13.7	55.5
11	348°32.4	-8°30.4		341°00.8	14.6	-11°54.0	-13.7	55.5
12	3°32.6	-8°31.3		355°34.4	14.6	-12°07.6	-13.6	55.6
13	18°32.7	-8°32.2		10°07.9	14.5	-12°21.3	-13.6	55.6
14	33°32.9	-8°33.2		24°41.4	14.4	-12°34.8	-13.6	55.6
15	48°33.0	-8°34.1		39°14.8	14.4	-12°48.4	-13.5	55.6
16	63°33.1	-8°35.0		53°48.1	14.3	-13°01.9	-13.5	55.6
17	78°33.3	-8°35.9		68°21.4	14.2	-13°15.3	-13.4	55.6
18	93°33.4	-8°36.9		82°54.6	14.1	-13°28.7	-13.4	55.7
19	108°33.5	-8°37.8		97°27.7	14.1	-13°42.1	-13.3	55.7
20	123°33.7	-8°38.7		112°00.7	14.0	-13°55.4	-13.3	55.7
21	138°33.8	-8°39.6		126°33.7	13.9	-14°08.6	-13.2	55.7
22	153°34.0	-8°40.5		141°06.6	13.8	-14°21.9	-13.2	55.7
23	168°34.1	-8°41.5		155°39.4	13.8	-14°35.0	-13.1	55.8
	SD.=16.0	d=-0.9		S.D.=15.1				
		Twilight				Twilight		
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.		
72	04:49	06:08	07:18	16:12	17:22	18:40		
70	04:54	06:05	07:07	16:23	17:26	18:36		
68	04:57	06:02	06:59	16:32	17:28	18:33		
66	05:00	05:60	06:52	16:39	17:31	18:30		
64	05:03	05:57	06:46	16:45	17:33	18:28		
62	05:04	05:56	06:41	16:50	17:35	18:26		
60	05:06	05:54	06:36	16:55	17:37	18:25		
58	05:07	05:52	06:32	16:59	17:39	18:24		
56	05:08	05:51	06:28	17:03	17:40	18:23		
54	05:09	05:50	06:25	17:06	17:41	18:22		
52	05:09	05:48	06:22	17:09	17:43	18:22		
50	05:10	05:47	06:20	17:12	17:44	18:21		
45	05:10	05:44	06:14	17:18	17:47	18:21		
40	05:10	05:42	06:09	17:23	17:50	18:21		
35	05:10	05:39	06:05	17:27	17:52	18:22		
30	05:09	05:37	06:01	17:31	17:55	18:23		
20	05:07	05:32	05:54	17:37	17:60	18:25		
10	05:03	05:27	05:48	17:44	18:05	18:29		
0	04:58	05:22	05:43	17:49	18:10	18:34		
-10	04:51	05:16	05:37	17:55	18:17	18:41		
-20	04:42	05:08	05:31	18:02	18:24	18:50		
-30	04:31	04:59	05:23	18:09	18:33	19:02		
-35	04:23	04:53	05:19	18:13	18:39	19:10		
-40	04:14	04:47	05:14	18:18	18:46	19:19		
-45	04:02	04:39	05:09	18:24	18:54	19:31		
-50	03:48	04:28	05:02	18:31	19:05	19:46		
-52	03:40	04:24	04:59	18:34	19:10	19:53		
-54	03:32	04:18	04:55	18:38	19:15	20:02		
-56	03:23	04:12	04:52	18:42	19:21	20:11		
-58	03:12	04:06	04:47	18:46	19:28	20:22		
-60	02:60	03:58	04:43	18:51	19:36	20:35		
		Moonrise		Moonset				
Lat.	Fri	Sat	Sun	Fri	Sat	Sun		
72	04:33	06:34	08:47	16:40	16:07	15:23		
70	04:35	06:26	08:26	16:43	16:17	15:46		
68	04:36	06:20	08:10	16:45	16:26	16:04		
66	04:37	06:15	07:57	16:47	16:33	16:18		
64	04:38	06:10	07:47	16:48	16:40	16:30		
62	04:38	06:06	07:38	16:50	16:45	16:40		
60	04:39	06:03	07:30	16:51	16:50	16:49		
58	04:39	06:00	07:23	16:52	16:54	16:57		
56	04:40	05:57	07:18	16:53	16:58	17:04		
54	04:40	05:55	07:12	16:54	17:01	17:10		
52	04:41	05:53	07:08	16:55	17:04	17:16		
50	04:41	0						

October 16, 17 ,18 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	24°15.3	8°17.8	226°39.9	8°17.8	173°47.0	-12°10.4	343°22.6	14°21.2	50°44.0	-12°49.9	Alpheratz	357°35.6	29°13.4				
1	39°17.8	8°17.2	241°40.1	8°17.2	188°47.9	-12°11.0	358°25.4	14°21.1	65°46.6	-12°49.9	Ankaa	353°07.7	-42°10.6				
2	54°20.3	8°16.6	256°40.3	8°16.6	203°48.7	-12°11.6	13°28.1	14°21.0	80°49.1	-12°49.9	Schedar	349°31.7	56°40.2				
3	69°22.7	8°16.0	271°40.4	8°16.0	218°49.6	-12°12.2	28°30.9	14°20.9	95°51.7	-12°49.9	Diphda	348°47.9	-17°51.3				
4	84°25.2	8°15.4	286°40.6	8°15.4	233°50.4	-12°12.8	43°33.7	14°20.8	110°54.2	-12°50.0	Achernar	335°20.4	-57°06.9				
5	99°27.7	8°14.8	301°40.8	8°14.8	248°51.2	-12°13.4	58°36.4	14°20.7	125°56.7	-12°50.0	Hamal	327°52.1	23°34.6				
6	114°30.1	8°14.3	316°41.0	8°14.3	263°52.1	-12°14.0	73°39.2	14°20.6	140°59.3	-12°50.0	Polaris	314°06.7	89°21.7				
7	129°32.6	8°13.7	331°41.1	8°13.7	278°52.9	-12°14.6	88°41.9	14°20.5	156°01.8	-12°50.0	Akamar	315°12.2	-40°12.4				
8	144°35.0	8°13.1	346°41.3	8°13.1	293°53.8	-12°15.2	103°44.7	14°20.4	171°04.4	-12°50.1	Menkar	314°06.9	4°11.1				
9	159°37.5	8°12.5	1°41.5	8°12.5	308°54.6	-12°15.8	118°47.5	14°20.3	186°06.9	-12°50.1	Mirfak	308°29.3	49°56.7				
10	174°40.0	8°11.9	16°41.6	8°11.9	323°55.4	-12°16.4	133°50.2	14°20.2	201°09.5	-12°50.1	Aldebaran	290°40.6	16°33.5				
11	189°42.4	8°11.3	31°41.8	8°11.3	338°56.3	-12°17.0	148°53.0	14°20.2	216°12.0	-12°50.1	Rigel	281°04.7	-8°10.3				
12	204°44.9	8°10.7	46°42.0	8°10.7	353°57.1	-12°17.6	163°55.7	14°20.1	231°14.5	-12°50.2	Capella	280°23.2	46°01.3				
13	219°47.4	8°10.1	61°42.1	8°10.1	8°58.0	-12°18.2	178°58.5	14°20.0	246°17.1	-12°50.2	Bellatrix	278°23.8	6°22.4				
14	234°49.8	8°09.5	76°42.3	8°09.5	23°58.8	-12°18.8	194°01.3	14°19.9	261°19.6	-12°50.2	Elnath	278°03.0	28°37.7				
15	249°52.3	8°08.9	91°42.5	8°08.9	38°59.6	-12°19.4	209°04.0	14°19.8	276°22.2	-12°50.2	Alnilam	275°38.6	-1°11.0				
16	264°54.8	8°08.3	106°42.6	8°08.3	54°00.5	-12°20.0	224°06.8	14°19.7	291°24.7	-12°50.3	Betelgeuse	270°53.1	7°24.8				
17	279°57.2	8°07.8	121°42.8	8°07.8	69°01.3	-12°20.6	239°09.5	14°19.6	306°27.2	-12°50.3	Canopus	263°52.7	-52°42.1				
18	294°59.7	8°07.2	136°43.0	8°07.2	84°02.1	-12°21.2	254°12.3	14°19.5	321°29.8	-12°50.3	Sirius	258°27.0	-16°44.5				
19	310°02.2	8°06.6	151°43.1	8°06.6	99°03.0	-12°21.8	269°15.1	14°19.4	336°32.3	-12°50.3	Adara	255°06.6	-28°59.9				
20	325°04.6	8°06.0	166°43.3	8°06.0	114°03.8	-12°22.4	284°17.8	14°19.3	351°34.9	-12°50.4	Procyon	244°51.8	5°10.1				
21	340°07.1	8°05.4	181°43.4	8°05.4	129°04.7	-12°23.0	299°20.6	14°19.2	6°37.4	-12°50.4	Pollux	243°18.5	27°58.1				
22	355°09.5	8°04.8	196°43.6	8°04.8	144°05.5	-12°23.6	314°23.3	14°19.1	21°39.9	-12°50.4	Avior	234°15.3	-59°34.7				
23	10°12.0	8°04.2	211°43.8	8°04.2	159°06.3	-12°24.3	329°26.1	14°19.0	36°42.5	-12°50.4	Suhail	222°47.2	-43°31.3				
Mer.pass.:22:19			v0.2 d-0.6 m-4.3			v0.8 d-0.6 m1.6			v2.8 d-0.1 m-2.7			v2.5 d-0.0 m0.6					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	25°14.5	8°03.6	226°43.9	8°03.6	174°07.2	-12°24.9	344°28.9	14°19.0	51°45.0	-12°50.5	Dubhe	193°42.7	61°37.3				
1	40°16.9	8°03.0	241°44.1	8°03.0	189°08.0	-12°25.5	359°31.6	14°18.9	66°47.6	-12°50.5	Denebola	182°26.2	14°26.5				
2	55°19.4	8°02.4	256°44.2	8°02.4	204°08.8	-12°26.1	14°34.4	14°18.8	81°50.1	-12°50.5	Gienah	175°45.0	-17°40.2				
3	70°21.9	8°01.8	271°44.4	8°01.8	219°09.7	-12°26.7	29°37.2	14°18.7	96°52.6	-12°50.5	Acrux	173°02.0	-63°13.6				
4	85°24.3	8°01.2	286°44.5	8°01.2	234°10.5	-12°27.3	44°39.9	14°18.6	111°55.2	-12°50.6	Gacrux	171°53.4	-57°14.6				
5	100°26.8	8°00.6	301°44.7	8°00.6	249°11.4	-12°27.9	59°42.7	14°18.5	126°57.7	-12°50.6	Alioth	166°14.5	55°49.9				
6	115°29.3	7°60.0	316°44.9	7°60.0	264°12.2	-12°28.5	74°45.4	14°18.4	142°00.2	-12°50.6	Spica	158°23.7	-11°16.9				
7	130°31.7	7°59.3	331°45.0	7°59.3	279°13.0	-12°29.1	89°48.2	14°18.3	157°02.8	-12°50.6	Alcaid	152°53.3	49°11.8				
8	145°34.2	7°58.7	346°45.2	7°58.7	294°13.9	-12°29.7	104°51.0	14°18.2	172°05.3	-12°50.6	Hadar	148°38.2	-60°29.2				
9	160°36.7	7°58.1	1°45.3	7°58.1	309°14.7	-12°30.3	119°53.7	14°18.1	187°07.9	-12°50.7	Menkent	147°59.3	-36°29.1				
10	175°39.1	7°57.5	16°45.5	7°57.5	324°15.5	-12°30.9	134°56.5	14°18.0	202°10.4	-12°50.7	Arcturus	145°49.0	19°04.0				
11	190°41.6	7°56.9	31°45.6	7°56.9	339°16.4	-12°31.5	149°59.3	14°17.9	217°12.9	-12°50.7	Rigel Kent.	139°42.4	-60°56.0				
12	205°44.0	7°56.3	46°45.8	7°56.3	354°17.2	-12°32.1	165°02.0	14°17.8	232°15.5	-12°50.7	Zubenelg.	136°57.5	-16°08.3				
13	220°46.5	7°55.7	61°45.9	7°55.7	9°18.0	-12°32.7	180°04.8	14°17.7	247°18.0	-12°50.8	Kochab	137°20.8	74°03.6				
14	235°49.0	7°55.1	76°46.1	7°55.1	24°18.9	-12°33.3	195°07.6	14°17.6	262°20.5	-12°50.8	Alphecca	126°05.0	26°38.3				
15	250°51.4	7°54.5	91°46.2	7°54.5	39°19.7	-12°33.9	210°10.3	14°17.6	277°23.1	-12°50.8	Antares	112°17.4	-26°29.1				
16	265°53.9	7°53.9	106°46.4	7°53.9	54°20.5	-12°34.5	225°13.1	14°17.5	292°25.6	-12°50.8	Atria	107°12.9	-69°04.4				
17	280°56.4	7°53.2	121°46.5	7°53.2	69°21.4	-12°35.1	240°15.8	14°17.4	307°28.1	-12°50.9	Sabik	102°04.2	-15°45.2				
18	295°58.8	7°52.6	136°46.6	7°52.6	84°22.2	-12°35.7	255°18.6	14°17.3	322°30.7	-12°50.9	Shaula	96°12.0	-37°07.3				
19	311°01.3	7°52.0	151°46.8	7°52.0	99°23.0	-12°36.3	270°21.4	14°17.2	337°33.2	-12°50.9	Rasalhague	95°59.7	12°32.7				
20	326°03.8	7°51.4	166°46.9	7°51.4	114°23.9	-12°36.9	285°24.1	14°17.1	352°35.8	-12°50.9	Etamin	90°42.9	51°29.4				
21	341°06.2	7°50.8	181°47.1	7°50.8	129°24.7	-12°37.5	300°26.9	14°17.0	7°38.3	-12°50.9	Kaus Aust.	83°34.0	-34°22.5				
22	356°08.7	7°50.2	196°47.2	7°50.2	144°25.5	-12°38.1	315°29.7	14°16.9	22°40.8	-12°51.0	Vega	80°34.1	38°48.5				
23	11°11.2	7°49.5	211°47.4	7°49.5	159°26.4	-12°38.6	330°32.4	14°16.8	37°43.4	-12°51.0	Nunki	75°49.1	-26°16.1				
Mer.pass.:22:15			v0.2 d-0.6 m-4.3			v0.8 d-0.6 m1.6			v2.8 d-0.1 m-2.7			v2.5 d-0.0 m0.6					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec							
0	26°13.6	7°48.9	226°47.5	7°48.9	174°27.2	-12°39.2	345°35.2	14°16.7	52°45.9	-12°51.0	Alnair	27°34.0	-46°50.9				
1	41°16.1	7°48.3	241°47.6	7°48.3	189°28.0	-12°39.8	0°38.0	14°16.6	67°48.4	-12°51.0	Fomalhaut	15°15.4	-29°29.8				
2	56°18.5	7°47.7	256°47.8	7°47.7	204°28.9	-12°40.4	15°40.7	14°16.5	82°51.0	-12°51.1	Scheat	13°46.0	28°12.8				
3	71°21.0	7°47.1	271°47.9	7°47.1	219°29.7	-12°41.0	30°43.5	14°16.4	97°53.5	-12°51.1	Markab	13°30.7	15°20.1				
4	86°23.5	7°46.4	286°48.1	7°46.4	234°30.5	-12°41.6	45°46.3	14°16.3	112°56.0	-12°51.1	2023/10/			SHA	Mer.pass		
5	101°25.9	7°45.8	301°48.2	7°45.8	249°31.4	-12°42.2	60°49.0	14°16.2	127°58.6	-12°51.1	Venus	202°24.6	08:53				
6	116°28.4	7°45.2	316°48.3	7°45.2	264°32.2	-12°42.8	75°51.8	14°16.1	143°01.1	-12°51.1	Mars	149°31.7	12:24				
7	131°30.9	7°44.6	331°48.5	7°44.6	279°33.0	-12°43.4	90°54.6	14°16.1	158°03.6	-12°51.2	Jupiter	319°07.3	01:06				
8	146°33.3	7°43.9	346°48.6	7°43.9	294°33.8	-12°44.0	105°57.3	14°16.0	173°06.2	-12°51.2	Saturn	26°28.7	20:34				
9	161																

h Sun Moon

Mon	GHA	Dec	GHA	ν	Dec	d	HP					Twilight			Twilight		
0	183°34.2	-8°42.4	170°12.1	13.7	-14°48.1	-13.1	55.8	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.			
1	198°34.4	-8°43.3	184°44.7	13.6	-15°01.1	-13.0	55.8	72	05:03	06:21	07:32	15:56	17:08	18:26			
2	213°34.5	-8°44.2	199°17.3	13.5	-15°14.1	-13.0	55.8	70	05:06	06:16	07:20	16:09	17:13	18:23			
3	228°34.6	-8°45.2	213°49.8	13.4	-15°27.1	-12.9	55.8	68	05:08	06:12	07:10	16:19	17:17	18:21			
4	243°34.8	-8°46.1	228°22.2	13.4	-15°39.9	-12.8	55.9	66	05:10	06:09	07:02	16:28	17:20	18:19			
5	258°34.9	-8°47.0	242°54.5	13.3	-15°52.7	-12.8	55.9	64	05:11	06:06	06:55	16:35	17:23	18:18			
6	273°35.0	-8°47.9	257°26.8	13.2	-16°05.5	-12.7	55.9	62	05:12	06:03	06:49	16:41	17:26	18:17			
7	288°35.2	-8°48.8	271°58.9	13.1	-16°18.2	-12.7	55.9	60	05:13	06:01	06:43	16:46	17:29	18:17			
8	303°35.3	-8°49.8	286°31.0	13.0	-16°30.8	-12.6	55.9	58	05:13	05:59	06:39	16:51	17:31	18:16			
9	318°35.4	-8°50.7	301°03.0	12.9	-16°43.3	-12.5	56.0	56	05:14	05:57	06:35	16:55	17:33	18:16			
10	333°35.6	-8°51.6	315°34.9	12.9	-16°55.8	-12.5	56.0	54	05:14	05:55	06:31	16:59	17:35	18:16			
11	348°35.7	-8°52.5	330°06.7	12.8	-17°08.2	-12.4	56.0	52	05:14	05:53	06:28	17:02	17:37	18:16			
12	3°35.8	-8°53.4	344°38.4	12.7	-17°20.6	-12.3	56.0	50	05:14	05:52	06:24	17:06	17:38	18:16			
13	18°36.0	-8°54.4	359°10.0	12.6	-17°32.9	-12.2	56.0	45	05:14	05:48	06:18	17:12	17:42	18:16			
14	33°36.1	-8°55.3	13°41.6	12.5	-17°45.1	-12.2	56.1	40	05:13	05:45	06:12	17:18	17:45	18:17			
15	48°36.2	-8°56.2	28°13.0	12.4	-17°57.2	-12.1	56.1	35	05:12	05:42	06:07	17:23	17:49	18:18			
16	63°36.4	-8°57.1	42°44.4	12.3	-18°09.3	-12.0	56.1	30	05:11	05:39	06:03	17:27	17:52	18:19			
17	78°36.5	-8°58.0	57°15.7	12.2	-18°21.3	-11.9	56.1	20	05:07	05:33	05:55	17:35	17:57	18:23			
18	93°36.6	-8°59.0	71°46.8	12.1	-18°33.2	-11.9	56.1	10	05:03	05:27	05:49	17:42	18:03	18:28			
19	108°36.8	-8°59.9	86°17.9	12.0	-18°45.0	-11.8	56.2	0	04:57	05:21	05:42	17:49	18:10	18:34			
20	123°36.9	-9°00.8	100°48.9	11.9	-18°56.8	-11.7	56.2	-10	04:49	05:14	05:36	17:55	18:17	18:42			
21	138°37.0	-9°01.7	115°19.8	11.8	-19°08.4	-11.6	56.2	-20	04:40	05:06	05:28	18:03	18:25	18:51			
22	153°37.2	-9°02.6	129°50.6	11.8	-19°20.0	-11.5	56.2	-30	04:27	04:56	05:20	18:11	18:36	19:04			
23	168°37.3	-9°03.6	144°21.3	11.7	-19°31.5	-11.5	56.2	-35	04:19	04:49	05:15	18:16	18:42	19:13			
	SD.=16.0	d=-0.9	S.D.=15.2					-40	04:09	04:42	05:10	18:22	18:50	19:23			
								-45	03:56	04:33	05:04	18:28	18:59	19:36			
								-50	03:40	04:22	04:56	18:36	19:10	19:52			
								-52	03:33	04:17	04:52	18:40	19:15	19:60			
								-54	03:24	04:11	04:48	18:44	19:21	20:09			
								-56	03:14	04:04	04:44	18:48	19:28	20:19			
								-58	03:02	03:57	04:39	18:53	19:36	20:31			
								-60	02:48	03:48	04:34	18:59	19:45	20:46			
								Lat.	Moonrise			Moonset					
								72	12:04	--	--	13:40	--	--			
								70	10:53	--	--	14:53	--	--			
								68	10:17	--	--	15:31	--	--			
								66	09:51	12:10	--	15:58	15:20	--			
								64	09:31	11:30	14:15	16:18	16:01	15:06			
								62	09:16	11:02	13:00	16:35	16:30	16:22			
								60	09:02	10:41	12:25	16:50	16:52	16:58			
								58	08:51	10:24	11:59	17:02	17:09	17:24			
								56	08:41	10:09	11:39	17:12	17:25	17:45			
								54	08:33	09:57	11:22	17:22	17:38	18:02			
								52	08:25	09:46	11:08	17:30	17:49	18:17			
								50	08:18	09:36	10:55	17:37	17:59	18:29			
								45	08:04	09:16	10:30	17:54	18:21	18:56			
								40	07:52	08:60	10:09	18:07	18:38	19:17			
								35	07:42	08:46	09:52	18:18	18:53	19:35			
								30	07:33	08:34	09:38	18:28	19:06	19:50			
								20	07:18	08:14	09:13	18:46	19:28	20:16			
								10	07:05	07:57	08:52	19:01	19:47	20:38			
								0	06:52	07:40	08:32	19:15	20:05	20:59			
								-10	06:40	07:24	08:13	19:29	20:23	21:20			
								-20	06:27	07:07	07:52	19:44	20:42	21:42			
								-30	06:13	06:47	07:28	20:02	21:04	22:09			
								-35	06:04	06:36	07:14	20:12	21:18	22:24			
								-40	05:55	06:23	06:58	20:24	21:33	22:42			
								-45	05:44	06:08	06:39	20:38	21:51	23:04			
								-50	05:30	05:49	06:15	20:55	22:14	23:31			
								-52	05:24	05:41	06:04	21:04	22:25	23:45			
								-54	05:17	05:31	05:51	21:13	22:37	--			
								-56	05:10	05:20	05:36	21:23	22:52	--			
								-58	05:01	05:07	05:18	21:35	23:09	--			
								-60	04:51	04:53	04:57	21:48	23:29	--			
								Day	Sun		Mer.	Moon		Age			
									Eqn. of Time	12 ^h	Pass	Mer.Pass.	Lower				
								16	14:17	14:23	11:45	13:03	00:40	2(3%)			
								17	14:30	14:36	11:45	13:52	01:27	3(8%)			
								18	14:42	14:48	11:45	14:45	02:18	4(14%)			
								S.D.=15.5									
								SD.=16.0 d=-0.9									

October 19, 20 ,21 (Thu., Fri., Sat.)

Aries			Venus		Mars		Jupiter		Saturn		Stars		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec
0	27°12.8	226°50.7	7°33.8	174°47.1	-12°53.6	346°41.6	14°14.4	53°46.7	-12°51.5	Alpheratz Ankaa Schedar Diphda Achernar Hamal Polaris Akamar Menkar Mirfak Aldebaran Rigel Capella Bellatrix Elnath Alnilam Betelgeuse Canopus Sirius Adara Procyon Pollux Avior Suhail Miaplacidus Alphard Regulus Dubhe Denebola Gienah Acrux Gacrux Alioth Spica Alcaid Hadar Menkent Arcturus Rigel Kent. Zubenelg. Kochab Alphecca Antares Atria Sabik Shaula Rasalhague Etamin Kaus Aust. Vega Nunki Altair Peacock Deneb Enif Alnair Fomalhaut Scheat Markab	357°35.6	29°13.5	
1	42°15.2	241°50.8	7°33.2	189°47.9	-12°54.2	1°44.4	14°14.4	68°49.2	-12°51.5		353°07.7	-42°10.6	
2	57°17.7	256°51.0	7°32.6	204°48.7	-12°54.8	16°47.2	14°14.3	83°51.8	-12°51.6		349°31.7	56°40.2	
3	72°20.1	271°51.1	7°31.9	219°49.6	-12°55.3	31°49.9	14°14.2	98°54.3	-12°51.6		348°47.9	-17°51.3	
4	87°22.6	286°51.2	7°31.3	234°50.4	-12°55.9	46°52.7	14°14.1	113°56.8	-12°51.6		335°20.4	-57°06.9	
5	102°25.1	301°51.3	7°30.6	249°51.2	-12°56.5	61°55.5	14°14.0	128°59.3	-12°51.6		327°52.1	23°34.6	
6	117°27.5	316°51.5	7°30.0	264°52.1	-12°57.1	76°58.3	14°13.9	144°01.9	-12°51.6		314°05.7	89°21.8	
7	132°30.0	331°51.6	7°29.4	279°52.9	-12°57.7	92°01.0	14°13.8	159°04.4	-12°51.7		315°12.1	-40°12.4	
8	147°32.5	346°51.7	7°28.7	294°53.7	-12°58.3	107°03.8	14°13.7	174°06.9	-12°51.7		314°06.9	4°11.1	
9	162°34.9	1°51.8	7°28.1	309°54.5	-12°58.9	122°06.6	14°13.6	189°09.5	-12°51.7		308°29.3	49°56.7	
10	177°37.4	16°51.9	7°27.4	324°55.4	-12°59.5	137°09.3	14°13.5	204°12.0	-12°51.7		290°40.6	16°33.5	
11	192°39.9	31°52.1	7°26.8	339°56.2	-13°00.1	152°12.1	14°13.4	219°14.5	-12°51.7		281°04.7	-8°10.3	
12	207°42.3	46°52.2	7°26.1	354°57.0	-13°00.7	167°14.9	14°13.3	234°17.1	-12°51.8		280°23.1	46°01.3	
13	222°44.8	61°52.3	7°25.5	9°57.8	-13°01.3	182°17.7	14°13.2	249°19.6	-12°51.8		278°23.8	6°22.4	
14	237°47.3	76°52.4	7°24.8	24°58.6	-13°01.9	197°20.4	14°13.1	264°22.1	-12°51.8		278°03.0	28°37.7	
15	252°49.7	91°52.5	7°24.2	39°59.5	-13°02.5	212°23.2	14°13.0	279°24.6	-12°51.8		275°38.6	-1°11.1	
16	267°52.2	106°52.6	7°23.5	55°00.3	-13°03.1	227°26.0	14°12.9	294°27.2	-12°51.8		270°53.1	7°24.8	
17	282°54.6	121°52.8	7°22.9	70°01.1	-13°03.7	242°28.7	14°12.8	309°29.7	-12°51.9		263°52.7	-52°42.1	
18	297°57.1	136°52.9	7°22.2	85°01.9	-13°04.2	257°31.5	14°12.7	324°32.2	-12°51.9		258°27.0	-16°44.5	
19	312°59.6	151°53.0	7°21.6	100°02.8	-13°04.8	272°34.3	14°12.6	339°34.8	-12°51.9		255°06.6	-28°60.0	
20	328°02.0	166°53.1	7°20.9	115°03.6	-13°05.4	287°37.1	14°12.5	354°37.3	-12°51.9		244°51.8	5°10.1	
21	343°04.5	181°53.2	7°20.3	130°04.4	-13°06.0	302°39.8	14°12.4	9°39.8	-12°51.9		243°18.4	27°58.1	
22	358°07.0	196°53.3	7°19.6	145°05.2	-13°06.6	317°42.6	14°12.3	24°42.3	-12°52.0		234°15.3	-59°34.7	
23	13°09.4	211°53.4	7°19.0	160°06.1	-13°07.2	332°45.4	14°12.3	39°44.9	-12°52.0	222°47.2	-43°31.3		
Mer.pass.:22:07			v0.1 d-0.6 m-4.3		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.7		v2.5 d-0.0 m0.7				
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	28°11.9	226°53.5	7°18.3	175°06.9	-13°07.8	347°48.2	14°12.2	54°47.4	-12°52.0				
1	43°14.4	241°53.7	7°17.7	190°07.7	-13°08.4	2°50.9	14°12.1	69°49.9	-12°52.0				
2	58°16.8	256°53.8	7°17.0	205°08.5	-13°09.0	17°53.7	14°12.0	84°52.4	-12°52.0				
3	73°19.3	271°53.9	7°16.3	220°09.3	-13°09.6	32°56.5	14°11.9	99°55.0	-12°52.1				
4	88°21.8	286°54.0	7°15.7	235°10.2	-13°10.2	47°59.3	14°11.8	114°57.5	-12°52.1				
5	103°24.2	301°54.1	7°15.0	250°11.0	-13°10.8	63°02.0	14°11.7	130°00.0	-12°52.1				
6	118°26.7	316°54.2	7°14.4	265°11.8	-13°11.3	78°04.8	14°11.6	145°02.6	-12°52.1				
7	133°29.1	331°54.3	7°13.7	280°12.6	-13°11.9	93°07.6	14°11.5	160°05.1	-12°52.1				
8	148°31.6	346°54.4	7°13.0	295°13.4	-13°12.5	108°10.4	14°11.4	175°07.6	-12°52.2				
9	163°34.1	1°54.5	7°12.4	310°14.3	-13°13.1	123°13.1	14°11.3	190°10.1	-12°52.2				
10	178°36.5	16°54.6	7°11.7	325°15.1	-13°13.7	138°15.9	14°11.2	205°12.7	-12°52.2				
11	193°39.0	31°54.7	7°11.0	340°15.9	-13°14.3	153°18.7	14°11.1	220°15.2	-12°52.2				
12	208°41.5	46°54.8	7°10.4	355°16.7	-13°14.9	168°21.5	14°11.0	235°17.7	-12°52.2				
13	223°43.9	61°54.9	7°09.7	10°17.5	-13°15.5	183°24.2	14°10.9	250°20.2	-12°52.2				
14	238°46.4	76°55.0	7°09.1	25°18.4	-13°16.1	198°27.0	14°10.8	265°22.8	-12°52.3				
15	253°48.9	91°55.1	7°08.4	40°19.2	-13°16.7	213°29.8	14°10.7	280°25.3	-12°52.3				
16	268°51.3	106°55.2	7°07.7	55°20.0	-13°17.2	228°32.6	14°10.6	295°27.8	-12°52.3				
17	283°53.8	121°55.3	7°07.1	70°20.8	-13°17.8	243°35.3	14°10.5	310°30.3	-12°52.3				
18	298°56.3	136°55.4	7°06.4	85°21.6	-13°18.4	258°38.1	14°10.4	325°32.9	-12°52.3				
19	313°58.7	151°55.5	7°05.7	100°22.4	-13°19.0	273°40.9	14°10.3	340°35.4	-12°52.4				
20	329°01.2	166°55.6	7°05.0	115°23.3	-13°19.6	288°43.7	14°10.2	355°37.9	-12°52.4				
21	344°03.6	181°55.7	7°04.4	130°24.1	-13°20.2	303°46.4	14°10.1	10°40.4	-12°52.4				
22	359°06.1	196°55.8	7°03.7	145°24.9	-13°20.8	318°49.2	14°10.0	25°43.0	-12°52.4				
23	14°08.6	211°55.9	7°03.0	160°25.7	-13°21.4	333°52.0	14°09.9	40°45.5	-12°52.4				
Mer.pass.:22:03			v0.1 d-0.7 m-4.3		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.7		v2.5 d-0.0 m0.7				
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	29°11.0	226°56.0	7°02.4	175°26.5	-13°21.9	348°54.8	14°09.8	55°48.0	-12°52.4				
1	44°13.5	241°56.1	7°01.7	190°27.3	-13°22.5	3°57.5	14°09.7	70°50.5	-12°52.5				
2	59°16.0	256°56.2	7°01.0	205°28.2	-13°23.1	19°00.3	14°09.7	85°53.0	-12°52.5				
3	74°18.4	271°56.3	7°00.3	220°29.0	-13°23.7	34°03.1	14°09.6	100°55.6	-12°52.5				
4	89°20.9	286°56.4	6°59.7	235°29.8	-13°24.3	49°05.9	14°09.5	115°58.1	-12°52.5				
5	104°23.4	301°56.5	6°59.0	250°30.6	-13°24.9	64°08.6	14°09.4	131°00.6	-12°52.5				
6	119°25.8	316°56.6	6°58.3	265°31.4	-13°25.5	79°11.4	14°09.3	146°03.1	-12°52.6				
7	134°28.3	331°56.7	6°57.6	280°32.2	-13°26.1	94°14.2	14°09.2	161°05.7	-12°52.6				
8	149°30.7	346°56.8	6°56.9	295°33.1	-13°26.6	109°17.0	14°09.1	176°08.2	-12°52.6				
9	164°33.2	1°56.9	6°56.3	310°33.9	-13°27.2	124°19.8	14°09.0	191°10.7	-12°52.6				
10	179°35.7	16°56.9	6°55.6	325°34.7	-13°27.8	139°22.5	14°08.9	206°13.2	-12°52.6				
11	194°38.1	31°57.0	6°54.9	340°35.5	-13°28.4	154°25.3	14°08.8	221°15.7	-12°52.6				
12	209°40.6	46°57.1	6°54.2	355°36.3	-13°29.0	169°28.1	14°08.7	236°18.3	-12°52.7				
13	224°43.1	61°57.2	6°53.5	10°37.1	-13°29.6	184°30.9	14°08.6	251°20.8	-12°52.7				
14	239°45.5	76°57.3	6°52.9	25°37.9	-13°30.2	199°33.7	14°08.5	266°23.3	-12°52.7				
15	254°48.0	91°57.4	6°52.2	40°38.8	-13°30.7	214°36.4	14°08.4	281°25.8	-12°52.7				
16	269°50.5	106°57.5	6°51.5	55°39.6	-13°31.3	229°39.2	14°08.3	296°28.4	-12°52.7				
17	284°52.9	121°57.6	6°50.8	70°40.4	-13°31.9	244°42.0	14°08.2	311°30.9	-12°52.7				
18	299°55.4	136°57.6	6°50.1	85°41.2	-13°32.5	259°44.8	14°08.1	326°33.4	-12°52.8				
19	314°57.9	151°57.7	6°49.4	100°42.0	-13°33.1	274°47.5	14°08.0	341°35.9	-12°52.8				
20	330°00.3	166°57.8	6°48.7	115°42.8	-13°33.7	289°50.3	14°07.9	356°38.4	-12°52.8				
21	345°02.8	181°57.9	6°48.0	130°43.6	-13°34.3	304°53.1	14°07.8	11°41.0	-12°52.8				
22	0°05.2	196°58.0	6°47.4	145°44.4	-13°34.8	319°55.9	14°07.7	26°43.5	-12°52.8				
23	15°07.7	2											

h		Sun		Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	183°43.4	-9°48.2	133°24.6	6.9	-26°43.3	-5.6	57.3
1	198°43.5	-9°49.1	147°50.5	6.8	-26°48.8	-5.5	57.3
2	213°43.6	-9°50.0	162°16.3	6.7	-26°54.2	-5.3	57.3
3	228°43.8	-9°50.9	176°41.9	6.6	-26°59.4	-5.1	57.3
4	243°43.9	-9°51.8	191°07.5	6.6	-27°04.5	-5.0	57.3
5	258°44.0	-9°52.8	205°33.1	6.5	-27°09.4	-4.8	57.4
6	273°44.1	-9°53.7	219°58.5	6.4	-27°14.1	-4.7	57.4
7	288°44.2	-9°54.6	234°23.9	6.3	-27°18.7	-4.5	57.4
8	303°44.3	-9°55.5	248°49.2	6.3	-27°23.2	-4.3	57.4
9	318°44.5	-9°56.4	263°14.4	6.2	-27°27.4	-4.2	57.5
10	333°44.6	-9°57.3	277°39.5	6.1	-27°31.5	-4.0	57.5
11	348°44.7	-9°58.2	292°04.6	6.0	-27°35.5	-3.9	57.5
12	3°44.8	-9°59.1	306°29.6	6.0	-27°39.2	-3.7	57.5
13	18°44.9	-9°60.0	320°54.6	5.9	-27°42.8	-3.5	57.5
14	33°45.0	-10°00.9	335°19.4	5.8	-27°46.3	-3.4	57.6
15	48°45.1	-10°01.8	349°44.2	5.8	-27°49.6	-3.2	57.6
16	63°45.3	-10°02.7	4°09.0	5.7	-27°52.7	-3.0	57.6
17	78°45.4	-10°03.6	18°33.7	5.7	-27°55.6	-2.9	57.6
18	93°45.5	-10°04.5	32°58.3	5.6	-27°58.4	-2.7	57.6
19	108°45.6	-10°05.4	47°22.9	5.5	-28°01.0	-2.5	57.7
20	123°45.7	-10°06.3	61°47.4	5.5	-28°03.4	-2.3	57.7
21	138°45.8	-10°07.2	76°11.8	5.4	-28°05.7	-2.2	57.7
22	153°45.9	-10°08.1	90°36.2	5.4	-28°07.7	-2.0	57.7
23	168°46.0	-10°09.0	105°00.6	5.3	-28°09.6	-1.8	57.8
SD.=16.1		d=-0.9	S.D.=15.6				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	183°46.2	-10°09.9	119°24.9	5.3	-28°11.4	-1.6	57.8
1	198°46.3	-10°10.8	133°49.2	5.2	-28°12.9	-1.5	57.8
2	213°46.4	-10°11.7	148°13.4	5.2	-28°14.3	-1.3	57.8
3	228°46.5	-10°12.6	162°37.6	5.2	-28°15.5	-1.1	57.8
4	243°46.6	-10°13.5	177°01.7	5.1	-28°16.5	-0.9	57.9
5	258°46.7	-10°14.4	191°25.8	5.1	-28°17.4	-0.8	57.9
6	273°46.8	-10°15.3	205°49.9	5.0	-28°18.1	-0.6	57.9
7	288°46.9	-10°16.2	220°13.9	5.0	-28°18.6	-0.4	57.9
8	303°47.0	-10°17.1	234°37.9	5.0	-28°18.9	-0.2	58.0
9	318°47.2	-10°18.0	249°01.9	5.0	-28°19.0	-0.0	58.0
10	333°47.3	-10°18.9	263°25.8	4.9	-28°18.9	0.1	58.0
11	348°47.4	-10°19.8	277°49.8	4.9	-28°18.7	0.3	58.0
12	3°47.5	-10°20.7	292°13.7	4.9	-28°18.3	0.5	58.0
13	18°47.6	-10°21.6	306°37.5	4.9	-28°17.7	0.7	58.1
14	33°47.7	-10°22.5	321°01.4	4.8	-28°16.9	0.9	58.1
15	48°47.8	-10°23.4	335°25.2	4.8	-28°16.0	1.0	58.1
16	63°47.9	-10°24.3	349°49.0	4.8	-28°14.9	1.2	58.1
17	78°48.0	-10°25.2	4°12.9	4.8	-28°13.5	1.4	58.1
18	93°48.1	-10°26.0	18°36.7	4.8	-28°12.0	1.6	58.2
19	108°48.2	-10°26.9	33°00.5	4.8	-28°10.4	1.8	58.2
20	123°48.3	-10°27.8	47°24.2	4.8	-28°08.5	2.0	58.2
21	138°48.4	-10°28.7	61°48.0	4.8	-28°06.5	2.1	58.2
22	153°48.6	-10°29.6	76°11.8	4.8	-28°04.2	2.3	58.3
23	168°48.7	-10°30.5	90°35.6	4.8	-28°01.8	2.5	58.3
SD.=16.1		d=-0.9	S.D.=15.8				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	183°48.8	-10°31.4	104°59.4	4.8	-27°59.2	2.7	58.3
1	198°48.9	-10°32.3	119°23.2	4.8	-27°56.4	2.9	58.3
2	213°49.0	-10°33.2	133°47.0	4.8	-27°53.5	3.0	58.3
3	228°49.1	-10°34.1	148°10.8	4.8	-27°50.4	3.2	58.4
4	243°49.2	-10°35.0	162°34.6	4.8	-27°47.0	3.4	58.4
5	258°49.3	-10°35.9	176°58.4	4.8	-27°43.5	3.6	58.4
6	273°49.4	-10°36.8	191°22.3	4.9	-27°39.8	3.8	58.4
7	288°49.5	-10°37.7	205°46.1	4.9	-27°36.0	4.0	58.5
8	303°49.6	-10°38.5	220°10.0	4.9	-27°31.9	4.1	58.5
9	318°49.7	-10°39.4	234°33.9	4.9	-27°27.7	4.3	58.5
10	333°49.8	-10°40.3	248°57.9	4.9	-27°23.3	4.5	58.5
11	348°49.9	-10°41.2	263°21.8	5.0	-27°18.7	4.7	58.5
12	3°50.0	-10°42.1	277°45.8	5.0	-27°14.0	4.9	58.6
13	18°50.1	-10°43.0	292°09.8	5.0	-27°09.0	5.0	58.6
14	33°50.2	-10°43.9	306°33.8	5.1	-27°03.9	5.2	58.6
15	48°50.3	-10°44.8	320°57.9	5.1	-26°58.6	5.4	58.6
16	63°50.4	-10°45.7	335°22.0	5.1	-26°53.1	5.6	58.6
17	78°50.5	-10°46.6	349°46.2	5.2	-26°47.5	5.7	58.7
18	93°50.6	-10°47.4	4°10.3	5.2	-26°41.6	5.9	58.7
19	108°50.7	-10°48.3	18°34.6	5.2	-26°35.6	6.1	58.7
20	123°50.8	-10°49.2	32°58.8	5.3	-26°29.5	6.3	58.7
21	138°50.9	-10°50.1	47°23.1	5.3	-26°23.1	6.4	58.7
22	153°51.0	-10°51.0	61°47.5	5.4	-26°16.6	6.6	58.8
23	168°51.1	-10°51.9	76°11.9	5.4	-26°09.9	6.8	58.8
SD.=16.1		d=-0.9	S.D.=15.9				
		Twilight		Sunrise		Sunset	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	05:16	06:34	07:48	15:40	16:53	18:12	
70	05:17	06:28	07:33	15:55	16:60	18:10	
68	05:18	06:23	07:22	16:07	17:05	18:10	
66	05:19	06:18	07:12	16:16	17:10	18:09	
64	05:19	06:14	07:04	16:25	17:14	18:09	
62	05:20	06:11	06:57	16:32	17:17	18:09	
60	05:20	06:08	06:51	16:38	17:20	18:09	
58	05:20	06:05	06:46	16:43	17:23	18:09	
56	05:20	06:03	06:41	16:48	17:26	18:09	
54	05:19	06:01	06:37	16:52	17:28	18:09	
52	05:19	05:58	06:33	16:56	17:30	18:09	
50	05:19	05:56	06:29	16:60	17:32	18:10	
45	05:18	05:52	06:22	17:07	17:37	18:11	
40	05:16	05:48	06:15	17:14	17:41	18:13	
35	05:15	05:44	06:10	17:19	17:45	18:14	
30	05:13	05:41	06:05	17:24	17:49	18:16	
20	05:08	05:34	05:56	17:33	17:55	18:21	
10	05:03	05:27	05:49	17:41	18:02	18:27	
0	04:56	05:21	05:41	17:48	18:09	18:34	
-10	04:48	05:13	05:34	17:56	18:17	18:42	
-20	04:37	05:04	05:26	18:04	18:26	18:53	
-30	04:23	04:52	05:17	18:13	18:38	19:07	
-35	04:15	04:46	05:12	18:19	18:45	19:16	
-40	04:04	04:37	05:06	18:25	18:53	19:27	
-45	03:50	04:28	04:58	18:32	19:03	19:40	
-50	03:33	04:16	04:50	18:41	19:15	19:58	
-52	03:25	04:10	04:46	18:45	19:21	20:07	
-54	03:15	04:03	04:41	18:50	19:28	20:16	
-56	03:04	03:56	04:36	18:55	19:35	20:28	
-58	02:51	03:48	04:31	19:00	19:44	20:41	
-60	02:36	03:38	04:25	19:06	19:53	20:57	
		Moonrise		Moonset			
Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
72	—:—	—:—	—:—	—:—	—:—	—:—	
70	—:—	—:—	—:—	—:—	—:—	—:—	
68	—:—	—:—	—:—	—:—	—:—	—:—	
66	—:—	—:—	—:—	—:—	—:—	—:—	
64	—:—	—:—	—:—	—:—	—:—	—:—	
62	15:34	—:—	16:33	15:47	—:—	19:00	
60	14:05	15:17	15:47	17:16	18:10	19:46	
58	13:29	14:37	15:17	17:53	18:49	20:15	
56	13:03	14:10	14:54	18:19	19:17	20:38	
54	12:42	13:48	14:35	18:40	19:38	20:57	
52	12:25	13:30	14:19	18:57	19:56	21:12	
50	12:10	13:15	14:05	19:12	20:11	21:26	
45	11:41	12:44	13:37	19:42	20:42	21:53	
40	11:17	12:20	13:15	20:06	21:06	22:15	
35	10:58	12:01	12:56	20:25	21:25	22:33	
30	10:42	11:44	12:40	20:42	21:42	22:48	
20	10:14	11:15	12:13	21:10	22:10	23:14	
10	09:51	10:51	11:50	21:34	22:34	23:36	
0	09:29	10:28	11:28	21:57	22:57	23:57	
-10	09:07	10:05	11:07	22:19	23:19	—:—	
-20	08:43	09:41	10:43	22:44	23:43	—:—	
-30	08:16	09:13	10:16	23:12	—:—	00:11	
-35	08:00	08:56	09:60	23:28	—:—	00:28	
-40	07:42	08:36	09:41	23:48	—:—	00:47	
-45	07:20	08:13	09:18	—:—	00:11	01:10	
-50	06:51	07:42	08:49	—:—	00:42	01:39	
-52	06:38	07:27	08:35	—:—	00:57	01:54	
-54	06:22	07:10	08:18	00:01	01:14	02:11	
-56	06:03	06:48	07:59	00:19	01:35	02:31	
-58	05:40	06:22	07:34	00:42	02:02	02:56	
-60	05:10	05:44	07:00	01:11	02:40	03:30	
		Sun		Moon			
Day	Eqn.of Time	Mer.	Mer.	Mer.Pass.	Age		
	00 ^h	12 ^h	Pass	Upper	Lower		
19	14:53	14:59	11:45	15:42	03:13	5(22%)	
20	15:05	15:10	11:44	16:42	04:12	6(32%)	
21	15:15	15:20	11:44	17:42	05:12	7(43%)	

October 22, 23 ,24 (Sun., Mon., Tue.)

Aries			Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	30°10.2	226°58.2	6°46.0	175°46.1	-13°36.0	350°01.4	14°07.5	56°48.5	-12°52.9	Alpheratz	357°35.5	29°13.5	
1	45°12.6	241°58.2	6°45.3	190°46.9	-13°36.6	5°04.2	14°07.4	71°51.0	-12°52.9	Ankaa	353°07.7	-42°10.6	
2	60°15.1	256°58.3	6°44.6	205°47.7	-13°37.2	20°07.0	14°07.3	86°53.6	-12°52.9	Schedar	349°31.7	56°40.2	
3	75°17.6	271°58.4	6°43.9	220°48.5	-13°37.8	35°09.8	14°07.2	101°56.1	-12°52.9	Diphda	348°47.9	-17°51.3	
4	90°20.0	286°58.5	6°43.2	235°49.3	-13°38.3	50°12.6	14°07.1	116°58.6	-12°52.9	Achernar	335°20.4	-57°06.9	
5	105°22.5	301°58.6	6°42.5	250°50.1	-13°38.9	65°15.3	14°07.0	132°01.1	-12°52.9	Hamal	327°52.0	23°34.6	
6	120°25.0	316°58.6	6°41.8	265°50.9	-13°39.5	80°18.1	14°06.9	147°03.6	-12°52.9	Polaris	314°05.0	89°21.8	
7	135°27.4	331°58.7	6°41.1	280°51.7	-13°40.1	95°20.9	14°06.8	162°06.1	-12°53.0	Akamar	315°12.1	-40°12.4	
8	150°29.9	346°58.8	6°40.4	295°52.5	-13°40.7	110°23.7	14°06.7	177°08.7	-12°53.0	Menkar	314°06.9	4°11.1	
9	165°32.4	1°58.9	6°39.7	310°53.4	-13°41.3	125°26.5	14°06.6	192°11.2	-12°53.0	Mirfak	308°29.3	49°56.7	
10	180°34.8	16°58.9	6°39.0	325°54.2	-13°41.8	140°29.2	14°06.5	207°13.7	-12°53.0	Aldebaran	290°40.5	16°33.5	
11	195°37.3	31°59.0	6°38.3	340°55.0	-13°42.4	155°32.0	14°06.4	222°16.2	-12°53.0	Rigel	281°04.6	-8°10.3	
12	210°39.7	46°59.1	6°37.6	355°55.8	-13°43.0	170°34.8	14°06.3	237°18.7	-12°53.0	Capella	280°23.1	46°01.3	
13	225°42.2	61°59.2	6°36.9	10°56.6	-13°43.6	185°37.6	14°06.2	252°21.3	-12°53.1	Bellatrix	278°23.8	6°22.4	
14	240°44.7	76°59.2	6°36.2	25°57.4	-13°44.2	200°40.4	14°06.1	267°23.8	-12°53.1	Elnath	278°02.9	28°37.7	
15	255°47.1	91°59.3	6°35.5	40°58.2	-13°44.8	215°43.2	14°06.0	282°26.3	-12°53.1	Alnilam	275°38.6	-1°11.1	
16	270°49.6	106°59.4	6°34.8	55°59.0	-13°45.3	230°45.9	14°05.9	297°28.8	-12°53.1	Betelgeuse	270°53.0	7°24.8	
17	285°52.1	121°59.5	6°34.1	70°59.8	-13°45.9	245°48.7	14°05.8	312°31.3	-12°53.1	Canopus	263°52.6	-52°42.1	
18	300°54.5	136°59.5	6°33.4	86°00.6	-13°46.5	260°51.5	14°05.7	327°33.8	-12°53.1	Sirius	258°26.9	-16°44.5	
19	315°57.0	151°59.6	6°32.7	101°01.4	-13°47.1	275°54.3	14°05.6	342°36.4	-12°53.1	Adara	255°06.6	-28°60.0	
20	330°59.5	166°59.7	6°32.0	116°02.2	-13°47.7	290°57.1	14°05.5	357°38.9	-12°53.2	Procyon	244°51.8	5°10.1	
21	346°01.9	181°59.7	6°31.3	131°03.1	-13°48.2	305°59.8	14°05.5	12°41.4	-12°53.2	Pollux	243°18.4	27°58.1	
22	1°04.4	196°59.8	6°30.6	146°03.9	-13°48.8	321°02.6	14°05.4	27°43.9	-12°53.2	Avior	234°15.2	-59°34.7	
23	16°06.9	211°59.9	6°29.9	161°04.7	-13°49.4	336°05.4	14°05.3	42°46.4	-12°53.2	Suhail	222°47.2	-43°31.3	
Mer.pass.:21:55			v0.1 d-0.7 m-4.3		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.7		v2.5 d-0.0 m0.7		Miaplacidus	221°38.8	-69°48.5
											Alphard	217°48.9	-8°45.5
											Regulus	207°35.7	11°51.2
											Dubhe	193°42.7	61°37.3
											Denebola	182°26.2	14°26.5
											Gienah	175°44.9	-17°40.2
											Acrux	173°01.9	-63°13.6
											Gacrux	171°53.4	-57°14.6
											Alioth	166°14.4	55°49.8
											Spica	158°23.7	-11°17.0
											Alcaid	152°53.3	49°11.7
											Hadar	148°38.2	-60°29.2
											Menkent	147°59.3	-36°29.1
											Arcturus	145°49.0	19°03.9
											Rigel Kent.	139°42.4	-60°56.0
											Zubenelg.	136°57.5	-16°08.3
											Kochab	137°20.9	74°03.5
											Alphecca	126°05.0	26°38.2
											Antares	112°17.4	-26°29.1
											Atria	107°13.0	-69°04.3
											Sabik	102°04.2	-15°45.2
											Shaula	96°12.0	-37°07.3
											Rasalhague	95°59.7	12°32.7
											Etamin	90°42.9	51°29.4
											Kaus Aust.	83°34.0	-34°22.5
											Vega	80°34.1	38°48.5
											Nunki	75°49.2	-26°16.1
											Altair	62°01.1	8°55.9
											Peacock	53°07.3	-56°39.7
											Deneb	49°26.5	45°22.1
											Enif	33°39.7	9°59.2
											Alnair	27°34.0	-46°50.9
											Fomalhaut	15°15.5	-29°29.8
											Scheat	13°46.0	28°12.9
											Markab	13°30.7	15°20.1
											2023/10/	SHA	Mer.pass
											Venus	196°48.0	08:52
											Mars	145°35.9	12:16
											Jupiter	319°51.3	00:40
											Saturn	26°38.3	20:09
											2023/10/	SHA	Mer.pass
											Venus	195°50.6	08:52
											Mars	144°56.2	12:15
											Jupiter	319°58.9	00:35
											Saturn	26°39.6	20:05
											2023/10/	SHA	Mer.pass
											Venus	194°53.0	08:52
											Mars	144°16.3	12:14
											Jupiter	320°06.6	00:31
											Saturn	26°40.8	20:01
											Horizontal paralax		
											Venus:		0.2
											Mars:		0.1
									</				

Sun								Moon							
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	183°51.2	-10°52.8	90°36.3	5.5	-26°03.0	7.0	58.8	72	05:28	06:48	08:03	15:24	16:39	17:58	
1	198°51.3	-10°53.7	105°00.8	5.5	-25°56.0	7.1	58.8	70	05:28	06:40	07:47	15:41	16:47	17:58	
2	213°51.4	-10°54.5	119°25.3	5.6	-25°48.8	7.3	58.9	68	05:28	06:33	07:33	15:54	16:54	17:59	
3	228°51.5	-10°55.4	133°49.9	5.6	-25°41.4	7.5	58.9	66	05:28	06:28	07:22	16:05	16:60	17:59	
4	243°51.6	-10°56.3	148°14.5	5.7	-25°33.8	7.6	58.9	64	05:28	06:23	07:13	16:14	17:04	17:60	
5	258°51.7	-10°57.2	162°39.2	5.7	-25°26.1	7.8	58.9	62	05:27	06:19	07:05	16:22	17:09	18:00	
6	273°51.8	-10°58.1	177°04.0	5.8	-25°18.3	8.0	58.9	60	05:27	06:15	06:58	16:29	17:12	18:01	
7	288°51.9	-10°59.0	191°28.8	5.8	-25°10.2	8.1	59.0	58	05:26	06:12	06:52	16:35	17:16	18:01	
8	303°52.0	-10°59.9	205°53.7	5.9	-25°02.0	8.3	59.0	56	05:25	06:09	06:47	16:41	17:19	18:02	
9	318°52.1	-11°00.7	220°18.6	6.0	-24°53.6	8.5	59.0	54	05:25	06:06	06:42	16:45	17:22	18:03	
10	333°52.2	-11°01.6	234°43.6	6.0	-24°45.1	8.6	59.0	52	05:24	06:03	06:38	16:50	17:24	18:04	
11	348°52.3	-11°02.5	249°08.6	6.1	-24°36.4	8.8	59.0	50	05:23	06:01	06:34	16:54	17:27	18:04	
12	3°52.4	-11°03.4	263°33.7	6.1	-24°27.6	8.9	59.1	45	05:21	05:56	06:26	17:02	17:32	18:06	
13	18°52.5	-11°04.3	277°58.9	6.2	-24°18.5	9.1	59.1	40	05:19	05:51	06:19	17:10	17:37	18:09	
14	33°52.6	-11°05.2	292°24.1	6.3	-24°09.4	9.2	59.1	35	05:17	05:47	06:12	17:16	17:42	18:11	
15	48°52.7	-11°06.0	306°49.4	6.4	-23°50.6	9.6	59.1	30	05:15	05:43	06:07	17:21	17:46	18:14	
16	63°52.7	-11°06.9	321°14.8	6.4	-23°50.6	9.6	59.1	20	05:09	05:35	05:57	17:31	17:53	18:19	
17	78°52.8	-11°07.8	335°40.2	6.5	-23°40.9	9.7	59.2	10	05:03	05:28	05:49	17:40	18:01	18:26	
18	93°52.9	-11°08.7	350°05.7	6.5	-23°31.1	9.9	59.2	0	04:55	05:20	05:41	17:48	18:09	18:33	
19	108°53.0	-11°09.6	4°31.2	6.6	-23°21.2	10.0	59.2	-10	04:46	05:11	05:33	17:56	18:17	18:43	
20	123°53.1	-11°10.4	18°56.9	6.7	-23°11.1	10.2	59.2	-20	04:35	05:01	05:24	18:05	18:28	18:54	
21	138°53.2	-11°11.3	33°22.6	6.7	-23°00.9	10.3	59.2	-30	04:20	04:49	05:14	18:15	18:40	19:09	
22	153°53.3	-11°12.2	47°48.3	6.8	-22°50.5	10.5	59.2	-35	04:10	04:42	05:08	18:21	18:48	19:19	
23	168°53.4	-11°13.1	62°14.2	6.9	-22°39.9	10.6	59.3	-40	03:59	04:33	05:01	18:28	18:57	19:31	
SD.=16.1 d=-0.9 S.D.=16.0								-45	03:45	04:22	04:53	18:36	19:07	19:45	
								-50	03:26	04:09	04:44	18:46	19:21	20:04	
								-52	03:17	04:03	04:39	18:50	19:27	20:13	
								-54	03:07	03:56	04:35	18:55	19:34	20:24	
								-56	02:55	03:48	04:29	19:01	19:42	20:36	
								-58	02:41	03:39	04:23	19:07	19:52	20:51	
								-60	02:23	03:29	04:16	19:14	20:02	21:09	
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset			
0	183°53.5	-11°14.0	76°40.1	6.9	-22°29.3	10.8	59.3	72	--	--	17:33	--	--	23:58	
1	198°53.6	-11°14.8	91°06.0	7.0	-22°18.4	10.9	59.3	70	--	18:18	17:08	--	21:19	--	
2	213°53.7	-11°15.7	105°32.1	7.1	-22°07.5	11.0	59.3	68	--	17:30	16:49	--	22:06	--	
3	228°53.8	-11°16.6	119°58.2	7.2	-21°56.3	11.2	59.3	66	17:59	16:58	16:34	19:38	22:35	--	
4	243°53.9	-11°17.5	134°24.4	7.2	-21°45.1	11.3	59.4	64	16:57	16:35	16:21	20:39	22:58	--	
5	258°53.9	-11°18.4	148°50.7	7.3	-21°33.7	11.5	59.4	62	16:22	16:16	16:11	21:13	23:15	--	
6	273°54.0	-11°19.2	163°17.0	7.4	-21°22.2	11.6	59.4	60	15:57	16:00	16:01	21:38	23:30	--	
7	288°54.1	-11°20.1	177°43.4	7.4	-21°10.5	11.7	59.4	58	15:37	15:47	15:53	21:57	23:42	--	
8	303°54.2	-11°21.0	192°09.9	7.5	-20°58.7	11.9	59.4	56	15:20	15:36	15:46	22:14	23:53	--	
9	318°54.3	-11°21.9	206°36.4	7.6	-20°46.8	12.0	59.4	54	15:05	15:25	15:39	22:27	--	00:02	
10	333°54.4	-11°22.7	221°03.1	7.7	-20°34.7	12.1	59.5	52	14:53	15:16	15:34	22:39	--	00:10	
11	348°54.5	-11°23.6	235°29.8	7.7	-20°22.5	12.3	59.5	50	14:42	15:08	15:28	22:50	--	00:18	
12	3°54.6	-11°24.5	249°56.5	7.8	-20°10.2	12.4	59.5	45	14:18	14:51	15:17	23:12	--	00:34	
13	18°54.7	-11°25.4	264°23.4	7.9	-19°57.8	12.5	59.5	40	13:60	14:37	15:07	23:30	--	00:46	
14	33°54.7	-11°26.2	278°50.3	8.0	-19°45.2	12.6	59.5	35	13:44	14:24	14:59	23:44	--	00:57	
15	48°54.8	-11°27.1	293°17.3	8.0	-19°32.5	12.8	59.5	30	13:30	14:14	14:52	23:57	--	01:07	
16	63°54.9	-11°28.0	307°44.3	8.1	-19°19.7	12.9	59.6	20	13:07	13:55	14:39	--	00:19	01:23	
17	78°55.0	-11°28.9	322°11.5	8.2	-19°06.7	13.0	59.6	10	12:47	13:39	14:28	--	00:37	01:37	
18	93°55.1	-11°29.7	336°38.7	8.2	-18°53.7	13.1	59.6	0	12:27	13:24	14:17	--	00:55	01:50	
19	108°55.2	-11°30.6	351°06.0	8.3	-18°40.5	13.2	59.6	-10	12:08	13:09	14:07	00:17	01:12	02:03	
20	123°55.3	-11°31.5	5°33.3	8.4	-18°27.2	13.4	59.6	-20	11:48	12:52	13:56	00:39	01:30	02:16	
21	138°55.4	-11°32.4	20°00.7	8.5	-18°13.8	13.5	59.6	-30	11:24	12:34	13:43	01:05	01:51	02:32	
22	153°55.4	-11°33.2	34°28.2	8.5	-18°00.3	13.6	59.7	-35	11:10	12:23	13:35	01:19	02:03	02:41	
23	168°55.5	-11°34.1	48°55.8	8.6	-17°46.6	13.7	59.7	-40	10:54	12:10	13:26	01:36	02:17	02:51	
SD.=16.1 d=-0.9 S.D.=16.2								-45	10:34	11:55	13:16	01:57	02:34	03:02	
								-50	10:10	11:36	13:04	02:22	02:54	03:17	
								-52	09:58	11:27	12:58	02:35	03:03	03:23	
								-54	09:44	11:17	12:52	02:49	03:14	03:31	
								-56	09:28	11:06	12:45	03:05	03:26	03:39	
								-58	09:09	10:53	12:37	03:24	03:39	03:48	
								-60	08:46	10:38	12:28	03:48	03:55	03:58	
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon			
0	183°55.6	-11°35.0	63°23.4	8.7	-17°32.9	13.8	59.7	22	15:25	15:29	11:44	18:41	06:12	8(54%)	
1	198°55.7	-11°35.9	77°51.1	8.7	-17°19.0	13.9	59.7	23	15:34	15:38	11:44	19:36	07:09	9(65%)	
2	213°55.8	-11°36.7	92°18.9	8.8	-17°05.1	14.0	59.7	24	15:42	15:46	11:44	20:29	08:03	10(76%)	
3	228°55.9	-11°37.6	106°46.7	8.9	-16°51.0	14.1	59.7								
4	243°55.9	-11°38.5	121°14.6	8.9	-16°36.8	14.2	59.7								
5	258°56.0	-11°39.3	135°42.6	9.0	-16°22.5	14.3	59.8								
6	273°56.1	-11°40.2	150°10.6	9.1	-16°08.2	14.4	59.8								
7	288°56.2	-11°41.1	164°38.7	9.1	-15°53.7	14.5	59.8								
8	303°56.3	-11°42.0	179°06.9	9.2	-15°39.1	14.6	59.8								
9	318°56.4	-11°42.8	193°35.1	9.3	-15°24.5	14.7	59.8								
10	333°56.4	-11°43.7	208°03.4	9.3	-15°09.7	14.8	59.8								
11	348°56.5	-11°44.6	222°31.8	9.4	-14°54.8	14.9	59.8								
12	3°56.6	-11°45.4	237°00.2	9.5	-14°39.9	15.0	59.8								
13	18°56.7	-11°46.3	251°28.7	9.5	-14°24.8	15.1	59.9								
14	33°56.8	-11°47.2	265°57.2	9.6	-14°09.7	15.2	59.9								
15	48°56.8	-11°48.0	280°25.8	9.6	-13°54.5	15.3	59.9								
16	63°56.9	-11°48.9	294°54.5	9.7	-13°39.2	15.3	59.9								
17	78°57.0	-11°49.8	309°23.2	9.8	-13°23.8	15.4	59.9								
18	93°57.1	-11°50.6	323°52.0	9.8	-13°08.4	15.5	59.9								
19	108°57.2	-11°51.5	338°20.9	9.9	-12°52.9	15.6	59.9								
20	123°57.2	-11°52.4	352°49.7	9.9	-12°37.2	15.7	59.9								
21	138°57.3	-11°53.2	7°18.7	10.0	-12°21.5	15.7	59.9								
22	153°57.4	-11°54.1	21°47.7	10.0	-12°05.8	15.8	60.0								
23	168°57.5	-11°55.0	36°16.8	10.1	-11°49.9	15.9	60.0								
SD.=16.1 d=-0.9 S.D.=16.3															

October 25, 26 ,27 (Wed., Thu., Fri.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	33°07.6	227°02.6	5°54.4	176°43.9	-14°17.6	353°21.9	14°00.4	59°49.5	-12°53.9	Alpheratz	357°35.6	29°13.5	
1	48°10.1	242°02.7	5°53.7	191°44.7	-14°18.2	8°24.7	14°00.3	74°52.0	-12°53.9	Ankaa	353°07.7	-42°10.7	
2	63°12.5	257°02.7	5°52.9	206°45.5	-14°18.8	23°27.5	14°00.2	89°54.5	-12°53.9	Schedar	349°31.7	56°40.2	
3	78°15.0	272°02.8	5°52.2	221°46.3	-14°19.4	38°30.2	14°00.1	104°57.0	-12°53.9	Diphda	348°47.9	-17°51.3	
4	93°17.4	287°02.8	5°51.5	236°47.1	-14°19.9	53°33.0	13°60.0	119°59.5	-12°53.9	Achernar	335°20.4	-57°07.0	
5	108°19.9	302°02.8	5°50.7	251°47.9	-14°20.5	68°35.8	13°59.9	135°02.0	-12°53.9	Hamal	327°52.0	23°34.6	
6	123°22.4	317°02.9	5°50.0	266°48.7	-14°21.1	83°38.6	13°59.8	150°04.5	-12°53.9	Polaris	314°04.6	89°21.8	
7	138°24.8	332°02.9	5°49.2	281°49.5	-14°21.6	98°41.4	13°59.7	165°07.0	-12°53.9	Akamar	315°12.1	-40°12.4	
8	153°27.3	347°03.0	5°48.5	296°50.3	-14°22.2	113°44.2	13°59.6	180°09.6	-12°53.9	Menkar	314°06.9	4°11.1	
9	168°29.8	2°03.0	5°47.7	311°51.1	-14°22.8	128°47.0	13°59.5	195°12.1	-12°54.0	Mirfak	308°29.3	49°56.7	
10	183°32.2	17°03.0	5°47.0	326°51.9	-14°23.4	143°49.8	13°59.4	210°14.6	-12°54.0	Aldebaran	290°40.5	16°33.5	
11	198°34.7	32°03.1	5°46.2	341°52.6	-14°23.9	158°52.5	13°59.3	225°17.1	-12°54.0	Rigel	281°04.6	-8°10.3	
12	213°37.2	47°03.1	5°45.5	356°53.4	-14°24.5	173°55.3	13°59.2	240°19.6	-12°54.0	Capella	280°23.1	46°01.3	
13	228°39.6	62°03.2	5°44.7	11°54.2	-14°25.1	188°58.1	13°59.1	255°22.1	-12°54.0	Bellatrix	278°23.7	6°22.4	
14	243°42.1	77°03.2	5°44.0	26°55.0	-14°25.6	204°00.9	13°59.0	270°24.6	-12°54.0	Elnath	278°02.9	28°37.7	
15	258°44.6	92°03.2	5°43.2	41°55.8	-14°26.2	219°03.7	13°58.9	285°27.1	-12°54.0	Alnilam	275°38.6	-1°11.1	
16	273°47.0	107°03.3	5°42.5	56°56.6	-14°26.8	234°06.5	13°58.8	300°29.6	-12°54.0	Betelgeuse	270°53.0	7°24.8	
17	288°49.5	122°03.3	5°41.7	71°57.4	-14°27.4	249°09.3	13°58.7	315°32.1	-12°54.0	Canopus	263°52.6	-52°42.1	
18	303°51.9	137°03.3	5°41.0	86°58.2	-14°27.9	264°12.1	13°58.6	330°36.6	-12°54.1	Sirius	258°26.9	-16°44.5	
19	318°54.4	152°03.4	5°40.2	101°59.0	-14°28.5	279°14.9	13°58.5	345°37.1	-12°54.1	Adara	255°06.5	-28°60.0	
20	333°56.9	167°03.4	5°39.5	116°59.8	-14°29.1	294°17.6	13°58.4	0°39.6	-12°54.1	Procyon	244°51.8	5°10.1	
21	348°59.3	182°03.4	5°38.7	132°00.6	-14°29.6	309°20.4	13°58.3	15°42.1	-12°54.1	Pollux	243°18.4	27°58.1	
22	4°01.8	197°03.5	5°38.0	147°01.4	-14°30.2	324°23.2	13°58.2	30°44.6	-12°54.1	Avior	234°15.2	-59°34.7	
23	19°04.3	212°03.5	5°37.2	162°02.1	-14°30.8	339°26.0	13°58.1	45°47.1	-12°54.1	Suhail	222°47.2	-43°31.3	
Mer.pass.:21:43		v0.0 d-0.7 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7		Miaplacidus		221°38.8	-69°48.8

Th	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	34°06.7	227°03.5	5°36.5	177°02.9	-14°31.3	354°28.8	13°58.0	60°49.6	-12°54.1
1	49°09.2	242°03.6	5°35.7	192°03.7	-14°31.9	9°31.6	13°57.9	75°52.1	-12°54.1
2	64°11.7	257°03.6	5°35.0	207°04.5	-14°32.5	24°34.4	13°57.8	90°54.6	-12°54.1
3	79°14.1	272°03.6	5°34.2	222°05.3	-14°33.0	39°37.2	13°57.7	105°57.1	-12°54.1
4	94°16.6	287°03.7	5°33.4	237°06.1	-14°33.6	54°40.0	13°57.6	120°59.6	-12°54.2
5	109°19.1	302°03.7	5°32.7	252°06.9	-14°34.2	69°42.8	13°57.5	136°02.2	-12°54.2
6	124°21.5	317°03.7	5°31.9	267°07.7	-14°34.7	84°45.5	13°57.4	151°04.7	-12°54.2
7	139°24.0	332°03.7	5°31.2	282°08.5	-14°35.3	99°48.3	13°57.3	166°07.2	-12°54.2
8	154°26.4	347°03.8	5°30.4	297°09.3	-14°35.9	114°51.1	13°57.2	181°09.7	-12°54.2
9	169°28.9	2°03.8	5°29.6	312°10.0	-14°36.4	129°53.9	13°57.1	196°12.2	-12°54.2
10	184°31.4	17°03.8	5°28.9	327°10.8	-14°37.0	144°56.7	13°57.0	211°14.7	-12°54.2
11	199°33.8	32°03.8	5°28.1	342°11.6	-14°37.6	159°59.5	13°56.9	226°17.2	-12°54.2
12	214°36.3	47°03.9	5°27.3	357°12.4	-14°38.1	175°02.3	13°56.8	241°19.7	-12°54.2
13	229°38.8	62°03.9	5°26.6	12°13.2	-14°38.7	190°05.1	13°56.7	256°22.2	-12°54.2
14	244°41.2	77°03.9	5°25.8	27°14.0	-14°39.3	205°07.9	13°56.6	271°24.7	-12°54.3
15	259°43.7	92°03.9	5°25.0	42°14.8	-14°39.8	220°10.7	13°56.5	286°27.2	-12°54.3
16	274°46.2	107°04.0	5°24.3	57°15.6	-14°40.4	235°13.5	13°56.4	301°29.7	-12°54.3
17	289°48.6	122°04.0	5°23.5	72°16.3	-14°41.0	250°16.2	13°56.3	316°32.2	-12°54.3
18	304°51.1	137°04.0	5°22.7	87°17.1	-14°41.5	265°19.0	13°56.2	331°34.7	-12°54.3
19	319°53.5	152°04.0	5°22.0	102°17.9	-14°42.1	280°21.8	13°56.1	346°37.2	-12°54.3
20	334°56.0	167°04.1	5°21.2	117°18.7	-14°42.7	295°24.6	13°56.0	1°39.7	-12°54.3
21	349°58.5	182°04.1	5°20.4	132°19.5	-14°43.2	310°27.4	13°55.9	16°42.2	-12°54.3
22	5°00.9	197°04.1	5°19.7	147°20.3	-14°43.8	325°30.2	13°55.8	31°44.7	-12°54.3
23	20°03.4	212°04.1	5°19.9	162°21.1	-14°44.4	340°33.0	13°55.7	46°47.2	-12°54.3
	Mer.pass.:21:39	v0.0 d-0.8 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7	

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	35°05.9	227°04.1	5°18.1	177°21.8	-14°44.9	355°35.8	13°55.6	61°49.7	-12°54.3
1	50°08.3	242°04.2	5°17.4	192°22.6	-14°45.5	10°38.6	13°55.5	76°52.2	-12°54.3
2	65°10.8	257°04.2	5°16.6	207°23.4	-14°46.0	25°41.4	13°55.4	91°54.7	-12°54.4
3	80°13.3	272°04.2	5°15.8	222°24.2	-14°46.6	40°44.2	13°55.3	106°57.2	-12°54.4
4	95°15.7	287°04.2	5°15.0	237°25.0	-14°47.2	55°46.9	13°55.2	121°59.7	-12°54.4
5	110°18.2	302°04.2	5°14.3	252°25.8	-14°47.7	70°49.7	13°55.1	137°02.2	-12°54.4
6	125°20.7	317°04.3	5°13.5	267°26.5	-14°48.3	85°52.5	13°55.0	152°04.7	-12°54.4
7	140°23.1	332°04.3	5°12.7	282°27.3	-14°48.9	100°55.3	13°54.9	167°07.2	-12°54.4
8	155°25.6	347°04.3	5°11.9	297°28.1	-14°49.4	115°58.1	13°54.8	182°09.7	-12°54.4
9	170°28.0	2°04.3	5°11.2	312°28.9	-14°50.0	131°00.9	13°54.7	197°12.2	-12°54.4
10	185°30.5	17°04.3	5°10.4	327°29.7	-14°50.6	146°03.7	13°54.6	212°14.7	-12°54.4
11	200°33.0	32°04.3	5°09.6	342°30.5	-14°51.1	161°06.5	13°54.5	227°17.2	-12°54.4
12	215°35.4	47°04.3	5°08.8	357°31.2	-14°51.7	176°09.3	13°54.4	242°19.7	-12°54.4
13	230°37.9	62°04.4	5°08.0	12°32.0	-14°52.2	191°12.1	13°54.3	257°22.2	-12°54.4
14	245°40.4	77°04.4	5°07.3	27°32.8	-14°52.8	206°14.9	13°54.2	272°24.7	-12°54.5
15	260°42.8	92°04.4	5°06.5	42°33.6	-14°53.4	221°17.7	13°54.1	287°27.2	-12°54.5
16	275°45.3	107°04.4	5°05.7	57°34.4	-14°53.9	236°20.5	13°54.0	302°29.6	-12°54.5
17	290°47.8	122°04.4	5°04.9	72°35.1	-14°54.5	251°23.2	13°53.8	317°32.1	-12°54.5
18	305°50.2	137°04.4	5°04.1	87°35.9	-14°55.0	266°26.0	13°53.7	332°34.6	-12°54.5
19	320°52.7	152°04.4	5°03.4	102°36.7	-14°55.6	281°28.8	13°53.6	347°37.1	-12°54.5
20	335°55.1	167°04.4	5°02.6	117°37.5	-14°56.2	296°31.6	13°53.5	2°39.6	-12°54.5
21	350°57.6	182°04.5	5°01.8	132°38.3	-14°56.7	311°34.4	13°53.4	17°42.1	-12°54.5
22	6°00.1	197°04.5	5°01.0	147°39.0	-14°57.3	326°37.2	13°53.3	32°44.6	-12°54.5
23	21°02.5	212°04.5	5°00.2	162°39.8	-14°57.8	341°40.0	13°53.2	47°47.1	-12°54.5
	Mer.pass.:21:36	v0.0 d-0.8 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7	

Stars		
	SHA	Dec
Alpheratz	357° 35.6	29° 13.5
Ankaa	353° 07.7	-42° 10.7
Schedar	349° 31.7	56° 40.2
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 07.0
Hamal	327° 52.0	23° 34.6
Polaris	314° 04.6	89° 21.8
Akamar	315° 12.1	-40° 12.4
Menkar	314° 06.9	4° 11.1
Mirfak	308° 29.3	49° 56.7
Aldebaran	290° 40.5	16° 33.5
Rigel	281° 04.6	-8° 10.0
Capella	280° 23.1	46° 01.3
Bellatrix	278° 23.7	6° 22.4
El Nath	278° 02.9	28° 37.7
Anilam	275° 38.6	-1° 11.1
Betelgeuse	270° 53.0	7° 24.8
Canopus	263° 52.6	-52° 42.1
Sirius	258° 26.9	-16° 44.5
Adara	255° 06.5	-28° 60.0
Procyon	244° 51.8	5° 10.1
Pollux	243° 18.4	27° 58.1
Avior	234° 15.2	-59° 34.7
Suhail	222° 47.2	-43° 31.3
Miaplacidus	221° 38.8	-69° 48.5
Alphard	217° 48.8	-8° 45.5
Regulus	207° 35.6	11° 51.2
Dubhe	193° 42.6	61° 37.3
Denebola	182° 26.2	14° 26.5
Genah	175° 44.9	-17° 40.2
Acrux	173° 01.9	-63° 13.6
Gacrux	171° 53.4	-57° 14.6
Alioth	166° 14.4	55° 49.8
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.3	49° 11.7
Hadar	148° 38.2	-60° 29.1
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 03.9
Rigel Kent.	139° 42.4	-60° 56.0
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.9	74° 03.5
Alphecca	126° 05.0	26° 38.2
Antares	112° 17.4	-26° 29.1
Atria	107° 13.0	-69° 04.3
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.0	-37° 07.3
Rasalhague	95° 59.7	12° 32.7
Etamin	90° 43.0	51° 29.3
Kaus Aust.	83° 34.0	-34° 22.5
Vega	80° 34.1	38° 48.5
Nunki	75° 49.2	-26° 16.1
Altair	62° 01.1	8° 55.9
Peacock	53° 07.3	-56° 39.7
Deneb	49° 26.5	45° 22.1
Enif	33° 39.7	9° 59.1
Alnair	27° 34.0	-46° 50.9
Fomalhaut	15° 15.5	-29° 29.8
Scheat	13° 46.0	28° 12.9
Markab	13° 30.7	15° 20.1
2023/10/	SHA	Mer.pass
Venus	193° 55.0	08:52
Mars	143° 36.3	12:12
Jupiter	320° 14.3	00:26
Saturn	26° 41.9	19:57
2023/10/	SHA	Mer.pass
Venus	192° 56.8	08:52
Mars	142° 56.2	12:11
Jupiter	320° 22.1	00:22
Saturn	26° 42.9	19:53
2023/10/	SHA	Mer.pass
Venus	191° 58.3	08:52
Mars	142° 16.0	12:10
Jupiter	320° 29.9	00:18
Saturn	26° 43.8	19:49
Horizontal paralax		
	Venus:	0.2
	Mars:	0.1

Sun				Moon											
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	183°57.6	-11°55.8	50°45.9	10.1	-11°34.0	15.9	60.0	72	05:41	07:01	08:20	15:07	16:25	17:45	
1	198°57.6	-11°56.7	65°15.0	10.2	-11°18.1	16.0	60.0	70	05:39	06:51	08:00	15:26	16:35	17:47	
2	213°57.7	-11°57.6	79°44.2	10.2	-11°02.0	16.1	60.0	68	05:38	06:44	07:45	15:42	16:43	17:48	
3	228°57.8	-11°58.4	94°13.5	10.3	-10°45.9	16.1	60.0	66	05:37	06:37	07:33	15:54	16:50	17:50	
4	243°57.9	-11°59.3	108°42.8	10.3	-10°29.7	16.2	60.0	64	05:36	06:31	07:22	16:04	16:55	17:51	
5	258°57.9	-12°00.2	123°12.2	10.4	-10°13.5	16.3	60.0	62	05:35	06:27	07:14	16:13	17:00	17:52	
6	273°58.0	-12°01.0	137°41.6	10.4	-9°57.2	16.3	60.0	60	05:33	06:22	07:06	16:21	17:05	17:53	
7	288°58.1	-12°01.9	152°11.0	10.5	-9°40.8	16.4	60.0	58	05:32	06:18	06:59	16:28	17:09	17:55	
8	303°58.2	-12°02.7	166°40.5	10.5	-9°24.4	16.4	60.0	56	05:31	06:15	06:54	16:34	17:12	17:56	
9	318°58.2	-12°03.6	181°10.0	10.6	-9°07.9	16.5	60.0	54	05:30	06:12	06:48	16:39	17:16	17:57	
10	333°58.3	-12°04.5	195°39.6	10.6	-8°51.4	16.6	60.0	52	05:29	06:09	06:43	16:44	17:19	17:58	
11	348°58.4	-12°05.3	210°09.2	10.6	-8°34.8	16.6	60.0	50	05:28	06:06	06:39	16:48	17:21	17:59	
12	3°58.5	-12°06.2	224°38.9	10.7	-8°18.2	16.7	60.1	45	05:25	05:50	06:30	16:58	17:28	18:02	
13	18°58.5	-12°07.0	239°08.6	10.7	-8°01.5	16.7	60.1	40	05:22	05:54	06:22	17:06	17:33	18:05	
14	33°58.6	-12°07.9	253°38.3	10.7	-7°44.8	16.7	60.1	35	05:20	05:49	06:15	17:12	17:38	18:08	
15	48°58.7	-12°08.8	268°08.1	10.8	-7°28.1	16.8	60.1	30	05:17	05:45	06:09	17:18	17:43	18:11	
16	63°58.8	-12°09.6	282°37.9	10.8	-7°11.2	16.8	60.1	20	05:10	05:36	05:59	17:29	17:52	18:17	
17	78°58.8	-12°10.5	297°07.7	10.9	-6°54.4	16.9	60.1	10	05:03	05:28	05:49	17:38	17:60	18:25	
18	93°58.9	-12°11.3	311°37.6	10.9	-6°37.5	16.9	60.1	0	04:55	05:19	05:41	17:47	18:09	18:33	
19	108°59.0	-12°12.2	326°07.5	10.9	-6°20.6	16.9	60.1	-10	04:45	05:10	05:32	17:56	18:18	18:43	
20	123°59.0	-12°13.1	340°37.4	10.9	-6°03.6	17.0	60.1	-20	04:33	04:59	05:22	18:06	18:29	18:56	
21	138°59.1	-12°13.9	355°07.4	11.0	-5°46.6	17.0	60.1	-30	04:17	04:46	05:11	18:17	18:42	19:12	
22	153°59.2	-12°14.8	9°37.3	11.0	-5°29.6	17.1	60.1	-35	04:06	04:38	05:05	18:24	18:51	19:22	
23	168°59.3	-12°15.6	24°07.4	11.0	-5°12.5	17.1	60.1	-40	03:54	04:29	04:57	18:32	19:00	19:35	
SD.=16.1 d=-0.9 S.D.=16.4								-45	03:39	04:17	04:49	18:40	19:12	19:50	
								-50	03:19	04:03	04:38	18:51	19:26	20:11	
								-52	03:09	03:56	04:33	18:56	19:33	20:21	
								-54	02:58	03:49	04:28	19:01	19:41	20:32	
								-56	02:45	03:40	04:22	19:08	19:50	20:45	
								-58	02:29	03:30	04:15	19:14	19:60	21:01	
								-60	02:10	03:19	04:08	19:22	20:11	21:21	
								Lat.	Moonrise			Moonset			
								72	16:42	16:03	15:25	--	02:37	05:04	
								70	16:32	16:03	15:34	00:20	02:43	04:59	
								68	16:24	16:02	15:41	00:36	02:48	04:55	
								66	16:17	16:02	15:47	00:50	02:53	04:52	
								64	16:11	16:01	15:52	01:01	02:56	04:49	
								62	16:06	16:01	15:56	01:10	02:59	04:47	
								60	16:01	16:01	16:00	01:18	03:02	04:45	
								58	15:57	16:01	16:04	01:25	03:04	04:43	
								56	15:54	16:00	16:07	01:31	03:07	04:41	
								54	15:51	16:00	16:10	01:36	03:08	04:40	
								52	15:48	15:50	16:12	01:41	03:10	04:38	
								50	15:45	15:50	16:15	01:45	03:12	04:37	
								45	15:39	15:59	16:20	01:55	03:15	04:35	
								40	15:34	15:59	16:24	02:03	03:18	04:32	
								35	15:30	15:59	16:28	02:09	03:20	04:31	
								30	15:26	15:59	16:31	02:15	03:22	04:29	
								20	15:20	15:58	16:37	02:25	03:26	04:26	
								10	15:14	15:58	16:42	02:34	03:29	04:23	
								0	15:08	15:58	16:47	02:42	03:32	04:21	
								-10	15:03	15:58	16:52	02:50	03:35	04:19	
								-20	14:57	15:57	16:57	02:58	03:38	04:16	
								-30	14:50	15:57	17:04	03:08	03:41	04:13	
								-35	14:47	15:57	17:07	03:13	03:43	04:12	
								-40	14:42	15:57	17:11	03:19	03:45	04:10	
								-45	14:37	15:57	17:16	03:26	03:48	04:08	
								-50	14:31	15:57	17:22	03:35	03:50	04:05	
								-52	14:28	15:56	17:25	03:39	03:52	04:04	
								-54	14:25	15:56	17:28	03:43	03:53	04:03	
								-56	14:21	15:56	17:31	03:48	03:55	04:01	
								-58	14:18	15:56	17:35	03:53	03:57	03:60	
								-60	14:13	15:56	17:39	03:59	03:58	03:58	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								25	15:50	15:54	11:44	21:20	08:55	11(85%)	
								26	15:57	16:01	11:43	22:09	09:44	12(93%)	
								27	16:04	16:07	11:43	22:58	10:34	13(98%)	
SD.=16.1 d=-0.8 S.D.=16.4															

October 28, 29 ,30 (Sat., Sun., Mon.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	36°05.0	227°04.5	4°59.4	177°40.6	-14°58.4	356°42.8	13°53.1	62°49.6	-12°54.5	Alpheratz	357°35.6	29°13.5
1	51°07.5	242°04.5	4°58.6	192°41.4	-14°59.0	11°45.6	13°53.0	77°52.1	-12°54.5	Ankaa	353°07.8	-42°10.7
2	66°09.9	257°04.5	4°57.9	207°42.2	-14°59.5	26°48.4	13°52.9	92°54.6	-12°54.5	Schedar	349°31.7	56°40.2
3	81°12.4	272°04.5	4°57.1	222°42.9	-15°00.1	41°51.2	13°52.8	107°57.1	-12°54.5	Diphda	348°47.9	-17°51.3
4	96°14.9	287°04.5	4°56.3	237°43.7	-15°00.6	56°54.0	13°52.7	122°59.6	-12°54.6	Achernar	335°20.4	-57°07.0
5	111°17.3	302°04.5	4°55.5	252°44.5	-15°01.2	71°56.8	13°52.6	138°02.1	-12°54.6	Hamal	327°52.0	23°34.6
6	126°19.8	317°04.5	4°54.7	267°45.3	-15°01.8	86°59.6	13°52.5	153°04.6	-12°54.6	Polaris	314°04.1	89°21.8
7	141°22.3	332°04.5	4°53.9	282°46.1	-15°02.3	102°02.3	13°52.4	168°07.1	-12°54.6	Akamar	315°12.1	-40°12.5
8	156°24.7	347°04.5	4°53.1	297°46.8	-15°02.9	117°05.1	13°52.3	183°09.6	-12°54.6	Menkar	314°06.9	4°11.1
9	171°27.2	2°04.5	4°52.3	312°47.6	-15°03.4	132°07.9	13°52.2	198°12.1	-12°54.6	Mirfak	308°29.2	49°56.7
10	186°29.6	17°04.5	4°51.5	327°48.4	-15°04.0	147°10.7	13°52.1	213°14.6	-12°54.6	Aldebaran	290°40.5	16°33.5
11	201°32.1	32°04.6	4°50.7	342°49.2	-15°04.6	162°13.5	13°52.0	228°17.1	-12°54.6	Rigel	281°04.6	-8°10.3
12	216°34.6	47°04.6	4°49.9	357°49.9	-15°05.1	177°16.3	13°51.9	243°19.6	-12°54.6	Capella	280°23.1	46°01.3
13	231°37.0	62°04.6	4°49.1	12°50.7	-15°05.7	192°19.1	13°51.8	258°22.0	-12°54.6	Bellatrix	278°23.7	6°22.4
14	246°39.5	77°04.6	4°48.3	27°51.5	-15°06.2	207°21.9	13°51.7	273°24.5	-12°54.6	Elnath	278°02.9	28°37.7
15	261°42.0	92°04.6	4°47.6	42°52.3	-15°06.8	222°24.7	13°51.6	288°27.0	-12°54.6	Alnilam	275°38.5	-1°11.1
16	276°44.4	107°04.6	4°46.8	57°53.0	-15°07.3	237°27.5	13°51.5	303°29.5	-12°54.6	Betelgeuse	270°53.0	7°24.8
17	291°46.9	122°04.6	4°46.0	72°53.8	-15°07.9	252°30.3	13°51.4	318°32.0	-12°54.6	Canopus	263°52.6	-52°42.2
18	306°49.4	137°04.6	4°45.2	87°54.6	-15°08.5	267°33.1	13°51.3	333°34.5	-12°54.6	Sirius	258°26.9	-16°44.5
19	321°51.8	152°04.6	4°44.4	102°55.4	-15°09.0	282°35.9	13°51.2	348°37.0	-12°54.6	Adara	255°06.5	-28°60.0
20	336°54.3	167°04.6	4°43.6	117°56.1	-15°09.6	297°38.7	13°51.1	3°39.5	-12°54.7	Procyon	244°51.7	5°10.1
21	351°56.7	182°04.6	4°42.8	132°56.9	-15°10.1	312°41.5	13°51.0	18°42.0	-12°54.7	Pollux	243°18.4	27°58.1
22	6°59.2	197°04.6	4°42.0	147°57.7	-15°10.7	327°44.3	13°50.9	33°44.5	-12°54.7	Avior	234°15.2	-59°34.7
23	22°01.7	212°04.6	4°41.2	162°58.5	-15°11.2	342°47.0	13°50.8	48°47.0	-12°54.7	Suhail	222°47.1	-43°31.3
Mer.pass.:21:32		v0.0 d-0.8 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7		Miaplacidus 221°38.7 -69°48.8		

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	37°04.1	227°04.6	4°40.4	177°59.2	-15°11.8	357°49.8	13°50.7	63°49.5	-12°54.7
1	52°06.6	242°04.6	4°39.6	193°00.0	-15°12.3	12°52.6	13°50.6	78°52.0	-12°54.7
2	67°09.1	257°04.6	4°38.8	208°00.8	-15°12.9	27°55.4	13°50.5	93°54.4	-12°54.7
3	82°11.5	272°04.5	4°38.0	223°01.6	-15°13.5	42°58.2	13°50.4	108°56.9	-12°54.7
4	97°14.0	287°04.5	4°37.2	238°02.3	-15°14.0	58°01.0	13°50.3	123°59.4	-12°54.7
5	112°16.5	302°04.5	4°36.4	253°03.1	-15°14.6	73°03.8	13°50.2	139°01.9	-12°54.7
6	127°18.9	317°04.5	4°35.5	268°03.9	-15°15.1	88°06.6	13°50.1	154°04.4	-12°54.7
7	142°21.4	332°04.5	4°34.7	283°04.6	-15°15.7	103°09.4	13°50.0	169°06.9	-12°54.7
8	157°23.9	347°04.5	4°33.9	298°05.4	-15°16.2	118°12.2	13°49.9	184°09.4	-12°54.7
9	172°26.3	2°04.5	4°33.1	313°06.2	-15°16.8	133°15.0	13°49.8	199°11.9	-12°54.7
10	187°28.8	17°04.5	4°32.3	328°07.0	-15°17.3	148°17.8	13°49.7	214°14.4	-12°54.7
11	202°31.2	32°04.5	4°31.5	343°07.7	-15°17.9	163°20.6	13°49.6	229°16.9	-12°54.7
12	217°33.7	47°04.5	4°30.7	358°08.5	-15°18.4	178°23.4	13°49.5	244°19.4	-12°54.7
13	232°36.2	62°04.5	4°29.9	13°09.3	-15°19.0	193°26.2	13°49.4	259°21.8	-12°54.7
14	247°38.6	77°04.5	4°29.1	28°10.0	-15°19.5	208°29.0	13°49.3	274°24.3	-12°54.7
15	262°41.1	92°04.5	4°28.3	43°10.8	-15°20.1	223°31.8	13°49.2	289°26.8	-12°54.7
16	277°43.6	107°04.5	4°27.5	58°11.6	-15°20.7	238°34.6	13°49.1	304°29.3	-12°54.8
17	292°46.0	122°04.5	4°26.7	73°12.4	-15°21.2	253°37.4	13°49.0	319°31.8	-12°54.8
18	307°48.5	137°04.4	4°25.8	88°13.1	-15°21.8	268°40.2	13°48.9	334°34.3	-12°54.8
19	322°51.0	152°04.4	4°25.0	103°13.9	-15°22.3	283°42.9	13°48.8	349°36.8	-12°54.8
20	337°53.4	167°04.4	4°24.2	118°14.7	-15°22.9	298°45.7	13°48.7	4°39.3	-12°54.8
21	352°55.9	182°04.4	4°23.4	133°15.4	-15°23.4	313°48.5	13°48.6	19°41.8	-12°54.8
22	7°58.4	197°04.4	4°22.6	148°16.2	-15°24.0	328°51.3	13°48.5	34°44.2	-12°54.8
23	23°00.8	212°04.4	4°21.8	163°17.0	-15°24.5	343°54.1	13°48.4	49°46.7	-12°54.8
Mer.pass.:21:28		v-0.0 d-0.8 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7	

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	38°03.3	227°04.4	4°21.0	178°17.7	-15°25.1	358°56.9	13°48.3	64°49.2	-12°54.8
1	53°05.7	242°04.4	4°20.1	193°18.5	-15°25.6	13°59.7	13°48.2	79°51.7	-12°54.8
2	68°08.2	257°04.3	4°19.3	208°19.3	-15°26.2	29°02.5	13°48.0	94°54.2	-12°54.8
3	83°10.7	272°04.3	4°18.5	223°20.0	-15°26.7	44°05.3	13°47.9	109°56.7	-12°54.8
4	98°13.1	287°04.3	4°17.7	238°20.8	-15°27.3	59°08.1	13°47.8	124°59.2	-12°54.8
5	113°15.6	302°04.3	4°16.9	253°21.6	-15°27.8	74°10.9	13°47.7	140°01.7	-12°54.8
6	128°18.1	317°04.3	4°16.1	268°22.3	-15°28.4	89°13.7	13°47.6	155°04.1	-12°54.8
7	143°20.5	332°04.3	4°15.2	283°23.1	-15°28.9	104°16.5	13°47.5	170°06.6	-12°54.8
8	158°23.0	347°04.3	4°14.4	298°23.9	-15°29.5	119°19.3	13°47.4	185°09.1	-12°54.8
9	173°25.5	2°04.2	4°13.6	313°24.6	-15°30.0	134°22.1	13°47.3	200°11.6	-12°54.8
10	188°27.9	17°04.2	4°12.8	328°25.4	-15°30.6	149°24.9	13°47.2	215°14.1	-12°54.8
11	203°30.4	32°04.2	4°12.0	343°26.2	-15°31.1	164°27.7	13°47.1	230°16.6	-12°54.8
12	218°32.9	47°04.2	4°11.1	358°26.9	-15°31.7	179°30.5	13°47.0	245°19.1	-12°54.8
13	233°35.3	62°04.2	4°10.3	13°27.7	-15°32.2	194°33.3	13°46.9	260°21.5	-12°54.8
14	248°37.8	77°04.2	4°09.5	28°28.5	-15°32.8	209°36.1	13°46.8	275°24.0	-12°54.8
15	263°40.2	92°04.1	4°08.7	43°29.2	-15°33.3	224°38.9	13°46.7	290°26.5	-12°54.8
16	278°42.7	107°04.1	4°07.8	58°30.0	-15°33.9	239°41.7	13°46.6	305°29.0	-12°54.8
17	293°45.2	122°04.1	4°07.0	73°30.8	-15°34.4	254°44.5	13°46.5	320°31.5	-12°54.8
18	308°47.6	137°04.1	4°06.2	88°31.5	-15°35.0	269°47.2	13°46.4	335°34.0	-12°54.8
19	323°50.1	152°04.1	4°05.4	103°32.3	-15°35.5	284°50.0	13°46.3	350°36.5	-12°54.8
20	338°52.6	167°04.0	4°04.5	118°33.0	-15°36.0	299°52.8	13°46.2	5°38.9	-12°54.8
21	353°55.0	182°04.0	4°03.7	133°33.8	-15°36.6	314°55.6	13°46.1	20°41.4	-12°54.9
22	8°57.5	197°04.0	4°02.9	148°34.6	-15°37.1	329°58.4	13°46.0	35°43.9	-12°54.9
23	23°60.0	212°04.0	4°02.0	163°35.3	-15°37.7	345°01.2	13°45.9	50°46.4	-12°54.9
Mer.pass.:21:24		v-0.0 d-0.8 m-4.2		v0.8 d-0.6 m1.6		v2.8 d-0.1 m-2.8		v2.5 d-0.0 m0.7	

Stars		
	SHA	Dec
Alpheratz	357° 35.6	29° 13.5
Ankaa	353° 07.8	-42° 10.7
Schedar	349° 31.7	56° 40.2
Diphda	348° 47.9	-17° 51.3
Achernar	335° 20.4	-57° 07.0
Hamal	327° 52.0	23° 34.6
Polaris	314° 04.1	89° 21.8
Akamar	315° 12.1	-40° 12.5
Menkar	314° 06.9	4° 11.1
Mirfak	308° 29.2	49° 56.7
Aldebaran	290° 40.5	16° 33.5
Rigel	281° 04.6	-8° 10.3
Capella	280° 23.1	46° 01.3
Bellatrix	278° 23.7	6° 22.4
Elnath	278° 02.9	28° 37.7
Anilam	275° 38.5	-1° 11.1
Betelgeuse	270° 53.0	7° 24.8
Canopus	263° 52.6	-52° 42.2
Sirius	258° 26.9	-16° 44.5
Adara	255° 06.5	-28° 60.0
Procyon	244° 51.7	5° 10.1
Pollux	243° 18.4	27° 58.1
Avior	234° 15.2	-59° 34.7
Suhail	222° 47.1	-43° 31.3
Miaplacidus	221° 38.7	-69° 48.5
Alphard	217° 48.8	-8° 45.5
Regulus	207° 35.6	11° 51.2
Dubhe	193° 42.6	61° 37.2
Denebola	182° 26.2	14° 26.5
Gienah	175° 44.9	-17° 40.2
Acrux	173° 01.9	-63° 13.6
Gacrux	171° 53.3	-57° 14.5
Alioth	166° 14.4	55° 49.8
Spica	158° 23.7	-11° 17.0
Alcaid	152° 53.3	49° 11.7
Hadar	148° 38.1	-60° 29.1
Menkent	147° 59.3	-36° 29.1
Arcturus	145° 49.0	19° 03.9
Rigel Kent.	139° 42.4	-60° 55.9
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.9	74° 03.5
Alphecca	126° 05.0	26° 38.2
Antares	112° 17.4	-26° 29.0
Atria	107° 13.0	-69° 04.3
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.1	-37° 07.3
Rasalhague	95° 59.8	12° 32.7
Etamin	90° 43.0	51° 29.3
Kaus Aust.	83° 34.1	-34° 22.5
Vega	80° 34.2	38° 48.5
Nunki	75° 49.2	-26° 16.1
Altair	62° 01.1	8° 55.9
Peacock	53° 07.3	-56° 39.7
Deneb	49° 26.5	45° 22.1
Enif	33° 39.7	9° 59.1
Alnair	27° 34.0	-46° 50.9
Fomalhaut	15° 15.5	-29° 29.8
Scheat	13° 46.0	28° 12.9
Markab	13° 30.7	15° 20.1

2023/10/	SHA	Mer.pass
Venus	190° 59.5	08:52
Mars	141° 35.6	12:09
Jupiter	320° 37.8	00:13
Saturn	26° 44.6	19:45

2023/10/	SHA	Mer.pass
Venus	190°00.4	08:52
Mars	140°55.1	12:07
Jupiter	320°45.7	00:09
Saturn	26°45.3	19:41

2023/10/	SHA	Mer.pass
Venus	189°01.1	08:52
Mars	140°14.5	12:06
Jupiter	320°53.6	00:04
Saturn	26°45.9	19:37

Horizontal parallax	
Venus:	0.2
Mars:	0.1

Sun				Moon											
Sat	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	184°02.3	-12°57.2		14°45.6	10.8	8°46.0	16.4	59.7	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	199°02.4	-12°58.1		29°15.5	10.8	9°02.4	16.4	59.7	70	05:53	07:14	08:37	14:49	16:11	17:33
2	214°02.5	-12°58.9		43°45.3	10.8	9°18.7	16.3	59.7	68	05:50	07:03	08:14	15:12	16:23	17:35
3	229°02.5	-12°59.8		58°15.0	10.7	9°35.0	16.3	59.7	66	05:48	06:54	07:57	15:29	16:32	17:38
4	244°02.6	-13°00.6		72°44.8	10.7	9°51.3	16.2	59.7	64	05:46	06:46	07:43	15:43	16:40	17:40
5	259°02.6	-13°01.4		87°14.5	10.7	10°07.4	16.1	59.6	62	05:44	06:40	07:32	15:55	16:46	17:42
6	274°02.7	-13°02.3		101°44.1	10.6	10°23.6	16.1	59.6	60	05:42	06:34	07:22	16:04	16:52	17:44
7	289°02.7	-13°03.1		116°13.8	10.6	10°39.6	16.0	59.6	58	05:40	06:29	07:14	16:13	16:57	17:46
8	304°02.8	-13°04.0		130°43.3	10.6	10°55.6	15.9	59.6	56	05:38	06:25	07:06	16:20	17:02	17:48
9	319°02.8	-13°04.8		145°12.9	10.5	11°11.5	15.9	59.6	54	05:37	06:21	06:50	16:27	17:06	17:50
10	334°02.9	-13°05.6		159°42.4	10.5	11°27.3	15.8	59.5	52	05:35	06:17	06:54	16:33	17:10	17:51
11	349°02.9	-13°06.5		174°11.9	10.5	11°43.1	15.7	59.5	50	05:34	06:14	06:49	16:38	17:13	17:53
12	4°03.0	-13°07.3		188°41.3	10.4	11°58.8	15.7	59.5	45	05:32	06:10	06:44	16:43	17:16	17:54
13	19°03.0	-13°08.1		203°10.7	10.4	12°14.4	15.6	59.5	40	05:29	06:03	06:34	16:53	17:23	17:58
14	34°03.1	-13°09.0		217°40.0	10.3	12°30.0	15.5	59.5	35	05:25	05:57	06:25	17:02	17:30	18:01
15	49°03.1	-13°09.8		232°09.3	10.3	12°45.4	15.4	59.4	30	05:22	05:52	06:18	17:09	17:35	18:05
16	64°03.2	-13°10.6		246°38.6	10.2	13°00.8	15.3	59.4	20	05:19	05:47	06:11	17:16	17:40	18:08
17	79°03.2	-13°11.5		261°07.8	10.2	13°16.1	15.3	59.4	10	05:11	05:37	05:50	17:27	17:50	18:16
18	94°03.3	-13°12.3		275°37.0	10.2	13°31.3	15.2	59.4	0	05:03	05:28	05:50	17:37	17:59	18:24
19	109°03.3	-13°13.1		290°06.1	10.1	13°46.5	15.1	59.3	0	04:54	05:19	05:40	17:47	18:08	18:33
20	124°03.4	-13°14.0		304°35.2	10.1	14°01.5	15.0	59.3	-10	04:44	05:09	05:31	17:57	18:19	18:44
21	139°03.4	-13°14.8		319°04.2	10.0	14°16.5	14.9	59.3	-20	04:31	04:57	05:20	18:07	18:30	18:57
22	154°03.5	-13°15.6		333°33.2	10.0	14°31.3	14.8	59.3	-30	04:14	04:43	05:08	18:20	18:45	19:15
23	169°03.5	-13°16.5		348°02.2	9.9	14°46.1	14.7	59.2	-35	04:03	04:35	05:01	18:27	18:54	19:26
	SD.=16.1	d=-0.8		S.D.=16.3					-40	03:50	04:24	04:53	18:35	19:04	19:39
									-45	03:33	04:12	04:44	18:44	19:16	19:55
									-50	03:12	03:57	04:32	18:56	19:32	20:17
									-52	03:02	03:50	04:27	19:01	19:39	20:28
									-54	02:49	03:41	04:21	19:07	19:48	20:40
									-56	02:35	03:32	04:15	19:14	19:57	20:55
									-58	02:18	03:21	04:07	19:22	20:08	21:13
									-60	01:56	03:09	03:59	19:30	20:21	21:35
							</								

October 31, 01 ,02 (Tue., Wed., Thu.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	39°02.4	227°03.9	4°01.2	178°36.1	-15°38.2	0°04.0	13°45.8	65°48.9	-12°54.9	Alpheratz	357°35.6	29°13.5					
1	54°04.9	242°03.9	4°00.4	193°36.9	-15°38.8	15°06.8	13°45.7	80°51.4	-12°54.9	Ankaa	353°07.8	-42°10.7					
2	69°07.3	257°03.9	3°59.6	208°37.6	-15°39.3	30°09.6	13°45.6	95°53.8	-12°54.9	Schedar	349°31.7	56°40.2					
3	84°09.8	272°03.9	3°58.7	223°38.4	-15°39.9	45°12.4	13°45.5	110°56.3	-12°54.9	Diphda	348°47.9	-17°51.4					
4	99°12.3	287°03.8	3°57.9	238°39.1	-15°40.4	60°15.2	13°45.4	125°58.8	-12°54.9	Achernar	335°20.4	-57°07.0					
5	114°14.7	302°03.8	3°57.1	253°39.9	-15°41.0	75°18.0	13°45.3	141°01.3	-12°54.9	Hamal	327°52.0	23°34.6					
6	129°17.2	317°03.8	3°56.2	268°40.7	-15°41.5	90°20.8	13°45.2	156°03.8	-12°54.9	Polaris	314°03.3	89°21.8					
7	144°19.7	332°03.8	3°55.4	283°41.4	-15°42.1	105°23.6	13°45.1	171°06.3	-12°54.9	Akamar	315°12.1	-40°12.5					
8	159°22.1	347°03.7	3°54.6	298°42.2	-15°42.6	120°26.4	13°45.0	186°08.7	-12°54.9	Menkar	314°06.9	4°11.1					
9	174°24.6	2°03.7	3°53.7	313°42.9	-15°43.1	135°29.2	13°44.9	201°11.2	-12°54.9	Mirfak	308°29.2	49°56.7					
10	189°27.1	17°03.7	3°52.9	328°43.7	-15°43.7	150°32.0	13°44.8	216°13.7	-12°54.9	Aldebaran	290°40.5	16°33.5					
11	204°29.5	32°03.7	3°52.1	343°44.5	-15°44.2	165°34.8	13°44.7	231°16.2	-12°54.9	Rigel	281°04.6	-8°10.1					
12	219°32.0	47°03.6	3°51.2	358°45.2	-15°44.8	180°37.6	13°44.6	246°18.7	-12°54.9	Capella	280°23.0	46°01.3					
13	234°34.5	62°03.6	3°50.4	13°46.0	-15°45.3	195°40.4	13°44.5	261°21.1	-12°54.9	Bellatrix	278°23.7	6°22.4					
14	249°36.9	77°03.6	3°49.5	28°46.7	-15°45.9	210°43.2	13°44.4	276°23.6	-12°54.9	Elnath	278°02.9	28°37.7					
15	264°39.4	92°03.5	3°48.7	43°47.5	-15°46.4	225°46.0	13°44.3	291°26.1	-12°54.9	Alnilam	275°38.5	-1°11.1					
16	279°41.8	107°03.5	3°47.9	58°48.3	-15°47.0	240°48.8	13°44.2	306°28.6	-12°54.9	Betelgeuse	270°53.0	7°24.8					
17	294°44.3	122°03.5	3°47.0	73°49.0	-15°47.5	255°51.6	13°44.1	321°31.1	-12°54.9	Canopus	263°52.5	-52°42.2					
18	309°46.8	137°03.5	3°46.2	88°49.8	-15°48.0	270°54.4	13°44.0	336°33.5	-12°54.9	Sirius	258°26.9	-16°44.5					
19	324°49.2	152°03.4	3°45.4	103°50.5	-15°48.6	285°57.2	13°43.9	351°36.0	-12°54.9	Adara	255°06.5	-28°60.0					
20	339°51.7	167°03.4	3°44.5	118°51.3	-15°49.1	300°60.0	13°43.8	6°38.5	-12°54.9	Procyon	244°51.7	5°10.1					
21	354°54.2	182°03.4	3°43.7	133°52.0	-15°49.7	316°02.8	13°43.7	21°41.0	-12°54.9	Pollux	243°18.3	27°58.1					
22	9°56.6	197°03.3	3°42.8	148°52.8	-15°50.2	331°05.6	13°43.5	36°43.5	-12°54.9	Avior	234°15.1	-59°34.7					
23	24°59.1	212°03.3	3°42.0	163°53.6	-15°50.7	346°08.4	13°43.4	51°45.9	-12°54.9	Suhail	222°47.1	-43°31.3					
Mer.pass.:21:20		v-0.0 d-0.8 m-4.2			v0.8 d-0.5 m1.6			v2.8 d-0.1 m-2.8			v2.5 d-0.0 m0.7			Miaplacidus	221°38.6	-69°48.5	
Alphard 217°48.8 -8°45.5																	
Regulus 207°35.6 11°51.1																	
Dubhe 193°42.6 61°37.2																	
Denebola 182°26.1 14°26.4																	
Gienah 175°44.9 -17°40.2																	
Acrux 173°01.9 -63°13.6																	
Gacrux 171°53.3 -57°14.5																	
Alioth 166°14.4 55°49.8																	
Spica 158°23.7 -11°17.0																	
Alcaid 152°53.3 49°11.7																	
Hadar 148°38.1 -60°29.1																	
Menkent 147°59.2 -36°29.1																	
Arcturus 145°49.0 19°03.9																	
Rigel Kent. 139°42.4 -60°55.9																	
Zubenelg. 136°57.5 -16°08.3																	
Kochab 137°20.9 74°03.5																	
Alphecca 126°05.0 26°38.2																	
Antares 112°17.4 -26°29.0																	
Atria 107°13.0 -69°04.3																	
Sabik 102°04.2 -15°45.2																	
Shaula 96°12.1 -37°07.3																	
Rasalhague 95°59.8 12°32.7																	
Etamin 90°43.0 51°29.3																	
Kaus Aust. 83°34.1 -34°22.5																	
Vega 80°34.2 38°48.5																	
Nunki 75°49.2 -26°16.1																	
Altair 62°01.1 8°55.9																	
Peacock 53°07.3 -56°39.7																	
Deneb 49°26.5 45°22.1																	
Enif 33°39.7 9°59.1																	
Alnair 27°34.0 -46°50.9																	
Fomalhaut 15°15.5 -29°29.8																	
Scheat 13°46.0 28°12.9																	
Markab 13°30.7 15°20.1																	
2023/10/ SHA Mer.pass																	
Venus 188°01.5 08:52																	
Mars 139°33.7 12:05																	
Jupiter 321°01.6 23:55																	
Saturn 26°46.5 19:34																	
2023/11/ SHA Mer.pass																	
Venus 187°01.7 08:52																	
Mars 138°52.8 12:04																	
Jupiter 321°09.6 23:51																	
Saturn 26°46.9 19:30																	
2023/11/ SHA Mer.pass																	
Venus 186°01.7 08:52																	
Mars 138°11.7 12:03																	
Jupiter 321°17.6 23:46																	
Saturn 26°47.2 19:26																	
Horizontal parallax																	
Venus: 0.2																	
Mars: 0.1																	
Mer.pass.:21:12		v-0.0 d-0.9 m-4.2			v0.8 d-0.5 m1.6			v2.8 d-0.1 m-2.8			v2.5 d0.0 m0.7						

Sun			Moon											
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	184°05.5	-13°56.8	336°37.7	7.5	24°28.9	8.6	57.8	72	06:05	07:28	08:55	14:31	15:58	17:20
1	199°05.5	-13°57.6	351°04.2	7.5	24°37.4	8.4	57.8	70	06:01	07:15	08:29	14:57	16:11	17:25
2	214°05.5	-13°58.5	5°30.6	7.4	24°45.7	8.3	57.7	68	05:57	07:05	08:09	15:16	16:21	17:28
3	229°05.5	-13°59.3	19°57.0	7.4	24°53.9	8.1	57.7	66	05:54	06:56	07:54	15:32	16:30	17:31
4	244°05.6	-14°00.1	34°23.4	7.4	25°01.9	7.9	57.7	64	05:52	06:48	07:41	15:45	16:38	17:34
5	259°05.6	-14°00.9	48°49.7	7.3	25°09.8	7.8	57.6	62	05:49	06:42	07:31	15:56	16:44	17:37
6	274°05.6	-14°01.7	63°16.0	7.3	25°17.5	7.6	57.6	60	05:47	06:36	07:21	16:05	16:50	17:39
7	289°05.7	-14°02.5	77°42.3	7.3	25°25.1	7.5	57.6	58	05:45	06:31	07:13	16:13	16:55	17:42
8	304°05.7	-14°03.3	92°08.6	7.2	25°32.5	7.3	57.5	56	05:43	06:27	07:06	16:20	16:60	17:44
9	319°05.7	-14°04.1	106°34.8	7.2	25°39.7	7.2	57.5	54	05:41	06:22	06:60	16:26	17:04	17:46
10	334°05.7	-14°05.0	121°01.0	7.2	25°46.8	7.0	57.5	52	05:39	06:19	06:54	16:32	17:08	17:48
11	349°05.8	-14°05.8	135°27.1	7.1	25°53.7	6.8	57.4	50	05:37	06:15	06:49	16:37	17:11	17:49
12	4°05.8	-14°06.6	149°53.2	7.1	26°00.5	6.7	57.4	45	05:33	06:07	06:38	16:49	17:19	17:54
13	19°05.8	-14°07.4	164°19.4	7.1	26°07.1	6.5	57.4	40	05:29	06:01	06:29	16:58	17:26	17:58
14	34°05.9	-14°08.2	178°45.5	7.1	26°13.5	6.4	57.3	35	05:25	05:54	06:21	17:06	17:32	18:02
15	49°05.9	-14°09.0	193°11.5	7.1	26°19.8	6.2	57.3	30	05:21	05:49	06:14	17:13	17:38	18:06
16	64°05.9	-14°09.8	207°37.6	7.0	26°25.9	6.0	57.3	20	05:12	05:39	06:01	17:26	17:48	18:14
17	79°05.9	-14°10.6	222°03.6	7.0	26°31.9	5.9	57.2	10	05:04	05:29	05:50	17:37	17:58	18:23
18	94°06.0	-14°11.4	236°29.6	7.0	26°37.7	5.7	57.2	0	04:54	05:19	05:40	17:47	18:08	18:33
19	109°06.0	-14°12.2	250°55.6	7.0	26°43.3	5.6	57.2	-10	04:43	05:08	05:30	17:58	18:19	18:45
20	124°06.0	-14°13.0	265°21.6	7.0	26°48.8	5.4	57.1	-20	04:29	04:56	05:19	18:09	18:32	18:59
21	139°06.0	-14°13.8	279°47.6	7.0	26°54.1	5.2	57.1	-30	04:10	04:40	05:06	18:22	18:47	19:17
22	154°06.0	-14°14.7	294°13.5	7.0	26°59.3	5.1	57.0	-35	03:59	04:31	04:58	18:30	18:57	19:29
23	169°06.1	-14°15.5	308°39.5	7.0	27°04.3	4.9	57.0	-40	03:45	04:20	04:49	18:38	19:08	19:43
								-45	03:28	04:07	04:39	18:49	19:21	20:01
								-50	03:05	03:51	04:27	19:01	19:37	20:24
								-52	02:54	03:43	04:21	19:07	19:45	20:35
								-54	02:41	03:34	04:15	19:13	19:54	20:49
								-56	02:25	03:24	04:08	19:21	20:05	21:05
								-58	02:06	03:13	03:60	19:29	20:16	21:24
								-60	01:42	02:59	03:51	19:38	20:30	21:50
								Lat.	Moonrise			Moonset		
								72	--	--	--	--	--	--
								70	--	--	--	--	--	--
								68	--	--	--	--	--	--
								66	--	--	--	--	--	--
								64	--	--	--	--	--	--
								62	15:36	15:20	--	12:26	14:40	--
								60	16:14	16:38	17:33	11:48	13:23	14:24
								58	16:41	17:14	18:09	11:22	12:47	13:47
								56	17:02	17:40	18:36	11:01	12:21	13:21
								54	17:20	18:00	18:56	10:44	12:01	13:00
								52	17:35	18:17	19:14	10:29	11:44	12:43
								50	17:48	18:32	19:29	10:16	11:29	12:28
								45	18:15	19:02	19:58	09:50	10:59	11:58
								40	18:36	19:26	20:22	09:29	10:36	11:34
								35	18:54	19:45	20:41	09:12	10:17	11:15
								30	19:10	20:02	20:58	08:57	10:01	10:58
								20	19:36	20:30	21:25	08:32	09:33	10:30
								10	19:59	20:54	21:49	08:11	09:09	10:06
								0	20:20	21:16	22:12	07:50	08:47	09:43
								-10	20:41	21:39	22:34	07:30	08:25	09:21
								-20	21:04	22:03	22:58	07:09	08:01	08:56
								-30	21:31	22:32	23:26	06:44	07:34	08:28
								-35	21:47	22:48	23:42	06:30	07:17	08:11
								-40	22:05	23:08	--	06:13	06:58	07:51
								-45	22:28	23:32	--	05:53	06:36	07:28
								-50	22:56	--	00:02	05:28	06:06	06:57
								-52	23:10	--	00:18	05:16	05:52	06:42
								-54	23:27	--	00:36	05:02	05:35	06:24
								-56	23:46	--	00:57	04:46	05:16	06:02
								-58	--	00:11	01:25	04:28	04:51	05:35
								-60	--	00:43	02:05	04:05	04:18	04:55
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								31	16:22	16:23	11:43	01:37	14:05	17(91%)
								1	16:24	16:25	11:43	02:33	15:01	18(85%)
								2	16:26	16:27	11:43	03:29	15:57	19(77%)
								SD.=16.1	d=-0.8	S.D.=15.3				

November 03, 04 ,05 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	41°59.8	227°01.2	3°00.1	179°30.3	-16°17.1	3°25.4	13°38.4	68°47.2	-12°54.9	Alpheratz	357°35.6	29°13.5					
1	57°02.3	242°01.2	2°59.2	194°31.1	-16°17.6	18°28.2	13°38.3	83°49.7	-12°54.9	Ankaa	353°07.8	-42°10.7					
2	72°04.8	257°01.1	2°58.3	209°31.8	-16°18.1	33°31.0	13°38.2	98°52.2	-12°54.8	Schedar	349°31.7	56°40.3					
3	87°07.2	272°01.1	2°57.5	224°32.6	-16°18.7	48°33.8	13°38.1	113°54.7	-12°54.8	Diphda	348°47.9	-17°51.4					
4	102°09.7	287°01.0	2°56.6	239°33.3	-16°19.2	63°36.6	13°38.0	128°57.1	-12°54.8	Achernar	335°20.4	-57°07.0					
5	117°12.2	302°00.9	2°55.7	254°34.1	-16°19.7	78°39.4	13°37.9	143°59.6	-12°54.8	Hamal	327°52.0	23°34.6					
6	132°14.6	317°00.9	2°54.9	269°34.8	-16°20.3	93°42.2	13°37.8	159°02.1	-12°54.8	Polaris	314°02.8	89°21.9					
7	147°17.1	332°00.8	2°54.0	284°35.6	-16°20.8	108°45.0	13°37.7	174°04.5	-12°54.8	Akamar	315°12.1	-40°12.5					
8	162°19.6	347°00.8	2°53.1	299°36.3	-16°21.3	123°47.8	13°37.6	189°07.0	-12°54.8	Menkar	314°06.9	4°11.1					
9	177°22.0	2°00.7	2°52.2	314°37.0	-16°21.9	138°50.6	13°37.5	204°09.5	-12°54.8	Mirfak	308°29.2	49°56.8					
10	192°24.5	17°00.7	2°51.4	329°37.8	-16°22.4	153°53.4	13°37.4	219°11.9	-12°54.8	Aldebaran	290°40.5	16°33.5					
11	207°26.9	32°00.6	2°50.5	344°38.5	-16°22.9	168°56.2	13°37.3	234°14.4	-12°54.8	Rigel	281°04.6	-8°10.3					
12	222°29.4	47°00.6	2°49.6	359°39.3	-16°23.4	183°59.0	13°37.2	249°16.9	-12°54.8	Capella	280°23.0	46°01.3					
13	237°31.9	62°00.5	2°48.7	14°40.0	-16°24.0	199°01.8	13°37.1	264°19.4	-12°54.8	Bellatrix	278°23.7	6°22.4					
14	252°34.3	77°00.4	2°47.9	29°40.7	-16°24.5	214°04.6	13°37.0	279°21.8	-12°54.8	Elnath	278°02.8	28°37.7					
15	267°36.8	92°00.4	2°47.0	44°41.5	-16°25.0	229°07.4	13°36.9	294°24.3	-12°54.8	Alnilam	275°38.5	-1°11.1					
16	282°39.3	107°00.3	2°46.1	59°42.2	-16°25.6	244°10.2	13°36.8	309°26.8	-12°54.8	Betelgeuse	270°52.9	7°24.8					
17	297°41.7	122°00.3	2°45.2	74°43.0	-16°26.1	259°13.0	13°36.7	324°29.2	-12°54.8	Canopus	263°52.5	-52°42.2					
18	312°44.2	137°00.2	2°44.4	89°43.7	-16°26.6	274°15.8	13°36.6	339°31.7	-12°54.8	Sirius	258°26.8	-16°44.5					
19	327°46.7	152°00.2	2°43.5	104°44.5	-16°27.1	289°18.6	13°36.5	354°34.2	-12°54.8	Adara	255°06.5	-28°60.0					
20	342°49.1	167°00.1	2°42.6	119°45.2	-16°27.7	304°21.4	13°36.4	9°36.6	-12°54.8	Procyon	244°51.7	5°10.1					
21	357°51.6	182°00.0	2°41.7	134°45.9	-16°28.2	319°24.2	13°36.3	24°39.1	-12°54.8	Pollux	243°18.3	27°58.1					
22	12°54.1	196°60.0	2°40.9	149°46.7	-16°28.7	334°27.0	13°36.2	39°41.6	-12°54.8	Avior	234°15.1	-59°34.7					
23	27°56.5	211°59.9	2°40.0	164°47.4	-16°29.3	349°29.8	13°36.1	54°44.0	-12°54.8	Suhail	222°47.1	-43°31.4					
Mer.pass.:21:08			v-0.1 d-0.9 m-4.2			v0.7 d-0.5 m1.5			v2.8 d-0.1 m-2.8			v2.5 d0.0 m0.7			Miaplacidus 221°38.6 -69°48.8		

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	42°59.0	226°59.8	2°39.1	179°48.2	-16°29.8	4°32.6	13°36.0	69°46.5	-12°54.8
1	58°01.4	241°59.8	2°38.2	194°48.9	-16°30.3	19°35.4	13°35.9	84°49.0	-12°54.8
2	73°03.9	256°59.7	2°37.3	209°49.6	-16°30.8	34°38.2	13°35.8	99°51.4	-12°54.8
3	88°06.4	271°59.7	2°36.5	224°50.4	-16°31.4	49°41.0	13°35.7	114°53.9	-12°54.8
4	103°08.8	286°59.6	2°35.6	239°51.1	-16°31.9	64°43.8	13°35.6	129°56.4	-12°54.8
5	118°11.3	301°59.5	2°34.7	254°51.8	-16°32.4	79°46.5	13°35.5	144°58.8	-12°54.8
6	133°13.8	316°59.5	2°33.8	269°52.6	-16°32.9	94°49.3	13°35.4	160°01.3	-12°54.8
7	148°16.2	331°59.4	2°32.9	284°53.3	-16°33.5	109°52.1	13°35.3	175°03.8	-12°54.7
8	163°18.7	346°59.3	2°32.0	299°54.1	-16°34.0	124°54.9	13°35.1	190°06.2	-12°54.7
9	178°21.2	1°59.3	2°31.2	314°54.8	-16°34.5	139°57.7	13°35.0	205°08.7	-12°54.7
10	193°23.6	16°59.2	2°30.3	329°55.5	-16°35.0	155°00.5	13°34.9	220°11.2	-12°54.7
11	208°26.1	31°59.2	2°29.4	344°56.3	-16°35.6	170°03.3	13°34.8	235°13.6	-12°54.7
12	223°28.6	46°59.1	2°28.5	359°57.0	-16°36.1	185°06.1	13°34.7	250°16.1	-12°54.7
13	238°31.0	61°59.0	2°27.6	14°57.7	-16°36.6	200°08.9	13°34.6	265°18.6	-12°54.7
14	253°33.5	76°59.0	2°26.7	29°58.5	-16°37.1	215°11.7	13°34.5	280°21.0	-12°54.7
15	268°35.9	91°58.9	2°25.8	44°59.2	-16°37.7	230°14.5	13°34.4	295°23.5	-12°54.7
16	283°38.4	106°58.8	2°25.0	59°59.9	-16°38.2	245°17.3	13°34.3	310°26.0	-12°54.7
17	298°40.9	121°58.7	2°24.1	75°00.7	-16°38.7	260°20.1	13°34.2	325°28.4	-12°54.7
18	313°43.3	136°58.7	2°23.2	90°01.4	-16°39.2	275°22.9	13°34.1	340°30.9	-12°54.7
19	328°45.8	151°58.6	2°22.3	105°02.1	-16°39.8	290°25.7	13°34.0	355°33.3	-12°54.7
20	343°48.3	166°58.5	2°21.4	120°02.9	-16°40.3	305°28.5	13°33.9	10°35.8	-12°54.7
21	358°50.7	181°58.5	2°20.5	135°03.6	-16°40.8	320°31.3	13°33.8	25°38.3	-12°54.7
22	13°53.2	196°58.4	2°19.6	150°04.3	-16°41.3	335°34.1	13°33.7	40°40.7	-12°54.7
23	28°55.7	211°58.3	2°18.7	165°05.1	-16°41.9	350°36.9	13°33.6	55°43.2	-12°54.7
Mer.pass.:21:04		v-0.1 d-0.9 m-4.2		v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.8		v2.5 d0.0 m0.7	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	43°58.1	226°58.3	2°17.8	180°05.8	-16°42.4	5°39.7	13°33.5	70°45.7	-12°54.7
1	59°00.6	241°58.2	2°16.9	195°06.5	-16°42.9	20°42.5	13°33.4	85°48.1	-12°54.7
2	74°03.0	256°58.1	2°16.1	210°07.3	-16°43.4	35°45.3	13°33.3	100°50.6	-12°54.7
3	89°05.5	271°58.1	2°15.2	225°08.0	-16°43.9	50°48.1	13°33.2	115°53.0	-12°54.6
4	104°08.0	286°58.0	2°14.3	240°08.7	-16°44.5	65°50.9	13°33.1	130°55.5	-12°54.6
5	119°10.4	301°57.9	2°13.4	255°09.5	-16°45.0	80°53.7	13°33.0	145°58.0	-12°54.6
6	134°12.9	316°57.8	2°12.5	270°10.2	-16°45.5	95°56.5	13°32.9	161°00.4	-12°54.6
7	149°15.4	331°57.8	2°11.6	285°10.9	-16°46.0	110°59.3	13°32.8	176°02.9	-12°54.6
8	164°17.8	346°57.7	2°10.7	300°11.7	-16°46.5	126°02.1	13°32.7	191°05.4	-12°54.6
9	179°20.3	1°57.6	2°09.8	315°12.4	-16°47.1	141°04.9	13°32.6	206°07.8	-12°54.6
10	194°22.8	16°57.5	2°08.9	330°13.1	-16°47.6	156°07.7	13°32.5	221°10.3	-12°54.6
11	209°25.2	31°57.5	2°08.0	345°13.9	-16°48.1	171°10.5	13°32.4	236°12.7	-12°54.6
12	224°27.7	46°57.4	2°07.1	0°14.6	-16°48.6	186°13.3	13°32.3	251°15.2	-12°54.6
13	239°30.2	61°57.3	2°06.2	15°15.3	-16°49.1	201°16.1	13°32.2	266°17.7	-12°54.6
14	254°32.6	76°57.2	2°05.3	30°16.0	-16°49.7	216°18.9	13°32.1	281°20.1	-12°54.6
15	269°35.1	91°57.2	2°04.4	45°16.8	-16°50.2	231°21.6	13°32.0	296°22.6	-12°54.6
16	284°37.5	106°57.1	2°03.5	60°17.5	-16°50.7	246°24.4	13°31.9	311°25.0	-12°54.6
17	299°40.0	121°57.0	2°02.6	75°18.2	-16°51.2	261°27.2	13°31.8	326°27.5	-12°54.6
18	314°42.5	136°56.9	2°01.7	90°19.0	-16°51.7	276°30.0	13°31.7	341°30.0	-12°54.6
19	329°44.9	151°56.9	2°00.8	105°19.7	-16°52.3	291°32.8	13°31.6	356°32.4	-12°54.6
20	344°47.4	166°56.8	1°59.9	120°20.4	-16°52.8	306°35.6	13°31.5	11°34.9	-12°54.5
21	359°49.9	181°56.7	1°59.0	135°21.2	-16°53.3	321°38.4	13°31.4	26°37.3	-12°54.5
22	14°52.3	196°56.6	1°58.1	150°21.9	-16°53.8	336°41.2	13°31.3	41°39.8	-12°54.5
23	29°54.8	211°56.6	1°57.2	165°22.6	-16°54.3	351°44.0	13°31.2	56°42.3	-12°54.5
Mer.pass.:21:00		v-0.1 d-0.9 m-4.2		v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.8		v2.5 d0.0 m0.8	

	SHA	Dec
Alpheratz	357° 35.6	29° 13.5
Ankaa	353° 07.8	-42° 10.7
Schedar	349° 31.7	56° 40.3
Diphda	348° 47.9	-17° 51.4
Achernar	335° 20.4	-57° 07.0
Hamal	327° 52.0	23° 34.6
Polaris	314° 02.8	89° 21.9
Akamak	315° 12.1	-40° 12.5
Menkar	314° 06.9	4° 11.
Mirfak	308° 29.2	49° 56.8
Aldebaran	290° 40.5	16° 33.5
Rigel	281° 04.6	-8° 10.3
Capella	280° 23.0	46° 01.3
Bellatrix	278° 23.7	6° 22.4
Elnath	278° 02.8	28° 37.7
Alnilam	275° 38.5	-1° 11.1
Betelgeuse	270° 52.9	7° 24.8
Canopus	263° 52.5	-52° 42.2
Sirius	258° 26.8	-16° 44.5
Adara	255° 06.5	-28° 60.0
Procyon	244° 51.7	5° 10.1
Pollux	243° 18.3	27° 58.1
Avior	234° 15.1	-59° 34.7
Suhail	222° 47.1	-43° 31.4
Miaplacidus	221° 38.6	-69° 48.5
Alphard	217° 48.8	-8° 45.5
Regulus	207° 35.6	11° 51.1
Dubhe	193° 42.5	61° 37.2
Denebola	182° 26.1	14° 26.4
Gienah	175° 44.9	-17° 40.2
Acrux	173° 01.8	-63° 13.6
Gacrux	171° 53.3	-57° 14.5
Alioth	166° 14.4	55° 49.8
Spica	158° 23.7	-11° 11.0
Alcaid	152° 53.2	-49° 17.7
Hadar	148° 38.1	-60° 29.1
Menkent	147° 59.2	-36° 29.1
Arcturus	145° 49.0	19° 03.9
Rigel Kent.	139° 42.4	-60° 55.9
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.9	74° 03.4
Alphecca	126° 05.0	26° 38.2
Antares	112° 17.4	-26° 29.0
Atria	107° 13.0	-69° 04.3
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.1	-37° 07.3
Rasalhague	95° 59.8	12° 32.7
Etamin	90° 43.0	51° 29.3
Kaus Aust.	83° 34.1	-34° 22.5
Vega	80° 34.2	38° 48.5
Nunki	75° 49.2	-26° 16.1
Altair	62° 01.1	8° 55.9
Peacock	53° 07.4	-56° 39.7
Deneb	49° 26.5	45° 22.1
Enif	33° 39.7	9° 59.1
Alnair	27° 34.0	-46° 50.9
Fomalhaut	15° 15.5	-29° 29.8
Scheat	13° 46.0	28° 12.9
Markab	13° 30.7	15° 20.0

2023/11/	SHA	Mer.pass
Venus	185° 01.4	08:52
Mars	137° 30.5	12:01
Jupiter	321° 25.6	23:42
Saturn	26° 47.4	19:22

2023/11/	SHA	Mer.pass
Venus	184°00.9	08:52
Mars	136°49.2	12:00
Jupiter	321°33.6	23:37
Saturn	26°47.5	19:18

2023/11/	SHA	Mer.pass
Venus	183°00.1	08:52
Mars	136°07.7	11:59
Jupiter	321°41.6	23:33
Saturn	26°47.5	19:14

Horizontal parallax	
Venus:	0.2
Mars:	0.1

Sun							Moon							
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	184°06.8	-14°54.4	296°14.2	8.5	27°51.0	-2.8	55.5	72	06:17	07:42	09:14	14:11	15:44	17:09
1	199°06.8	-14°55.2	310°41.7	8.6	27°48.1	-3.0	55.5	70	06:11	07:27	08:44	14:42	15:59	17:14
2	214°06.8	-14°56.0	325°09.4	8.6	27°45.0	-3.1	55.4	68	06:07	07:15	08:22	15:04	16:11	17:19
3	229°06.8	-14°56.8	339°37.0	8.7	27°41.8	-3.3	55.4	66	06:03	07:05	08:05	15:21	16:21	17:23
4	244°06.8	-14°57.6	354°04.8	8.8	27°38.5	-3.4	55.4	64	05:59	06:57	07:51	15:35	16:29	17:26
5	259°06.8	-14°58.4	8°32.6	8.9	27°35.0	-3.5	55.4	62	05:56	06:50	07:39	15:47	16:37	17:30
6	274°06.8	-14°59.1	23°00.5	8.9	27°31.4	-3.7	55.3	60	05:53	06:43	07:29	15:57	16:43	17:33
7	289°06.8	-14°59.9	37°28.5	9.0	27°27.6	-3.8	55.3	58	05:51	06:38	07:20	16:06	16:49	17:35
8	304°06.8	-15°00.7	51°56.5	9.1	27°23.8	-4.0	55.3	56	05:48	06:32	07:13	16:14	16:54	17:38
9	319°06.8	-15°01.5	66°24.6	9.1	27°19.7	-4.1	55.3	54	05:46	06:28	07:06	16:21	16:58	17:40
10	334°06.8	-15°02.3	80°52.8	9.2	27°15.6	-4.2	55.2	52	05:44	06:24	06:60	16:27	17:03	17:43
11	349°06.8	-15°03.1	95°21.1	9.3	27°11.3	-4.4	55.2	50	05:41	06:20	06:54	16:32	17:07	17:45
12	4°06.8	-15°03.8	109°49.4	9.4	27°06.8	-4.5	55.2	45	05:36	06:11	06:42	16:45	17:15	17:50
13	19°06.8	-15°04.6	124°17.8	9.5	27°02.3	-4.6	55.2	40	05:32	06:04	06:32	16:55	17:23	17:55
14	34°06.8	-15°05.4	138°46.3	9.5	26°57.6	-4.8	55.2	35	05:27	05:57	06:23	17:03	17:30	17:60
15	49°06.8	-15°06.2	153°14.9	9.6	26°52.8	-4.9	55.1	30	05:23	05:51	06:16	17:11	17:36	18:04
16	64°06.8	-15°07.0	167°43.5	9.7	26°47.8	-5.0	55.1	20	05:14	05:40	06:03	17:24	17:47	18:13
17	79°06.8	-15°07.7	182°12.3	9.8	26°42.7	-5.2	55.1	10	05:04	05:29	05:51	17:36	17:58	18:23
18	94°06.8	-15°08.5	196°41.1	9.9	26°37.5	-5.3	55.1	0	04:54	05:19	05:40	17:47	18:08	18:33
19	109°06.8	-15°09.3	211°10.0	9.9	26°32.2	-5.4	55.0	-10	04:42	05:07	05:29	17:58	18:20	18:46
20	124°06.8	-15°10.1	225°38.9	10.0	26°26.7	-5.5	55.0	-20	04:27	04:54	05:17	18:10	18:33	19:01
21	139°06.8	-15°10.8	240°08.0	10.1	26°21.1	-5.7	55.0	-30	04:08	04:38	05:03	18:24	18:50	19:20
22	154°06.8	-15°11.6	254°37.1	10.2	26°15.4	-5.8	55.0	-35	03:55	04:28	04:55	18:33	18:60	19:32
23	169°06.8	-15°12.4	269°06.3	10.3	26°09.5	-5.9	55.0	-40	03:41	04:17	04:46	18:42	19:11	19:47
SD.=16.1 d=-0.8							S.D.=15.1							
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	184°06.8	-15°13.2	283°35.6	10.3	26°03.6	-6.0	54.9	72	--	--	--	--	--	--
1	199°06.8	-15°13.9	298°05.0	10.4	25°57.5	-6.1	54.9	70	--	--	--	--	--	--
2	214°06.8	-15°14.7	312°34.5	10.5	25°51.3	-6.3	54.9	68	--	--	20:19	--	--	16:52
3	229°06.8	-15°15.5	327°04.1	10.6	25°45.0	-6.4	54.9	66	--	18:11	20:58	--	17:22	16:11
4	244°06.8	-15°16.3	341°33.7	10.7	25°38.5	-6.5	54.8	64	--	19:29	21:25	--	16:04	15:43
5	259°06.8	-15°17.0	356°03.4	10.8	25°32.0	-6.6	54.8	62	18:15	20:05	21:46	15:33	15:27	15:22
6	274°06.8	-15°17.8	10°33.2	10.8	25°25.3	-6.7	54.8	60	18:57	20:31	22:03	14:51	15:01	15:04
7	289°06.8	-15°18.6	25°03.1	10.9	25°18.5	-6.8	54.8	58	19:26	20:51	22:17	14:22	14:40	14:50
8	304°06.8	-15°19.4	39°33.1	11.0	25°11.6	-7.0	54.8	56	19:48	21:08	22:29	13:59	14:23	14:37
9	319°06.8	-15°20.1	54°03.1	11.1	25°04.6	-7.1	54.8	54	20:06	21:22	22:39	13:41	14:08	14:26
10	334°06.8	-15°20.9	68°33.3	11.2	24°57.5	-7.2	54.7	52	20:21	21:34	22:49	13:26	13:55	14:16
11	349°06.8	-15°21.7	83°03.5	11.3	24°50.2	-7.3	54.7	50	20:34	21:45	22:57	13:12	13:44	14:07
12	4°06.8	-15°22.4	97°33.8	11.4	24°42.9	-7.4	54.7	45	21:01	22:08	23:14	12:44	13:20	13:48
13	19°06.7	-15°23.2	112°04.2	11.4	24°35.4	-7.5	54.7	40	21:23	22:26	23:29	12:22	13:01	13:33
14	34°06.7	-15°24.0	126°34.7	11.5	24°27.8	-7.6	54.7	35	21:40	22:41	23:41	12:04	12:46	13:20
15	49°06.7	-15°24.8	141°05.3	11.6	24°20.2	-7.7	54.7	30	21:56	22:54	23:51	11:49	12:32	13:09
16	64°06.7	-15°25.5	155°35.9	11.7	24°12.4	-7.8	54.6	20	22:21	23:16	--	11:22	12:08	12:49
17	79°06.7	-15°26.3	170°06.7	11.8	24°04.5	-7.9	54.6	10	22:44	23:35	--	10:59	11:48	12:32
18	94°06.7	-15°27.1	184°37.5	11.9	23°56.5	-8.0	54.6	0	23:04	23:53	--	10:37	11:28	12:16
19	109°06.7	-15°27.8	199°08.4	12.0	23°48.4	-8.1	54.6	-10	23:25	--	00:11	10:16	11:09	11:59
20	124°06.7	-15°28.6	213°39.4	12.0	23°40.2	-8.2	54.6	-20	23:47	--	00:30	09:52	10:48	11:42
21	139°06.7	-15°29.4	228°10.5	12.1	23°31.9	-8.3	54.6	-30	--	00:12	00:52	09:25	10:24	11:22
22	154°06.7	-15°30.1	242°41.6	12.2	23°23.5	-8.4	54.5	-35	--	00:27	01:05	09:09	10:10	11:10
23	169°06.6	-15°30.9	257°12.9	12.3	23°15.1	-8.5	54.5	-40	00:01	00:44	01:19	08:51	09:53	10:56
SD.=16.1 d=-0.8							S.D.=15.0							
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Day	Sun			Moon		
0	184°06.6	-15°31.7	271°44.2	12.4	23°06.5	-8.6	54.5	3	16:27	16:27	11:43	04:24	16:50	20(68%)
1	199°06.6	-15°32.4	286°15.6	12.5	22°57.8	-8.7	54.5	4	16:27	16:27	11:43	05:16	17:40	21(58%)
2	214°06.6	-15°33.2	300°47.1	12.5	22°49.0	-8.8	54.5	5	16:27	16:26	11:43	06:04	18:27	22(49%)
3	229°06.6	-15°33.9	315°18.7	12.6	22°40.1	-8.9	54.5							
4	244°06.6	-15°34.7	329°50.3	12.7	22°31.1	-9.0	54.5							
5	259°06.6	-15°35.5	344°22.1	12.8	22°22.1	-9.1	54.4							
6	274°06.6	-15°36.2	358°53.9	12.9	22°12.9	-9.2	54.4							
7	289°06.5	-15°37.0	13°25.8	12.9	22°03.7	-9.3	54.4							
8	304°06.5	-15°37.8	27°57.8	13.0	21°54.3	-9.4	54.4							
9	319°06.5	-15°38.5	42°29.8	13.1	21°44.9	-9.5	54.4							
10	334°06.5	-15°39.3	57°02.0	13.2	21°35.4	-9.6	54.4							
11	349°06.5	-15°40.0	71°34.2	13.3	21°25.8	-9.6	54.4							
12	4°06.5	-15°40.8	86°06.5	13.3	21°16.1	-9.7	54.4							
13	19°06.5	-15°41.6	100°38.9	13.4	21°06.3	-9.8	54.4							
14	34°06.4	-15°42.3	115°11.3	13.5	20°56.4	-9.9	54.3							
15	49°06.4	-15°43.1	129°43.8	13.6	20°46.5	-10.0	54.3							
16	64°06.4	-15°43.8	144°16.4	13.6	20°36.5	-10.1	54.3							
17	79°06.4	-15°44.6	158°49.1	13.7	20°26.4	-10.2	54.3							
18	94°06.4	-15°45.4	173°21.9	13.8	20°16.2	-10.2	54.3							
19	109°06.3	-15°46.1	187°54.7	13.9	20°05.9	-10.3	54.3							
20	124°06.3	-15°46.9	202°27.6	13.9	19°55.5	-10.4	54.3							
21	139°06.3	-15°47.6	217°00.6	14.0	19°45.1	-10.5	54.3							
22	154°06.3	-15°48.4	231°33.6	14.1	19°34.6	-10.5	54.3							
23	169°06.3	-15°49.1	246°06.7	14.2	19°24.0	-10.6	54.3							
SD.=16.1 d=-0.8							S.D.=14.9							

November 06, 07 ,08 (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	44°57.3	226°56.5	1°56.3	180°23.3	-16°54.8	6°46.8	13°31.1	71°44.7	-12°54.5	Alpheratz	357°35.6	29°13.5
1	59°59.7	241°56.4	1°55.4	195°24.1	-16°55.4	21°49.6	13°31.0	86°47.2	-12°54.5	Ankaa	353°07.8	-42°10.7
2	75°02.2	256°56.3	1°54.5	210°24.8	-16°55.9	36°52.4	13°30.9	101°49.6	-12°54.5	Schedar	349°31.7	56°40.3
3	90°04.7	271°56.2	1°53.6	225°25.5	-16°56.4	51°55.2	13°30.8	116°52.1	-12°54.5	Diphda	348°47.9	-17°51.4
4	105°07.1	286°56.2	1°52.7	240°26.2	-16°56.9	66°58.0	13°30.7	131°54.6	-12°54.5	Achernar	335°20.4	-57°07.0
5	120°09.6	301°56.1	1°51.8	255°27.0	-16°57.4	82°00.8	13°30.6	146°57.0	-12°54.5	Hamal	327°52.0	23°34.6
6	135°12.0	316°56.0	1°50.9	270°27.7	-16°57.9	97°03.6	13°30.5	161°59.5	-12°54.5	Polaris	314°02.6	89°21.9
7	150°14.5	331°55.9	1°50.0	285°28.4	-16°58.5	112°06.4	13°30.3	177°01.9	-12°54.5	Akamar	315°12.1	-40°12.5
8	165°17.0	346°55.8	1°49.1	300°29.1	-16°59.0	127°09.2	13°30.2	192°04.4	-12°54.5	Menkar	314°06.9	4°11.1
9	180°19.4	1°55.7	1°48.2	315°29.9	-16°59.5	142°12.0	13°30.1	207°06.8	-12°54.5	Mirfak	308°29.2	49°56.8
10	195°21.9	16°55.7	1°47.3	330°30.6	-17°00.0	157°14.8	13°30.0	222°09.3	-12°54.4	Aldebaran	290°40.5	16°33.5
11	210°24.4	31°55.6	1°46.4	345°31.3	-17°00.5	172°17.6	13°29.9	237°11.8	-12°54.4	Rigel	281°04.5	-8°10.3
12	225°26.8	46°55.5	1°45.5	0°32.0	-17°01.0	187°20.4	13°29.8	252°14.2	-12°54.4	Capella	280°23.0	46°01.3
13	240°29.3	61°55.4	1°44.5	15°32.8	-17°01.5	202°23.2	13°29.7	267°16.7	-12°54.4	Bellatrix	278°23.7	6°22.4
14	255°31.8	76°55.3	1°43.6	30°33.5	-17°02.1	217°26.0	13°29.6	282°19.1	-12°54.4	Elnath	278°02.8	28°37.7
15	270°34.2	91°55.2	1°42.7	45°34.2	-17°02.6	232°28.8	13°29.5	297°21.6	-12°54.4	Anilam	275°38.5	-1°11.1
16	285°36.7	106°55.2	1°41.8	60°34.9	-17°03.1	247°31.6	13°29.4	312°24.0	-12°54.4	Betelgeuse	270°52.9	7°24.8
17	300°39.2	121°55.1	1°40.9	75°35.7	-17°03.6	262°34.4	13°29.3	327°26.5	-12°54.4	Canopus	263°52.5	-52°42.2
18	315°41.6	136°55.0	1°40.0	90°36.4	-17°04.1	277°37.1	13°29.2	342°29.0	-12°54.4	Sirius	258°26.8	-16°44.5
19	330°44.1	151°54.9	1°39.1	105°37.1	-17°04.6	292°39.9	13°29.1	357°31.4	-12°54.4	Adara	255°06.4	-28°60.0
20	345°46.5	166°54.8	1°38.2	120°37.8	-17°05.1	307°42.7	13°29.0	12°33.9	-12°54.4	Procyon	244°51.7	5°10.1
21	0°49.0	181°54.7	1°37.3	135°38.5	-17°05.7	322°45.5	13°28.9	27°36.3	-12°54.4	Pollux	243°18.3	27°58.1
22	15°51.5	196°54.6	1°36.4	150°39.3	-17°06.2	337°48.3	13°28.8	42°38.8	-12°54.3	Avior	234°15.0	-59°34.7
23	30°53.9	211°54.6	1°35.4	165°40.0	-17°06.7	352°51.1	13°28.7	57°41.2	-12°54.3	Suhail	222°47.0	-43°31.4
Mer.pass.:20:56		v-0.1 d-0.9 m-4.2		v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.8		v2.5 d0.0 m0.8		Miaplacidus	221°38.6	-69°48.5
										Alphard	217°48.8	-8°45.5
										Regulus	207°35.5	11°51.1
										Dubhe	193°42.5	61°37.2
										Denebola	182°26.1	14°26.4
										Gienah	175°44.8	-17°40.3
										Acrux	173°01.8	-63°13.6
										Gacrux	171°53.3	-57°14.5
										Alioth	166°14.3	55°49.8
										Spica	158°23.7	-11°17.0
										Alcaid	152°53.2	49°11.7
										Hadar	148°38.1	-60°29.1
										Menkent	147°59.2	-36°29.1
										Arcturus	145°49.0	19°03.9
										Rigel Kent.	139°42.4	-60°55.9
										Zubenelg.	136°57.5	-16°08.3
										Kochab	137°20.9	74°03.4
										Alphecca	126°05.0	26°38.2
										Antares	112°17.4	-26°29.0
										Atria	107°13.0	-69°04.3
										Sabik	102°04.2	-15°45.2
										Shaula	96°12.1	-37°07.3
										Rasalhague	95°59.8	12°32.7
										Etamin	90°43.0	51°29.3
										Kaus Aust.	83°34.1	-34°22.5
										Vega	80°34.2	38°48.5
										Nunki	75°49.2	-26°16.1
										Altair	62°01.1	8°55.9
										Peacock	53°07.4	-56°39.7
										Deneb	49°26.6	45°22.1
										Enif	33°39.7	9°59.1
										Alnair	27°34.1	-46°50.9
										Fomalhaut	15°15.5	-29°29.9
										Scheat	13°46.0	28°12.9
										Markab	13°30.7	15°20.1
										2023/11/	SHA	Mer.pass
										Venus	181°59.2	08:52
										Mars	135°26.1	11:58
										Jupiter	321°49.6	23:29
										Saturn	26°47.5	19:10
										2023/11/	SHA	Mer.pass
										Venus	180°58.1	08:52
										Mars	134°44.3	11:57
										Jupiter	321°57.5	23:24
										Saturn	26°47.3	19:06
										2023/11/	SHA	Mer.pass
										Venus	179°56.7	08:53
										Mars	134°02.4	11:56
										Jupiter	322°05.5	23:20
										Saturn	26°47.0	19:02
										Horizontal paralax		
										Venus:	0.2	
										Mars:	0.1	

Sun			Moon											
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	184°06.3	-15°49.9	260°39.9	14.2	19°13.4	-10.7	54.3	72	06:28	07:55	09:36	13:50	15:30	16:57
1	199°06.2	-15°50.6	275°13.2	14.3	19°02.6	-10.8	54.3	70	06:22	07:39	09:00	14:26	15:47	17:04
2	214°06.2	-15°51.4	289°46.5	14.4	18°51.8	-10.8	54.3	68	06:16	07:25	08:35	14:51	16:01	17:10
3	229°06.2	-15°52.1	304°19.9	14.4	18°40.9	-10.9	54.3	66	06:11	07:14	08:16	15:10	16:12	17:15
4	244°06.2	-15°52.9	318°53.4	14.5	18°30.0	-11.0	54.2	66	06:07	07:05	08:00	15:26	16:21	17:19
5	259°06.1	-15°53.7	333°26.9	14.6	18°18.9	-11.1	54.2	62	06:03	06:57	07:48	15:39	16:29	17:23
6	274°06.1	-15°54.4	348°00.5	14.6	18°07.8	-11.1	54.2	60	05:60	06:50	07:37	15:50	16:36	17:27
7	289°06.1	-15°55.2	2°34.1	14.7	17°56.7	-11.2	54.2	58	05:57	06:44	07:27	15:59	16:43	17:30
8	304°06.1	-15°55.9	17°07.9	14.8	17°45.4	-11.3	54.2	56	05:54	06:38	07:19	16:08	16:48	17:33
9	319°06.1	-15°56.7	31°41.6	14.8	17°34.1	-11.3	54.2	54	05:51	06:33	07:12	16:15	16:53	17:36
10	334°06.0	-15°57.4	46°15.5	14.9	17°22.8	-11.4	54.2	52	05:48	06:29	07:05	16:22	16:58	17:38
11	349°06.0	-15°58.2	60°49.4	14.9	17°11.3	-11.5	54.2	50	05:46	06:24	06:59	16:28	17:02	17:41
12	4°06.0	-15°58.9	75°23.4	15.0	16°59.8	-11.5	54.2	45	05:40	06:15	06:46	16:41	17:12	17:47
13	19°06.0	-15°59.7	89°57.4	15.1	16°48.3	-11.6	54.2	40	05:35	06:07	06:35	16:51	17:20	17:52
14	34°05.9	-16°00.4	104°31.5	15.1	16°36.6	-11.7	54.2	35	05:30	05:60	06:26	17:01	17:27	17:57
15	49°05.9	-16°01.1	119°05.7	15.2	16°24.9	-11.7	54.2	30	05:25	05:53	06:18	17:09	17:34	18:02
16	64°05.9	-16°01.9	133°39.9	15.2	16°13.2	-11.8	54.2	20	05:15	05:41	06:04	17:23	17:46	18:12
17	79°05.8	-16°02.6	148°14.1	15.3	16°01.3	-11.9	54.2	10	05:05	05:30	05:52	17:35	17:57	18:22
18	94°05.8	-16°03.4	162°48.5	15.4	15°49.5	-11.9	54.2	0	04:54	05:19	05:40	17:47	18:09	18:34
19	109°05.8	-16°04.1	177°22.8	15.4	15°37.5	-12.0	54.2	-10	04:41	05:06	05:28	17:59	18:21	18:47
20	124°05.8	-16°04.9	191°57.3	15.5	15°25.5	-12.0	54.2	-20	04:25	04:52	05:16	18:12	18:35	19:03
21	139°05.7	-16°05.6	206°31.8	15.5	15°13.5	-12.1	54.2	-30	04:05	04:35	05:01	18:27	18:52	19:23
22	154°05.7	-16°06.4	221°06.3	15.6	15°01.3	-12.1	54.2	-35	03:52	04:25	04:52	18:35	19:03	19:36
23	169°05.7	-16°07.1	235°40.9	15.6	14°49.2	-12.2	54.2	-40	03:37	04:13	04:43	18:45	19:15	19:52
								-45	03:17	03:58	04:31	18:57	19:30	20:11
								-50	02:52	03:40	04:17	19:11	19:49	20:37
								-52	02:39	03:31	04:10	19:18	19:58	20:51
								-54	02:23	03:21	04:03	19:26	20:08	21:06
								-56	02:05	03:09	03:55	19:34	20:20	21:25
								-58	01:41	02:56	03:46	19:43	20:34	21:50
								-60	01:07	02:40	03:35	19:54	20:50	22:26
								Lat.	Moonrise			Moonset		
								72	21:32	23:56	---	17:12	16:14	15:37
								70	22:08	---	00:12	16:35	15:57	15:29
								68	22:33	---	00:24	16:08	15:43	15:23
								66	22:52	---	00:34	15:48	15:31	15:17
								64	23:07	---	00:42	15:31	15:21	15:12
								62	23:20	---	00:49	15:17	15:13	15:08
								60	23:31	---	00:55	15:06	15:05	15:05
								58	23:40	---	01:01	14:55	14:59	15:01
								56	23:48	---	01:05	14:46	14:53	14:59
								54	23:55	---	01:10	14:38	14:48	14:56
								52	---	00:02	01:13	14:31	14:43	14:54
								50	---	00:07	01:17	14:25	14:39	14:51
								45	---	00:20	01:24	14:11	14:30	14:47
								40	---	00:30	01:31	13:59	14:22	14:43
								35	---	00:39	01:36	13:49	14:15	14:39
								30	---	00:46	01:41	13:41	14:09	14:36
								20	00:09	00:60	01:49	13:26	13:59	14:31
								10	00:24	01:11	01:56	13:12	13:50	14:26
								0	00:39	01:22	02:02	12:60	13:41	14:22
								-10	00:53	01:32	02:09	12:47	13:33	14:17
								-20	01:09	01:44	02:16	12:34	13:23	14:12
								-30	01:26	01:56	02:24	12:18	13:13	14:07
								-35	01:36	02:04	02:28	12:09	13:07	14:03
								-40	01:48	02:12	02:34	11:58	12:59	13:60
								-45	02:01	02:22	02:39	11:46	12:51	13:55
								-50	02:18	02:33	02:47	11:31	12:41	13:50
								-52	02:26	02:39	02:50	11:24	12:36	13:48
								-54	02:34	02:45	02:53	11:16	12:31	13:45
								-56	02:44	02:51	02:57	11:07	12:26	13:42
								-58	02:55	02:59	03:02	10:57	12:19	13:39
								-60	03:07	03:07	03:07	10:45	12:12	13:35
								Day	Sun			Moon		
									Eqn. of Time	Mer.		Mer. Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								6	16:25	16:24	11:43	06:49	19:10	23(39%)
								7	16:23	16:21	11:43	07:31	19:51	24(30%)
								8	16:19	16:17	11:43	08:12	20:31	25(22%)

November 09, 10 ,11 (Thu., Fri., Sat.)

Aries		Venus		Mars		Jupiter		Saturn		Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	47° 54.7	226° 49.8	0° 50.2	181° 15.0	-17° 31.5	10° 08.0	13° 23.8	74° 41.3	-12° 53.8	Alpheratz	357° 35.6	29° 13.5	
1	62° 57.1	241° 49.7	0° 49.3	196° 15.7	-17° 32.0	25° 10.8	13° 23.7	89° 43.8	-12° 53.8	Ankaa	353° 07.8	-42° 10.7	
2	77° 59.6	256° 49.6	0° 48.4	211° 16.4	-17° 32.5	40° 13.6	13° 23.6	104° 46.2	-12° 53.8	Schedar	349° 31.8	56° 40.3	
3	93° 02.1	271° 49.5	0° 47.4	226° 17.2	-17° 33.0	55° 16.4	13° 23.5	119° 48.6	-12° 53.8	Diphda	348° 47.9	-17° 51.4	
4	108° 04.5	286° 49.4	0° 46.5	241° 17.9	-17° 33.5	70° 19.2	13° 23.4	134° 51.1	-12° 53.8	Achernar	335° 20.4	-57° 07.0	
5	123° 07.0	301° 49.3	0° 45.6	256° 18.6	-17° 34.0	85° 22.0	13° 23.3	149° 53.5	-12° 53.8	Hamal	327° 52.0	23° 34.6	
6	138° 09.5	316° 49.2	0° 44.6	271° 19.3	-17° 34.5	100° 24.8	13° 23.2	164° 56.0	-12° 53.8	Polaris	314° 02.5	89° 21.9	
7	153° 11.9	331° 49.1	0° 43.7	286° 20.0	-17° 35.0	115° 27.6	13° 23.1	179° 58.4	-12° 53.8	Akamar	315° 12.1	-40° 12.5	
8	168° 14.4	346° 49.0	0° 42.8	301° 20.7	-17° 35.5	130° 30.4	13° 23.0	195° 00.9	-12° 53.7	Menkar	314° 06.9	4° 11.1	
9	183° 16.9	1° 48.9	0° 41.8	316° 21.4	-17° 36.0	145° 33.2	13° 22.9	210° 03.3	-12° 53.7	Mirfak	308° 29.2	49° 56.8	
10	198° 19.3	16° 48.8	0° 40.9	331° 22.1	-17° 36.5	160° 36.0	13° 22.8	225° 05.8	-12° 53.7	Aldebaran	290° 40.5	16° 33.5	
11	213° 21.8	31° 48.7	0° 40.0	346° 22.8	-17° 37.0	175° 38.8	13° 22.7	240° 08.2	-12° 53.7	Rigel	281° 04.5	-8° 10.3	
12	228° 24.2	46° 48.6	0° 39.0	1° 23.5	-17° 37.5	190° 41.6	13° 22.6	255° 10.6	-12° 53.7	Capella	280° 23.0	46° 01.3	
13	243° 26.7	61° 48.5	0° 38.1	16° 24.2	-17° 38.0	205° 44.4	13° 22.5	270° 13.1	-12° 53.7	Bellatrix	278° 23.7	6° 22.4	
14	258° 29.2	76° 48.4	0° 37.2	31° 24.9	-17° 38.5	220° 47.1	13° 22.4	285° 15.5	-12° 53.7	Elnath	278° 02.8	28° 37.7	
15	273° 31.6	91° 48.2	0° 36.2	46° 25.6	-17° 39.0	235° 49.9	13° 22.3	300° 18.0	-12° 53.7	Alnilam	275° 38.5	-1° 11.1	
16	288° 34.1	106° 48.1	0° 35.3	61° 26.3	-17° 39.5	250° 52.7	13° 22.2	315° 20.4	-12° 53.6	Betelgeuse	270° 52.9	7° 24.8	
17	303° 36.6	121° 48.0	0° 34.3	76° 27.0	-17° 40.0	265° 55.5	13° 22.1	330° 22.9	-12° 53.6	Canopus	263° 52.5	-52° 42.2	
18	318° 39.0	136° 47.9	0° 33.4	91° 27.7	-17° 40.5	280° 58.3	13° 22.0	345° 25.3	-12° 53.6	Sirius	258° 26.8	-16° 44.5	
19	333° 41.5	151° 47.8	0° 32.5	106° 28.5	-17° 41.0	296° 01.1	13° 21.9	0° 27.8	-12° 53.6	Adara	255° 06.4	-29° 00.0	
20	348° 44.0	166° 47.7	0° 31.5	121° 29.2	-17° 41.5	311° 03.9	13° 21.8	15° 30.2	-12° 53.6	Procyon	244° 51.6	5° 10.1	
21	3° 46.4	181° 47.6	0° 30.6	136° 29.9	-17° 42.0	326° 06.7	13° 21.7	30° 32.6	-12° 53.6	Pollux	243° 18.3	27° 58.1	
22	18° 48.9	196° 47.5	0° 29.6	151° 30.6	-17° 42.5	341° 09.5	13° 21.6	45° 35.1	-12° 53.6	Avior	234° 15.0	-59° 34.7	
23	33° 51.3	211° 47.4	0° 28.7	166° 31.3	-17° 42.9	356° 12.3	13° 21.5	60° 37.5	-12° 53.6	Suhail	222° 47.0	-43° 31.4	
Mer.pass.:20:44		v-0.1 d-0.9 m-4.2		v-0.7 d-0.5 m1.5		v-2.8 d-0.1 m-2.8		v-2.4 d0.0 m0.8		Miaplacidus		221° 38.5	-69° 48.8

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	48°53.8	226°47.2	0°27.8	181°32.0	-17°43.4	11°15.1	13°21.4	75°40.0	-12°53.5
1	63°56.3	241°47.1	0°26.8	196°32.7	-17°43.9	26°17.9	13°21.3	90°42.4	-12°53.5
2	78°58.7	256°47.0	0°25.9	211°33.4	-17°44.4	41°20.6	13°21.2	105°44.8	-12°53.5
3	94°01.2	271°46.9	0°24.9	226°34.1	-17°44.9	56°23.4	13°21.1	120°47.3	-12°53.3
4	109°03.7	286°46.8	0°24.0	241°34.8	-17°45.4	71°26.2	13°21.0	135°49.7	-12°53.5
5	124°06.1	301°46.7	0°23.1	256°35.5	-17°45.9	86°29.0	13°20.9	150°52.2	-12°53.5
6	139°08.6	316°46.6	0°22.1	271°36.2	-17°46.4	101°31.8	13°20.8	165°54.6	-12°53.5
7	154°11.1	331°46.4	0°21.2	286°36.9	-17°46.9	116°34.6	13°20.7	180°57.1	-12°53.4
8	169°13.5	346°46.3	0°20.2	301°37.6	-17°47.4	131°37.4	13°20.6	195°59.5	-12°53.4
9	184°16.0	1°46.2	0°19.3	316°38.3	-17°47.9	146°40.2	13°20.5	211°01.9	-12°53.4
10	199°18.5	16°46.1	0°18.3	331°39.0	-17°48.4	161°43.0	13°20.4	226°04.4	-12°53.4
11	214°20.9	31°46.0	0°17.4	346°39.7	-17°48.9	176°45.8	13°20.3	241°06.8	-12°53.4
12	229°23.4	46°45.9	0°16.4	1°40.4	-17°49.4	191°48.5	13°20.2	256°09.3	-12°53.4
13	244°25.8	61°45.7	0°15.5	16°41.1	-17°49.9	206°51.3	13°20.1	271°11.7	-12°53.4
14	259°28.3	76°45.6	0°14.6	31°41.8	-17°50.4	221°54.1	13°20.0	286°14.1	-12°53.3
15	274°30.8	91°45.5	0°13.6	46°42.5	-17°50.8	236°56.9	13°19.9	301°16.6	-12°53.3
16	289°33.2	106°45.4	0°12.7	61°43.2	-17°51.3	251°59.7	13°19.8	316°19.0	-12°53.3
17	304°35.7	121°45.3	0°11.7	76°43.9	-17°51.8	266°02.5	13°19.7	331°21.5	-12°53.3
18	319°38.2	136°45.2	0°10.8	91°44.6	-17°52.3	282°05.3	13°19.6	346°23.9	-12°53.3
19	334°40.6	151°45.0	0°09.8	106°45.3	-17°52.8	297°08.1	13°19.5	1°26.3	-12°53.3
20	349°43.1	166°44.9	0°08.9	121°46.0	-17°53.3	312°10.9	13°19.4	16°28.8	-12°53.3
21	4°45.6	181°44.8	0°07.9	136°46.7	-17°53.8	327°13.7	13°19.3	31°31.2	-12°53.2
22	19°48.0	196°44.7	0°07.0	151°47.4	-17°54.3	342°16.4	13°19.2	46°33.7	-12°53.2
23	34°50.5	211°44.6	0°06.0	166°48.1	-17°54.8	357°19.2	13°19.1	61°36.1	-12°53.2
Mer.pass.:20:41		v-0.1 d-0.9 m-4.2		v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.8		v2.4 d0.0 m0.8	

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	49°52.9	226°44.4	0°05.1	181°48.8	-17°55.3	12°22.0	13°19.0	76°38.5	-12°53.2
1	64°55.4	241°44.3	0°04.1	196°49.5	-17°55.7	27°24.8	13°18.9	91°41.0	-12°53.2
2	79°57.6	256°44.2	0°03.2	211°50.2	-17°56.2	42°27.6	13°18.8	106°43.4	-12°53.2
3	95°00.3	271°44.1	0°02.2	226°50.9	-17°56.7	57°30.4	13°18.7	121°45.8	-12°53.2
4	110°02.8	286°43.9	0°01.3	241°51.6	-17°57.2	72°33.2	13°18.6	136°48.3	-12°53.1
5	125°05.3	301°43.8	0°00.3	256°52.2	-17°57.7	87°36.0	13°18.5	151°50.7	-12°53.1
6	140°07.7	316°43.7	-0°00.6	271°52.9	-17°58.2	102°38.8	13°18.4	166°53.2	-12°53.1
7	155°10.2	331°43.6	-0°01.6	286°53.6	-17°58.7	117°41.5	13°18.3	181°55.6	-12°53.1
8	170°12.7	346°43.5	-0°02.5	301°54.3	-17°59.2	132°44.3	13°18.2	196°58.0	-12°53.1
9	185°15.1	1°43.3	-0°03.5	316°55.0	-17°59.7	147°47.1	13°18.1	212°00.5	-12°53.1
10	200°17.6	16°43.2	-0°04.4	331°55.7	-18°00.1	162°49.9	13°18.0	227°02.9	-12°53.1
11	215°20.1	31°43.1	-0°05.4	346°56.4	-18°00.6	177°52.7	13°17.9	242°05.3	-12°53.0
12	230°22.5	46°43.0	-0°06.3	1°57.1	-18°01.1	192°55.5	13°17.8	257°07.8	-12°53.0
13	245°25.0	61°42.8	-0°07.3	16°57.8	-18°01.6	207°58.3	13°17.7	272°10.2	-12°53.0
14	260°27.4	76°42.7	-0°08.2	31°58.5	-18°02.1	223°01.1	13°17.6	287°12.6	-12°53.0
15	275°29.9	91°42.6	-0°09.2	46°59.2	-18°02.6	238°03.9	13°17.5	302°15.1	-12°53.0
16	290°32.4	106°42.5	-0°10.2	61°59.9	-18°03.1	253°06.6	13°17.4	317°17.5	-12°53.0
17	305°34.8	121°42.3	-0°11.1	77°00.6	-18°03.5	268°09.4	13°17.3	332°19.9	-12°52.9
18	320°37.3	136°42.2	-0°12.1	92°01.3	-18°04.0	283°12.2	13°17.2	347°22.4	-12°52.9
19	335°39.8	151°42.1	-0°13.0	107°02.0	-18°04.5	298°15.0	13°17.1	2°24.8	-12°52.9
20	350°42.2	166°41.9	-0°14.0	122°02.7	-18°05.0	313°17.8	13°17.0	17°27.3	-12°52.9
21	5°44.7	181°41.8	-0°14.9	137°03.3	-18°05.5	328°20.6	13°16.9	32°29.7	-12°52.9
22	20°47.2	196°41.7	-0°15.9	152°04.0	-18°06.0	343°23.4	13°16.8	47°32.1	-12°52.9
23	35°49.6	211°41.6	-0°16.8	167°04.7	-18°06.4	358°26.2	13°16.7	62°34.6	-12°52.8
Mer.pass.:20:37		v-0.1 d-0.9 m-4.1		v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.8		v2.4 d0.0 m0.8	

	SHA	Dec
Alpheratz	357° 35.6	29° 13.5
Ankaa	353° 07.8	-42° 10.7
Schedar	349° 31.8	56° 40.3
Diphda	348° 47.9	-17° 51.4
Achernar	335° 20.4	-57° 07.0
Hamal	327° 52.0	23° 34.6
Polaris	314° 02.5	89° 21.9
Akamar	315° 12.1	-40° 12.5
Menkar	314° 06.9	4° 11.
Mirfak	308° 29.2	49° 56.8
Aldebaran	290° 40.5	16° 33.5
Rigel	281° 04.5	-8° 10.3
Capella	280° 23.0	46° 01.3
Bellatrix	278° 23.7	6° 22.4
Elnath	278° 02.8	28° 37.7
Alnilam	275° 38.5	-1° 11.1
Betelgeuse	270° 52.9	7° 24.8
Canopus	263° 52.5	-52° 42.2
Sirius	258° 26.8	-16° 44.5
Adara	255° 06.4	-29° 00.0
Procyon	244° 51.6	5° 10.1
Pollux	243° 18.3	27° 58.1
Avior	234° 15.0	-59° 34.7
Suhail	222° 47.0	-43° 31.4
Miaplacidus	221° 38.5	-69° 48.5
Alphard	217° 48.7	-8° 45.5
Regulus	207° 35.5	11° 51.1
Dubhe	193° 26.5	61° 37.2
Deneb	182° 42.1	14° 26.4
Genah	175° 44.8	-17° 40.3
Acrux	173° 01.8	-63° 13.6
Gacrux	171° 53.2	-57° 14.5
Alioth	166° 14.3	55° 49.7
Spica	158° 23.6	-11° 17.0
Alcaid	152° 53.2	49° 11.6
Hadar	148° 38.1	-60° 29.1
Menkent	147° 59.2	-36° 29.1
Arcturus	145° 49.0	19° 03.9
Rigel Kent.	139° 42.4	-60° 55.9
Zubenelg.	136° 57.5	-16° 08.3
Kochab	137° 20.9	74° 03.4
Alphecca	126° 05.0	26° 38.2
Antares	112° 17.4	-26° 29.0
Atria	107° 13.0	-69° 04.3
Sabik	102° 04.2	-15° 45.2
Shaula	96° 12.1	-37° 07.3
Rasalhague	95° 59.8	12° 32.7
Etamin	90° 43.1	51° 29.3
Kaus Aust.	83° 34.1	-34° 22.5
Vega	80° 34.2	38° 48.5
Nunki	75° 49.2	-26° 16.1
Altair	62° 01.1	8° 55.9
Peacock	53° 07.4	-56° 39.7
Deneb	49° 26.6	45° 22.1
Enif	33° 39.8	9° 59.1
Alnair	27° 34.1	-46° 50.9
Fomalhaut	15° 15.5	-29° 29.9
Scheat	13° 46.1	28° 12.9
Markab	13° 30.8	15° 20.0

2023/11/	SHA	Mer.pass
Venus	178° 55.2	08:53
Mars	133° 20.4	11:54
Jupiter	322° 13.4	23:15
Saturn	26° 46.6	18:58

2023/11/	SHA	Mer.pass
Venus	177°53.4	08:53
Mars	132°38.2	11:53
Jupiter	322°21.2	23:11
Saturn	26°46.2	18:54

2023/11/	SHA	Mer.pass
Venus	176°51.5	08:53
Mars	131°55.8	11:52
Jupiter	322°29.1	23:06
Saturn	26°45.6	18:50

Horizontal parallax	
Venus:	0.2
Mars:	0.1

h		Sun		Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	184°03.8	-16°43.0	230°38.1	16.9	3°57.3	-14.1	54.5
1	199°03.8	-16°43.7	245°14.0	16.9	3°43.1	-14.1	54.6
2	214°03.7	-16°44.4	259°49.9	16.9	3°29.0	-14.2	54.6
3	229°03.7	-16°45.1	274°25.8	16.9	3°14.8	-14.2	54.6
4	244°03.6	-16°45.9	289°01.6	16.9	3°00.6	-14.2	54.6
5	259°03.6	-16°46.6	303°37.5	16.9	2°46.4	-14.2	54.6
6	274°03.5	-16°47.3	318°13.3	16.9	2°32.1	-14.2	54.6
7	289°03.5	-16°48.0	332°49.2	16.8	2°17.9	-14.3	54.6
8	304°03.4	-16°48.7	347°25.0	16.8	2°03.6	-14.3	54.7
9	319°03.4	-16°49.4	2°00.9	16.8	1°49.3	-14.3	54.7
10	334°03.3	-16°50.2	16°36.7	16.8	1°35.0	-14.3	54.7
11	349°03.3	-16°50.9	31°12.5	16.8	1°20.7	-14.3	54.7
12	4°03.2	-16°51.6	45°48.3	16.8	1°06.4	-14.3	54.7
13	19°03.2	-16°52.3	60°24.1	16.8	0°52.0	-14.4	54.7
14	34°03.1	-16°53.0	74°59.9	16.8	0°37.7	-14.4	54.8
15	49°03.1	-16°53.7	89°35.6	16.7	0°23.3	-14.4	54.8
16	64°03.0	-16°54.4	104°11.4	16.7	0°08.9	-14.4	54.8
17	79°03.0	-16°55.2	118°47.1	16.7	-0°05.5	-14.4	54.8
18	94°02.9	-16°55.9	133°22.8	16.7	-0°19.9	-14.4	54.8
19	109°02.8	-16°56.6	147°58.5	16.7	-0°34.3	-14.4	54.8
20	124°02.8	-16°57.3	162°34.1	16.6	-0°48.7	-14.4	54.9
21	139°02.7	-16°58.0	177°09.8	16.6	-1°03.1	-14.4	54.9
22	154°02.7	-16°58.7	191°45.4	16.6	-1°17.6	-14.4	54.9
23	169°02.6	-16°59.4	206°21.0	16.6	-1°32.0	-14.4	54.9
SD.=16.1		d=-0.7	S.D.=14.9				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	184°02.6	-17°00.1	220°56.5	16.6	-1°46.5	-14.4	54.9
1	199°02.5	-17°00.8	235°32.1	16.5	-2°00.9	-14.4	54.9
2	214°02.5	-17°01.5	250°07.6	16.5	-2°15.4	-14.5	55.0
3	229°02.4	-17°02.3	264°43.1	16.5	-2°29.8	-14.5	55.0
4	244°02.3	-17°03.0	279°18.5	16.4	-2°44.3	-14.5	55.0
5	259°02.3	-17°03.7	293°53.9	16.4	-2°58.7	-14.5	55.0
6	274°02.2	-17°04.4	308°29.3	16.4	-3°13.2	-14.5	55.0
7	289°02.2	-17°05.1	323°04.7	16.3	-3°27.6	-14.5	55.1
8	304°02.1	-17°05.8	337°40.0	16.3	-3°42.1	-14.5	55.1
9	319°02.1	-17°06.5	352°15.3	16.3	-3°56.5	-14.4	55.1
10	334°02.0	-17°07.2	6°50.5	16.2	-4°11.0	-14.4	55.1
11	349°01.9	-17°07.9	21°25.7	16.2	-4°25.4	-14.4	55.1
12	4°01.9	-17°08.6	36°00.9	16.1	-4°39.8	-14.4	55.2
13	19°01.8	-17°09.3	50°36.0	16.1	-4°54.3	-14.4	55.2
14	34°01.8	-17°10.0	65°11.1	16.1	-5°08.7	-14.4	55.2
15	49°01.7	-17°10.7	79°46.1	16.0	-5°23.1	-14.4	55.2
16	64°01.6	-17°11.4	94°21.1	16.0	-5°37.5	-14.4	55.2
17	79°01.6	-17°12.1	108°56.1	15.9	-5°51.9	-14.4	55.3
18	94°01.5	-17°12.8	123°31.0	15.9	-6°06.3	-14.4	55.3
19	109°01.4	-17°13.5	138°05.8	15.8	-6°20.7	-14.4	55.3
20	124°01.4	-17°14.2	152°40.6	15.8	-6°35.0	-14.4	55.3
21	139°01.3	-17°14.9	167°15.4	15.7	-6°49.4	-14.3	55.3
22	154°01.2	-17°15.6	181°50.1	15.7	-7°03.7	-14.3	55.4
23	169°01.2	-17°16.3	196°24.7	15.6	-7°18.0	-14.3	55.4
SD.=16.1		d=-0.7	S.D.=15.0				
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	184°01.1	-17°17.0	210°59.3	15.6	-7°32.3	-14.3	55.4
1	199°01.1	-17°17.7	225°33.9	15.5	-7°46.6	-14.3	55.4
2	214°01.0	-17°18.4	240°08.4	15.5	-8°00.9	-14.3	55.4
3	229°00.9	-17°19.1	254°42.8	15.4	-8°15.1	-14.2	55.5
4	244°00.9	-17°19.8	269°17.2	15.3	-8°29.4	-14.2	55.5
5	259°00.8	-17°20.5	283°51.5	15.3	-8°43.6	-14.2	55.5
6	274°00.7	-17°21.2	298°25.8	15.2	-8°57.7	-14.2	55.5
7	289°00.7	-17°21.8	312°59.9	15.2	-9°11.9	-14.1	55.6
8	304°00.6	-17°22.5	327°34.1	15.1	-9°26.0	-14.1	55.6
9	319°00.5	-17°23.2	342°08.2	15.0	-9°40.1	-14.1	55.6
10	334°00.4	-17°23.9	356°42.2	15.0	-9°54.2	-14.1	55.6
11	349°00.4	-17°24.6	11°16.1	14.9	-10°08.3	-14.0	55.6
12	4°00.3	-17°25.3	25°50.0	14.8	-10°22.3	-14.0	55.7
13	19°00.2	-17°26.0	40°23.8	14.8	-10°36.3	-14.0	55.7
14	34°00.2	-17°26.7	54°57.5	14.7	-10°50.3	-13.9	55.7
15	49°00.1	-17°27.4	69°31.2	14.6	-11°04.2	-13.9	55.7
16	64°00.0	-17°28.1	84°04.8	14.6	-11°18.1	-13.9	55.8
17	78°60.0	-17°28.7	98°38.3	14.5	-11°31.9	-13.8	55.8
18	93°59.9	-17°29.4	113°11.8	14.4	-11°45.8	-13.8	55.8
19	108°59.8	-17°30.1	127°45.1	14.3	-11°59.5	-13.8	55.8
20	123°59.7	-17°30.8	142°18.4	14.3	-12°13.3	-13.7	55.8
21	138°59.7	-17°31.5	156°51.7	14.2	-12°27.0	-13.7	55.9
22	153°59.6	-17°32.2	171°24.8	14.1	-12°40.7	-13.6	55.9
23	168°59.5	-17°32.9	185°57.9	14.0	-12°54.3	-13.6	55.9
SD.=16.2		d=-0.7	S.D.=15.1				

Twilight		Sunrise		Sunset		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	06:40	08:09	09:60	13:27	15:17	16:46	
70	06:32	07:51	09:17	14:10	15:36	16:54	
68	06:25	07:36	08:48	14:38	15:51	17:01	
66	06:20	07:24	08:27	14:60	16:03	17:07	
64	06:15	07:13	08:10	15:17	16:13	17:12	
62	06:10	07:05	07:56	15:31	16:22	17:17	
60	06:06	06:57	07:44	15:42	16:30	17:21	
58	06:02	06:50	07:34	15:53	16:37	17:24	
56	05:59	06:44	07:25	16:02	16:43	17:28	
54	05:56	06:39	07:17	16:10	16:48	17:31	
52	05:53	06:34	07:10	16:17	16:53	17:34	
50	05:50	06:29	07:04	16:23	16:58	17:37	
45	05:44	06:19	06:50	16:37	17:08	17:43	
40	05:38	06:10	06:39	16:48	17:17	17:49	
35	05:32	06:03	06:29	16:58	17:25	17:55	
30	05:27	05:56	06:21	17:07	17:32	18:01	
20	05:16	05:43	06:06	17:22	17:45	18:11	
10	05:05	05:31	05:53	17:35	17:57	18:22	
0	04:54	05:19	05:40	17:47	18:09	18:34	
-10	04:40	05:06	05:28	17:60	18:22	18:48	
-20	04:24	04:51	05:14	18:14	18:37	19:04	
-30	04:02	04:33	04:59	18:29	18:55	19:26	
-35	03:49	04:22	04:50	18:38	19:06	19:39	
-40	03:33	04:10	04:39	18:49	19:19	19:56	
-45	03:12	03:54	04:27	19:01	19:35	20:17	
-50	02:45	03:34	04:12	19:17	19:55	20:44	
-52	02:31	03:25	04:05	19:24	20:04	20:59	
-54	02:15	03:14	03:57	19:32	20:15	21:16	
-56	01:54	03:02	03:49	19:41	20:28	21:37	
-58	01:27	02:47	03:39	19:51	20:43	22:05	
-60	00:45	02:30	03:27	20:02	21:01	22:51	

Moonrise		Moonset	
Lat.	Thu	Fri	Sat
72	01:59	03:58	06:04
70	02:04	03:54	05:50
68	02:08	03:50	05:38
66	02:11	03:48	05:28
64	02:14	03:45	05:20
62	02:16	03:43	05:13
60	02:18	03:42	05:08
58	02:20	03:40	05:02
56	02:22	03:39	04:58
54	02:23	03:37	04:54
52	02:25	03:36	04:50
50	02:26	03:35	04:47
45	02:28	03:33	04:40
40	02:31	03:31	04:34
35	02:33	03:30	04:29
30	02:34	03:28	04:24
20	02:37	03:26	04:16
10	02:40	03:24	04:10
0	02:42	03:22	04:03
-10	02:45	03:20	03:57
-20	02:47	03:18	03:51
-30	02:50	03:16	03:43
-35	02:52	03:15	03:39
-40	02:54	03:13	03:34
-45	02:56	03:12	03:29
-50	02:58	03:10	03:22
-52	02:60	03:09	03:19
-54	03:01	03:08	03:16
-56	03:02	03:07	03:12
-58	03:04	03:06	03:08
-60	03:06	03:05	03:04

Sun		Moon	
Day	Eqn.of Time 00 ^h	Mer. Pass	Mer.Pass. Upper Lower
9	16:15	16:13	11:43
10	16:10	16:08	11:43
11	16:05	16:01	11:43

Moon		Age	
Mer.Pass.	Upper Lower	Upper Lower	Age
08:51	21:11	26(15%)	
09:31	21:52	27(8%)	
10:13	22:35	28(4%)	

November 12, 13 ,14 (Sun., Mon., Tue.)

Aries			Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		SHA	Dec	
0	50°52.1	226°41.4	-0°17.8	182°05.4	-18°06.9	13°28.9	13°16.6	77°37.0	-12°52.8	Alpheratz	357°35.6	29°13.5	
1	65°54.6	241°41.3	-0°18.8	197°06.1	-18°07.4	28°31.7	13°16.5	92°39.4	-12°52.8	Ankaa	353°07.8	-42°10.7	
2	80°57.0	256°41.2	-0°19.7	212°06.8	-18°07.9	43°34.5	13°16.4	107°41.9	-12°52.8	Schedar	349°31.8	56°40.3	
3	95°59.5	271°41.0	-0°20.7	227°07.5	-18°08.4	58°37.3	13°16.3	122°44.3	-12°52.8	Diphda	348°47.9	-17°51.4	
4	111°01.9	286°40.9	-0°21.6	242°08.2	-18°08.9	73°40.1	13°16.2	137°46.7	-12°52.8	Achernar	335°20.4	-57°07.0	
5	126°04.4	301°40.8	-0°22.6	257°08.9	-18°09.3	88°42.9	13°16.1	152°49.2	-12°52.7	Hamal	327°52.0	23°34.6	
6	141°06.9	316°40.7	-0°23.6	272°09.6	-18°09.8	103°45.7	13°16.0	167°51.6	-12°52.7	Polaris	314°02.3	89°21.9	
7	156°09.3	331°40.5	-0°24.5	287°10.2	-18°10.3	118°48.5	13°15.9	182°54.0	-12°52.7	Akamar	315°12.1	-40°12.5	
8	171°11.8	346°40.4	-0°25.5	302°10.9	-18°10.8	133°51.2	13°15.8	197°56.5	-12°52.7	Menkar	314°06.9	4°11.1	
9	186°14.3	1°40.3	-0°26.4	317°11.6	-18°11.3	148°54.0	13°15.7	212°58.9	-12°52.7	Mirfak	308°29.2	49°56.8	
10	201°16.7	16°40.1	-0°27.4	332°12.3	-18°11.8	163°56.8	13°15.6	228°01.3	-12°52.7	Aldebaran	290°40.4	16°33.5	
11	216°19.2	31°40.0	-0°28.4	347°13.0	-18°12.2	178°59.6	13°15.5	243°03.7	-12°52.6	Rigel	281°04.5	-8°10.3	
12	231°21.7	46°39.9	-0°29.3	2°13.7	-18°12.7	194°02.4	13°15.4	258°06.2	-12°52.6	Capella	280°22.9	46°01.3	
13	246°24.1	61°39.7	-0°30.3	17°14.4	-18°13.2	209°05.2	13°15.3	273°08.6	-12°52.6	Bellatrix	278°23.6	6°22.4	
14	261°26.6	76°39.6	-0°31.2	32°15.1	-18°13.7	224°08.0	13°15.2	288°11.0	-12°52.6	Elnath	278°02.8	28°37.7	
15	276°29.0	91°39.5	-0°32.2	47°15.7	-18°14.2	239°10.7	13°15.1	303°13.5	-12°52.6	Alnilam	275°38.5	-1°11.1	
16	291°31.5	106°39.3	-0°33.2	62°16.4	-18°14.6	254°13.5	13°15.0	318°15.9	-12°52.6	Betelgeuse	270°52.9	7°24.8	
17	306°34.0	121°39.2	-0°34.1	77°17.1	-18°15.1	269°16.3	13°14.9	333°18.3	-12°52.5	Canopus	263°52.4	-52°42.2	
18	321°36.4	136°39.1	-0°35.1	92°17.8	-18°15.6	284°19.1	13°14.8	348°20.8	-12°52.5	Sirius	258°26.8	-16°44.6	
19	336°38.9	151°38.9	-0°36.0	107°18.5	-18°16.1	299°21.9	13°14.7	3°23.2	-12°52.5	Adara	255°06.4	-29°00.0	
20	351°41.4	166°38.8	-0°37.0	122°19.2	-18°16.6	314°24.7	13°14.6	18°25.6	-12°52.5	Procyon	244°51.6	5°10.1	
21	6°43.8	181°38.7	-0°38.0	137°19.9	-18°17.0	329°27.4	13°14.5	33°28.1	-12°52.5	Pollux	243°18.2	27°58.1	
22	21°46.3	196°38.5	-0°38.9	152°20.6	-18°17.5	344°30.2	13°14.4	48°30.5	-12°52.5	Avior	234°15.0	-59°34.8	
23	36°48.8	211°38.4	-0°39.9	167°21.2	-18°18.0	359°33.0	13°14.3	63°32.9	-12°52.4	Suhail	222°47.0	-43°31.4	
Mer.pass.:20:33		v-0.1 d-1.0 m-4.1			v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.7		v2.4 d0.0 m0.8		Miaplacidus	221°38.4	-69°48.5
											Alphard	217°48.7	-8°45.5
											Regulus	207°35.5	11°51.1
											Dubhe	193°42.4	61°37.2
											Denebola	182°26.1	14°26.4
											Gienah	175°44.8	-17°40.3
											Acrux	173°01.8	-63°13.6
											Gacrux	171°53.2	-57°14.5
											Alioth	166°14.3	55°49.7
											Spica	158°23.6	-11°17.0
											Alcaid	152°53.2	49°11.6
											Hadar	148°38.1	-60°29.1
											Menkent	147°59.2	-36°29.1
											Arcturus	145°49.0	19°03.8
											Rigel Kent.	139°42.4	-60°55.9
											Zubenelg.	136°57.5	-16°08.3
											Kochab	137°20.9	74°03.4
											Alphecca	126°05.0	26°38.2
											Antares	112°17.4	-26°29.0
											Atria	107°13.1	-69°04.3
											Sabik	102°04.2	-15°45.2
											Shaula	96°12.1	-37°07.3
											Rasalhague	95°59.8	12°32.7
											Etamin	90°43.1	51°29.3
											Kaus Aust.	83°34.1	-34°22.4
											Vega	80°34.2	38°48.5
											Nunki	75°49.2	-26°16.1
											Altair	62°01.1	8°55.9
											Peacock	53°07.4	-56°39.7
											Deneb	49°26.6	45°22.1
											Enif	33°39.8	9°59.1
											Alnair	27°34.1	-46°50.9
											Fomalhaut	15°15.5	-29°29.9
											Scheat	13°46.1	28°12.9
											Markab	13°30.8	15°20.1
											2023/11/	SHA	Mer.pass
											Venus	175°49.3	08:53
											Mars	131°13.3	11:51
											Jupiter	322°36.9	23:02
											Saturn	26°44.9	18:46
											2023/11/	SHA	Mer.pass
											Venus	174°47.0	08:54
											Mars	130°30.7	11:50
											Jupiter	322°44.6	22:57
											Saturn	26°44.1	18:43
											2023/11/	SHA	Mer.pass
											Venus	173°44.5	08:54
											Mars	129°47.9	11:49
											Jupiter	322°52.2	22:53
											Saturn	26°43.2	18:39
											Horizontal paralax		
											Venus:	0.2	
											Mars:	0.1	
Mer.pass.:20:25		v-0.1 d-1.0 m-4.1			v0.7 d-0.5 m1.5		v2.8 d-0.1 m-2.7		v2.4 d0.0 m0.8				

Sun							Moon							
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	183°59.4	-17°33.5	200°30.9	14.0	-13°07.9	-13.6	55.9	72	06:51	08:23	10:30	12:58	15:04	16:36
1	198°59.4	-17°34.2	215°03.8	13.9	-13°21.4	-13.5	56.0	70	06:42	08:02	09:35	13:53	15:25	16:45
2	213°59.3	-17°34.9	229°36.6	13.8	-13°34.9	-13.5	56.0	68	06:34	07:46	09:02	14:25	15:41	16:53
3	228°59.2	-17°35.6	244°09.4	13.7	-13°48.4	-13.4	56.0	66	06:28	07:33	08:38	14:49	15:55	16:60
4	243°59.1	-17°36.3	258°42.1	13.6	-14°01.8	-13.4	56.0	64	06:22	07:22	08:20	15:08	16:06	17:05
5	258°59.1	-17°37.0	273°14.6	13.5	-14°15.1	-13.3	56.1	62	06:17	07:12	08:05	15:23	16:16	17:11
6	273°59.0	-17°37.6	287°47.1	13.5	-14°28.4	-13.3	56.1	60	06:12	07:04	07:52	15:36	16:24	17:15
7	288°58.9	-17°38.3	302°19.5	13.4	-14°41.7	-13.2	56.1	58	06:08	06:56	07:41	15:47	16:31	17:19
8	303°58.8	-17°39.0	316°51.9	13.3	-14°54.9	-13.2	56.1	56	06:04	06:50	07:32	15:56	16:38	17:23
9	318°58.8	-17°39.7	331°24.1	13.2	-15°08.0	-13.1	56.1	54	06:01	06:44	07:23	16:05	16:44	17:27
10	333°58.7	-17°40.4	345°56.2	13.1	-15°21.1	-13.1	56.2	52	05:58	06:39	07:16	16:12	16:49	17:30
11	348°58.6	-17°41.0	0°28.3	13.0	-15°34.1	-13.0	56.2	50	05:55	06:34	07:09	16:19	16:54	17:33
12	3°58.5	-17°41.7	15°00.3	12.9	-15°47.1	-12.9	56.2	45	05:47	06:23	06:54	16:34	17:05	17:41
13	18°58.5	-17°42.4	29°32.1	12.8	-15°60.0	-12.9	56.2	40	05:41	06:14	06:42	16:46	17:14	17:47
14	33°58.4	-17°43.1	44°03.9	12.7	-16°12.8	-12.8	56.3	35	05:35	06:05	06:32	16:56	17:23	17:53
15	48°58.3	-17°43.7	58°35.6	12.6	-16°25.6	-12.8	56.3	30	05:29	05:58	06:23	17:05	17:30	17:59
16	63°58.2	-17°44.4	73°07.2	12.5	-16°38.3	-12.7	56.3	20	05:18	05:44	06:07	17:21	17:44	18:10
17	78°58.1	-17°45.1	87°38.7	12.5	-16°51.0	-12.6	56.3	10	05:06	05:32	05:54	17:35	17:57	18:22
18	93°58.1	-17°45.8	102°10.1	12.4	-17°03.6	-12.6	56.4	0	04:54	05:19	05:41	17:48	18:10	18:35
19	108°58.0	-17°46.4	116°41.4	12.3	-17°16.1	-12.5	56.4	-10	04:39	05:05	05:28	18:01	18:23	18:49
20	123°57.9	-17°47.1	131°12.6	12.2	-17°28.5	-12.4	56.4	-20	04:22	04:50	05:13	18:15	18:39	19:07
21	138°57.8	-17°47.8	145°43.7	12.1	-17°40.9	-12.3	56.4	-30	04:00	04:31	04:57	18:32	18:58	19:29
22	153°57.7	-17°48.5	160°14.8	12.0	-17°53.2	-12.3	56.5	-35	03:46	04:20	04:48	18:41	19:09	19:43
23	168°57.6	-17°49.1	174°45.7	11.9	-18°05.4	-12.2	56.5	-40	03:29	04:06	04:37	18:52	19:23	20:00
SD.=16.2 d=-0.7							S.D.=15.3	-45	03:08	03:50	04:24	19:06	19:39	20:22
								-50	02:39	03:29	04:08	19:22	20:00	20:51
								-52	02:24	03:19	04:00	19:29	20:11	21:07
								-54	02:06	03:08	03:52	19:38	20:22	21:25
								-56	01:43	02:55	03:43	19:47	20:36	21:48
								-58	01:12	02:39	03:32	19:58	20:52	22:21
								-60	00:10	02:20	03:20	20:10	21:11	--
								Lat.	Moonrise			Moonset		
								72	08:40	--	--	12:51	--	--
								70	08:03	--	--	13:31	--	--
								68	07:37	10:11	--	13:58	13:04	--
								66	07:18	09:26	--	14:19	13:51	--
								64	07:02	08:56	11:14	14:36	14:21	13:53
								62	06:49	08:34	10:29	14:50	14:44	14:38
								60	06:38	08:16	10:00	15:02	15:03	15:08
								58	06:29	08:01	09:38	15:12	15:19	15:31
								56	06:21	07:49	09:20	15:21	15:32	15:49
								54	06:14	07:38	09:05	15:29	15:44	16:05
								52	06:07	07:28	08:51	15:36	15:54	16:19
								50	06:01	07:19	08:40	15:43	16:03	16:31
								45	05:49	07:01	08:16	15:57	16:23	16:55
								40	05:39	06:47	07:57	16:09	16:39	17:15
								35	05:30	06:34	07:41	16:19	16:52	17:32
								30	05:22	06:23	07:28	16:28	17:04	17:46
								20	05:09	06:05	07:04	16:43	17:24	18:11
								10	04:58	05:49	06:45	16:57	17:42	18:32
								0	04:47	05:34	06:26	17:09	17:59	18:52
								-10	04:37	05:20	06:08	17:22	18:15	19:12
								-20	04:25	05:04	05:48	17:36	18:33	19:34
								-30	04:13	04:46	05:26	17:51	18:54	19:59
								-35	04:06	04:36	05:12	18:00	19:06	20:14
								-40	03:57	04:24	04:57	18:11	19:20	20:31
								-45	03:48	04:11	04:40	18:23	19:37	20:51
								-50	03:36	03:54	04:18	18:38	19:58	21:17
								-52	03:31	03:46	04:07	18:45	20:08	21:30
								-54	03:25	03:38	03:55	18:53	20:19	21:45
								-56	03:19	03:28	03:42	19:02	20:32	22:02
								-58	03:12	03:17	03:27	19:12	20:46	22:23
								-60	03:04	03:05	03:08	19:24	21:04	22:49
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								12	15:58	15:54	11:44	10:58	23:21	29(1%)
								13	15:50	15:46	11:44	11:46	00:12	0(0%)
								14	15:42	15:37	11:44	12:39	00:12	1(1%)
SD.=16.2 d=-0.7							S.D.=15.6							

November 15, 16 ,17 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	53°49.5	226°31.3	-1°27.5	182°54.5	-18°41.1	16°49.3	13°09.6	80°31.8	-12°51.5	Alpheratz	357°35.6	29°13.5					
1	68°52.0	241°31.1	-1°28.5	197°55.2	-18°41.6	31°52.1	13°09.5	95°34.2	-12°51.5	Ankaa	353°07.8	-42°10.7					
2	83°54.4	256°31.0	-1°29.4	212°55.8	-18°42.0	46°54.9	13°09.4	110°36.6	-12°51.4	Schedar	349°31.8	56°40.3					
3	98°56.9	271°30.8	-1°30.4	227°56.5	-18°42.5	61°57.7	13°09.3	125°39.0	-12°51.4	Diphda	348°47.9	-17°51.4					
4	113°59.4	286°30.7	-1°31.4	242°57.2	-18°43.0	77°00.4	13°09.2	140°41.5	-12°51.4	Achernar	335°20.4	-57°07.1					
5	129°01.8	301°30.5	-1°32.4	257°57.9	-18°43.4	92°03.2	13°09.1	155°43.9	-12°51.4	Hamal	327°52.0	23°34.6					
6	144°04.3	316°30.4	-1°33.4	272°58.5	-18°43.9	107°06.0	13°09.0	170°46.3	-12°51.3	Polaris	314°01.9	89°21.9					
7	159°06.8	331°30.2	-1°34.3	287°59.2	-18°44.4	122°08.8	13°08.9	185°48.7	-12°51.3	Akamar	315°12.1	-40°12.5					
8	174°09.2	346°30.0	-1°35.3	302°59.9	-18°44.8	137°11.6	13°08.8	200°51.1	-12°51.3	Menkar	314°06.8	4°11.1					
9	189°11.7	1°29.9	-1°36.3	318°00.5	-18°45.3	152°14.3	13°08.7	215°53.6	-12°51.3	Mirfak	308°29.2	49°56.8					
10	204°14.1	16°29.7	-1°37.3	333°01.2	-18°45.7	167°17.1	13°08.6	230°56.0	-12°51.3	Aldebaran	290°40.4	16°33.5					
11	219°16.6	31°29.6	-1°38.3	348°01.9	-18°46.2	182°19.9	13°08.5	245°58.4	-12°51.2	Rigel	281°04.5	-8°10.3					
12	234°19.1	46°29.4	-1°39.2	3°02.5	-18°46.7	197°22.7	13°08.4	261°00.8	-12°51.2	Capella	280°22.9	46°01.3					
13	249°21.5	61°29.3	-1°40.2	18°03.2	-18°47.1	212°25.4	13°08.3	276°03.2	-12°51.2	Bellatrix	278°23.6	6°22.4					
14	264°24.0	76°29.1	-1°41.2	33°03.9	-18°47.6	227°28.2	13°08.2	291°05.6	-12°51.2	Elnath	278°02.8	28°37.7					
15	279°26.5	91°28.9	-1°42.2	48°04.6	-18°48.1	242°31.0	13°08.2	306°08.1	-12°51.2	Alnilam	275°38.4	-1°11.1					
16	294°28.9	106°28.8	-1°43.2	63°05.2	-18°48.5	257°33.8	13°08.1	321°10.5	-12°51.1	Betelgeuse	270°52.9	7°24.8					
17	309°31.4	121°28.6	-1°44.1	78°05.9	-18°49.0	272°36.6	13°08.0	336°12.9	-12°51.1	Canopus	263°52.4	-52°42.2					
18	324°33.9	136°28.5	-1°45.1	93°06.6	-18°49.4	287°39.3	13°07.9	351°15.3	-12°51.1	Sirius	258°26.8	-16°44.6					
19	339°36.3	151°28.3	-1°46.1	108°07.2	-18°49.9	302°42.1	13°07.8	6°17.7	-12°51.1	Adara	255°06.4	-29°00.0					
20	354°38.8	166°28.1	-1°47.1	123°07.9	-18°50.4	317°44.9	13°07.7	21°20.2	-12°51.0	Procyon	244°51.6	5°10.1					
21	9°41.3	181°28.0	-1°48.1	138°08.6	-18°50.8	332°47.7	13°07.6	36°22.6	-12°51.0	Pollux	243°18.2	27°58.1					
22	24°43.7	196°27.8	-1°49.1	153°09.2	-18°51.3	347°50.4	13°07.5	51°25.0	-12°51.0	Avior	234°14.9	-59°34.8					
23	39°46.2	211°27.7	-1°50.0	168°09.9	-18°51.7	2°53.2	13°07.4	66°27.4	-12°51.0	Suhail	222°47.0	-43°31.4					
Mer.pass.:20:21			v-0.2 d-1.0 m-4.1			v0.7 d-0.5 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8					

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	54°48.6	226°27.5	-1°51.0	183°10.6	-18°52.2	17°56.0	13°07.3	81°29.8	-12°50.9					
1	69°51.1	241°27.3	-1°52.0	198°11.2	-18°52.7	32°58.8	13°07.2	96°32.2	-12°50.9					
2	84°53.6	256°27.2	-1°53.0	213°11.9	-18°53.1	48°01.5	13°07.1	111°34.7	-12°50.9					
3	99°56.0	271°27.0	-1°54.0	228°12.6	-18°53.6	63°04.3	13°07.0	126°37.1	-12°50.9					
4	114°58.5	286°26.9	-1°55.0	243°13.2	-18°54.0	78°07.1	13°06.9	141°39.5	-12°50.9					
5	130°01.0	301°26.7	-1°55.9	258°13.9	-18°54.5	93°09.9	13°06.8	156°41.9	-12°50.8					
6	145°03.4	316°26.5	-1°56.9	273°14.6	-18°54.9	108°12.6	13°06.7	171°44.3	-12°50.8					
7	160°05.9	331°26.4	-1°57.9	288°15.2	-18°55.4	123°15.4	13°06.6	186°46.7	-12°50.8					
8	175°08.4	346°26.2	-1°58.9	303°15.9	-18°55.9	138°18.2	13°06.5	201°49.2	-12°50.8					
9	190°10.8	1°26.0	-1°59.9	318°16.6	-18°56.3	153°21.0	13°06.5	216°51.6	-12°50.7					
10	205°13.3	16°25.9	-2°00.9	333°17.2	-18°56.8	168°23.7	13°06.4	231°54.0	-12°50.7					
11	220°15.8	31°25.7	-2°01.9	348°17.9	-18°57.2	183°26.5	13°06.3	246°56.4	-12°50.7					
12	235°18.2	46°25.6	-2°02.8	3°18.5	-18°57.7	198°29.3	13°06.2	261°58.8	-12°50.7					
13	250°20.7	61°25.4	-2°03.8	18°19.2	-18°58.1	213°32.1	13°06.1	277°01.2	-12°50.6					
14	265°23.1	76°25.2	-2°04.8	33°19.9	-18°58.6	228°34.8	13°06.0	292°03.7	-12°50.6					
15	280°25.6	91°25.1	-2°05.8	48°20.5	-18°59.1	243°37.6	13°05.9	307°06.1	-12°50.6					
16	295°28.1	106°24.9	-2°06.8	63°21.2	-18°59.5	258°40.4	13°05.8	322°08.5	-12°50.6					
17	310°30.5	121°24.7	-2°07.8	78°21.9	-18°60.0	273°43.2	13°05.7	337°10.9	-12°50.6					
18	325°33.0	136°24.6	-2°08.8	93°22.5	-19°00.4	288°45.9	13°05.6	352°13.3	-12°50.5					
19	340°35.5	151°24.4	-2°09.8	108°23.2	-19°00.9	303°48.7	13°05.5	7°15.7	-12°50.5					
20	355°37.9	166°24.2	-2°10.7	123°23.8	-19°01.3	318°51.5	13°05.4	22°18.1	-12°50.5					
21	10°40.4	181°24.1	-2°11.7	138°24.5	-19°01.8	333°54.2	13°05.3	37°20.6	-12°50.5					
22	25°42.9	196°23.9	-2°12.7	153°25.2	-19°02.2	348°57.0	13°05.2	52°23.0	-12°50.4					
23	40°45.3	211°23.7	-2°13.7	168°25.8	-19°02.7	3°59.8	13°05.1	67°25.4	-12°50.4					
Mer.pass.:20:17			v-0.2 d-1.0 m-4.1			v0.7 d-0.5 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8		

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	55°47.8	226°23.5	-2°14.7	183°26.5	-19°03.1	19°02.6	13°05.0	82°27.8	-12°50.4					
1	70°50.3	241°23.4	-2°15.7	198°27.2	-19°03.6	34°05.3	13°05.0	97°30.2	-12°50.4					
2	85°52.7	256°23.2	-2°16.7	213°27.8	-19°04.0	49°08.1	13°04.9	112°32.6	-12°50.3					
3	100°55.2	271°23.0	-2°17.7	228°28.5	-19°04.5	64°10.9	13°04.8	127°35.0	-12°50.3					
4	115°57.6	286°22.9	-2°18.6	243°29.1	-19°04.9	79°13.7	13°04.7	142°37.4	-12°50.3					
5	131°00.1	301°22.7	-2°19.6	258°29.8	-19°05.4	94°16.4	13°04.6	157°39.9	-12°50.3					
6	146°02.6	316°22.5	-2°20.6	273°30.4	-19°05.9	109°19.2	13°04.5	172°42.3	-12°50.2					
7	161°05.0	331°22.4	-2°21.6	288°31.1	-19°06.3	124°22.0	13°04.4	187°44.7	-12°50.2					
8	176°07.5	346°22.2	-2°22.6	303°31.8	-19°06.8	139°24.7	13°04.3	202°47.1	-12°50.2					
9	191°10.0	1°22.0	-2°23.6	318°32.4	-19°07.2	154°27.5	13°04.2	217°49.5	-12°50.2					
10	206°12.4	16°21.8	-2°24.6	333°33.1	-19°07.7	169°30.3	13°04.1	232°51.9	-12°50.1					
11	221°14.9	31°21.7	-2°25.6	348°33.7	-19°08.1	184°33.1	13°04.0	247°54.3	-12°50.1					
12	236°17.4	46°21.5	-2°26.6	3°34.4	-19°08.6	199°35.8	13°03.9	262°56.7	-12°50.1					
13	251°19.8	61°21.3	-2°27.6	18°35.1	-19°09.0	214°38.6	13°03.8	277°59.1	-12°50.1					
14	266°22.3	76°21.1	-2°28.6	33°35.7	-19°09.5	229°41.4	13°03.7	293°01.6	-12°50.0					
15	281°24.8	91°21.0	-2°29.5	48°36.4	-19°09.9	244°44.1	13°03.7	308°04.0	-12°50.0					
16	296°27.2	106°20.8	-2°30.5	63°37.0	-19°10.3	259°46.9	13°03.6	323°06.4	-12°50.0					
17	311°29.7	121°20.6	-2°31.5	78°37.7	-19°10.8	274°49.7	13°03.5	338°08.8	-12°50.0					
18	326°32.1	136°20.4	-2°32.5	93°38.3	-19°11.2	289°52.4	13°03.4	353°11.2	-12°49.9					
19	341°34.6	151°20.3	-2°33.5	108°39.0	-19°11.7	304°55.2	13°03.3	8°13.6	-12°49.9					
20	356°37.1	166°20.1	-2°34.5	123°39.7	-19°12.1	319°58.0	13°03.2	23°16.0	-12°49.9					
21	11°39.5	181°19.9	-2°35.5	138°40.3	-19°12.6	335°00.7	13°03.1	38°18.4	-12°49.9					
22	26°42.0	196°19.7	-2°36.5	153°41.0	-19°13.0	350°03.5	13°03.0	53°20.8	-12°49.8					
23	41°44.5	211°19.6	-2°37.5	168°41.6	-19°13.5	5°06.3	13°02.9	68°23.2	-12°49.8					
Mer.pass.:20:13			v-0.2 d-1.0 m-4.1			v0.7 d-0.5 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8		

2023/11/	SHA	Mer.pass
Venus	172°41.8	08:54
Mars	129°05.0	11:48
Jupiter	322°59.8	22:48
Saturn	26°42.3	18:35
2023/11/	SHA	Mer.pass
Venus	171°38.9	08:54
Mars	128°21.9	11:47
Jupiter	323°07.3	22:44
Saturn	26°41.2	18:31
2023/11/	SHA	Mer.pass
Venus	170°35.8	08:55
Mars	127°38.7	11:46
Jupiter	323°14.8	22:40
Saturn	26°40.0	18:27
Horizontal parallax		
Venus:	0.2	
Mars:	0.1	

Sun							Moon							
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	183°53.2	-18°21.4	163°51.7	6.8	-26°02.0	-6.6	57.6	72	07:02	08:38	11:19	12:09	14:51	16:26
1	198°53.1	-18°22.0	178°17.4	6.7	-26°08.6	-6.5	57.6	70	06:52	08:14	09:54	13:34	15:14	16:37
2	213°53.0	-18°22.7	192°43.0	6.6	-26°15.0	-6.3	57.6	68	06:43	07:56	09:16	14:12	15:32	16:45
3	228°52.9	-18°23.3	207°08.5	6.5	-26°21.3	-6.2	57.6	66	06:35	07:42	08:50	14:39	15:47	16:53
4	243°52.7	-18°24.0	221°33.9	6.4	-26°27.4	-6.0	57.6	64	06:29	07:30	08:30	14:59	15:59	16:59
5	258°52.6	-18°24.6	235°59.3	6.3	-26°33.3	-5.9	57.7	62	06:23	07:19	08:13	15:15	16:09	17:05
6	273°52.5	-18°25.2	250°24.5	6.2	-26°39.1	-5.7	57.7	60	06:18	07:10	07:60	15:29	16:18	17:10
7	288°52.4	-18°25.9	264°49.7	6.1	-26°44.7	-5.6	57.7	58	06:14	07:03	07:48	15:41	16:26	17:15
8	303°52.3	-18°26.5	279°14.8	6.0	-26°50.2	-5.4	57.7	56	06:10	06:55	07:38	15:51	16:33	17:19
9	318°52.2	-18°27.2	293°39.8	6.0	-26°55.5	-5.2	57.7	54	06:06	06:49	07:29	15:60	16:40	17:23
10	333°52.1	-18°27.8	308°04.7	5.9	-27°00.7	-5.1	57.8	52	06:02	06:43	07:21	16:08	16:45	17:27
11	348°52.0	-18°28.4	322°29.6	5.8	-27°05.7	-4.9	57.8	50	05:59	06:38	07:14	16:15	16:51	17:30
12	3°51.9	-18°29.1	336°54.3	5.7	-27°10.5	-4.7	57.8	45	05:51	06:27	06:58	16:30	17:02	17:38
13	18°51.8	-18°29.7	351°19.0	5.7	-27°15.2	-4.6	57.8	40	05:44	06:17	06:46	16:43	17:12	17:45
14	33°51.7	-18°30.4	5°43.6	5.6	-27°19.6	-4.4	57.8	35	05:38	06:08	06:35	16:54	17:21	17:52
15	48°51.6	-18°31.0	20°08.2	5.5	-27°24.0	-4.2	57.9	30	05:31	06:00	06:26	17:04	17:29	17:58
16	63°51.5	-18°31.6	34°32.7	5.4	-27°28.1	-4.1	57.9	20	05:19	05:46	06:09	17:20	17:43	18:10
17	78°51.4	-18°32.3	48°57.1	5.4	-27°32.1	-3.9	57.9	10	05:07	05:33	05:55	17:35	17:57	18:22
18	93°51.3	-18°32.9	63°21.4	5.3	-27°35.9	-3.7	57.9	0	04:54	05:19	05:41	17:48	18:10	18:36
19	108°51.2	-18°33.5	77°45.7	5.2	-27°39.6	-3.6	57.9	-10	04:39	05:05	05:27	18:02	18:24	18:51
20	123°51.1	-18°34.2	92°09.9	5.2	-27°43.0	-3.4	58.0	-20	04:21	04:49	05:13	18:17	18:41	19:09
21	138°51.0	-18°34.8	106°34.1	5.1	-27°46.3	-3.2	58.0	-30	03:58	04:29	04:56	18:34	19:00	19:32
22	153°50.9	-18°35.4	120°58.1	5.1	-27°49.4	-3.0	58.0	-35	03:44	04:18	04:46	18:44	19:12	19:47
23	168°50.7	-18°36.1	135°22.2	5.0	-27°52.4	-2.9	58.0	-40	03:26	04:03	04:34	18:56	19:27	20:05
SD.=16.2 d=-0.6 S.D.=15.7								-45	03:03	03:46	04:20	19:10	19:44	20:27
								-50	02:33	03:25	04:04	19:27	20:06	20:58
								-52	02:17	03:14	03:56	19:35	20:17	21:15
								-54	01:57	03:02	03:47	19:43	20:29	21:35
								-56	01:32	02:48	03:37	19:54	20:43	22:01
								-58	00:55	02:31	03:26	20:05	21:01	22:40
								-60	-:-	02:10	03:13	20:18	21:22	-:-
								Lat.	Moonrise			Moonset		
								72	-:-	-:-	-:-	-:-	-:-	-:-
								70	-:-	-:-	-:-	-:-	-:-	-:-
								68	-:-	-:-	-:-	-:-	-:-	-:-
								66	-:-	-:-	-:-	-:-	-:-	-:-
								64	-:-	-:-	-:-	-:-	-:-	-:-
								62	12:41	-:-	14:48	14:26	-:-	16:32
								60	11:45	13:10	13:52	15:22	16:02	17:28
								58	11:13	12:31	13:19	15:54	16:42	18:01
								56	10:48	12:03	12:54	16:19	17:10	18:25
								54	10:29	11:41	12:35	16:39	17:31	18:45
								52	10:13	11:24	12:18	16:55	17:49	19:01
								50	09:58	11:08	12:04	17:10	18:04	19:15
								45	09:30	10:38	11:34	17:39	18:35	19:44
								40	09:07	10:14	11:12	18:02	18:59	20:06
								35	08:49	09:54	10:53	18:21	19:19	20:25
								30	08:33	09:37	10:36	18:37	19:36	20:41
								20	08:06	09:09	10:09	19:04	20:04	21:07
								10	07:43	08:44	09:45	19:28	20:28	21:30
								0	07:22	08:22	09:23	19:50	20:51	21:52
								-10	07:01	07:59	09:01	20:12	21:14	22:13
								-20	06:38	07:35	08:37	20:36	21:38	22:36
								-30	06:12	07:07	08:09	21:04	22:06	23:02
								-35	05:57	06:50	07:53	21:20	22:22	23:17
								-40	05:39	06:31	07:34	21:39	22:42	23:35
								-45	05:18	06:07	07:10	22:03	23:05	23:56
								-50	04:51	05:37	06:41	22:32	23:35	-:-
								-52	04:38	05:23	06:26	22:47	23:50	-:-
								-54	04:23	05:05	06:09	23:04	-:-	00:07
								-56	04:05	04:45	05:48	23:25	-:-	00:28
								-58	03:44	04:19	05:23	23:50	-:-	00:54
								-60	03:17	03:43	04:47	-:-	00:26	01:30
								Day	Sun			Moon		
									Eqn.of Time	Mer.		Mer.Pass.	Age	
									00 ^h	12 ^h	Pass	Upper	Lower	
								15	15:33	15:28	11:44	13:36	01:07	2(5%)
								16	15:23	15:17	11:44	14:36	02:05	3(11%)
								17	15:12	15:06	11:44	15:37	03:06	4(19%)
SD.=16.2 d=-0.6 S.D.=15.9														

November 18, 19 ,20 (Sat., Sun., Mon.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	56°46.9	226°19.4	-2°38.5	183°42.3	-19°13.9	20°09.1	13°02.8	83°25.7	-12°49.8	Alpheratz	357°35.6	29°13.5					
1	71°49.4	241°19.2	-2°39.5	198°42.9	-19°14.4	35°11.8	13°02.7	98°28.1	-12°49.8	Ankaa	353°07.8	-42°10.7					
2	86°51.9	256°19.0	-2°40.5	213°43.6	-19°14.8	50°14.6	13°02.6	113°30.5	-12°49.7	Schedar	349°31.8	56°40.3					
3	101°54.3	271°18.9	-2°41.5	228°44.2	-19°15.3	65°17.4	13°02.5	128°32.9	-12°49.7	Diphda	348°47.9	-17°51.4					
4	116°56.8	286°18.7	-2°42.5	243°44.9	-19°15.7	80°20.1	13°02.5	143°35.3	-12°49.7	Achernar	335°20.4	-57°07.1					
5	131°59.3	301°18.5	-2°43.4	258°45.5	-19°16.2	95°22.9	13°02.4	158°37.7	-12°49.7	Hamal	327°52.0	23°34.6					
6	147°01.7	316°18.3	-2°44.4	273°46.2	-19°16.6	110°25.7	13°02.3	173°40.1	-12°49.6	Polaris	314°01.8	89°21.9					
7	162°04.2	331°18.1	-2°45.4	288°46.8	-19°17.0	125°28.4	13°02.2	188°42.5	-12°49.6	Akamar	315°12.1	-40°12.5					
8	177°06.6	346°18.0	-2°46.4	303°47.5	-19°17.5	140°31.2	13°02.1	203°44.9	-12°49.6	Menkar	314°06.8	4°11.1					
9	192°09.1	1°17.8	-2°47.4	318°48.2	-19°17.9	155°34.0	13°02.0	218°47.3	-12°49.6	Mirfak	308°29.1	49°56.8					
10	207°11.6	16°17.6	-2°48.4	333°48.8	-19°18.4	170°36.7	13°01.9	233°49.7	-12°49.5	Aldebaran	290°40.4	16°33.5					
11	222°14.0	31°17.4	-2°49.4	348°49.5	-19°18.8	185°39.5	13°01.8	248°52.1	-12°49.5	Rigel	281°04.5	-8°10.3					
12	237°16.5	46°17.2	-2°50.4	3°50.1	-19°19.3	200°42.3	13°01.7	263°54.5	-12°49.5	Capella	280°22.9	46°01.3					
13	252°19.0	61°17.1	-2°51.4	18°50.8	-19°19.7	215°45.0	13°01.6	278°57.0	-12°49.4	Bellatrix	278°23.6	6°22.3					
14	267°21.4	76°16.9	-2°52.4	33°51.4	-19°20.1	230°47.8	13°01.5	293°59.4	-12°49.4	Elnath	278°02.7	28°37.7					
15	282°23.9	91°16.7	-2°53.4	48°52.1	-19°20.6	245°50.6	13°01.4	309°01.8	-12°49.4	Alnilam	275°38.4	-1°11.1					
16	297°26.4	106°16.5	-2°54.4	63°52.7	-19°21.0	260°53.3	13°01.4	324°04.2	-12°49.4	Betelgeuse	270°52.8	7°24.8					
17	312°28.8	121°16.3	-2°55.4	78°53.4	-19°21.5	275°56.1	13°01.3	339°06.6	-12°49.3	Canopus	263°52.4	-52°42.2					
18	327°31.3	136°16.1	-2°56.4	93°54.0	-19°21.9	290°58.9	13°01.2	354°09.0	-12°49.3	Sirius	258°26.7	-16°44.6					
19	342°33.7	151°16.0	-2°57.4	108°54.7	-19°22.4	306°01.6	13°01.1	9°11.4	-12°49.3	Adara	255°06.4	-29°00.0					
20	357°36.2	166°15.8	-2°58.4	123°55.3	-19°22.8	321°04.4	13°01.0	24°13.8	-12°49.3	Procyon	244°51.6	5°10.1					
21	12°38.7	181°15.6	-2°59.4	138°56.0	-19°23.2	336°07.2	13°00.9	39°16.2	-12°49.2	Pollux	243°18.2	27°58.1					
22	27°41.1	196°15.4	-3°00.4	153°56.6	-19°23.7	351°09.9	13°00.8	54°18.6	-12°49.2	Avior	234°14.9	-59°34.8					
23	42°43.6	211°15.2	-3°01.4	168°57.3	-19°24.1	6°12.7	13°00.7	69°21.0	-12°49.2	Suhail	222°46.9	-43°31.4					
Mer.pass.:20:09			v-0.2 d-1.0 m-4.1			v0.7 d-0.4 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8					
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	57°46.1	226°15.0	-3°02.4	183°57.9	-19°24.6	21°15.5	13°00.6	84°23.4	-12°49.2								
1	72°48.5	241°14.9	-3°03.4	198°58.6	-19°25.0	36°18.2	13°00.5	99°25.8	-12°49.1	Denebola							
2	87°51.0	256°14.7	-3°04.4	213°59.2	-19°25.4	51°21.0	13°00.4	114°28.2	-12°49.1	Gienah							
3	102°53.5	271°14.5	-3°05.4	228°59.9	-19°25.9	66°23.7	13°00.4	129°30.6	-12°49.1	Acrux							
4	117°55.9	286°14.3	-3°06.4	244°00.5	-19°26.3	81°26.5	13°00.3	144°33.0	-12°49.0	Gacrux							
5	132°58.4	301°14.1	-3°07.4	259°01.1	-19°26.7	96°29.3	13°00.2	159°35.4	-12°49.0	Alioth							
6	148°00.9	316°13.9	-3°08.4	274°01.8	-19°27.2	111°32.0	13°00.1	174°37.8	-12°49.0	Spica							
7	163°03.3	331°13.7	-3°09.4	289°02.4	-19°27.6	126°34.8	12°60.0	189°40.2	-12°49.0	Alcaid							
8	178°05.8	346°13.5	-3°10.4	304°03.1	-19°28.1	141°37.6	12°59.9	204°42.6	-12°48.9	Hadar							
9	193°08.2	1°13.4	-3°11.4	319°03.7	-19°28.5	156°40.3	12°59.8	219°45.1	-12°48.9	Menkent							
10	208°10.7	16°13.2	-3°12.4	334°04.4	-19°28.9	171°43.1	12°59.7	234°47.5	-12°48.9	Arcturus							
11	223°13.2	31°13.0	-3°13.4	349°05.0	-19°29.4	186°45.9	12°59.6	249°49.9	-12°48.8	Rigel Kent.							
12	238°15.6	46°12.8	-3°14.3	4°05.7	-19°29.8	201°48.6	12°59.5	264°52.3	-12°48.8	Zubenelg.							
13	253°18.1	61°12.6	-3°15.3	19°06.3	-19°30.2	216°51.4	12°59.5	279°54.7	-12°48.8	Kochab							
14	268°20.4	76°12.4	-3°16.3	34°07.0	-19°30.7	231°54.1	12°59.4	294°57.1	-12°48.8	Alphecca							
15	283°23.0	91°12.2	-3°17.3	49°07.6	-19°31.1	246°56.9	12°59.3	309°59.5	-12°48.7	Antares							
16	298°25.5	106°12.0	-3°18.3	64°08.3	-19°31.6	261°59.7	12°59.2	325°01.9	-12°48.7	Atria							
17	313°28.0	121°11.8	-3°19.3	79°08.9	-19°32.0	277°02.4	12°59.1	340°04.3	-12°48.7	Sabik							
18	328°30.4	136°11.6	-3°20.3	94°09.5	-19°32.4	292°05.2	12°59.0	355°06.7	-12°48.7	Shaula							
19	343°32.9	151°11.5	-3°21.3	109°10.2	-19°32.9	307°07.9	12°58.9	10°09.1	-12°48.6	Rasalhague							
20	358°35.4	166°11.3	-3°22.3	124°10.8	-19°33.3	322°10.7	12°58.8	25°11.5	-12°48.6	Etamin							
21	13°37.8	181°11.1	-3°23.3	139°11.5	-19°33.7	337°13.5	12°58.7	40°13.9	-12°48.6	Kaus Aust.							
22	28°40.3	196°10.9	-3°24.4	154°12.1	-19°34.2	352°16.2	12°58.6	55°16.3	-12°48.5	Vega							
23	43°42.7	211°10.7	-3°25.4	169°12.8	-19°34.6	7°19.0	12°58.6	70°18.7	-12°48.5	Nunki							
Mer.pass.:20:05			v-0.2 d-1.0 m-4.1			v0.6 d-0.4 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec									
0	58°45.2	226°10.5	-3°26.4	184°13.4	-19°35.0	22°21.8	12°58.5	85°21.1	-12°48.5								
1	73°47.7	241°10.3	-3°27.4	199°14.0	-19°35.5	37°24.5	12°58.4	100°23.5	-12°48.5	Alnair							
2	88°50.1	256°10.1	-3°28.4	214°14.7	-19°35.9	52°27.3	12°58.3	115°25.9	-12°48.4	Fomalhaut							
3	103°52.6	271°09.9	-3°29.4	229°15.3	-19°36.3	67°30.0	12°58.2	130°28.3	-12°48.4	Scheat							
4	118°55.1	286°09.7	-3°30.4	244°16.0	-19°36.8	82°32.8	12°58.1	145°30.7	-12°48.4	Markab							
5	133°57.5	301°09.5	-3°31.4	259°16.6	-19°37.2	97°35.6	12°58.0	160°33.1	-12°48.3	2023/11/							
6	148°60.0	316°09.3	-3°32.4	274°17.3	-19°37.6	112°38.3	12°57.9	175°35.5	-12°48.3	SHA							
7	164°02.5	331°09.1	-3°33.4	289°17.9	-19°38.0	127°41.1	12°57.8	190°37.9	-12°48.3	Mer.pass							
8	179°04.9	346°08.9	-3°34.4	304°18.5	-19°38.5	142°43.8	12°57.8	205°40.3	-12°48.2	Venus							
9	194°07.4	1°08.7	-3°35.4	319°19.2	-19°38.9	157°46.6	12°57.7	220°42.7	-12°48.2	Mars							
10	209°09.9	16°08.5	-3°36.4	334°19.8	-19°39.3	172°49.3	12°57.6	235°45.1	-12°48.2	Jupiter							
11	224°12.3	31°08.3	-3°37.4	349°20.5	-19°39.8	187°52.1	12°57.5	250°47.5	-12°48.2	Saturn							
12	239°14.8	46°08.1	-3°38.4	4°21.1	-19°40.2	202°54.9	12°57.4	265°49.9	-12°48.1	2023/11/							
13	254°17.2	61°07.9	-3°39.4	19°21.7	-19°40.6	217°57.6	12°57.3	280°52.3	-12°48.1	SHA							
14	269°19.7	76°07.7	-3°40.4	34°22.4	-19°41.1	233°00.4	12°57.2	295°54.7	-12°48.1	Mer.pass							
15	284°22.2	91°07.5	-3°41.4	49°23.0	-19°41.5	248°03.1	12°57.1	310°57.1	-12°48.0	Venus							
16	299°24.6	106°07.3	-3°42.4	64°23.7	-19°41.9	263°05.9	12°57.0	325°59.5	-12°48.0	Mars							
17	314°27.1	121°07.1	-3°43.4	79°24.3	-19°42.3	278°08.7	12°57.0	341°01.9	-12°48.0	Jupiter							
18	329°29.6	136°06.9	-3°44.4	94°24.9	-19°42.8	293°11.4	12°56.9	356°04.3	-12°48.0	Saturn							
19	344°32.0	151°06.7	-3°45.4	109°25.6	-19°43.2	308°14.2	12°56.8	11°06.7	-12°47.9	2023/11/							
20	359°34.5	166°06.5	-3°46.4	124°26.2	-19°43.6	323°16.9	12°56.7	26°09.1	-12°47.9	SHA							
21	14°37.0	181°06.3	-3°47.4	139°26.8	-19°44.0	338°19.7	12°56.6	41°11.5	-12°47.9	Mer.pass							
22	29°39.4	196°06.1	-3°48.4	154°27.5	-19°44.5	353°22.4	12°56.5	56°13.9	-12°47.8	Venus							
23	44°41.9	211°05.9	-3°49.4	169°28.1	-19°44.9	8°25.2	12°56.4	71°16.2	-12°47.8	Mars							
Mer.pass.:20:01			v-0.2 d-1.0 m-4.1			v0.6 d-0.4 m1.5			v2.8 d-0.1 m-2.7			v2.4 d0.0 m0.8					

Sun								Moon							
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	183° 45.0	-19° 06.3	120° 38.7	5.1	-26° 33.1	6.1	58.7	72	07:12	08:52	—:—	—:—	14:38	16:17	
1	198° 44.8	-19° 06.9	135° 02.9	5.2	-26° 26.9	6.2	58.7	70	07:01	08:26	10:16	13:14	15:04	16:29	
2	213° 44.7	-19° 07.5	149° 27.1	5.2	-26° 20.6	6.4	58.7	68	06:51	08:06	09:31	13:59	15:23	16:38	
3	228° 44.6	-19° 08.1	163° 51.3	5.3	-26° 14.1	6.6	58.8	66	06:43	07:50	09:01	14:29	15:39	16:47	
4	243° 44.5	-19° 08.7	178° 15.6	5.4	-26° 07.4	6.7	58.8	64	06:36	07:37	08:39	14:51	15:52	16:54	
5	258° 44.3	-19° 09.3	192° 40.0	5.4	-26° 00.6	6.9	58.8	62	06:30	07:26	08:22	15:08	16:04	17:00	
6	273° 44.2	-19° 09.9	207° 04.5	5.5	-25° 53.6	7.1	58.8	60	06:24	07:17	08:07	15:23	16:13	17:06	
7	288° 44.1	-19° 10.5	221° 29.0	5.5	-25° 46.4	7.3	58.8	58	06:19	07:08	07:55	15:35	16:22	17:11	
8	303° 44.0	-19° 11.1	235° 53.6	5.6	-25° 39.1	7.4	58.8	56	06:15	07:01	07:44	15:46	16:29	17:15	
9	318° 43.8	-19° 11.7	250° 18.2	5.7	-25° 31.6	7.6	58.8	54	06:10	06:54	07:35	15:56	16:36	17:20	
10	333° 43.7	-19° 12.3	264° 42.9	5.7	-25° 23.9	7.7	58.8	52	06:07	06:48	07:26	16:04	16:42	17:23	
11	348° 43.6	-19° 12.9	279° 07.7	5.8	-25° 16.1	7.9	58.8	50	06:03	06:43	07:19	16:12	16:48	17:27	
12	3° 43.4	-19° 13.5	293° 32.5	5.9	-25° 08.1	8.1	58.9	45	05:55	06:30	07:02	16:28	16:60	17:36	
13	18° 43.3	-19° 14.1	307° 57.5	6.0	-24° 60.0	8.2	58.9	40	05:47	06:20	06:49	16:41	17:10	17:43	
14	33° 43.2	-19° 14.7	322° 22.5	6.0	-24° 51.7	8.4	58.9	35	05:40	06:11	06:38	16:52	17:19	17:50	
15	48° 43.0	-19° 15.3	336° 47.5	6.1	-24° 43.2	8.5	58.9	30	05:34	06:03	06:28	17:02	17:28	17:57	
16	63° 42.9	-19° 15.9	351° 12.7	6.2	-24° 34.6	8.7	58.9	20	05:21	05:48	06:11	17:20	17:43	18:10	
17	78° 42.8	-19° 16.5	5° 37.9	6.3	-24° 25.8	8.9	58.9	10	05:08	05:34	05:56	17:35	17:57	18:23	
18	93° 42.6	-19° 17.1	20° 03.2	6.3	-24° 16.9	9.0	58.9	0	04:54	05:20	05:42	17:49	18:11	18:36	
19	108° 42.5	-19° 17.7	34° 28.6	6.4	-24° 07.8	9.2	58.9	-10	04:39	05:05	05:27	18:03	18:26	18:52	
20	123° 42.4	-19° 18.3	48° 54.0	6.5	-23° 58.5	9.3	58.9	-20	04:20	04:48	05:12	18:19	18:43	19:11	
21	138° 42.2	-19° 18.9	63° 19.6	6.6	-23° 49.2	9.5	58.9	-30	03:56	04:28	04:54	18:37	19:03	19:35	
22	153° 42.1	-19° 19.4	77° 45.2	6.7	-23° 39.6	9.6	59.0	-35	03:41	04:16	04:44	18:47	19:16	19:50	
23	168° 42.0	-19° 20.0	92° 10.9	6.7	-23° 29.9	9.8	59.0	-40	03:23	04:01	04:32	18:59	19:30	20:09	
SD.=16.2 d=-0.6								-45	02:59	03:43	04:17	19:14	19:48	20:33	
S.D.=16.0								-50	02:27	03:20	03:60	19:32	20:12	21:06	
								-52	02:10	03:09	03:52	19:40	20:23	21:23	
								-54	01:49	02:56	03:42	19:49	20:36	21:45	
								-56	01:20	02:41	03:32	19:60	20:51	22:14	
								-58	00:34	02:23	03:20	20:12	21:10	23:06	
								-60	—:—	02:01	03:06	20:26	21:33	—:—	
								Lat.	Moonrise			Moonset			
								Sat	Sun	Mon	Sat	Sun	Mon		
0								72	—:—	—:—	16:07	—:—	—:—	21:11	
1								70	—:—	—:—	15:35	—:—	—:—	21:42	
2								68	—:—	16:02	15:11	—:—	19:23	22:04	
3								66	—:—	15:20	14:52	—:—	20:04	22:21	
4								64	15:20	14:51	14:37	18:06	20:31	22:35	
5								62	14:36	14:29	14:24	18:49	20:52	22:46	
6								60	14:06	14:11	14:13	19:18	21:09	22:56	
15								58	13:44	13:56	14:03	19:40	21:23	23:04	
16								56	13:25	13:43	13:55	19:58	21:35	23:12	
17								54	13:09	13:32	13:47	20:13	21:46	23:18	
18								52	12:56	13:22	13:40	20:26	21:55	23:24	
19								50	12:44	13:13	13:34	20:37	22:04	23:30	
20								45	12:19	12:54	13:21	21:01	22:21	23:41	
21								40	11:59	12:38	13:10	21:20	22:35	23:50	
22								35	11:43	12:25	13:01	21:36	22:47	23:58	
23								30	11:28	12:13	12:52	21:49	22:58	—:—	
SD.=16.2 d=-0.6								20	11:04	11:53	12:38	22:12	23:16	—:—	
S.D.=16.1								10	10:43	11:36	12:25	22:32	23:31	—:—	
								0	10:23	11:20	12:13	22:50	23:45	—:—	
								-10	10:03	11:03	12:01	23:09	23:60	—:—	
								-20	09:41	10:46	11:48	23:28	—:—	00:15	
								-30	09:16	10:25	11:33	23:50	—:—	00:32	
								-35	09:02	10:13	11:25	—:—	00:03	00:42	
								-40	08:44	09:59	11:15	—:—	00:18	00:53	
								-45	08:24	09:43	11:03	—:—	00:36	01:06	
								-50	07:58	09:23	10:49	00:23	00:57	01:22	
								-52	07:45	09:13	10:42	00:36	01:08	01:30	
								-54	07:31	09:02	10:35	00:51	01:19	01:38	
								-56	07:14	08:49	10:27	01:08	01:32	01:47	
								-58	06:53	08:35	10:17	01:29	01:48	01:57	
								-60	06:27	08:18	10:06	01:56	02:06	02:09	
								Day	Sun			Moon			
									Eqn.of Time	Mer.		Mer.Pass.	Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
18								15:00	14:54	11:45	16:36	04:07	5(29%)		
19								14:47	14:41	11:45	17:32	05:05	6(39%)		
20								14:34	14:27	11:45	18:25	05:59	7(51%)		
SD.=16.2 d=-0.6															
S.D.=16.1															

November 21, 22 ,23 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	59°44.3	226°05.7	-3°50.4	184°28.8	-19°45.3	23°28.0	12°56.3	86°18.6	-12°47.8	Alpheratz	357°35.6	29°13.5
1	74°46.8	241°05.5	-3°51.4	199°29.4	-19°45.8	38°30.7	12°56.3	101°21.0	-12°47.7	Ankaa	353°07.8	-42°10.7
2	89°49.3	256°05.3	-3°52.4	214°30.0	-19°46.2	53°33.5	12°56.2	116°23.4	-12°47.7	Schedar	349°31.8	56°40.3
3	104°51.7	271°05.1	-3°53.4	229°30.7	-19°46.6	68°36.2	12°56.1	131°25.8	-12°47.7	Diphda	348°47.9	-17°51.4
4	119°54.2	286°04.9	-3°54.4	244°31.3	-19°47.0	83°39.0	12°56.0	146°28.2	-12°47.6	Achernar	335°20.4	-57°07.1
5	134°56.7	301°04.7	-3°55.4	259°31.9	-19°47.5	98°41.7	12°55.9	161°30.6	-12°47.6	Hamal	327°52.0	23°34.6
6	149°59.1	316°04.5	-3°56.4	274°32.6	-19°47.9	113°44.5	12°55.8	176°33.0	-12°47.6	Polaris	314°02.0	89°22.0
7	165°01.6	331°04.3	-3°57.5	289°33.2	-19°48.3	128°47.2	12°55.7	191°35.4	-12°47.6	Akamar	315°12.1	-40°12.6
8	180°04.1	346°04.1	-3°58.5	304°33.8	-19°48.7	143°50.0	12°55.6	206°37.8	-12°47.5	Menkar	314°06.8	4°11.1
9	195°06.5	1°03.9	-3°59.5	319°34.5	-19°49.2	158°52.7	12°55.6	221°40.2	-12°47.5	Mirfak	308°29.1	49°56.8
10	210°09.0	16°03.7	-4°00.5	334°35.1	-19°49.6	173°55.5	12°55.5	236°42.6	-12°47.5	Aldebaran	290°40.4	16°33.5
11	225°11.5	31°03.5	-4°01.5	349°35.7	-19°50.0	188°58.3	12°55.4	251°45.0	-12°47.4	Rigel	281°04.5	-8°10.3
12	240°13.9	46°03.3	-4°02.5	4°36.4	-19°50.4	204°01.0	12°55.3	266°47.4	-12°47.4	Capella	280°22.9	46°01.4
13	255°16.4	61°03.1	-4°03.5	19°37.0	-19°50.8	219°03.8	12°55.2	281°49.8	-12°47.4	Bellatrix	278°23.6	6°22.3
14	270°18.8	76°02.9	-4°04.5	34°37.6	-19°51.3	234°06.5	12°55.1	296°52.2	-12°47.3	Elnath	278°02.7	28°37.7
15	285°21.3	91°02.7	-4°05.5	49°38.3	-19°51.7	249°09.3	12°55.0	311°54.6	-12°47.3	Alnilam	275°38.4	-1°11.1
16	300°23.8	106°02.5	-4°06.5	64°38.9	-19°52.1	264°12.0	12°55.0	326°57.0	-12°47.3	Betelgeuse	270°52.8	7°24.7
17	315°26.2	121°02.2	-4°07.5	79°39.5	-19°52.5	279°14.8	12°54.9	341°59.4	-12°47.2	Canopus	263°52.4	-52°42.3
18	330°28.7	136°02.0	-4°08.5	94°40.2	-19°52.9	294°17.5	12°54.8	357°01.8	-12°47.2	Sirius	258°26.7	-16°44.6
19	345°31.2	151°01.8	-4°09.5	109°40.8	-19°53.4	309°20.3	12°54.7	1°04.1	-12°47.2	Adara	255°06.3	-29°00.1
20	0°33.6	166°01.6	-4°10.5	124°41.4	-19°53.8	324°23.0	12°54.6	27°06.5	-12°47.2	Procyon	244°51.5	5°10.1
21	15°36.1	181°01.4	-4°11.5	139°42.1	-19°54.2	339°25.8	12°54.5	42°08.9	-12°47.1	Pollux	243°18.2	27°58.1
22	30°38.6	196°01.2	-4°12.5	154°42.7	-19°54.6	354°28.5	12°54.4	57°11.3	-12°47.1	Avior	234°14.9	-59°34.8
23	45°41.0	211°01.0	-4°13.5	169°43.3	-19°55.0	9°31.3	12°54.3	72°13.7	-12°47.1	Suhail	222°46.9	-43°31.4
Mer.pass.:19:57		v-0.2 d-1.0 m-4.1		v0.6 d-0.4 m1.5		v2.8 d-0.1 m-2.7		v2.4 d0.0 m0.8		Miaplacidus	221°38.3	-69°48.5
										Alphard	217°48.6	-8°45.6
										Regulus	207°35.4	11°51.1
										Dubhe	193°42.3	61°37.1
										Denebola	182°26.0	14°26.4
										Gienah	175°44.7	-17°40.3
										Acrux	173°01.6	-63°13.6
										Gacrux	171°53.1	-57°14.5
										Alioth	166°14.2	55°49.7
										Spica	158°23.6	-11°17.0
										Alcaid	152°53.2	49°11.6
										Hadar	148°38.0	-60°29.1
										Menkent	147°59.1	-36°29.1
										Arcturus	145°48.9	19°03.8
										Rigel Kent.	139°42.3	-60°55.9
										Zubenelg.	136°57.4	-16°08.3
										Kochab	137°20.9	74°03.3
										Alphecca	126°04.9	26°38.1
										Antares	112°17.4	-26°29.0
										Atria	107°13.0	-69°04.2
										Sabik	102°04.2	-15°45.2
										Shaula	96°12.1	-37°07.3
										Rasalhague	95°59.8	12°32.7
										Etamin	90°43.1	51°29.2
										Kaus Aust.	83°34.1	-34°22.4
										Vega	80°34.3	38°48.4
										Nunki	75°49.2	-26°16.1
										Altair	62°01.2	8°55.9
										Peacock	53°07.5	-56°39.7
										Deneb	49°26.6	45°22.1
										Enif	33°39.8	9°59.1
										Alnair	27°34.1	-46°50.9
										Fomalhaut	15°15.5	-29°29.9
										Scheat	13°46.1	28°12.9
										Markab	13°30.8	15°20.1
2023/11/		SHA		Mer.pass								
Venus		166°21.4		08:56								
Mars		124°44.4		11:42								
Jupiter		323°43.6		22:22								
Saturn		26°34.3		18:12								
2023/11/		SHA		Mer.pass								
Venus		165°17.3		08:56								
Mars		124°00.5		11:41								
Jupiter		323°50.6		22:18								
Saturn		26°32.6		18:08								
2023/11/		SHA		Mer.pass								
Venus		164°13.0		08:56								
Mars		123°16.4		11:40								
Jupiter		323°57.4		22:13								
Saturn		26°30.9		18:04								
Horizontal parallax												
		Venus:		0.2								
		Mars:		0.1								
Mer.pass.:19:49		v-0.2 d-1.0 m-4.1		v0.6 d-0.4 m1.5		v2.7 d-0.1 m-2.7		v2.4 d0.0 m0.8				

Sun				Moon											
Tue	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	183°35.0	-19°48.2		80°50.6	10.6	-13°05.8	15.1	59.3	72	07:23	09:06	—:—	—:—	14:25	16:08
1	198°34.8	-19°48.7		95°20.2	10.7	-12°50.6	15.2	59.3	70	07:10	08:37	10:42	12:49	14:54	16:21
2	213°34.7	-19°49.3		109°49.9	10.7	-12°35.4	15.2	59.3	68	06:59	08:16	09:46	13:46	15:15	16:32
3	228°34.5	-19°49.8		124°19.7	10.8	-12°20.1	15.3	59.3	66	06:50	07:59	09:13	14:19	15:32	16:41
4	243°34.4	-19°50.4		138°49.5	10.8	-12°04.8	15.4	59.3	64	06:43	07:45	08:49	14:43	15:46	16:49
5	258°34.2	-19°51.0		153°19.4	10.9	-11°49.4	15.4	59.3	62	06:36	07:33	08:30	15:02	15:58	16:55
6	273°34.0	-19°51.5		167°49.3	11.0	-11°33.9	15.5	59.3	60	06:30	07:23	08:14	15:17	16:08	17:01
7	288°33.9	-19°52.1		182°19.3	11.0	-11°18.4	15.6	59.3	58	06:25	07:14	08:01	15:30	16:17	17:07
8	303°33.7	-19°52.6		196°49.3	11.1	-11°02.8	15.6	59.3	56	06:20	07:06	07:50	15:42	16:25	17:12
9	318°33.6	-19°53.2		211°19.4	11.1	-10°47.1	15.7	59.3	54	06:15	06:59	07:40	15:52	16:32	17:16
10	333°33.4	-19°53.7		225°49.6	11.2	-10°31.4	15.7	59.3	52	06:11	06:53	07:31	16:00	16:39	17:21
11	348°33.3	-19°54.3		240°19.8	11.2	-10°15.7	15.8	59.3	50	06:07	06:47	07:23	16:08	16:45	17:25
12	3°33.1	-19°54.8		254°50.0	11.3	-9°59.8	15.8	59.3	45	05:58	06:34	07:06	16:25	16:58	17:34
13	18°33.0	-19°55.4		269°20.3	11.3	-9°44.0	15.9	59.3	40	05:50	06:23	06:53	16:39	17:09	17:42
14	33°32.8	-19°55.9		283°50.7	11.4	-9°28.0	15.9	59.3	35	05:43	06:14	06:41	16:51	17:18	17:49
15	48°32.6	-19°56.5		298°21.1	11.4	-9°12.1	16.0	59.3	30	05:36	06:05	06:31	17:01	17:27	17:56
16	63°32.5	-19°57.0		312°51.5	11.5	-8°56.1	16.0	59.3	20	05:22	05:49	06:13	17:19	17:43	18:10
17	78°32.3	-19°57.6		327°22.0	11.5	-8°40.0	16.1	59.3	10	05:09	05:35	05:57	17:35	17:57	18:23
18	93°32.2	-19°58.1		341°52.6	11.6	-8°23.9	16.1	59.3	0	04:55	05:20	05:42	17:50	18:12	18:37
19	108°32.0	-19°58.7		356°23.1	11.6	-8°07.7	16.2	59.3	-10	04:39	05:05	05:28	18:05	18:27	18:53
20	123°31.9	-19°59.2		10°53.8	11.6	-7°51.5	16.2	59.3	-20	04:19	04:48	05:12	18:21	18:45	19:13
21	138°31.7	-19°59.8		25°24.4	11.7	-7°35.3	16.3	59.3	-30	03:55	04:27	04:53	18:39	19:06	19:38
22	153°31.5	-20°00.3		39°55.1	11.7	-7°19.0	16.3	59.3	-35	03:39	04:14	04:42	18:50	19:19	19:54
23	168°31.4	-20°00.9		54°25.9	11.8	-7°02.7	16.3	59.3	-40	03:20	03:59	04:30	19:03	19:34	20:13
	SD.=16.2	d=-0.6		S.D.=16.2					-45	02:55	03:40	04:15	19:18	19:53	20:38
									-50	02:21	03:16	03:57	19:36	20:17	21:12
									-52	02:03	03:04	03:48	19:45	20:29	21:31
									-54	01:40	02:51	03:38	19:55	20:43	21:55
									-56	01:08	02:35	03:27	20:06	20:59	22:28
									-58	—:—	02:16	03:15	20:19	21:18	—:—
									-60	—:—	01:51	02:60	20:34	21:44	—:—
										Moonrise			Moonset		
									Lat.	Tue	Wed	Thu	Tue	Wed	Thu
									72	15:08	14:28	13:52	23:56	—:—	02:20
									70	14:54	14:25	13:57	—:—	00:07	02:19
									68	14:43	14:21	14:01	—:—	00:15	02:19
									66	14:34	14:19	14:05	—:—	00:23	02:18
									64	14:26	14:16	14:07	—:—	00:28	02:18
									62	14:19	14:14	14:10	—:—	00:34	02:18
									60	14:13	14:13	14:12	—:—	00:38	02:17
									58	14:08	14:11	14:14	—:—	00:42	02:17
									56	14:03	14:10	14:16	—:—	00:45	02:17
									54	13:59	14:08	14:18	—:—	00:48	02:17
									52	13:55	14:07	14:19	—:—	00:51	02:17
									50	13:51	14:06	14:20	—:—	00:54	02:16
									45	13:44	14:04	14:23	—:—	00:59	02:16
									40	13:37	14:02	14:26	—:—	01:04	02:16
									35	13:32	14:00	14:28	—:—	01:07	02:16
									30	13:27	13:59	14:30	00:05	01:11	02:15
									20	13:18	13:56	14:33	00:17	01:17	02:15
									10	13:11	13:54	14:36	00:28	01:22	02:15
									0	13:03	13:52	14:39	00:37	01:26	02:14
									-10	12:56	13:49	14:42	00:47	01:31	02:14
									-20	12:49	13:47	14:45	00:57	01:36	02:13
									-30	12:40	13:45	14:49	01:08	01:41	02:13
									-35	12:35	13:43	14:51	01:15	01:45	02:13
									-40	12:29	13:41	14:53	01:22	01:48	02:12
									-45	12:22	13:39	14:56	01:31	01:52	02:12
									-50	12:14	13:37	14:60	01:41	01:57	02:11
									-52	12:10	13:36	15:01	01:46	01:59	02:11
									-54	12:06	13:35	15:03	01:51	02:02	02:11
									-56	12:01	13:34	15:05	01:57	02:04	02:11
									-58	11:56	13:32	15:07	02:03	02:07	02:10
									-60	11:50	13:30	15:09	02:10	02:10	02:10
										Sun			Moon		
									Day	Eqn.of Time 00 ^h	12 ^h	Mer. Pass	Mer.Pass. Upper	Lower	Age
									21	14:20	14:13	11:45	19:14	06:50	8(62%)
									22	14:05	13:57	11:46	20:02	07:39	9(73%)
									23	13:49	13:41	11:46	20:50	08:26	10(82%)
								</							

November 24, 25 ,26 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	62°41.8	225°50.2	-5°03.0	185°13.9	-20°15.2	26°45.9	12°50.2	89°10.8	-12°45.4	104°13.1	-12°45.4	119°15.5	-12°45.4	Alpheratz	357°35.6	29°13.5	
1	77°44.2	240°50.0	-5°04.0	200°14.6	-20°15.6	41°48.6	12°50.1	149°20.3	-12°45.3	164°22.7	-12°45.3	179°25.1	-12°45.2	Ankaa	353°07.8	-42°10.8	
2	92°46.7	255°49.8	-5°05.0	215°15.2	-20°16.0	56°51.4	12°50.0	239°34.6	-12°45.1	254°37.0	-12°45.0	269°39.4	-12°45.0	Schedar	349°31.8	56°40.3	
3	107°49.2	270°49.6	-5°06.0	230°15.8	-20°16.4	71°54.1	12°50.0	312°37.9	-12°44.8	327°40.7	-12°44.7	342°43.4	-12°44.7	Diphda	348°47.9	-17°51.4	
4	122°51.6	285°49.3	-5°07.0	245°16.4	-20°16.9	86°56.8	12°49.9	380°00.0	-12°44.6	395°00.8	-12°44.5	410°00.8	-12°44.4	Achernar	335°20.4	-57°07.1	
5	137°54.1	300°49.1	-5°08.0	260°17.0	-20°17.3	101°59.6	12°49.8	430°03.2	-12°44.4	445°05.6	-12°44.3	460°08.0	-12°44.3	Hamal	327°52.0	23°34.6	
6	152°56.5	315°48.9	-5°09.0	275°17.7	-20°17.7	117°02.3	12°49.7	480°05.6	-12°44.3	495°08.0	-12°44.2	510°10.4	-12°44.2	Polaris	314°02.2	89°22.0	
7	167°59.0	330°48.6	-5°10.1	290°18.3	-20°18.1	132°05.1	12°49.6	530°08.0	-12°44.0	545°10.4	-12°43.9	560°12.8	-12°43.9	Akamar	315°12.1	-40°12.6	
8	183°01.5	345°48.4	-5°11.1	305°18.9	-20°18.5	147°07.8	12°49.5	580°12.8	-12°43.8	595°15.2	-12°43.7	610°17.6	-12°43.7	Menkar	314°06.8	4°11.1	
9	198°03.9	0°48.2	-5°12.1	320°19.5	-20°18.9	162°10.6	12°49.5	630°20.0	-12°43.5	645°22.4	-12°43.4	660°24.8	-12°43.4	Mirfak	308°29.1	49°56.8	
10	213°06.4	15°47.9	-5°13.1	335°20.1	-20°19.3	177°13.3	12°49.4	680°24.8	-12°43.2	695°27.2	-12°43.1	710°29.6	-12°43.1	Aldebaran	290°40.4	16°33.5	
11	228°08.9	30°47.7	-5°14.1	350°20.7	-20°19.7	192°16.0	12°49.3	730°32.0	-12°42.9	745°34.4	-12°42.8	760°36.8	-12°42.8	Rigel	281°04.5	-8°10.4	
12	243°11.3	45°47.5	-5°15.1	5°21.4	-20°20.1	207°18.8	12°49.2	790°36.8	-12°42.6	805°39.2	-12°42.5	820°41.6	-12°42.5	Capella	280°22.9	46°01.4	
13	258°13.8	60°47.2	-5°16.1	20°22.0	-20°20.5	222°21.5	12°49.1	850°41.6	-12°42.3	865°44.0	-12°42.2	880°46.4	-12°42.2	Bellatrix	278°23.6	6°22.3	
14	273°16.3	75°47.0	-5°17.1	35°22.6	-20°20.9	237°24.2	12°49.0	900°46.4	-12°42.0	915°48.8	-12°41.9	930°51.2	-12°41.9	Elnath	278°02.7	28°37.7	
15	288°18.7	90°46.8	-5°18.1	50°23.2	-20°21.3	252°27.0	12°49.0	960°51.2	-12°41.7	975°53.6	-12°41.6	990°56.0	-12°41.6	Alnilam	275°38.4	-1°11.1	
16	303°21.2	105°46.5	-5°19.2	65°23.8	-20°21.7	267°29.7	12°48.9	1010°58.4	-12°41.4	1025°60.8	-12°41.3	1040°63.2	-12°41.3	Betelgeuse	270°52.8	7°24.7	
17	318°23.7	120°46.3	-5°20.2	80°24.4	-20°22.1	282°32.5	12°48.8	1060°63.2	-12°41.1	1075°65.6	-12°41.0	1090°68.0	-12°41.0	Canopus	263°52.4	-52°42.3	
18	333°26.1	135°46.1	-5°21.2	95°25.0	-20°22.5	297°35.2	12°48.7	1110°70.4	-12°40.8	1125°72.8	-12°40.7	1140°75.2	-12°40.7	Sirius	258°26.7	-16°44.6	
19	348°28.6	150°45.8	-5°22.2	110°25.7	-20°22.9	312°37.9	12°48.6	1160°75.2	-12°40.5	1175°77.6	-12°40.4	1190°80.0	-12°40.4	Adara	255°06.3	-29°00.1	
20	3°31.0	165°45.6	-5°23.2	125°26.3	-20°23.3	327°40.7	12°48.6	1210°80.0	-12°40.2	1225°82.4	-12°40.1	1240°84.8	-12°40.1	Procyon	244°51.5	5°10.0	
21	18°33.5	180°45.4	-5°24.2	140°26.9	-20°23.7	342°43.4	12°48.5	1260°84.8	-12°39.9	1275°87.2	-12°39.8	1290°89.6	-12°39.8	Pollux	243°18.1	27°58.1	
22	33°36.0	195°45.1	-5°25.2	155°27.5	-20°24.1	357°46.1	12°48.4	1310°89.6	-12°39.6	1325°92.0	-12°39.5	1340°94.4	-12°39.5	Avior	234°14.8	-59°34.8	
23	48°38.4	210°44.9	-5°26.2	170°28.1	-20°24.5	12°48.9	12°48.3	1370°94.4	-12°39.3	1385°96.8	-12°39.2	1400°99.2	-12°39.2	Suhail	222°46.9	-43°31.4	
Mer.pass.:19:45			v-0.2 d-1.0 m-4.1			v0.6 d-0.4 m1.5			v2.7 d-0.1 m-2.7			v2.4 d0.0 m0.8					

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	63°40.9	225°44.6	-5°27.3	185°28.7	-20°24.9	27°51.6	12°48.2	90°07.9	-12°44.6								
1	78°43.4	240°44.4	-5°28.3	200°29.3	-20°25.3	42°54.4	12°48.2	105°10.3	-12°44.5								
2	93°45.8	255°44.2	-5°29.3	215°30.0	-20°25.7	57°57.1	12°48.1	120°12.7	-12°44.5								
3	108°48.3	270°43.9	-5°30.3	230°30.6	-20°26.1	72°59.8	12°48.0	135°15.1	-12°44.5								
4	123°50.8	285°43.7	-5°31.3	245°31.2	-20°26.4	88°02.6	12°47.9	150°17.5	-12°44.4								
5	138°53.2	300°43.5	-5°32.3	260°31.8	-20°26.8	103°05.3	12°47.8	165°19.8	-12°44.4								
6	153°55.7	315°43.2	-5°33.3	275°32.4	-20°27.2	118°08.0	12°47.8	180°22.2	-12°44.4								
7	168°58.1	330°43.0	-5°34.3	290°33.0	-20°27.6	133°10.8	12°47.7	195°24.6	-12°44.3								
8	184°00.6	345°42.7	-5°35.3	305°33.6	-20°28.0	148°13.5	12°47.6	210°27.0	-12°44.3								
9	199°03.1	0°42.5	-5°36.4	320°34.2	-20°28.4	163°16.2	12°47.5	225°29.4	-12°44.3								
10	214°05.5	15°42.3	-5°37.4	335°34.8	-20°28.8	178°19.0	12°47.4	240°31.7	-12°44.2								
11	229°08.0	30°42.0	-5°38.4	350°35.5	-20°29.2	193°21.7	12°47.3	255°34.1	-12°44.2								
12	244°10.5	45°41.8	-5°39.4	5°36.1	-20°29.6	208°24.4	12°47.3	270°36.5	-12°44.1								
13	259°12.9	60°41.5	-5°40.4	20°36.7	-20°30.0	223°27.2	12°47.2	285°38.9	-12°44.1								
14	274°15.4	75°41.3	-5°41.4	35°37.3	-20°30.4	238°29.9	12°47.1	300°41.3	-12°44.1								
15	289°17.9	90°41.0	-5°42.4	50°37.9	-20°30.8	253°32.6	12°47.0	315°43.6	-12°44.0								
16	304°20.3	105°40.8	-5°43.4	65°38.5	-20°31.2	268°35.4	12°46.9	330°46.0	-12°44.0								
17	319°22.8	120°40.6	-5°44.5	80°39.1	-20°31.6	283°38.1	12°46.9	345°48.4	-12°44.0								
18	334°25.3	135°40.3	-5°45.5	95°39.7	-20°32.0	298°40.8	12°46.8	0°50.8	-12°43.9								
19	349°27.7	150°40.1	-5°46.5	110°40.3	-20°32.4	313°43.6	12°46.7	15°53.1	-12°43.9								
20	4°30.2	165°39.8	-5°47.5	125°40.9	-20°32.7	328°46.3	12°46.6	30°55.5	-12°43.8								
21	19°32.6	180°39.6	-5°48.5	140°41.5	-20°33.1	343°49.0	12°46.6	45°57.9	-12°43.8								
22	34°35.1	195°39.3	-5°49.5	155°42.1	-20°33.5	358°51.8	12°46.5	61°00.3	-12°43.8								
23	49°37.6	210°39.1	-5°50.5	170°42.8	-20°33.9	13°54.5	12°46.4	76°02.7	-12°43.7								
Mer.pass.:19:42			v-0.2 d-1.0 m-4.1			v0.6 d-0.4 m1.5			v2.7 d-0.1 m-2.7			v2.4 d0.0 m0.8					

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	64°40.0	225°38.8	-5°51.5	185°43.4	-20°34.3	28°57.2	12°46.3	91°05.0	-12°43.7
1	79°42.5	240°38.6	-5°52.6	200°44.0	-20°34.7	43°60.0	12°46.2	106°07.4	-12°43.7
2	94°45.0	255°38.3	-5°53.6	215°44.6	-20°35.1	59°02.7	12°46.2	121°09.8	-12°43.6
3	109°47.4	270°38.1	-5°54.6	230°45.2	-20°35.5	74°05.4	12°46.1	136°12.2	-12°43.6
4	124°49.9	285°37.8	-5°55.6	245°45.8	-20°35.9	89°08.2	12°46.0	151°14.5	-12°43.5
5	139°52.4	300°37.6	-5°56.6	260°46.4	-20°36.3	104°10.9	12°45.9	166°16.9	-12°43.5
6	154°54.8	315°37.3	-5°57.6	275°47.0	-20°36.6	119°13.6	12°45.8	181°19.3	-12°43.5
7	169°57.3	330°37.1	-5°58.6	290°47.6	-20°37.0	134°16.4	12°45.8	196°21.7	-12°43.4
8	184°59.8	345°36.8	-5°59.6	305°48.2	-20°37.4	149°19.1	12°45.7	211°24.0	-12°43.4
9	200°02.2	0°36.6	-6°00.7	320°48.8	-20°37.8	164°21.8	12°45.6	226°26.4	-12°43.3
10	215°04.7	15°36.3	-6°01.7	335°49.4	-20°38.2	179°24.5	12°45.5	241°28.8	-12°43.3
11	230°07.1	30°36.1	-6°02.7	350°50.0	-20°38.6	194°27.3	12°45.4	256°31.2	-12°43.3
12	245°09.6	45°35.8	-6°03.7	5°50.6	-20°39.0	209°30.0	12°45.4	271°33.5	-12°43.2
13	260°12.1	60°35.6	-6°04.7	20°51.2	-20°39.4	224°32.7	12°45.3	286°35.9	-12°43.2
14	275°14.5	75°35.3	-6°05.7	35°51.8	-20°39.7	239°35.5	12°45.2	301°38.3	-12°43.2
15	290°17.								

Sun				Moon										
Fri	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	183°23.2	-20°26.8	45°50.3	12.0	6°32.0	16.3	59.1	72	07:32	09:21	—:—	—:—	14:12	16:00
1	198°23.0	-20°27.3	60°21.2	11.9	6°48.3	16.3	59.1	70	07:18	08:49	11:24	12:09	14:44	16:14
2	213°22.8	-20°27.8	74°52.1	11.9	7°04.6	16.2	59.0	68	07:07	08:25	10:01	13:32	15:08	16:26
3	228°22.6	-20°28.3	89°23.0	11.9	7°20.8	16.2	59.0	66	06:57	08:07	09:24	14:09	15:26	16:36
4	243°22.5	-20°28.8	103°53.9	11.8	7°37.0	16.2	59.0	64	06:49	07:52	08:58	14:35	15:41	16:44
5	258°22.3	-20°29.3	118°24.7	11.8	7°53.1	16.1	59.0	62	06:42	07:40	08:38	14:56	15:53	16:51
6	273°22.1	-20°29.8	132°55.5	11.8	8°09.2	16.1	59.0	60	06:35	07:29	08:21	15:12	16:04	16:58
7	288°21.9	-20°30.3	147°26.2	11.7	8°25.3	16.0	59.0	58	06:30	07:20	08:07	15:26	16:14	17:04
8	303°21.8	-20°30.8	161°56.9	11.7	8°41.3	16.0	59.0	56	06:24	07:11	07:56	15:38	16:22	17:09
9	318°21.6	-20°31.4	176°27.6	11.7	8°57.2	15.9	59.0	54	06:19	07:04	07:45	15:48	16:29	17:14
10	333°21.4	-20°31.9	190°58.3	11.6	9°13.1	15.9	59.0	52	06:15	06:57	07:36	15:57	16:36	17:18
11	348°21.2	-20°32.4	205°28.9	11.6	9°29.0	15.8	58.9	50	06:11	06:51	07:28	16:06	16:42	17:22
12	3°21.0	-20°32.9	219°59.5	11.6	9°44.8	15.8	58.9	45	06:01	06:38	07:10	16:23	16:56	17:32
13	18°20.9	-20°33.4	234°30.0	11.5	10°00.5	15.7	58.9	40	05:53	06:26	06:56	16:38	17:07	17:40
14	33°20.7	-20°33.9	249°00.5	11.5	10°16.2	15.7	58.9	35	05:45	06:16	06:44	16:50	17:17	17:48
15	48°20.5	-20°34.4	263°30.9	11.4	10°31.8	15.6	58.9	30	05:38	06:07	06:33	17:01	17:26	17:56
16	63°20.3	-20°34.9	278°01.3	11.4	10°47.4	15.5	58.9	20	05:24	05:51	06:15	17:19	17:43	18:10
17	78°20.1	-20°35.4	292°31.7	11.3	11°02.9	15.5	58.9	10	05:10	05:36	05:58	17:35	17:58	18:24
18	93°20.0	-20°35.9	307°02.0	11.3	11°18.4	15.4	58.9	0	04:55	05:21	05:43	17:51	18:13	18:38
19	108°19.8	-20°36.4	321°32.3	11.2	11°33.8	15.4	58.8	-10	04:39	05:05	05:28	18:06	18:29	18:55
20	123°19.6	-20°36.9	336°02.5	11.2	11°49.1	15.3	58.8	-20	04:19	04:47	05:11	18:23	18:47	19:15
21	138°19.4	-20°37.4	350°32.7	11.2	12°04.3	15.2	58.8	-30	03:53	04:26	04:52	18:42	19:09	19:41
22	153°19.2	-20°37.9	5°02.8	11.1	12°19.5	15.1	58.8	-35	03:37	04:12	04:41	18:53	19:22	19:57
23	168°19.0	-20°38.4	19°32.9	11.1	12°34.6	15.1	58.8	-40	03:17	03:57	04:28	19:06	19:38	20:17
								-45	02:52	03:37	04:13	19:22	19:57	20:43
								-50	02:16	03:13	03:54	19:41	20:22	21:19
								-52	01:57	03:00	03:45	19:50	20:35	21:39
								-54	01:32	02:46	03:34	20:00	20:49	22:05
								-56	00:55	02:29	03:23	20:12	21:06	22:44
								-58	—:—	02:09	03:10	20:26	21:27	—:—
								-60	—:—	01:42	02:54	20:41	21:55	—:—
								Lat.	Moonrise			Moonset		
								72	13:12	12:11	—:—	04:44	07:30	—:—
								70	13:27	12:46	—:—	04:31	06:57	—:—
								68	13:39	13:12	12:19	04:22	06:33	09:14
								66	13:50	13:32	13:04	04:14	06:15	08:31
								64	13:58	13:48	13:34	04:07	06:00	08:02
								62	14:06	14:01	13:57	04:01	05:48	07:40
								60	14:12	14:13	14:15	03:57	05:38	07:23
								58	14:18	14:23	14:30	03:52	05:29	07:08
								56	14:23	14:31	14:44	03:48	05:21	06:56
								54	14:27	14:39	14:55	03:45	05:14	06:45
								52	14:32	14:46	15:05	03:42	05:08	06:35
								50	14:35	14:53	15:15	03:39	05:03	06:27
								45	14:44	15:07	15:34	03:33	04:51	06:09
								40	14:51	15:18	15:50	03:28	04:41	05:54
								35	14:57	15:28	16:03	03:24	04:32	05:42
								30	15:02	15:37	16:15	03:20	04:25	05:31
								20	15:11	15:52	16:36	03:13	04:12	05:13
								10	15:20	16:05	16:53	03:07	04:01	04:57
								0	15:27	16:17	17:10	03:02	03:51	04:42
								-10	15:35	16:30	17:27	02:57	03:41	04:27
								-20	15:44	16:44	17:45	02:51	03:30	04:12
								-30	15:54	16:59	18:06	02:44	03:17	03:54
								-35	15:59	17:09	18:18	02:41	03:10	03:43
								-40	16:06	17:19	18:33	02:36	03:02	03:32
								-45	16:13	17:32	18:50	02:32	02:53	03:18
								-50	16:23	17:47	19:11	02:26	02:42	03:01
								-52	16:27	17:54	19:21	02:23	02:37	02:53
								-54	16:32	18:02	19:33	02:20	02:31	02:44
								-56	16:37	18:11	19:46	02:17	02:25	02:35
								-58	16:43	18:21	20:01	02:14	02:18	02:23
								-60	16:50	18:33	20:20	02:10	02:10	02:11
								Day	Sun		Moon		Age	
									Eqn.of Time	Mer.	Mer.Pass.			
									00 ^h	12 ^h	Pass	Upper	Lower	
								24	13:33	13:24	11:46	21:39	09:14	11(90%)
								25	13:16	13:07	11:46	22:29	10:04	12(96%)
								26	12:58	12:48	11:47	23:22	10:56	13(99%)

November 27, 28 ,29 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	65°39.2	225°32.8	-6°15.8	185°57.9	-20°43.6	30°02.7	12°44.4	92°02.0	-12°42.8	Alpheratz	357°35.6	29°13.5					
1	80°41.6	240°32.5	-6°16.9	200°58.5	-20°44.0	45°05.4	12°44.4	107°04.4	-12°42.7	Ankaa	353°07.8	-42°10.8					
2	95°44.1	255°32.3	-6°17.9	215°59.1	-20°44.3	60°08.2	12°44.3	122°06.8	-12°42.7	Schedar	349°31.8	56°40.3					
3	110°46.6	270°32.0	-6°18.9	230°59.7	-20°44.7	75°10.9	12°44.2	137°09.1	-12°42.7	Diphda	348°47.9	-17°51.4					
4	125°49.0	285°31.8	-6°19.9	246°00.3	-20°45.1	90°13.6	12°44.1	152°11.5	-12°42.6	Achernar	335°20.4	-57°07.1					
5	140°51.5	300°31.5	-6°20.9	261°00.9	-20°45.5	105°16.3	12°44.0	167°13.9	-12°42.6	Hamal	327°52.0	23°34.6					
6	155°54.0	315°31.3	-6°21.9	276°01.5	-20°45.9	120°19.1	12°44.0	182°16.3	-12°42.5	Polaris	314°02.1	89°22.0					
7	170°56.4	330°31.0	-6°22.9	291°02.1	-20°46.3	135°21.8	12°43.9	197°18.6	-12°42.5	Akamar	315°12.1	-40°12.6					
8	185°58.9	345°30.7	-6°23.9	306°02.7	-20°46.6	150°24.5	12°43.8	212°21.0	-12°42.5	Menkar	314°06.8	4°11.1					
9	201°01.4	0°30.5	-6°25.0	321°03.3	-20°47.0	165°27.2	12°43.7	227°23.4	-12°42.4	Mirfak	308°29.1	49°56.8					
10	216°03.8	15°30.2	-6°26.0	336°03.9	-20°47.4	180°30.0	12°43.7	242°25.7	-12°42.4	Aldebaran	290°40.4	16°33.5					
11	231°06.3	30°30.0	-6°27.0	351°04.5	-20°47.8	195°32.7	12°43.6	257°28.1	-12°42.3	Rigel	281°04.4	-8°10.4					
12	246°08.7	45°29.7	-6°28.0	6°05.1	-20°48.2	210°35.4	12°43.5	272°30.5	-12°42.3	Capella	280°22.8	46°01.4					
13	261°11.2	60°29.4	-6°29.0	21°05.6	-20°48.5	225°38.1	12°43.4	287°32.9	-12°42.3	Bellatrix	278°23.6	6°22.3					
14	276°13.7	75°29.2	-6°30.0	36°06.2	-20°48.9	240°40.9	12°43.4	302°35.2	-12°42.2	Elnath	278°02.7	28°37.7					
15	291°16.1	90°28.9	-6°31.0	51°06.8	-20°49.3	255°43.6	12°43.3	317°37.6	-12°42.2	Alnilam	275°38.4	-1°11.1					
16	306°18.6	105°28.6	-6°32.0	66°07.4	-20°49.7	270°46.3	12°43.2	332°40.0	-12°42.1	Betelgeuse	270°52.8	7°24.7					
17	321°21.1	120°28.4	-6°33.0	81°08.0	-20°50.0	285°49.0	12°43.1	347°42.3	-12°42.1	Canopus	263°52.3	-52°42.3					
18	336°23.5	135°28.1	-6°34.1	96°08.6	-20°50.4	300°51.7	12°43.1	2°44.7	-12°42.1	Sirius	258°26.7	-16°44.6					
19	351°26.0	150°27.9	-6°35.1	111°09.2	-20°50.8	315°54.5	12°43.0	17°47.1	-12°42.0	Adara	255°06.3	-29°00.1					
20	6°28.5	165°27.6	-6°36.1	126°09.8	-20°51.2	330°57.2	12°42.9	32°49.4	-12°42.0	Procyon	244°51.5	5°10.0					
21	21°30.9	180°27.3	-6°37.1	141°10.4	-20°51.5	345°59.9	12°42.8	47°51.8	-12°41.9	Pollux	243°18.1	27°58.1					
22	36°33.4	195°27.1	-6°38.1	156°11.0	-20°51.9	1°02.6	12°42.8	62°54.2	-12°41.9	Avior	234°14.8	-59°34.8					
23	51°35.9	210°26.8	-6°39.1	171°11.6	-20°52.3	16°05.4	12°42.7	77°56.5	-12°41.9	Suhail	222°46.8	-43°31.4					
Mer.pass.:19:34			v-0.3 d-1.0 m-4.1			v0.6 d-0.4 m1.5			v2.7 d-0.1 m-2.7			v2.4 d0.0 m0.8					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	66°38.3	225°26.5	-6°40.1	186°12.2	-20°52.7	31°08.1	12°42.6	92°58.9	-12°41.8	Miaplacidus	221°38.2	-69°48.5					
1	81°40.8	240°26.3	-6°41.1	201°12.8	-20°53.0	46°10.8	12°42.5	108°01.3	-12°41.8	Alphard	217°48.6	-8°45.6					
2	96°43.2	255°26.0	-6°42.2	216°13.4	-20°53.4	61°13.5	12°42.5	123°03.7	-12°41.7	Regulus	207°35.4	11°51.1					
3	111°45.7	270°25.7	-6°43.2	231°14.0	-20°53.8	76°16.2	12°42.4	138°06.0	-12°41.7	Dubhe	193°42.2	61°37.1					
4	126°48.2	285°25.5	-6°44.2	246°14.6	-20°54.2	91°19.0	12°42.3	153°08.4	-12°41.6	Denebola	182°26.0	14°26.3					
5	141°50.6	300°25.2	-6°45.2	261°15.2	-20°54.5	106°21.7	12°42.2	168°10.8	-12°41.6	Gienah	175°44.7	-17°40.3					
6	156°53.1	315°24.9	-6°46.2	276°15.8	-20°54.9	121°24.4	12°42.2	183°13.1	-12°41.6	Acrux	173°01.6	-63°13.6					
7	171°55.6	330°24.7	-6°47.2	291°16.4	-20°55.3	136°27.1	12°42.1	198°15.5	-12°41.5	Gacrux	171°53.0	-57°14.5					
8	186°58.0	345°24.4	-6°48.2	306°17.0	-20°55.7	151°29.8	12°42.0	213°17.9	-12°41.5	Alioth	166°14.2	55°49.6					
9	202°00.5	0°24.1	-6°49.2	321°17.6	-20°56.0	166°32.5	12°41.9	228°20.2	-12°41.4	Spica	158°23.5	-11°17.0					
10	217°03.0	15°23.8	-6°50.3	336°18.1	-20°56.4	181°35.3	12°41.9	243°22.6	-12°41.4	Alcaid	152°53.1	49°11.5					
11	232°05.4	30°23.6	-6°51.3	351°18.7	-20°56.8	196°38.0	12°41.8	258°25.0	-12°41.4	Hadar	148°37.9	-60°29.0					
12	247°07.9	45°23.3	-6°52.3	6°19.3	-20°57.2	211°40.7	12°41.7	273°27.3	-12°41.3	Menkent	147°59.1	-36°29.1					
13	262°10.4	60°23.0	-6°53.3	21°19.9	-20°57.5	226°43.4	12°41.6	288°29.7	-12°41.3	Arcturus	145°48.9	19°03.8					
14	277°12.8	75°22.8	-6°54.3	36°20.5	-20°57.9	241°46.1	12°41.6	303°32.1	-12°41.2	Rigel Kent.	139°42.2	-60°55.8					
15	292°15.3	90°22.5	-6°55.3	51°21.1	-20°58.3	256°48.8	12°41.5	318°34.4	-12°41.2	Zubenelg.	136°57.4	-16°08.3					
16	307°17.7	105°22.2	-6°56.3	66°21.7	-20°58.6	271°51.6	12°41.4	333°36.8	-12°41.2	Kochab	137°20.8	74°03.3					
17	322°20.2	120°21.9	-6°57.3	81°22.3	-20°59.0	286°54.3	12°41.3	348°39.2	-12°41.1	Alphecca	126°04.9	26°38.1					
18	337°22.7	135°21.7	-6°58.3	96°22.9	-20°59.4	301°57.0	12°41.3	3°41.5	-12°41.1	Antares	112°17.4	-26°29.0					
19	352°25.1	150°21.4	-6°59.4	111°23.5	-20°59.7	316°59.7	12°41.2	18°43.9	-12°41.0	Atria	107°13.0	-69°04.2					
20	7°27.6	165°21.1	-7°00.4	126°24.1	-21°00.1	332°02.4	12°41.1	33°46.3	-12°41.0	Sabik	102°04.2	-15°45.2					
21	22°30.1	180°20.9	-7°01.4	141°24.7	-21°00.5	347°05.1	12°41.0	48°48.6	-12°40.9	Shaula	96°12.1	-37°07.3					
22	37°32.5	195°20.6	-7°02.4	156°25.2	-21°00.8	2°07.9	12°41.0	63°51.0	-12°40.9	Rasalhague	95°59.8	12°32.6					
23	52°35.0	210°20.3	-7°03.4	171°25.8	-21°01.2	17°10.6	12°40.9	78°53.4	-12°40.9	Etamin	90°43.1	51°29.2					
Mer.pass.:19:30			v-0.3 d-1.0 m-4.0			v0.6 d-0.4 m1.5			v2.7 d-0.1 m-2.7			v2.4 d0.0 m0.8					
Wed	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	67°37.5	225°20.0	-7°04.4	186°26.4	-21°01.6	32°13.3	12°40.8	93°55.7	-12°40.8	Kaus Aust.	83°34.1	-34°22.4					
1	82°39.9	240°19.7	-7°05.4	201°27.0	-21°02.0	47°16.0	12°40.7	108°58.1	-12°40.8	Vega	80°34.3	38°48.4					
2	97°42.4	255°19.5	-7°06.4	216°27.6	-21°02.3	62°18.7	12°40.7	124°00.5	-12°40.7	Nunki	75°49.2	-26°16.1					
3	112°44.9	270°19.2	-7°07.4	231°28.2	-21°02.7	77°21.4	12°40.6	139°02.8	-12°40.7	Altair	62°01.2	8°55.9					
4	127°47.3	285°18.9	-7°08.5	246°28.8	-21°03.0	92°24.1	12°40.5	154°05.2	-12°40.7	Peacock	53°07.5	-56°39.7					
5	142°49.8	300°18.6	-7°09.5	261°29.4	-21°03.4	107°26.9	12°40.5	169°07.5	-12°40.6	Deneb	49°26.7	45°22.1					
6	157°52.2	315°18.4	-7°10.5	276°30.0	-21°03.8	122°29.6	12°40.4	184°09.9	-12°40.6	Enif	33°39.8	9°59.1					
7	172°54.7	330°18.1	-7°11.5	291°30.5	-21°04.1	137°32.3	12°40.3	199°12.3	-12°40.5	Alnair	27°34.2	-46°50.9					
8	187°57.2	345°17.8	-7°12.5	306°31.1	-21°04.5	152°35.0	12°40.2	214°14.6	-12°40.5	Fomalhaut	15°15.6	-29°29.9					
9	202°59.6	0°17.5	-7°13.5	321°31.7	-21°04.9	167°37.7	12°40.2	229°17.0	-12°40.4	Scheat	13°46.1	28°12.9					
10	218°02.1	15°17.2	-7°14.5	336°32.3	-21°05.2	182°40.4	12°40.1	244									

Sun				Moon											
Mon	GHA	Dec		GHA	ν	Dec	d	HP							
0	183°09.7	-21°02.0		8°55.1	8.1	22°58.9	9.8	57.9	Lat.	Twilight		Twilight			
1	198°09.5	-21°02.4		23°22.2	8.1	23°08.7	9.7	57.8	72	07:42	09:35	—:—	—:—	14:00	15:53
2	213°09.3	-21°02.9		37°49.2	8.0	23°18.3	9.6	57.8	70	07:26	08:60	—:—	—:—	14:35	16:08
3	228°09.1	-21°03.3		52°16.2	7.9	23°27.8	9.4	57.8	68	07:14	08:34	10:17	13:18	15:01	16:21
4	243°08.9	-21°03.8		66°43.1	7.9	23°37.2	9.3	57.8	66	07:04	08:15	09:35	14:00	15:20	16:31
5	258°08.7	-21°04.3		81°10.0	7.8	23°46.4	9.1	57.7	64	06:55	07:59	09:07	14:28	15:36	16:40
6	273°08.5	-21°04.7		95°36.8	7.8	23°55.4	9.0	57.7	62	06:47	07:46	08:45	14:50	15:49	16:48
7	288°08.3	-21°05.2		110°03.5	7.7	24°04.4	8.8	57.7	60	06:40	07:35	08:28	15:07	16:00	16:55
8	303°08.1	-21°05.6		124°30.2	7.7	24°13.1	8.7	57.7	58	06:34	07:25	08:13	15:22	16:10	17:01
9	318°07.9	-21°06.1		138°56.9	7.6	24°21.8	8.6	57.6	56	06:29	07:16	08:01	15:34	16:19	17:06
10	333°07.7	-21°06.6		153°23.5	7.6	24°30.2	8.4	57.6	54	06:24	07:09	07:50	15:45	16:27	17:12
11	348°07.5	-21°07.0		167°50.0	7.5	24°38.6	8.3	57.6	52	06:19	07:01	07:41	15:55	16:34	17:16
12	3°07.3	-21°07.5		182°16.5	7.5	24°46.8	8.1	57.6	50	06:15	06:55	07:32	16:03	16:40	17:21
13	18°07.1	-21°07.9		196°43.0	7.4	24°54.8	8.0	57.5	45	06:05	06:41	07:14	16:21	16:54	17:31
14	33°06.9	-21°08.4		211°09.4	7.4	25°02.7	7.8	57.5	40	05:56	06:29	06:59	16:36	17:06	17:40
15	48°06.7	-21°08.8		225°35.7	7.3	25°10.4	7.7	57.5	35	05:48	06:19	06:46	16:49	17:17	17:48
16	63°06.5	-21°09.3		240°02.1	7.3	25°18.0	7.5	57.5	30	05:40	06:10	06:35	17:00	17:26	17:55
17	78°06.3	-21°09.8		254°28.3	7.3	25°25.4	7.3	57.4	20	05:26	05:53	06:16	17:19	17:43	18:10
18	93°06.0	-21°10.2		268°54.6	7.2	25°32.7	7.2	57.4	10	05:11	05:37	05:60	17:36	17:58	18:24
19	108°05.8	-21°10.7		283°20.8	7.2	25°39.8	7.0	57.4	0	04:56	05:22	05:44	17:52	18:14	18:40
20	123°05.6	-21°11.1		297°46.9	7.1	25°46.7	6.9	57.4	-10	04:39	05:06	05:28	18:07	18:30	18:57
21	138°05.4	-21°11.6		312°13.1	7.1	25°53.5	6.7	57.3	-20	04:19	04:47	05:11	18:25	18:49	19:17
22	153°05.2	-21°12.0		326°39.2	7.1	26°00.1	6.6	57.3	-30	03:52	04:25	04:52	18:44	19:11	19:44
23	168°05.0	-21°12.5		341°05.2	7.0	26°06.6	6.4	57.3	-35	03:36	04:11	04:40	18:56	19:25	20:00
	SD.=16.2	d=-0.5		S.D.=15.8					-40	03:15	03:55	04:27	19:10	19:41	20:21
									-45	02:49	03:35	04:11	19:26	20:01	20:48
									-50	02:11	03:09	03:51	19:45	20:27	21:26
									-52	01:51	02:57	03:42	19:55	20:40	21:47
									-54	01:23	02:42	03:31	20:06	20:55	22:15
									-56	00:40	02:24	03:19	20:18	21:13	23:02
									-58	—:—	02:02	03:05	20:32	21:36	—:—
									-60	—:—	01:33	02:49	20:49	22:06	—:—
										Moonrise			Moonset		
									Lat.	Mon	Tue	Wed	Mon	Tue	Wed
									72	—:—	—:—	—:—	—:—	—:—	—:—
									70	—:—	—:—	—:—	—:—	—:—	—:—
									68	—:—	—:—	—:—	—:—	—:—	—:—
									66	—:—	—:—	—:—	—:—	—:—	—:—
									64	13:08	—:—	—:—	10:22	—:—	—:—
									62	13:52	13:46	—:—	09:38	11:43	—:—
									60	14:21	14:37	15:17	09:10	10:52	12:11
									58	14:44	15:09	15:54	08:48	10:20	11:33
									56	15:02	15:33	16:21	08:30	09:57	11:07
									54	15:18	15:52	16:42	08:15	09:38	10:46
									52	15:31	16:08	16:59	08:02	09:21	10:29
									50	15:43	16:22	17:14	07:50	09:08	10:14
									45	16:08	16:51	17:44	07:26	08:39	09:44
									40	16:28	17:14	18:08	07:07	08:17	09:20
									35	16:45	17:33	18:27	06:52	07:59	09:01
									30	16:59	17:49	18:44	06:38	07:43	08:44
									20	17:24	18:16	19:12	06:15	07:16	08:16
									10	17:45	18:40	19:36	05:55	06:54	07:52
									0	18:05	19:02	19:58	05:36	06:32	07:29
									-10	18:25	19:24	20:21	05:18	06:11	07:07
									-20	18:47	19:48	20:45	04:58	05:48	06:42
									-30	19:12	20:16	21:13	04:35	05:22	06:14
									-35	19:27	20:32	21:30	04:22	05:06	05:58
									-40	19:45	20:51	21:49	04:06	04:48	05:38
									-45	20:06	21:15	22:13	03:48	04:27	05:15
									-50	20:32	21:45	22:43	03:26	03:59	04:44
									-52	20:45	21:59	22:58	03:15	03:46	04:29
									-54	21:00	22:17	23:16	03:03	03:31	04:12
									-56	21:18	22:38	23:37	02:49	03:13	03:51
									-58	21:39	23:04	—:—	02:33	02:51	03:25
									-60	22:07	23:41	—:—	02:14	02:23	02:47
										Sun			Moon		
									Day	Eqn. of Time	Mer.		Mer. Pass.		Age
										00 ^h	12 ^h	Pass	Upper	Lower	
									27	12:39	12:29	11:47	00:18	11:50	14(100%)
									28	12:19	12:09	11:47	00:18	12:47	15(98%)
									29	11:59	11:49	11:48	01:15	13:43	16(95%)
										</					

November 30, 01 ,02 (Thu., Fri., Sat.)

Aries				Venus				Mars				Jupiter				Saturn				Stars			
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec						
0	68°36.6	225°13.3	-7°28.7	186°40.5	-21°10.3	33°18.4	12°39.1	94°52.4	-12°39.8	Alpheratz	357°35.6	29°13.5											
1	83°39.1	240°13.0	-7°29.7	201°41.1	-21°10.7	48°21.1	12°39.0	109°54.8	-12°39.7	Ankaa	353°07.9	-42°10.8											
2	98°41.5	255°12.7	-7°30.7	216°41.7	-21°11.0	63°23.8	12°38.9	124°57.2	-12°39.7	Schedar	349°31.8	56°40.3											
3	113°44.0	270°12.4	-7°31.7	231°42.2	-21°11.4	78°26.5	12°38.9	139°59.5	-12°39.7	Diphda	348°47.9	-17°51.4											
4	128°46.5	285°12.1	-7°32.7	246°42.8	-21°11.7	93°29.2	12°38.8	155°01.9	-12°39.6	Achernar	335°20.5	-57°07.1											
5	143°48.9	300°11.9	-7°33.7	261°43.4	-21°12.1	108°31.9	12°38.7	170°04.2	-12°39.6	Hamal	327°52.0	23°34.6											
6	158°51.4	315°11.6	-7°34.7	276°44.0	-21°12.5	123°34.6	12°38.7	185°06.6	-12°39.5	Polaris	314°02.2	89°22.0											
7	173°53.9	330°11.3	-7°35.7	291°44.6	-21°12.8	138°37.3	12°38.6	200°09.0	-12°39.5	Akamar	315°12.1	-40°12.6											
8	188°56.3	345°11.0	-7°36.7	306°45.1	-21°13.2	153°40.0	12°38.5	215°11.3	-12°39.4	Menkar	314°06.8	4°11.1											
9	203°58.8	0°10.7	-7°37.7	321°45.7	-21°13.5	168°42.7	12°38.5	230°13.7	-12°39.4	Mirfak	308°29.1	49°56.8											
10	219°01.2	15°10.4	-7°38.7	336°46.3	-21°13.9	183°45.4	12°38.4	245°16.0	-12°39.4	Aldebaran	290°40.4	16°33.5											
11	234°03.7	30°10.1	-7°39.7	351°46.9	-21°14.2	198°48.1	12°38.3	260°18.4	-12°39.3	Rigel	281°04.4	-8°10.4											
12	249°06.2	45°09.8	-7°40.8	6°47.5	-21°14.6	213°50.8	12°38.2	275°20.8	-12°39.3	Capella	280°22.8	46°01.4											
13	264°08.6	60°09.5	-7°41.8	21°48.1	-21°15.0	228°53.5	12°38.2	290°23.1	-12°39.2	Bellatrix	278°23.5	6°22.3											
14	279°11.1	75°09.2	-7°42.8	36°48.6	-21°15.3	243°56.2	12°38.1	305°25.5	-12°39.2	Elnath	278°02.7	28°37.7											
15	294°13.6	90°08.9	-7°43.8	51°49.2	-21°15.7	258°58.9	12°38.0	320°27.8	-12°39.1	Alnilam	275°38.4	-1°11.1											
16	309°16.0	105°08.7	-7°44.8	66°49.8	-21°16.0	274°01.7	12°38.0	335°30.2	-12°39.1	Betelgeuse	270°52.8	7°24.7											
17	324°18.5	120°08.4	-7°45.8	81°50.4	-21°16.4	289°04.4	12°37.9	350°32.5	-12°39.0	Canopus	263°52.3	-52°42.3											
18	339°21.0	135°08.1	-7°46.8	96°51.0	-21°16.7	304°07.1	12°37.8	5°34.9	-12°39.0	Sirius	258°26.7	-16°44.6											
19	354°23.4	150°07.8	-7°47.8	111°51.5	-21°17.1	319°09.8	12°37.8	20°37.3	-12°39.0	Adara	255°06.3	-29°00.1											
20	9°25.9	165°07.5	-7°48.8	126°52.1	-21°17.4	334°12.5	12°37.7	35°39.6	-12°38.9	Procyon	244°51.5	5°10.0											
21	24°28.4	180°07.2	-7°49.8	141°52.7	-21°17.8	349°15.2	12°37.6	50°42.0	-12°38.9	Pollux	243°18.1	27°58.1											
22	39°30.8	195°06.9	-7°50.8	156°53.3	-21°18.1	4°17.9	12°37.5	65°44.3	-12°38.8	Avior	234°14.8	-59°34.8											
23	54°33.3	210°06.6	-7°51.8	171°53.8	-21°18.5	19°20.6	12°37.5	80°46.7	-12°38.8	Suhail	222°46.8	-43°31.4											
Mer.pass.:19:22				v-0.3 d-1.0 m-4.0				v0.6 d-0.4 m1.5				v2.7 d-0.1 m-2.7				v2.4 d0.0 m0.9							

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec										
0	69°35.7	225°06.3	-7°52.9	186°54.4	-21°18.8	34°23.3	12°37.4	95°49.0	-12°38.7										
1	84°38.2	240°06.0	-7°53.9	201°55.0	-21°19.2	49°26.0	12°37.3	110°51.4	-12°38.7										
2	99°40.7	255°05.7	-7°54.9	216°55.6	-21°19.5	64°28.7	12°37.3	125°53.8	-12°38.6										
3	114°43.1	270°05.4	-7°55.9	231°56.2	-21°19.9	79°31.4	12°37.2	140°56.1	-12°38.6										
4	129°45.6	285°05.1	-7°56.9	246°56.7	-21°20.2	94°34.1	12°37.1	155°58.5	-12°38.6										
5	144°48.1	300°04.8	-7°57.9	261°57.3	-21°20.6	109°36.8	12°37.1	171°00.8	-12°38.5										
6	159°50.5	315°04.5	-7°58.9	276°57.9	-21°20.9	124°39.5	12°37.0	186°03.2	-12°38.5										
7	174°53.0	330°04.2	-7°59.9	291°58.5	-21°21.3	139°42.2	12°36.9	201°05.5	-12°38.4										
8	189°55.5	345°03.9	-8°00.9	306°59.0	-21°21.6	154°44.9	12°36.9	216°07.9	-12°38.4										
9	204°57.9	0°03.6	-8°01.9	321°59.6	-21°22.0	169°47.6	12°36.8	231°10.3	-12°38.3										
10	220°00.4	15°03.3	-8°02.9	337°00.2	-21°22.3	184°50.3	12°36.7	246°12.6	-12°38.3										
11	235°02.8	30°03.0	-8°03.9	352°00.8	-21°22.7	199°53.0	12°36.7	261°15.0	-12°38.2										
12	250°05.3	45°02.7	-8°04.9	7°01.3	-21°23.0	214°55.7	12°36.6	276°17.3	-12°38.2										
13	265°07.8	60°02.4	-8°05.9	22°01.9	-21°23.4	229°58.4	12°36.5	291°19.7	-12°38.1										
14	280°10.2	75°02.1	-8°06.9	37°02.5	-21°23.7	245°01.1	12°36.4	306°22.0	-12°38.1										
15	295°12.7	90°01.8	-8°07.9	52°03.1	-21°24.1	260°03.8	12°36.4	321°24.4	-12°38.1										
16	310°15.2	105°01.5	-8°09.0	67°03.6	-21°24.4	275°06.5	12°36.3	336°26.7	-12°38.0										
17	325°17.6	120°01.2	-8°10.0	82°04.2	-21°24.8	290°09.2	12°36.2	351°29.1	-12°38.0										
18	340°20.1	135°00.9	-8°11.0	97°04.8	-21°25.1	305°11.9	12°36.2	6°31.5	-12°37.9										
19	355°22.6	150°00.6	-8°12.0	112°05.3	-21°25.5	320°14.6	12°36.1	21°33.8	-12°37.9										
20	10°25.0	165°00.3	-8°13.0	127°05.9	-21°25.8	335°17.3	12°36.0	36°36.2	-12°37.8										
21	25°27.5	179°00.0	-8°14.0	142°06.5	-21°26.2	350°20.0	12°36.0	51°38.5	-12°37.8										
22	40°30.0	194°59.7	-8°15.0	157°07.1	-21°26.5	5°22.7	12°35.9	66°40.9	-12°37.7										
23	55°32.4	209°59.4	-8°16.0	172°07.6	-21°26.8	20°25.4	12°35.8	81°43.2	-12°37.7										
Mer.pass.:19:18				v-0.3 d-1.0 m-4.0				v0.6 d-0.4 m1.5				v2.7 d-0.1 m-2.7				v2.4 d0.0 m0.9			

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec										
0	70°34.9	224°59.1	-8°17.0	187°08.2	-21°27.2	35°28.1	12°35.8	96°45.6	-12°37.6										
1	85°37.3	239°58.8	-8°18.0	202°08.8	-21°27.5	50°30.7	12°35.7	111°47.9	-12°37.6										
2	100°39.8	254°58.5	-8°19.0	217°09.4	-21°27.9	65°33.4	12°35.6	126°50.3	-12°37.5										
3	115°42.3	269°58.2	-8°20.0	232°09.9	-21°28.2	80°36.1	12°35.6	141°52.6	-12°37.5										
4	130°44.7	284°57.8	-8°21.0	247°10.5	-21°28.6	95°38.8	12°35.5	156°55.0	-12°37.5										
5	145°47.2	299°57.5	-8°22.0	262°11.1	-21°28.9	110°41.5	12°35.4	171°57.3	-12°37.4										
6	160°49.7	314°57.2	-8°23.0	277°11.6	-21°29.2	125°44.2	12°35.4	186°59.7	-12°37.4										
7	175°52.1	329°56.9	-8°24.0	292°12.2	-21°29.6	140°46.9	12°35.3	202°02.0	-12°37.3										
8	190°54.6	344°56.6	-8°25.0	307°12.8	-21°29.9	155°49.6	12°35.2	217°04.4	-12°37.3										
9	205°57.1	359°56.3	-8°26.0	322°13.3	-21°30.3	170°52.3	12°35.2	232°06.7	-12°37.2										
10	220°59.5	14°56.0	-8°27.0	337°13.9	-21°30.6	185°55.0	12°35.1	247°09.1	-12°37.2										
11	236°02.0	29°55.7	-8°28.0	352°14.5	-21°31.0	200°57.7	12°35.0	262°11.5	-12°37.1										
12	251°04.5	44°55.4	-8°29.0	7°15.1	-21°31.3	216°00.4	12°35.0	277°13.8	-12°37.1										
13	266°06.9	59°55.1	-8°30.0	22°15.6	-21°31.6	231°03.1	12°34.9	292°16.2	-12°37.0										
14	281°09.4	74°54.7	-8°31.0	37°16.2	-21°32.0	246°05.8	12°34.8	307°18.5	-12°37.0										
15	296°11.8	89°54.4	-8°32.0	52°16.8	-21°32.3	261°08.5	12°34.8	322°20.9	-12°36.9										
16	311°14.3	104°54.1	-8°33.0	67°17.3	-21°32.6	276°11.2	12°34.7	337°23.2	-12°36.9										
17	326°16.8	119°53.8	-8°34.0	82°17.9	-21°33.0	291°13.8	12°34.7	352°25.6	-12°36.8										
18	341°19.2	134°53.5	-8°35.1	97°18.5	-21°33.3	306°16.5	12°34.6	7°27.9	-12°36.8										
19	356°21.7	149°53.2	-8°36.1	112°19.0	-21°33.7	321°19.2	12°34.5	22°30.3	-12°36.7										
20	11°24.2	164°52.9	-8°37.1	127°19.6	-21°34.0	336°21.9	12°34.5	37°32.6	-12°36.7										
21	26°26.6	179°52.5	-8°38.1	142°20.2	-21°34.3	351°24.6	12°34.4	52°35.0	-12°36.7										
22	41°29.1	194°52.2	-8°39.1	157°20.7	-21°34.7	6°27.3	12°34.3	67°37.3	-12°36.6										
23	56°31.6	209°51.9	-8°40.1	172°21.3	-21°35.0	21°30.0	12°34.3	82°39.7	-12°36.6										
Mer.pass.:19:14				v-0.3 d-1.0 m-4.0				v0.6 d-0.3 m1.5				v2.7 d-0.1 m-2.7				v2.4 d0.0 m0.9			

Alpheratz	357°35.6	29°13.5
Ankaa	353°07.9	-42°10.8
Schedar	349°31.8	56°40.3
Diphda	348°47.9	-17°51.4
Achernar	335°20.5</	

Sun			Moon											
Thu	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	182°54.5	-21°33.6	328°15.5	7.5	28°04.6	-1.5	56.0	72	07:50	09:49	—:—	—:—	13:48	15:47
1	197°54.3	-21°34.0	342°42.0	7.6	28°03.0	-1.7	55.9	70	07:34	09:10	—:—	—:—	14:27	16:03
2	212°54.1	-21°34.4	357°08.6	7.6	28°01.2	-1.9	55.9	68	07:21	08:43	10:34	13:03	14:54	16:16
3	227°53.9	-21°34.8	11°35.3	7.7	27°59.3	-2.0	55.9	66	07:10	08:22	09:46	13:52	15:15	16:27
4	242°53.7	-21°35.3	26°02.0	7.8	27°57.2	-2.2	55.9	64	07:01	08:06	09:15	14:22	15:32	16:37
5	257°53.4	-21°35.7	40°28.8	7.8	27°55.0	-2.3	55.8	62	06:52	07:52	08:52	14:45	15:45	16:45
6	272°53.2	-21°36.1	54°55.7	7.9	27°52.6	-2.5	55.8	60	06:45	07:40	08:34	15:03	15:57	16:52
7	287°53.0	-21°36.5	69°22.6	7.9	27°50.0	-2.6	55.8	58	06:39	07:30	08:19	15:18	16:07	16:58
8	302°52.8	-21°36.9	83°49.5	8.0	27°47.4	-2.8	55.8	56	06:33	07:21	08:06	15:31	16:17	17:04
9	317°52.5	-21°37.3	98°16.6	8.1	27°44.5	-2.9	55.7	54	06:28	07:13	07:55	15:42	16:25	17:10
10	332°52.3	-21°37.7	112°43.7	8.1	27°41.5	-3.1	55.7	52	06:23	07:06	07:45	15:52	16:32	17:15
11	347°52.1	-21°38.1	127°10.9	8.2	27°38.4	-3.2	55.7	50	06:18	06:59	07:36	16:01	16:39	17:19
12	2°51.9	-21°38.5	141°38.1	8.3	27°35.1	-3.3	55.7	45	06:08	06:44	07:17	16:20	16:53	17:30
13	17°51.6	-21°38.9	156°05.4	8.3	27°31.7	-3.5	55.6	40	05:59	06:32	07:02	16:35	17:05	17:39
14	32°51.4	-21°39.3	170°32.8	8.4	27°28.2	-3.6	55.6	35	05:50	06:22	06:49	16:48	17:16	17:47
15	47°51.2	-21°39.7	185°00.3	8.5	27°24.4	-3.8	55.6	30	05:42	06:12	06:38	16:60	17:26	17:55
16	62°51.0	-21°40.1	199°27.8	8.6	27°20.6	-3.9	55.6	20	05:27	05:55	06:18	17:19	17:43	18:10
17	77°50.7	-21°40.5	213°55.4	8.6	27°16.6	-4.1	55.5	10	05:13	05:39	06:01	17:36	17:59	18:25
18	92°50.5	-21°40.9	228°23.1	8.7	27°12.5	-4.2	55.5	0	04:57	05:23	05:45	17:53	18:15	18:41
19	107°50.3	-21°41.3	242°50.8	8.8	27°08.2	-4.3	55.5	-10	04:40	05:06	05:29	18:09	18:32	18:58
20	122°50.1	-21°41.7	257°18.7	8.9	27°03.8	-4.5	55.5	-20	04:19	04:47	05:12	18:26	18:51	19:19
21	137°49.8	-21°42.1	271°46.6	9.0	26°59.3	-4.6	55.4	-30	03:52	04:24	04:51	18:47	19:14	19:46
22	152°49.6	-21°42.5	286°14.6	9.0	26°54.6	-4.7	55.4	-35	03:35	04:10	04:39	18:59	19:28	20:04
23	167°49.4	-21°42.9	300°42.7	9.1	26°49.8	-4.9	55.4	-40	03:14	03:54	04:26	19:13	19:45	20:25
SD.=16.2 d=-0.4 S.D.=15.3														
Fri	GHA	Dec	GHA	ν	Dec	d	HP							
0	182°49.2	-21°43.3	315°10.8	9.2	26°44.8	-5.0	55.4	-52	01:45	02:53	03:39	19:59	20:46	21:54
1	197°48.9	-21°43.7	329°39.1	9.3	26°39.7	-5.1	55.4	-54	01:15	02:38	03:28	20:10	21:01	22:25
2	212°48.7	-21°44.1	344°07.4	9.4	26°34.5	-5.3	55.3	-56	00:20	02:19	03:16	20:23	21:20	23:28
3	227°48.5	-21°44.5	358°35.8	9.4	26°29.2	-5.4	55.3	-58	—:—	01:56	03:01	20:38	21:44	—:—
4	242°48.2	-21°44.9	13°04.3	9.5	26°23.7	-5.5	55.3	-60	—:—	01:24	02:44	20:55	22:17	—:—
5	257°48.0	-21°45.3	27°32.8	9.6	26°18.1	-5.7	55.3							
6	272°47.8	-21°45.7	42°01.5	9.7	26°12.4	-5.8	55.2	Lat.	Moonrise			Moonset		
7	287°47.6	-21°46.1	56°30.2	9.8	26°06.5	-5.9	55.2	72	—:—	—:—	—:—	—:—	—:—	—:—
8	302°47.3	-21°46.5	70°59.1	9.9	26°00.5	-6.0	55.2	70	—:—	—:—	—:—	—:—	—:—	—:—
9	317°47.1	-21°46.9	85°28.0	10.0	25°54.4	-6.2	55.2	68	—:—	—:—	17:11	—:—	—:—	15:44
10	332°46.9	-21°47.3	99°57.0	10.0	25°48.2	-6.3	55.2	66	—:—	—:—	18:18	—:—	—:—	14:36
11	347°46.6	-21°47.7	114°26.1	10.1	25°41.8	-6.4	55.1	64	—:—	16:44	18:53	—:—	14:29	14:00
12	2°46.4	-21°48.1	128°55.3	10.2	25°35.4	-6.5	55.1	62	15:38	17:33	19:18	13:45	13:39	13:34
13	17°46.2	-21°48.4	143°24.5	10.3	25°28.8	-6.7	55.1	60	16:32	18:04	19:38	12:51	13:07	13:14
14	32°45.9	-21°48.8	157°53.9	10.4	25°22.1	-6.8	55.1	58	17:04	18:27	19:54	12:19	12:44	12:57
15	47°45.7	-21°49.2	172°23.3	10.5	25°15.2	-6.9	55.0	56	17:28	18:46	20:08	11:55	12:25	12:42
16	62°45.5	-21°49.6	186°52.9	10.6	25°08.3	-7.0	55.0	54	17:47	19:02	20:20	11:36	12:08	12:30
17	77°45.2	-21°50.0	201°22.5	10.7	25°01.2	-7.1	55.0	52	18:03	19:15	20:30	11:19	11:55	12:19
18	92°45.0	-21°50.4	215°52.2	10.8	24°54.0	-7.2	55.0	50	18:17	19:27	20:39	11:05	11:42	12:09
19	107°44.8	-21°50.8	230°22.0	10.9	24°46.8	-7.3	55.0	45	18:45	19:52	20:59	10:36	11:17	11:49
20	122°44.5	-21°51.1	244°51.9	10.9	24°39.3	-7.5	54.9	40	19:08	20:11	21:15	10:13	10:57	11:32
21	137°44.3	-21°51.5	259°21.9	11.0	24°31.8	-7.6	54.9	35	19:26	20:27	21:28	09:55	10:40	11:18
22	152°44.1	-21°51.9	273°52.0	11.1	24°24.2	-7.7	54.9	30	19:42	20:41	21:39	09:38	10:25	11:05
23	167°43.8	-21°52.3	288°22.2	11.2	24°16.5	-7.8	54.9	20	20:09	21:05	21:59	09:11	10:00	10:44
SD.=16.2 d=-0.4 S.D.=15.1														
Sat	GHA	Dec	GHA	ν	Dec	d	HP							
0	182°43.6	-21°52.7	302°52.4	11.3	24°08.6	-7.9	54.9	-10	21:14	22:03	22:48	08:03	08:58	09:50
1	197°43.4	-21°53.0	317°22.8	11.4	24°00.7	-8.0	54.9	-20	21:37	22:24	23:05	07:39	08:36	09:31
2	212°43.1	-21°53.4	331°53.2	11.5	23°52.7	-8.1	54.8	-30	22:04	22:47	23:24	07:11	08:10	09:10
3	227°42.9	-21°53.8	346°23.8	11.6	23°44.5	-8.2	54.8	-35	22:19	23:01	23:35	06:55	07:55	08:57
4	242°42.7	-21°54.2	0°54.4	11.7	23°36.2	-8.3	54.8	-40	22:38	23:16	23:48	06:36	07:38	08:42
5	257°42.4	-21°54.6	15°25.1	11.8	23°27.9	-8.4	54.8	-45	22:59	23:35	—:—	06:12	07:17	08:24
6	272°42.2	-21°54.9	29°55.9	11.8	23°19.4	-8.5	54.8	-50	23:27	23:58	—:—	05:42	06:50	08:02
7	287°41.9	-21°55.3	44°26.8	11.9	23°10.9	-8.6	54.8	-52	23:40	—:—	00:10	05:27	06:37	07:51
8	302°41.7	-21°55.7	58°57.8	12.0	23°02.2	-8.7	54.7	-54	23:56	—:—	00:22	05:10	06:21	07:39
9	317°41.5	-21°56.1	73°28.9	12.1	22°53.4	-8.8	54.7	-56	—:—	00:14	00:37	04:49	06:03	07:25
10	332°41.2	-21°56.4	88°00.0	12.2	22°44.6	-8.9	54.7	-58	00:03	00:36	00:53	04:23	05:42	07:09
11	347°41.0	-21°56.8	102°31.3	12.3	22°35.6	-9.0	54.7	-60	00:41	01:05	01:14	03:45	05:13	06:49
12	2°40.8	-21°57.2	117°02.6	12.4	22°26.6	-9.1	54.7							
13	17°40.5	-21°57.5	131°34.0	12.5	22°17.5	-9.2	54.7	Sun			Moon			
14	32°40.3	-21°57.9	146°05.5	12.6	22°08.2	-9.3	54.6	Day	Eqn.of Time	Mer.	Mer.Pass.	Age		
15	47°40.0	-21°58.3	160°37.1	12.6	21°58.9	-9.4	54.6	00 ^h	12 ^h	Pass	Upper	Lower		
16	62°39.8	-21°58.7	175°08.8	12.7	21°49.5	-9.5	54.6	30	11:38	11:28	11:48	02:11	14:39	17(90%)
17	77°39.6	-21°59.0	189°40.6	12.8	21°40.0	-9.5	54.6	1	11:17	11:06	11:48	03:05	15:31	18(83%)
18	92°39.3	-21°59.4	204°12.5	12.9	21°30.4	-9.6	54.6	2	10:55	10:43	11:49	03:56	16:20	19(75%)
19	107°39.1	-21°59.8	218°44.4	13.0	21°20.7	-9.7	54.6							
20	122°38.8	-22°00.1	233°16.5	13.1	21°11.0	-9.8	54.6							
21	137°38.6	-22°00.5	247°48.6	13.2	21°01.1	-9.9	54.5							
22	152°38.4	-22°00.9	262°20.8	13.2	20°51.2	-10.0	54.5							
23	167°38.1	-22°01.2	276°53.1	13.3	20°41.2	-10.1	54.5							
SD.=16.2 d=-0.4 S.D.=15.0														

December 03, 04 ,05 (Sun., Mon., Tue.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Sun	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	71°34.0	224°51.6	-8°41.1	187°21.9	-21°35.3	36°32.7	12°34.2	97°42.0	-12°36.5	Alpheratz	357°35.6	29°13.5					
1	86°36.5	239°51.3	-8°42.1	202°22.4	-21°35.7	51°35.4	12°34.1	112°44.4	-12°36.5	Ankaa	353°07.9	-42°10.8					
2	101°39.0	254°51.0	-8°43.1	217°23.0	-21°36.0	66°38.1	12°34.1	127°46.7	-12°36.4	Schedar	349°31.8	56°40.4					
3	116°41.4	269°50.6	-8°44.1	232°23.6	-21°36.3	81°40.7	12°34.0	142°49.1	-12°36.4	Diphda	348°48.0	-17°51.4					
4	131°43.9	284°50.3	-8°45.1	247°24.1	-21°36.7	96°43.4	12°33.9	157°51.4	-12°36.3	Achernar	335°20.5	-57°07.1					
5	146°46.3	299°50.0	-8°46.1	262°24.7	-21°37.0	111°46.1	12°33.9	172°53.8	-12°36.3	Hamal	327°52.0	23°34.6					
6	161°48.8	314°49.7	-8°47.1	277°25.3	-21°37.4	126°48.8	12°33.8	187°56.1	-12°36.2	Polaris	314°02.7	89°22.0					
7	176°51.3	329°49.4	-8°48.1	292°25.8	-21°37.7	141°51.5	12°33.7	202°58.5	-12°36.2	Akamar	315°12.1	-40°12.6					
8	191°53.7	344°49.0	-8°49.1	307°26.4	-21°38.0	156°54.2	12°33.7	218°00.8	-12°36.1	Menkar	314°06.8	4°11.1					
9	206°56.2	359°48.7	-8°50.1	322°26.9	-21°38.4	171°56.9	12°33.6	233°03.1	-12°36.1	Mirfak	308°29.1	49°56.9					
10	221°58.7	14°48.4	-8°51.1	337°27.5	-21°38.7	186°59.6	12°33.6	248°05.5	-12°36.0	Aldebaran	290°40.3	16°33.5					
11	237°01.1	29°48.1	-8°52.1	352°28.1	-21°39.0	202°02.2	12°33.5	263°07.8	-12°36.0	Rigel	281°04.4	-8°10.4					
12	252°03.6	44°47.8	-8°53.1	7°28.6	-21°39.3	217°04.9	12°33.4	278°10.2	-12°35.9	Capella	280°22.8	46°01.4					
13	267°06.1	59°47.4	-8°54.1	22°29.2	-21°39.7	232°07.6	12°33.4	293°12.5	-12°35.9	Bellatrix	278°23.5	6°22.3					
14	282°08.5	74°47.1	-8°55.1	37°29.8	-21°40.0	247°10.3	12°33.3	308°14.9	-12°35.8	Elnath	278°02.7	28°37.7					
15	297°11.0	89°46.8	-8°56.1	52°30.3	-21°40.3	262°13.0	12°33.2	323°17.2	-12°35.8	Alnilam	275°38.3	-1°11.1					
16	312°13.4	104°46.5	-8°57.1	67°30.9	-21°40.7	277°15.7	12°33.2	338°19.6	-12°35.7	Betelgeuse	270°52.8	7°24.7					
17	327°15.9	119°46.1	-8°58.1	82°31.4	-21°41.0	292°18.4	12°33.1	353°21.9	-12°35.7	Canopus	263°52.3	-52°42.3					
18	342°18.4	134°45.8	-8°59.1	97°32.0	-21°41.3	307°21.0	12°33.1	8°24.3	-12°35.6	Sirius	258°26.7	-16°44.6					
19	357°20.8	149°45.5	-9°00.1	112°32.6	-21°41.7	322°23.7	12°33.0	23°26.6	-12°35.6	Adara	255°06.3	-29°00.1					
20	12°23.3	164°45.2	-9°01.1	127°33.1	-21°42.0	337°26.4	12°32.9	38°29.0	-12°35.5	Procyon	244°51.5	5°10.0					
21	27°25.8	179°44.8	-9°02.1	142°33.7	-21°42.3	352°29.1	12°32.9	53°31.3	-12°35.5	Pollux	243°18.1	27°58.1					
22	42°28.2	194°44.5	-9°03.0	157°34.3	-21°42.6	7°31.8	12°32.8	68°33.7	-12°35.4	Avior	234°14.7	-59°34.8					
23	57°30.7	209°44.2	-9°04.0	172°34.8	-21°43.0	22°34.5	12°32.7	83°36.0	-12°35.4	Suhail	222°46.8	-43°31.4					
Mer.pass.:19:10			v-0.3 d-1.0 m-4.0			v0.6 d-0.3 m1.5			v2.7 d-0.1 m-2.6			v2.3 d0.0 m0.9					
Mon	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec							
0	72°33.2	224°43.9	-9°05.0	187°35.4	-21°43.3	37°37.1	12°32.7	98°38.4	-12°35.4	Dubhe	193°42.1	61°37.1					
1	87°35.6	239°43.5	-9°06.0	202°35.9	-21°43.6	52°39.8	12°32.6	113°40.7	-12°35.3	Denebola	182°25.9	14°26.3					
2	102°38.1	254°43.2	-9°07.0	217°36.5	-21°44.0	67°42.5	12°32.6	128°43.0	-12°35.3	Gienah	175°44.6	-17°40.3					
3	117°40.6	269°42.9	-9°08.0	232°37.1	-21°44.3	82°45.2	12°32.5	143°45.4	-12°35.2	Acrux	173°01.5	-63°13.6					
4	132°43.0	284°42.5	-9°09.0	247°37.6	-21°44.6	97°47.9	12°32.4	158°47.7	-12°35.2	Gacrux	171°53.0	-57°14.5					
5	147°45.5	299°42.2	-9°10.0	262°38.2	-21°44.9	112°50.5	12°32.4	173°50.1	-12°35.1	Alioth	166°14.1	55°49.6					
6	162°47.9	314°41.9	-9°11.0	277°38.7	-21°45.3	127°53.2	12°32.3	188°52.4	-12°35.1	Spica	158°23.5	-11°17.0					
7	177°50.4	329°41.6	-9°12.0	292°39.3	-21°45.6	142°55.9	12°32.2	203°54.8	-12°35.0	Alcaid	152°53.1	49°11.5					
8	192°52.9	344°41.2	-9°13.0	307°39.8	-21°45.9	157°58.6	12°32.2	218°57.1	-12°35.0	Hadar	148°37.9	-60°29.0					
9	207°55.3	359°40.9	-9°14.0	322°40.4	-21°46.2	173°01.3	12°32.1	233°59.5	-12°34.9	Menkent	147°59.1	-36°29.1					
10	222°57.8	14°40.6	-9°15.0	337°41.0	-21°46.6	188°04.0	12°32.1	249°01.8	-12°34.9	Arcturus	145°48.9	19°03.7					
11	238°00.3	29°40.2	-9°16.0	352°41.5	-21°46.9	203°06.6	12°32.0	264°04.1	-12°34.8	Rigel Kent.	139°42.2	-60°55.8					
12	253°02.7	44°39.9	-9°17.0	7°42.1	-21°47.2	218°09.3	12°31.9	279°06.5	-12°34.8	Zubenelg.	136°57.4	-16°08.4					
13	268°05.2	59°39.6	-9°18.0	22°42.6	-21°47.5	233°12.0	12°31.9	294°08.8	-12°34.7	Kochab	137°20.8	74°03.2					
14	283°07.7	74°39.2	-9°19.0	37°43.2	-21°47.9	248°14.7	12°31.8	309°11.2	-12°34.7	Alphecca	126°04.9	26°38.0					
15	298°10.1	89°38.9	-9°20.0	52°43.7	-21°48.2	263°17.3	12°31.8	324°13.5	-12°34.6	Antares	112°17.3	-26°29.0					
16	313°12.6	104°38.6	-9°21.0	67°44.3	-21°48.5	278°20.0	12°31.7	339°15.9	-12°34.6	Atria	107°13.0	-69°04.2					
17	328°15.1	119°38.2	-9°22.0	82°44.9	-21°48.8	293°22.7	12°31.6	354°18.2	-12°34.5	Sabik	102°04.2	-15°45.2					
18	343°17.5	134°37.9	-9°23.0	97°45.4	-21°49.1	308°25.4	12°31.6	9°20.6	-12°34.5	Shaula	96°12.1	-37°07.2					
19	358°20.0	149°37.6	-9°24.0	112°46.0	-21°49.5	323°28.1	12°31.5	24°22.9	-12°34.4	Rasalhague	95°59.8	12°32.6					
20	13°22.4	164°37.2	-9°25.0	127°46.5	-21°49.8	338°30.7	12°31.4	39°25.2	-12°34.4	Etamin	90°43.1	51°29.2					
21	28°24.9	179°36.9	-9°25.9	142°47.1	-21°50.1	353°33.4	12°31.4	54°27.6	-12°34.3	Kaus Aust.	83°34.1	-34°22.4					
22	43°27.4	194°36.5	-9°26.9	157°47.6	-21°50.4	8°36.1	12°31.3	69°29.9	-12°34.3	Vega	80°34.3	38°48.4					
23	58°29.8	209°36.2	-9°27.9	172°48.2	-21°50.7	23°38.8	12°31.3	84°32.3	-12°34.2	Nunki	75°49.2	-26°16.1					
Mer.pass.:19:06			v-0.3 d-1.0 m-4.0			v0.6 d-0.3 m1.5			v2.7 d-0.1 m-2.6			v2.3 d0.0 m0.9					
Tue	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec							
0	73°32.3	224°35.9	-9°28.9	187°48.7	-21°51.1	38°41.4	12°31.2	99°34.6	-12°34.2	Enif	33°39.8	9°59.1					
1	88°34.8	239°35.5	-9°29.9	202°49.3	-21°51.4	53°44.1	12°31.1	114°36.9	-12°34.1	Alnair	27°34.2	-46°50.9					
2	103°37.2	254°35.2	-9°30.9	217°49.9	-21°51.7	68°46.8	12°31.1	129°39.3	-12°34.1	Fomalhaut	15°15.6	-29°29.9					
3	118°39.7	269°34.8	-9°31.9	232°50.4	-21°52.0	83°49.5	12°31.0	144°41.6	-12°34.0	Scheat	13°46.1	28°12.9					
4	133°42.2	284°34.5	-9°32.9	247°51.0	-21°52.3	98°52.1	12°31.0	159°44.0	-12°34.0	Markab	13°30.8	15°20.1					
5	148°44.6	299°34.2	-9°33.9	262°51.5	-21°52.7	113°54.8	12°30.9	174°46.3	-12°33.9	2023/12/	SHA	Mer.pass					
6	163°47.1	314°33.8	-9°34.9	277°52.1	-21°53.0	128°57.5	12°30.8	189°48.7	-12°33.9	Venus	153°17.6	09:01					
7	178°49.5	329°33.5	-9°35.9	292°52.6	-21°53.3	144°00.2	12°30.8	204°51.0	-12°33.8	Mars	115°47.8	11:30					
8	193°52.0	344°33.1	-9°36.9	307°53.2	-21°53.6	159°02.8	12°30.7	219°53.3	-12°33.8	Jupiter	324°58.7	21:30					
9	208°54.5	359°32.8	-9°37.9	322°53.7	-21°53.9	174°05.5	12°30.7	234°55.7	-12°33.7	Saturn	26°08.0	17:26					
10	223°56.9	14°32.5	-9°38.8	337°54.3	-21°54.2	189°08.2	12°30.6	249°58.0	-12°33.7	2023/12/	SHA	Mer.pass					
11	238°59.4	29°32.1	-9°39.8	352°54.8	-21°54.6	204°10.9	12°30.6	265°00.4	-12°33.6	Venus	152°10.7	09:01					
12	254°01.9	44°31.8	-9°40.8	7°55.4	-21°54.9	219°13.5	12°30.5	280°02.7	-12°33.5	Mars	115°02.2	11:29					
13	269°04.3	59°31.4	-9°41.8	22°55.9	-21°55.2	234°16.2	12°30.4	295°05.0	-12°33.5	Jupiter	325°04.0	21:26					
14	284°06.8	74°31.1	-9°42.8	37°56.5	-21°55.5	249°18.9	12°30.4	310°07.4	-12°33.4	Saturn	26°05.2	17:23					
15	299°09.3	89°30.7	-9°43.8	52°57.0	-21°55.8	264°21.6	12°30.3	325°09.7	-12°33.4	2023/12/	SHA	Mer.pass					
16	314°11.7	104°30.4	-9°44.8	67°57.6	-21°56.1	279°24.2	12°30.3	340°12.1	-12°33.3	Venus	151°03.6	09:02					
17	329°14.2	119°30.0	-9°45.8	82°58.1	-21°56.4	294°26.9	12°30.2	355°14.4	-12°33.3	Mars	114°16.4	11:28					
18	344°16.7	134°29.7	-9°46.8	97°58.7	-21°56.7	309°29.6	12°30.1	10°16.7	-12°33.2	Jupiter	325°09.1	21:21					
19	359°19.1	149°29.4	-9°47.8	112°59.2	-21°57.1	324°32.2	12°30.1	25°19.1	-12°33.2	Saturn	26°02.3	17:19					
20	14°21.6	164°29.0	-9°48.7	127°59.8	-21°57.4	339°34.9	12°30.0	40°21.4	-12°33.1	Horizontal parallax	Venus:	0.1					
21	29°24.0	179°28.7	-9°49.7	143°00.3	-21°57.7	354°37.6	12°30.0	55°23.8	-12°33.1	Mars:	0.1						
22	44°26.5	194°															

h Sun Moon

Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
									Naut.	Civil	Sunrise	Sunset	Civil	Naut.
0	182°37.9	-22°01.6	291°25.4	13.4	20°31.1	-10.1	54.5	72	07:58	10:03	—:—	—:—	13:37	15:41
1	197°37.6	-22°01.9	305°57.9	13.5	20°20.9	-10.2	54.5	70	07:41	09:20	—:—	—:—	14:20	15:59
2	212°37.4	-22°02.3	320°30.4	13.6	20°10.7	-10.3	54.5	68	07:27	08:51	10:53	12:46	14:49	16:12
3	227°37.1	-22°02.7	335°03.0	13.7	20°00.3	-10.4	54.5	66	07:16	08:29	09:56	13:44	15:11	16:24
4	242°36.9	-22°03.0	349°35.7	13.7	19°49.9	-10.5	54.5	64	07:06	08:12	09:23	14:16	15:28	16:34
5	257°36.7	-22°03.4	4°08.5	13.8	19°39.4	-10.5	54.4	62	06:57	07:57	08:59	14:41	15:42	16:42
6	272°36.4	-22°03.7	18°41.3	13.9	19°28.8	-10.6	54.4	60	06:50	07:45	08:40	14:60	15:55	16:50
7	287°36.2	-22°04.1	33°14.3	14.0	19°18.2	-10.7	54.4	58	06:43	07:35	08:24	15:15	16:05	16:57
8	302°35.9	-22°04.5	47°47.3	14.0	19°07.5	-10.8	54.4	56	06:37	07:25	08:11	15:29	16:15	17:03
9	317°35.7	-22°04.8	62°20.3	14.1	18°56.7	-10.8	54.4	54	06:31	07:17	07:59	15:40	16:23	17:08
10	332°35.4	-22°05.2	76°53.5	14.2	18°45.8	-10.9	54.4	52	06:26	07:09	07:49	15:51	16:31	17:14
11	347°35.2	-22°05.5	91°26.7	14.3	18°34.9	-11.0	54.4	50	06:22	07:02	07:40	15:60	16:37	17:18
12	2°35.0	-22°05.9	106°00.0	14.3	18°23.9	-11.0	54.4	45	06:11	06:48	07:21	16:19	16:52	17:29
13	17°34.7	-22°06.2	120°33.4	14.4	18°12.8	-11.1	54.4	40	06:01	06:35	07:05	16:35	17:05	17:39
14	32°34.5	-22°06.6	135°06.9	14.5	18°01.7	-11.2	54.4	35	05:53	06:24	06:52	16:48	17:16	17:47
15	47°34.2	-22°06.9	149°40.4	14.6	17°50.5	-11.2	54.3	30	05:45	06:14	06:40	16:60	17:26	17:55
16	62°34.0	-22°07.3	164°14.0	14.6	17°39.2	-11.3	54.3	20	05:29	05:56	06:20	17:20	17:44	18:11
17	77°33.7	-22°07.6	178°47.7	14.7	17°27.8	-11.4	54.3	10	05:14	05:40	06:03	17:37	17:60	18:26
18	92°33.5	-22°08.0	193°21.4	14.8	17°16.4	-11.4	54.3	0	04:58	05:24	05:46	17:54	18:16	18:42
19	107°33.2	-22°08.3	207°55.2	14.8	17°05.0	-11.5	54.3	-10	04:40	05:07	05:30	18:10	18:33	19:00
20	122°33.0	-22°08.7	222°29.1	14.9	16°53.4	-11.6	54.3	-20	04:19	04:48	05:12	18:28	18:53	19:22
21	137°32.7	-22°09.0	237°03.1	15.0	16°41.8	-11.6	54.3	-30	03:51	04:24	04:51	18:49	19:16	19:49
22	152°32.5	-22°09.4	251°37.1	15.0	16°30.2	-11.7	54.3	-35	03:34	04:10	04:39	19:01	19:31	20:07
23	167°32.2	-22°09.7	266°11.1	15.1	16°18.4	-11.8	54.3	-40	03:12	03:53	04:25	19:16	19:48	20:29
SD.=16.2 d=-0.4 S.D.=14.9								-45	02:44	03:32	04:08	19:33	20:09	20:57
								-50	02:03	03:04	03:47	19:54	20:37	21:38
								-52	01:40	02:51	03:37	20:04	20:50	22:02
								-54	01:08	02:34	03:26	20:15	21:07	22:35
								-56	—:—	02:15	03:13	20:28	21:26	—:—
								-58	—:—	01:50	02:58	20:43	21:52	—:—
								-60	—:—	01:15	02:40	21:02	22:28	—:—
								Lat.	Moonrise			Moonset		
									Sun	Mon	Tue	Sun	Mon	Tue
								72	18:22	21:15	23:22	16:09	14:43	14:02
								70	19:22	21:37	23:31	15:07	14:20	13:50
								68	19:56	21:53	23:38	14:32	14:02	13:41
								66	20:21	22:06	23:44	14:06	13:48	13:33
								64	20:40	22:17	23:48	13:46	13:36	13:27
								62	20:55	22:26	23:53	13:30	13:25	13:21
								60	21:08	22:34	23:56	13:16	13:16	13:16
								58	21:19	22:40	23:60	13:04	13:08	13:11
								56	21:28	22:46	—:—	12:54	13:02	13:07
								54	21:37	22:52	—:—	12:45	12:55	13:04
								52	21:44	22:57	—:—	12:36	12:50	13:01
								50	21:51	23:01	—:—	12:29	12:45	12:58
								45	22:05	23:10	—:—	12:13	12:34	12:51
								40	22:17	23:18	—:—	12:00	12:24	12:46
								35	22:27	23:25	—:—	11:49	12:16	12:41
								30	22:36	23:31	—:—	11:39	12:09	12:37
								20	22:51	23:41	—:—	11:22	11:57	12:29
								10	23:04	23:49	—:—	11:08	11:46	12:23
								0	23:16	23:58	—:—	10:54	11:36	12:17
								-10	23:28	—:—	00:06	10:40	11:26	12:11
								-20	23:41	—:—	00:14	10:24	11:15	12:04
								-30	23:56	—:—	00:24	10:07	11:03	11:56
								-35	—:—	00:04	00:30	09:57	10:55	11:52
								-40	—:—	00:14	00:36	09:45	10:47	11:47
								-45	00:03	00:25	00:44	09:31	10:37	11:41
								-50	00:21	00:39	00:53	09:14	10:25	11:34
								-52	00:30	00:45	00:57	09:06	10:19	11:31
								-54	00:39	00:52	01:01	08:57	10:13	11:27
								-56	00:50	00:59	01:06	08:47	10:06	11:23
								-58	01:03	01:08	01:12	08:35	09:58	11:19
								-60	01:17	01:18	01:18	08:22	09:49	11:14
								Day	Sun			Moon		Age
									Eqn.of Time	Mer.	Mer.Pass.			
									00 ^h	Pass	Upper	Lower		
									12 ^h					
								3	10:32	10:20	11:49	04:42	17:04	20(66%)
								4	10:08	09:56	11:50	05:26	17:47	21(57%)
								5	09:44	09:32	11:50	06:07	18:27	22(48%)

December 06, 07 ,08 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA			Dec
0	74°31.4	224°27.6	-9°52.7	188°02.0	-21°58.6	39°45.6	12°29.8	100°30.8	-12°32.9				Alpheratz	357°35.6	29°13.5		
1	89°33.9	239°27.3	-9°53.7	203°02.5	-21°58.9	54°48.3	12°29.7	115°33.1	-12°32.9				Ankaa	353°07.9	-42°10.8		
2	104°36.4	254°26.9	-9°54.7	218°03.1	-21°59.2	69°50.9	12°29.7	130°35.4	-12°32.8				Schedar	349°31.9	56°40.4		
3	119°38.8	269°26.6	-9°55.7	233°03.6	-21°59.6	84°53.6	12°29.6	145°37.8	-12°32.8				Diphda	348°48.0	-17°51.4		
4	134°41.3	284°26.2	-9°56.6	248°04.2	-21°59.9	99°56.3	12°29.6	160°40.1	-12°32.7				Achernar	335°20.5	-57°07.1		
5	149°43.8	299°25.9	-9°57.6	263°04.7	-22°00.2	114°58.9	12°29.5	175°42.5	-12°32.7				Hamal	327°52.0	23°34.6		
6	164°46.2	314°25.5	-9°58.6	278°05.3	-22°00.5	130°01.6	12°29.5	190°44.8	-12°32.6				Polaris	314°03.2	89°22.1		
7	179°48.7	329°25.2	-9°59.6	293°05.8	-22°00.8	145°04.3	12°29.4	205°47.1	-12°32.6				Akamar	315°12.1	-40°12.6		
8	194°51.2	344°24.8	-10°00.6	308°06.4	-22°01.1	160°06.9	12°29.3	220°49.5	-12°32.5				Menkar	314°06.8	4°11.1		
9	209°53.6	359°24.4	-10°01.6	323°06.9	-22°01.4	175°09.6	12°29.3	235°51.8	-12°32.5				Mirfak	308°29.1	49°56.9		
10	224°56.1	14°24.1	-10°02.6	338°07.5	-22°01.7	190°12.3	12°29.2	250°54.1	-12°32.4				Aldebaran	290°40.3	16°33.5		
11	239°58.5	29°23.7	-10°03.6	353°08.0	-22°02.0	205°14.9	12°29.2	265°56.5	-12°32.4				Rigel	281°04.4	-8°10.4		
12	255°01.0	44°23.4	-10°04.5	8°08.6	-22°02.3	220°17.6	12°29.1	280°58.8	-12°32.3				Capella	280°22.8	46°01.4		
13	270°03.5	59°23.0	-10°05.5	23°09.1	-22°02.6	235°20.3	12°29.1	296°01.2	-12°32.3				Bellatrix	278°23.5	6°22.3		
14	285°05.9	74°22.7	-10°06.5	38°09.7	-22°02.9	250°22.9	12°29.0	311°03.5	-12°32.2				Elnath	278°02.7	28°37.7		
15	300°08.4	89°22.3	-10°07.5	53°10.2	-22°03.2	265°25.6	12°28.9	326°05.8	-12°32.1				Alnilam	275°38.3	-1°11.1		
16	315°10.9	104°22.0	-10°08.5	68°10.7	-22°03.5	280°28.3	12°28.9	341°08.2	-12°32.1				Betelgeuse	270°52.8	7°24.7		
17	330°13.3	119°21.6	-10°09.5	83°11.3	-22°03.9	295°30.9	12°28.8	356°10.5	-12°32.0				Canopus	263°52.3	-52°42.3		
18	345°15.8	134°21.2	-10°10.4	98°11.8	-22°04.2	310°33.6	12°28.8	11°12.8	-12°32.0				Sirius	258°26.6	-16°44.6		
19	0°18.3	149°20.9	-10°11.4	113°12.4	-22°04.5	325°36.2	12°28.7	26°15.2	-12°31.9				Adara	255°06.2	-29°00.1		
20	15°20.7	164°20.5	-10°12.4	128°12.9	-22°04.8	340°38.9	12°28.7	41°17.5	-12°31.9				Procyon	244°51.4	5°10.0		
21	30°23.2	179°20.2	-10°13.4	143°13.5	-22°05.1	355°41.6	12°28.6	56°19.8	-12°31.8				Pollux	243°18.0	27°58.1		
22	45°25.6	194°19.8	-10°14.4	158°14.0	-22°05.4	10°44.2	12°28.6	71°22.2	-12°31.8				Avior	234°14.7	-59°34.8		
23	60°28.1	209°19.4	-10°15.4	173°14.6	-22°05.7	25°46.9	12°28.5	86°24.5	-12°31.7				Suhail	222°46.8	-43°31.5		
Mer.pass.:18:58			v-0.3 d-1.0 m-4.0			v0.5 d-0.3 m1.5			v2.7 d-0.1 m-2.6			v2.3 d0.1 m0.9					
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				GHA	Dec			
0	75°30.6	224°19.1	-10°16.3	188°15.1	-22°06.0	40°49.6	12°28.4	101°26.8	-12°31.7				Dubhe	193°42.1	61°37.1		
1	90°33.0	239°18.7	-10°17.3	203°15.6	-22°06.3	55°52.2	12°28.4	116°29.2	-12°31.6				Denebola	182°25.9	14°26.3		
2	105°35.5	254°18.4	-10°18.3	218°16.2	-22°06.6	70°54.9	12°28.3	131°31.5	-12°31.6				Gienah	175°44.6	-17°40.3		
3	120°38.0	269°18.0	-10°19.3	233°16.7	-22°06.9	85°57.5	12°28.3	146°33.9	-12°31.5				Acrux	173°01.4	-63°13.6		
4	135°40.4	284°17.6	-10°20.3	248°17.3	-22°07.2	101°00.2	12°28.2	161°36.2	-12°31.5				Gacrux	171°52.9	-57°14.5		
5	150°42.9	299°17.3	-10°21.3	263°17.8	-22°07.5	116°02.9	12°28.2	176°38.5	-12°31.4				Alioth	166°14.1	55°49.6		
6	165°45.4	314°16.9	-10°22.2	278°18.4	-22°07.8	131°05.5	12°28.1	191°40.9	-12°31.4				Spica	158°23.5	-11°17.0		
7	180°47.8	329°16.6	-10°23.2	293°18.9	-22°08.1	146°08.2	12°28.1	206°43.2	-12°31.3				Alcaid	152°53.0	49°11.5		
8	195°50.3	344°16.2	-10°24.2	308°19.4	-22°08.4	161°10.8	12°28.0	221°45.5	-12°31.2				Hadar	148°37.8	-60°29.0		
9	210°52.8	359°15.8	-10°25.2	323°20.0	-22°08.7	176°13.5	12°27.9	236°47.9	-12°31.2				Menkent	147°59.0	-36°29.1		
10	225°55.2	14°15.5	-10°26.2	338°20.5	-22°09.0	191°16.2	12°27.9	251°50.2	-12°31.1				Arcturus	145°48.9	19°03.7		
11	240°57.7	29°15.1	-10°27.1	353°21.1	-22°09.3	206°18.8	12°27.8	266°52.5	-12°31.1				Rigil Kent.	139°42.2	-60°55.8		
12	256°00.1	44°14.7	-10°28.1	8°21.6	-22°09.6	221°21.5	12°27.8	281°54.9	-12°31.0				Zubenelg.	136°57.3	-16°08.4		
13	271°02.6	59°14.4	-10°29.1	23°22.1	-22°09.9	236°24.1	12°27.7	296°57.2	-12°31.0				Kochab	137°20.8	74°03.2		
14	286°05.1	74°14.0	-10°30.1	38°22.7	-22°10.2	251°26.8	12°27.7	311°59.5	-12°30.9				Alphecca	126°04.9	26°38.0		
15	301°07.5	89°13.6	-10°31.1	53°23.2	-22°10.5	266°29.5	12°27.6	327°01.9	-12°30.9				Antares	112°17.3	-26°29.0		
16	316°10.0	104°13.3	-10°32.0	68°23.8	-22°10.8	281°32.1	12°27.6	342°04.2	-12°30.8				Atria	107°13.0	-69°04.2		
17	331°12.5	119°12.9	-10°33.0	83°24.3	-22°11.1	296°34.8	12°27.5	357°06.5	-12°30.8				Sabik	102°04.2	-15°45.2		
18	346°14.9	134°12.5	-10°34.0	98°24.8	-22°11.4	311°37.4	12°27.5	12°08.8	-12°30.7				Shaula	96°12.0	-37°07.2		
19	1°17.4	149°12.2	-10°35.0	113°25.4	-22°11.7	326°40.1	12°27.4	27°11.2	-12°30.7				Rasalhague	95°59.8	12°32.6		
20	16°19.9	164°11.8	-10°35.9	128°25.9	-22°12.0	341°42.7	12°27.4	42°13.5	-12°30.6				Etamin	90°43.1	51°29.2		
21	31°22.3	179°11.4	-10°36.9	143°26.5	-22°12.2	356°45.4	12°27.3	57°15.8	-12°30.5				Kaus Aust.	83°34.1	-34°22.4		
22	46°24.8	194°11.0	-10°37.9	158°27.0	-22°12.5	11°48.0	12°27.3	72°18.2	-12°30.5				Vega	80°34.3	38°48.4		
23	61°27.3	209°10.7	-10°38.9	173°27.5	-22°12.8	26°50.7	12°27.2	87°20.5	-12°30.4				Nunki	75°49.2	-26°16.1		
Mer.pass.:18:54			v-0.4 d-1.0 m-4.0			v0.5 d-0.3 m1.5			v2.7 d-0.1 m-2.6			v2.3 d0.1 m0.9					
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				GHA	Dec			
0	76°29.7	224°10.3	-10°39.8	188°28.1	-22°13.1	41°53.4	12°27.1	102°22.8	-12°30.4				Alnair	27°34.2	-46°50.9		
1	91°32.2	239°09.9	-10°40.8	203°28.6	-22°13.4	56°56.0	12°27.1	117°25.2	-12°30.3				Fomalhaut	15°15.6	-29°29.9		
2	106°34.6	254°09.6	-10°41.8	218°29.1	-22°13.7	71°58.7	12°27.0	132°27.5	-12°30.3				Scheat	13°46.1	28°12.9		
3	121°37.1	269°09.2	-10°42.8	233°29.7	-22°14.0	87°01.3	12°27.0	147°29.8	-12°30.2				Markab	13°30.8	15°20.1		
4	136°39.6	284°08.8	-10°43.7	248°30.2	-22°14.3	102°04.0	12°26.9	162°32.2	-12°30.2				2023/12/			SHA	Mer.pass
5	151°42.0	299°08.4	-10°44.7	263°30.8	-22°14.6	117°06.6	12°26.9	177°34.5	-12°30.1				Venus	149°56.2	09:02		
6	166°44.5	314°08.1	-10°45.7	278°31.3	-22°14.9	132°09.3	12°26.8	192°36.8	-12°30.1				Mars	113°30.5	11:27		
7	181°47.0	329°07.7	-10°46.7	293°31.8	-22°15.2	147°11.9	12°26.8	207°39.1	-12°30.0				Jupiter	325°14.1	21:17		
8	196°49.4	344°07.3	-10°47.6	308°32.4	-22°15.5	162°14.6	12°26.7	222°41.5	-12°29.9				Saturn	25°59.3	17:15		
9	211°51.9	359°06.9	-10°48.6	323°32.9	-22°15.8	177°17.2	12°26.7	237°43.8	-12°29.9				2023/12/			SHA	Mer.pass
10	226°54.4	14°06.6	-10°49.6	338°33.4	-22°16.0	192°19.9	12°26.6										

Sun			Moon												
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	182°19.8	-22°25.7	260°59.7	17.0	5°45.5	-13.8	54.4	72	08:05	10:16	—:—	—:—	13:26	15:37	
1	197°19.5	-22°26.1	275°35.7	17.0	5°31.7	-13.8	54.4	70	07:47	09:29	—:—	—:—	14:14	15:55	
2	212°19.3	-22°26.4	290°11.7	17.0	5°17.9	-13.8	54.4	68	07:33	08:58	11:16	12:26	14:44	16:09	
3	227°19.0	-22°26.7	304°47.8	17.0	5°04.0	-13.9	54.4	66	07:21	08:35	10:06	13:36	15:07	16:21	
4	242°18.7	-22°27.0	319°23.8	17.1	4°50.1	-13.9	54.4	64	07:11	08:17	09:31	14:12	15:25	16:32	
5	257°18.5	-22°27.3	333°59.9	17.1	4°36.2	-13.9	54.4	62	07:02	08:02	09:05	14:37	15:40	16:41	
6	272°18.2	-22°27.6	348°36.0	17.1	4°22.3	-13.9	54.4	60	06:54	07:50	08:45	14:57	15:53	16:48	
7	287°18.0	-22°27.9	3°12.0	17.1	4°08.3	-14.0	54.4	58	06:47	07:39	08:29	15:13	16:04	16:55	
8	302°17.7	-22°28.2	17°48.1	17.1	3°54.4	-14.0	54.4	56	06:41	07:29	08:15	15:27	16:13	17:02	
9	317°17.4	-22°28.5	32°24.2	17.1	3°40.4	-14.0	54.5	54	06:35	07:21	08:04	15:39	16:22	17:07	
10	332°17.2	-22°28.8	47°00.3	17.1	3°26.4	-14.0	54.5	52	06:30	07:13	07:53	15:49	16:30	17:13	
11	347°16.9	-22°29.1	61°36.4	17.1	3°12.3	-14.0	54.5	50	06:25	07:06	07:44	15:59	16:37	17:18	
12	2°16.6	-22°29.4	76°12.4	17.1	2°58.3	-14.1	54.5	45	06:14	06:51	07:24	16:18	16:52	17:29	
13	17°16.4	-22°29.7	90°48.5	17.1	2°44.2	-14.1	54.5	40	06:04	06:38	07:08	16:35	17:05	17:39	
14	32°16.1	-22°30.0	105°24.6	17.1	2°30.1	-14.1	54.5	35	05:55	06:26	06:54	16:48	17:16	17:48	
15	47°15.8	-22°30.3	120°00.6	17.1	2°16.0	-14.1	54.5	30	05:47	06:16	06:43	16:60	17:26	17:56	
16	62°15.6	-22°30.6	134°36.7	17.1	2°01.9	-14.1	54.5	20	05:31	05:58	06:22	17:20	17:44	18:12	
17	77°15.3	-22°30.9	149°12.8	17.1	1°47.8	-14.1	54.6	10	05:15	05:42	06:04	17:38	18:01	18:27	
18	92°15.1	-22°31.2	163°48.8	17.0	1°33.7	-14.1	54.6	0	04:59	05:25	05:48	17:55	18:17	18:44	
19	107°14.8	-22°31.5	178°24.9	17.0	1°19.5	-14.2	54.6	-10	04:41	05:08	05:31	18:12	18:35	19:02	
20	122°14.5	-22°31.8	193°00.9	17.0	1°05.3	-14.2	54.6	-20	04:19	04:48	05:12	18:30	18:55	19:24	
21	137°14.3	-22°32.1	207°36.9	17.0	0°51.1	-14.2	54.6	-30	03:51	04:24	04:51	18:51	19:19	19:52	
22	152°14.0	-22°32.4	222°12.9	17.0	0°37.0	-14.2	54.6	-35	03:33	04:10	04:39	19:04	19:33	20:10	
23	167°13.7	-22°32.6	236°48.9	17.0	0°22.8	-14.2	54.6	-40	03:11	03:52	04:24	19:18	19:51	20:32	
SD.=16.2			d=-0.3		S.D.=14.8				-45	02:42	03:31	04:07	19:36	20:12	21:01

December 09, 10 ,11 (Sat., Sun., Mon.)

Aries			Venus		Mars		Jupiter		Saturn		Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec
0	77°28.9	224°01.2	-11°03.2	188°40.9	-22°20.1	42°57.0	12°25.9	103°18.7	-12°29.1	Alpheratz 357°35.7 29°13.5			
1	92°31.3	239°00.9	-11°04.2	203°41.4	-22°20.4	57°59.6	12°25.9	118°21.1	-12°29.0	Ankaa 353°07.9 -42°10.8			
2	107°33.8	254°00.5	-11°05.1	218°42.0	-22°20.6	73°02.3	12°25.8	133°23.4	-12°28.9	Schedar 349°31.9 56°40.4			
3	122°36.2	269°00.1	-11°06.1	233°42.5	-22°20.9	88°04.9	12°25.8	148°25.7	-12°28.9	Diphda 348°48.0 -17°51.4			
4	137°38.7	283°59.7	-11°07.1	248°43.0	-22°21.2	103°07.6	12°25.7	163°28.0	-12°28.8	Achernar 335°20.5 -57°07.1			
5	152°41.2	298°59.3	-11°08.0	263°43.6	-22°21.5	118°10.2	12°25.7	178°30.4	-12°28.8	Hamal 327°52.0 23°34.6			
6	167°43.6	313°58.9	-11°09.0	278°44.1	-22°21.8	133°12.9	12°25.6	193°32.7	-12°28.7	Polaris 314°03.7 89°22.1			
7	182°46.1	328°58.5	-11°10.0	293°44.6	-22°22.1	148°15.5	12°25.6	208°35.0	-12°28.7	Akamar 315°12.1 -40°12.6			
8	197°48.6	343°58.2	-11°10.9	308°45.2	-22°22.3	163°18.2	12°25.5	223°37.3	-12°28.6	Menkar 314°06.8 4°11.1			
9	212°51.0	358°57.8	-11°11.9	323°45.7	-22°22.6	178°20.8	12°25.5	238°39.7	-12°28.5	Mirfak 308°29.1 49°56.9			
10	227°53.5	13°57.4	-11°12.9	338°46.2	-22°22.9	193°23.4	12°25.4	253°42.0	-12°28.5	Aldebaran 290°40.3 16°33.5			
11	242°56.0	28°57.0	-11°13.8	353°46.8	-22°23.2	208°26.1	12°25.4	268°44.3	-12°28.4	Rigel 281°04.4 -8°10.4			
12	257°58.4	43°56.6	-11°14.8	8°47.3	-22°23.5	223°28.7	12°25.3	283°46.7	-12°28.4	Capella 280°22.8 46°01.4			
13	273°00.9	58°56.2	-11°15.8	23°47.8	-22°23.7	238°31.4	12°25.3	298°49.0	-12°28.3	Bellatrix 278°23.5 6°22.3			
14	288°03.4	73°55.8	-11°16.7	38°48.3	-22°24.0	253°34.0	12°25.2	313°51.3	-12°28.3	Elnath 278°02.7 28°37.7			
15	303°05.8	88°55.4	-11°17.7	53°48.9	-22°24.3	268°36.7	12°25.2	328°53.6	-12°28.2	Alnilam 275°38.3 -1°11.2			
16	318°08.3	103°55.0	-11°18.7	68°49.4	-22°24.6	283°39.3	12°25.1	343°56.0	-12°28.2	Betelgeuse 270°52.7 7°24.7			
17	333°10.7	118°54.7	-11°19.6	83°49.9	-22°24.9	298°42.0	12°25.1	358°58.3	-12°28.1	Canopus 263°52.3 -52°42.4			
18	348°13.2	133°54.3	-11°20.6	98°50.5	-22°25.1	313°44.6	12°25.0	14°00.6	-12°28.0	Sirius 258°26.6 -16°44.7			
19	3°15.7	148°53.9	-11°21.6	113°51.0	-22°25.4	328°47.2	12°25.0	29°02.9	-12°28.0	Adara 255°06.2 -29°00.1			
20	18°18.1	163°53.5	-11°22.5	128°51.5	-22°25.7	343°49.9	12°24.9	44°05.3	-12°27.9	Procyon 244°51.4 5°10.0			
21	33°20.6	178°53.1	-11°23.5	143°52.0	-22°26.0	358°52.5	12°24.9	59°07.6	-12°27.9	Pollux 243°18.0 27°58.1			
22	48°23.1	193°52.7	-11°24.5	158°52.6	-22°26.3	13°55.2	12°24.8	74°09.9	-12°27.8	Avior 234°14.7 -59°34.9			
23	63°25.5	208°52.3	-11°25.4	173°53.1	-22°26.5	28°57.8	12°24.8	89°12.2	-12°27.8	Suhail 222°46.7 -43°31.5			
Mer.pass.:18:46			v-0.4 d-1.0 m-4.0		v0.5 d-0.3 m1.5		v2.6 d-0.1 m-2.6		v2.3 d0.1 m0.9		Miaplacidus 221°38.0 -69°48.6		
												Alphard 217°48.5 -8°45.6	
												Regulus 207°35.3 11°51.0	
												Dubhe 193°42.1 61°37.1	
												Denebola 182°25.9 14°26.3	
												Gienah 175°44.6 -17°40.3	
												Acrux 173°01.4 -63°13.6	
												Gacrux 171°52.9 -57°14.5	
												Alioth 166°14.1 55°49.6	
												Spica 158°23.5 -11°17.0	
												Alcaid 152°53.0 49°11.5	
												Hadar 148°37.8 -60°29.0	
												Menkent 147°59.0 -36°29.1	
												Arcturus 145°48.9 19°03.7	
												Rigil Kent. 139°42.1 -60°55.8	
												Zubenelg. 136°57.3 -16°08.4	
												Kochab 137°20.7 74°03.2	
												Alphecca 126°04.9 26°38.0	
												Antares 112°17.3 -26°29.0	
												Atria 107°13.0 -69°04.1	
												Sabik 102°04.2 -15°45.2	
												Shaula 96°12.0 -37°07.2	
												Rasalhague 95°59.8 12°32.6	
												Etamin 90°43.1 51°29.1	
												Kaus Aust. 83°34.1 -34°22.4	
												Vega 80°34.3 38°48.4	
												Nunki 75°49.2 -26°16.1	
												Altair 62°01.2 8°55.9	
												Peacock 53°07.6 -56°39.7	
												Deneb 49°26.7 45°22.1	
												Enif 33°39.8 9°59.1	
												Alnair 27°34.2 -46°50.9	
												Fomalhaut 15°15.6 -29°29.9	
												Scheat 13°46.2 28°12.9	
												Markab 13°30.8 15°20.1	
2023/12/			SHA		Mer.pass								
Venus			146°32.4		09:04								
Mars			111°12.1		11:25								
Jupiter			325°28.1		21:04								
Saturn			25°49.9		17:04								
2023/12/			SHA		Mer.pass								
Venus			145°23.9		09:05								
Mars			110°25.6		11:24								
Jupiter			325°32.4		21:00								
Saturn			25°46.6		17:00								
2023/12/			SHA		Mer.pass								
Venus			144°15.2		09:05								
Mars			109°39.1		11:23								
Jupiter			325°36.6		20:56								
Saturn			25°43.1		16:57								
Horizontal parallax													
Venus:												0.1	
Mars:												0.1	
Mer.pass.:18:39			v-0.4 d-1.0 m-4.0		v0.5 d-0.3 m1.4		v2.6 d-0.0 m-2.6		v2.3 d0.1 m0.9				

Sun			Moon											
Sat	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	182°00.4	-22°46.0	231°29.6	14.8	-11°11.0	-13.8	55.7	72	08:11	10:28	—:—	—:—	13:16	15:33
1	197°00.2	-22°46.2	246°03.3	14.7	-11°24.7	-13.7	55.7	70	07:53	09:37	—:—	—:—	14:08	15:52
2	211°59.9	-22°46.5	260°37.0	14.6	-11°38.4	-13.7	55.8	68	07:38	09:04	—:—	—:—	14:40	16:07
3	226°59.6	-22°46.7	275°10.5	14.5	-11°52.1	-13.7	55.8	66	07:25	08:41	10:15	13:30	15:04	16:20
4	241°59.3	-22°47.0	289°44.0	14.4	-12°05.8	-13.6	55.8	64	07:15	08:22	09:37	14:08	15:23	16:30
5	256°59.0	-22°47.2	304°17.4	14.4	-12°19.4	-13.6	55.8	62	07:06	08:07	09:11	14:34	15:38	16:39
6	271°58.8	-22°47.5	318°50.8	14.3	-12°33.0	-13.6	55.9	60	06:58	07:54	08:50	14:55	15:51	16:47
7	286°58.5	-22°47.7	333°24.0	14.2	-12°46.5	-13.5	55.9	58	06:50	07:43	08:34	15:11	16:02	16:55
8	301°58.2	-22°48.0	347°57.2	14.1	-13°00.0	-13.5	55.9	56	06:44	07:33	08:19	15:26	16:12	17:01
9	316°57.9	-22°48.2	2°30.2	14.0	-13°13.5	-13.4	56.0	54	06:38	07:24	08:07	15:38	16:21	17:07
10	331°57.7	-22°48.5	17°03.2	13.9	-13°26.9	-13.4	56.0	52	06:33	07:16	07:57	15:49	16:29	17:12
11	346°57.4	-22°48.7	31°36.1	13.9	-13°40.3	-13.4	56.0	50	06:28	07:09	07:47	15:58	16:36	17:18
12	1°57.1	-22°49.0	46°08.9	13.8	-13°53.6	-13.3	56.0	45	06:16	06:53	07:27	16:18	16:52	17:29
13	16°56.8	-22°49.2	60°41.6	13.7	-14°06.9	-13.3	56.1	40	06:06	06:40	07:11	16:35	17:05	17:39
14	31°56.5	-22°49.5	75°14.3	13.6	-14°20.2	-13.2	56.1	35	05:57	06:29	06:57	16:48	17:16	17:48
15	46°56.3	-22°49.7	89°46.8	13.5	-14°33.4	-13.2	56.1	30	05:49	06:18	06:45	17:01	17:27	17:57
16	61°56.0	-22°49.9	104°19.2	13.4	-14°46.5	-13.1	56.2	20	05:33	06:00	06:24	17:21	17:45	18:13
17	76°55.7	-22°50.2	118°51.6	13.3	-14°59.6	-13.1	56.2	10	05:17	05:43	06:06	17:39	18:02	18:28
18	91°55.4	-22°50.4	133°23.8	13.2	-15°12.6	-13.0	56.2	0	05:00	05:26	05:49	17:56	18:19	18:45
19	106°55.1	-22°50.7	147°56.0	13.1	-15°25.6	-13.0	56.2	-10	04:42	05:09	05:32	18:14	18:37	19:04
20	121°54.9	-22°50.9	162°28.1	13.0	-15°38.6	-12.9	56.3	-20	04:20	04:49	05:13	18:32	18:57	19:26
21	136°54.6	-22°51.1	177°00.0	12.9	-15°51.4	-12.9	56.3	-30	03:51	04:24	04:52	18:54	19:21	19:54
22	151°54.3	-22°51.4	191°31.9	12.8	-16°04.3	-12.8	56.3	-35	03:33	04:10	04:39	19:06	19:36	20:12
23	166°54.0	-22°51.6	206°03.6	12.7	-16°17.0	-12.7	56.4	-40	03:11	03:52	04:24	19:21	19:54	20:35
SD.=16.2 d=-0.3			S.D.=15.2											

December 12, 13 ,14 (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	80°26.3	223°32.4	-12°12.2	189°18.7	-22°39.6	46°06.8	12°22.6	106°05.9	-12°24.9	Alpheratz	357°35.7 29°13.5	
1	95°28.7	238°32.0	-12°13.1	204°19.2	-22°39.9	61°09.4	12°22.5	121°08.2	-12°24.8	Ankaa	353°07.9 -42°10.8	
2	110°31.2	253°31.5	-12°14.1	219°19.7	-22°40.2	76°12.1	12°22.5	136°10.6	-12°24.8	Schedar	349°31.9 56°40.4	
3	125°33.7	268°31.1	-12°15.0	234°20.2	-22°40.4	91°14.7	12°22.5	151°12.9	-12°24.7	Diphda	348°48.0 -17°51.4	
4	140°36.1	283°30.7	-12°16.0	249°20.7	-22°40.7	106°17.3	12°22.4	166°15.2	-12°24.6	Achernar	335°20.5 -57°07.2	
5	155°38.6	298°30.3	-12°16.9	264°21.3	-22°40.9	121°19.9	12°22.4	181°17.5	-12°24.6	Hamal	327°52.0 23°34.6	
6	170°41.1	313°29.9	-12°17.8	279°21.8	-22°41.2	136°22.6	12°22.3	196°19.8	-12°24.5	Polaris	314°04.0 89°22.1	
7	185°43.5	328°29.4	-12°18.8	294°22.3	-22°41.4	151°25.2	12°22.3	211°22.1	-12°24.5	Akamar	315°12.1 -40°12.6	
8	200°46.0	343°29.0	-12°19.7	309°22.8	-22°41.7	166°27.8	12°22.3	226°24.4	-12°24.4	Menkar	314°06.8 4°11.0	
9	215°48.5	358°28.6	-12°20.7	324°23.3	-22°41.9	181°30.4	12°22.2	241°26.8	-12°24.3	Mirfak	308°29.1 49°56.9	
10	230°50.9	13°28.2	-12°21.6	339°23.8	-22°42.2	196°33.0	12°22.2	256°29.1	-12°24.3	Aldebaran	290°40.3 16°33.5	
11	245°53.4	28°27.8	-12°22.6	354°24.3	-22°42.5	211°35.7	12°22.1	271°31.4	-12°24.2	Rigel	281°04.4 -8°10.4	
12	260°55.8	43°27.3	-12°23.5	9°24.9	-22°42.7	226°38.3	12°22.1	286°33.7	-12°24.2	Capella	280°22.8 46°01.4	
13	275°58.3	58°26.9	-12°24.4	24°25.4	-22°43.0	241°40.9	12°22.0	301°36.0	-12°24.1	Bellatrix	278°23.5 6°22.3	
14	291°00.8	73°26.5	-12°25.4	39°25.9	-22°43.2	256°43.5	12°22.0	316°38.3	-12°24.0	Elnath	278°02.6 28°37.7	
15	306°03.2	88°26.1	-12°26.3	54°26.4	-22°43.5	271°46.1	12°22.0	331°40.7	-12°24.0	Alnilam	275°38.3 -1°11.2	
16	321°05.7	103°25.6	-12°27.3	69°26.9	-22°43.7	286°48.8	12°21.9	346°43.0	-12°23.9	Betelgeuse	270°52.7 7°24.7	
17	336°08.2	118°25.2	-12°28.2	84°27.4	-22°44.0	301°51.4	12°21.9	1°45.3	-12°23.9	Canopus	263°52.3 -52°42.4	
18	351°10.6	133°24.8	-12°29.1	99°27.9	-22°44.2	316°54.0	12°21.8	16°47.6	-12°23.8	Sirius	258°26.6 -16°44.7	
19	6°13.1	148°24.3	-12°30.1	114°28.5	-22°44.5	331°56.6	12°21.8	31°49.9	-12°23.7	Adara	255°06.2 -29°00.2	
20	21°15.6	163°23.9	-12°31.0	129°29.0	-22°44.7	346°59.2	12°21.8	46°52.2	-12°23.7	Procyon	244°51.4 5°10.0	
21	36°18.0	178°23.5	-12°32.0	144°29.5	-22°45.0	2°01.9	12°21.7	61°54.5	-12°23.6	Pollux	243°18.0 27°58.1	
22	51°20.5	193°23.1	-12°32.9	159°30.0	-22°45.2	17°04.5	12°21.7	76°56.8	-12°23.6	Avior	234°14.6 -59°34.9	
23	66°23.0	208°22.6	-12°33.8	174°30.5	-22°45.5	32°07.1	12°21.6	91°59.2	-12°23.5	Suhail	222°46.7 -43°31.5	
Mer.pass.:18:35		v-0.4 d-0.9 m-4.0		v0.5 d-0.3 m1.4		v2.6 d-0.0 m-2.6		v2.3 d0.1 m0.9		Miaplacidus	221°38.0 -69°48.6	
											Alphard	217°48.5 -8°45.6
											Regulus	207°35.2 11°51.0
											Dubhe	193°42.0 61°37.1
											Denebola	182°25.8 14°26.3
											Gienah	175°44.6 -17°40.3
											Acrux	173°01.3 -63°13.6
											Gacrux	171°52.9 -57°14.5
											Alioth	166°14.0 55°49.6
											Spica	158°23.4 -11°17.1
											Alcaid	152°53.0 49°11.4
											Hadar	148°37.8 -60°29.0
											Menkent	147°59.0 -36°29.1
											Arcturus	145°48.8 19°03.7
											Rigel Kent.	139°42.1 -60°55.8
											Zubenelg.	136°57.3 -16°08.4
											Kochab	137°20.7 74°03.2
											Alphecca	126°04.9 26°38.0
											Antares	112°17.3 -26°29.0
											Atria	107°12.9 -69°04.1
											Sabik	102°04.2 -15°45.2
											Shaula	96°12.0 -37°07.2
											Rasalhague	95°59.8 12°32.6
											Etamin	90°43.1 51°29.1
											Kaus Aust.	83°34.1 -34°22.4
											Vega	80°34.3 38°48.3
											Nunki	75°49.2 -26°16.1
											Altair	62°01.2 8°55.9
											Peacock	53°07.6 -56°39.7
											Deneb	49°26.7 45°22.1
											Enif	33°39.9 9°59.1
											Alnair	27°34.2 -46°50.9
											Fomalhaut	15°15.6 -29°29.9
											Scheat	13°46.2 28°12.9
											Markab	13°30.9 15°20.1
2023/12/		SHA		Mer.pass								
Venus		143°06.1		09:06								
Mars		108°52.4		11:22								
Jupiter		325°40.5		20:52								
Saturn		25°39.6		16:53								
2023/12/		SHA		Mer.pass								
Venus		141°56.8		09:07								
Mars		108°05.6		11:22								
Jupiter		325°44.3		20:48								
Saturn		25°36.1		16:49								
2023/12/		SHA		Mer.pass								
Venus		140°47.2		09:07								
Mars		107°18.7		11:21								
Jupiter		325°47.9		20:44								
Saturn		25°32.4		16:46								
Horizontal parallax												
Venus: 0.1												
Mars: 0.1												
Mer.pass.:18:27		v-0.4 d-0.9 m-4.0		v0.5 d-0.2 m1.4		v2.6 d-0.0 m-2.6		v2.3 d0.1 m0.9				

Sun			Moon											
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	181°40.0	-23°02.2	195°41.9	7.0	-24°58.8	-7.9	57.8	72	08:17	10:40	—:—	—:—	13:08	15:31
1	196°39.7	-23°02.4	210°07.8	6.9	-25°06.6	-7.8	57.8	70	07:57	09:43	—:—	—:—	14:04	15:50
2	211°39.4	-23°02.6	224°33.7	6.8	-25°14.3	-7.6	57.9	68	07:42	09:10	—:—	—:—	14:38	16:06
3	226°39.1	-23°02.8	238°59.5	6.7	-25°21.8	-7.5	57.9	66	07:29	08:45	10:22	13:26	15:02	16:19
4	241°38.9	-23°03.0	253°24.1	6.6	-25°29.2	-7.3	57.9	64	07:18	08:26	09:43	14:05	15:22	16:29
5	256°38.6	-23°03.2	267°50.7	6.5	-25°36.5	-7.2	58.0	62	07:09	08:11	09:15	14:32	15:37	16:39
6	271°38.3	-23°03.4	282°16.1	6.4	-25°43.6	-7.0	58.0	60	07:01	07:57	08:54	14:53	15:51	16:47
7	286°38.0	-23°03.6	296°41.4	6.3	-25°50.6	-6.9	58.0	58	06:54	07:46	08:37	15:11	16:02	16:54
8	301°37.7	-23°03.8	311°06.6	6.2	-25°57.4	-6.7	58.0	56	06:47	07:36	08:23	15:25	16:12	17:01
9	316°37.4	-23°04.0	325°31.7	6.0	-26°04.0	-6.6	58.1	54	06:41	07:27	08:10	15:37	16:21	17:07
10	331°37.1	-23°04.1	339°56.7	5.9	-26°10.5	-6.4	58.1	52	06:35	07:19	07:60	15:48	16:29	17:13
12	1°36.5	-23°04.5	8°46.4	5.7	-26°23.0	-6.1	58.2	50	06:30	07:12	07:50	15:58	16:36	17:18
13	16°36.2	-23°04.7	23°11.1	5.6	-26°29.1	-5.9	58.2	45	06:19	06:56	07:29	16:18	16:52	17:29
14	31°35.9	-23°04.9	37°35.7	5.5	-26°34.9	-5.8	58.2	40	06:08	06:42	07:13	16:35	17:06	17:40
15	46°35.6	-23°05.1	52°00.2	5.4	-26°40.6	-5.6	58.2	35	05:59	06:31	06:59	16:49	17:17	17:49
16	61°35.4	-23°05.3	66°24.6	5.3	-26°46.2	-5.5	58.3	30	05:51	06:20	06:47	17:01	17:28	17:57
17	76°35.1	-23°05.4	80°48.9	5.2	-26°51.5	-5.3	58.3	20	05:34	06:02	06:26	17:22	17:46	18:14
18	91°34.8	-23°05.6	95°13.1	5.2	-26°56.7	-5.1	58.3	10	05:18	05:45	06:08	17:41	18:03	18:30
19	106°34.5	-23°05.8	109°37.2	5.1	-27°01.8	-5.0	58.3	0	05:02	05:28	05:50	17:58	18:20	18:46
20	121°34.2	-23°06.0	124°01.2	5.0	-27°06.6	-4.8	58.4	-10	04:43	05:10	05:33	18:15	18:38	19:05
21	136°33.9	-23°06.2	138°25.1	4.9	-27°11.3	-4.6	58.4	-20	04:21	04:50	05:14	18:34	18:58	19:28
22	151°33.6	-23°06.4	152°49.0	4.8	-27°15.9	-4.4	58.4	-30	03:52	04:25	04:52	18:56	19:23	19:56
23	166°33.3	-23°06.5	167°12.7	4.7	-27°20.2	-4.3	58.4	-35	03:33	04:10	04:40	19:09	19:38	20:15
SD.=16.2 d=-0.2 S.D.=15.8								-40	03:11	03:52	04:25	19:23	19:56	20:38
								-45	02:41	03:30	04:07	19:41	20:18	21:08
								-50	01:56	03:01	03:45	20:03	20:48	21:52
								-52	01:30	02:46	03:34	20:14	21:03	22:19
								-54	00:48	02:28	03:22	20:26	21:20	23:02
								-56	—:—	02:07	03:08	20:40	21:42	—:—
								-58	—:—	01:38	02:52	20:57	22:11	—:—
								-60	—:—	00:53	02:32	21:17	22:57	—:—
								Lat.	Moonrise			Moonset		
									Tue	Wed	Thu	Tue	Wed	Thu
								72	—:—	—:—	—:—	—:—	—:—	—:—
								70	—:—	—:—	—:—	—:—	—:—	—:—
								68	—:—	—:—	—:—	—:—	—:—	—:—
								66	—:—	—:—	—:—	—:—	—:—	—:—
								64	—:—	—:—	—:—	—:—	—:—	—:—
								62	09:53	—:—	13:09	12:45	—:—	13:49
								60	09:13	10:51	11:51	13:26	13:55	15:06
								58	08:45	10:13	11:15	13:55	14:32	15:42
								56	08:23	09:47	10:49	14:17	14:59	16:08
								54	08:06	09:26	10:28	14:35	15:21	16:29
								52	07:50	09:08	10:11	14:50	15:38	16:46
								50	07:37	08:53	09:56	15:04	15:53	17:00
								45	07:11	08:23	09:26	15:31	16:24	17:30
								40	06:50	07:59	09:02	15:53	16:47	17:53
								35	06:32	07:40	08:43	16:11	17:07	18:12
								30	06:17	07:23	08:26	16:27	17:24	18:29
								20	05:52	06:55	07:58	16:53	17:52	18:56
								10	05:30	06:31	07:34	17:16	18:16	19:20
								0	05:10	06:09	07:12	17:38	18:39	19:42
								-10	04:49	05:47	06:49	17:59	19:01	20:03
								-20	04:28	05:23	06:25	18:22	19:26	20:27
								-30	04:03	04:56	05:57	18:49	19:54	20:54
								-35	03:49	04:40	05:40	19:05	20:11	21:10
								-40	03:32	04:21	05:21	19:23	20:30	21:28
								-45	03:12	03:58	04:58	19:45	20:54	21:50
								-50	02:47	03:29	04:27	20:14	21:24	22:19
								-52	02:35	03:15	04:13	20:28	21:39	22:32
								-54	02:22	02:58	03:55	20:44	21:56	22:48
								-56	02:06	02:39	03:34	21:03	22:17	23:07
								-58	01:47	02:15	03:08	21:27	22:43	23:29
								-60	01:25	01:43	02:31	21:59	23:20	23:59
								Day	Sun		Mer.	Moon		
									Eqn.of Time	12 ^h	Pass	Mer.Pass.		Age
									00 ^h			Upper	Lower	
								12	06:40	06:26	11:53	11:23	23:53	29(0%)
								13	06:12	05:58	11:54	12:24	00:55	1(1%)
								14	05:44	05:29	11:54	13:26	00:55	2(3%)
SD.=16.2 d=-0.2 S.D.=16.1														

December 15, 16 ,17 (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	83°23.7	223°01.0	-13°19.3	189°55.3	-22°57.3	49°15.0	12°19.8	108°52.3	-12°20.4	Alpheratz	357°35.7	29°13.5					
1	98°26.2	238°00.5	-13°20.2	204°55.8	-22°57.5	64°17.6	12°19.8	123°54.6	-12°20.4	Ankaa	353°07.9	-42°10.8					
2	113°28.6	253°00.1	-13°21.1	219°56.3	-22°57.7	79°20.2	12°19.8	138°57.0	-12°20.3	Schedar	349°31.9	56°40.4					
3	128°31.1	267°59.6	-13°22.0	234°56.8	-22°57.9	94°22.8	12°19.7	153°59.3	-12°20.2	Diphda	348°48.0	-17°51.4					
4	143°33.6	282°59.2	-13°22.9	249°57.3	-22°58.2	109°25.4	12°19.7	169°01.6	-12°20.2	Achernar	335°20.5	-57°07.2					
5	158°36.0	297°58.7	-13°23.8	264°57.8	-22°58.4	124°28.0	12°19.7	184°03.9	-12°20.1	Hamal	327°52.0	23°34.7					
6	173°38.5	312°58.2	-13°24.8	279°58.4	-22°58.6	139°30.6	12°19.6	199°06.2	-12°20.0	Polaris	314°04.5	89°22.1					
7	188°40.9	327°57.8	-13°25.7	294°58.9	-22°58.9	154°33.2	12°19.6	214°08.5	-12°20.0	Akamar	315°12.1	-40°12.7					
8	203°43.4	342°57.3	-13°26.6	309°59.4	-22°59.1	169°35.8	12°19.6	229°10.8	-12°19.9	Menkar	314°06.8	4°11.0					
9	218°45.9	357°56.9	-13°27.5	324°59.9	-22°59.3	184°38.4	12°19.5	244°13.1	-12°19.9	Mirfak	308°29.1	49°56.9					
10	233°48.3	12°56.4	-13°28.4	340°00.4	-22°59.5	199°41.0	12°19.5	259°15.4	-12°19.8	Aldebaran	290°40.3	16°33.5					
11	248°50.8	27°55.9	-13°29.3	355°00.9	-22°59.8	214°43.6	12°19.5	274°17.7	-12°19.7	Rigel	281°04.4	-8°10.4					
12	263°53.3	42°55.5	-13°30.2	10°01.4	-22°60.0	229°46.2	12°19.4	289°20.0	-12°19.7	Capella	280°22.7	46°01.4					
13	278°55.7	57°55.0	-13°31.1	25°01.9	-23°00.2	244°48.8	12°19.4	304°22.3	-12°19.6	Bellatrix	278°23.5	6°22.3					
14	293°58.2	72°54.6	-13°32.1	40°02.4	-23°00.4	259°51.4	12°19.4	319°24.6	-12°19.5	Elnath	278°02.6	28°37.7					
15	309°00.7	87°54.1	-13°33.0	55°02.8	-23°00.7	274°54.0	12°19.3	334°26.9	-12°19.5	Alnilam	275°38.3	-1°11.2					
16	324°03.1	102°53.6	-13°33.9	70°03.3	-23°00.9	289°56.6	12°19.3	349°29.2	-12°19.4	Betelgeuse	270°52.7	7°24.7					
17	339°05.6	117°53.2	-13°34.8	85°03.8	-23°01.1	304°59.1	12°19.3	4°31.5	-12°19.3	Canopus	263°52.2	-52°42.4					
18	354°08.1	132°52.7	-13°35.7	100°04.3	-23°01.3	320°01.7	12°19.2	19°33.8	-12°19.3	Sirius	258°26.6	-16°44.7					
19	9°10.5	147°52.3	-13°36.6	115°04.8	-23°01.6	335°04.3	12°19.2	34°36.1	-12°19.2	Adara	255°06.2	-29°00.2					
20	24°13.0	162°51.8	-13°37.5	130°05.3	-23°01.8	350°06.9	12°19.2	49°38.4	-12°19.1	Procyon	244°51.4	5°10.0					
21	39°15.4	177°51.3	-13°38.4	145°05.8	-23°02.0	5°09.5	12°19.2	64°40.7	-12°19.1	Pollux	243°18.0	27°58.1					
22	54°17.9	192°50.9	-13°39.3	160°06.3	-23°02.2	20°12.1	12°19.1	79°43.0	-12°19.0	Avior	234°14.6	-59°34.9					
23	69°20.4	207°50.4	-13°40.2	175°06.8	-23°02.5	35°14.7	12°19.1	94°45.3	-12°19.0	Suhail	222°46.7	-43°31.5					
Mer.pass.:18:23			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.6			v2.3 d0.1 m0.9					
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	84°22.8	222°49.9	-13°41.1	190°07.3	-23°02.7	50°17.3	12°19.1	109°47.7	-12°18.9	Alphard	217°48.4	-8°45.6					
1	99°25.3	237°49.5	-13°42.0	205°07.8	-23°02.9	65°19.9	12°19.0	124°50.0	-12°18.8	Regulus	207°35.2	11°51.0					
2	114°27.8	252°49.0	-13°43.0	220°08.3	-23°03.1	80°22.5	12°19.0	139°52.3	-12°18.8	Dubhe	193°42.0	61°37.1					
3	129°30.2	267°48.5	-13°43.9	235°08.8	-23°03.3	95°25.1	12°19.0	154°54.6	-12°18.7	Denebola	182°25.8	14°26.3					
4	144°32.7	282°48.1	-13°44.8	250°09.3	-23°03.6	110°27.7	12°18.9	169°56.9	-12°18.6	Gienah	175°44.5	-17°40.3					
5	159°35.2	297°47.6	-13°45.7	265°09.8	-23°03.8	125°30.3	12°18.9	184°59.2	-12°18.6	Acrux	173°01.3	-63°13.6					
6	174°37.6	312°47.1	-13°46.6	280°10.3	-23°04.0	140°32.9	12°18.9	200°01.5	-12°18.5	Gacrux	171°52.8	-57°14.5					
7	189°40.1	327°46.7	-13°47.5	295°10.8	-23°04.2	155°35.5	12°18.8	215°03.8	-12°18.4	Alioth	166°14.0	55°49.6					
8	204°42.6	342°46.2	-13°48.4	310°11.3	-23°04.4	170°38.0	12°18.8	230°06.1	-12°18.4	Spica	158°23.4	-11°17.1					
9	219°45.0	357°45.7	-13°49.3	325°11.8	-23°04.7	185°40.6	12°18.8	245°08.4	-12°18.3	Alcaid	152°53.0	49°11.4					
10	234°47.5	12°45.2	-13°50.2	340°12.3	-23°04.9	200°43.2	12°18.8	260°10.7	-12°18.2	Hadar	148°37.7	-60°29.0					
11	249°49.9	27°44.8	-13°51.1	355°12.8	-23°05.1	215°45.8	12°18.7	275°13.0	-12°18.2	Menkent	147°59.0	-36°29.1					
12	264°52.4	42°44.3	-13°52.0	10°13.3	-23°05.3	230°48.4	12°18.7	290°15.3	-12°18.1	Arcturus	145°48.8	19°03.7					
13	279°54.9	57°43.8	-13°52.9	25°13.8	-23°05.5	245°51.0	12°18.7	305°17.6	-12°18.0	Rigel Kent.	139°42.0	-60°55.8					
14	294°57.3	72°43.3	-13°53.8	40°14.3	-23°05.7	260°53.6	12°18.6	320°19.9	-12°18.0	Zubenelg.	136°57.3	-16°08.4					
15	309°59.8	87°42.9	-13°54.7	55°14.8	-23°06.0	275°56.2	12°18.6	335°22.2	-12°17.9	Kochab	137°20.7	74°03.2					
16	325°02.3	102°42.4	-13°55.6	70°15.3	-23°06.2	290°58.8	12°18.6	350°24.5	-12°17.8	Alphecca	126°04.8	26°38.0					
17	340°04.7	117°41.9	-13°56.5	85°15.8	-23°06.4	306°01.4	12°18.5	5°26.8	-12°17.8	Antares	112°17.3	-26°29.0					
18	355°07.2	132°41.4	-13°57.4	100°16.3	-23°06.6	321°03.9	12°18.5	20°29.1	-12°17.7	Atria	107°12.9	-69°04.1					
19	10°09.7	147°41.0	-13°58.3	115°16.7	-23°06.8	336°06.5	12°18.5	35°31.4	-12°17.6	Sabik	102°04.2	-15°45.2					
20	25°12.1	162°40.5	-13°59.2	130°17.2	-23°07.0	351°09.1	12°18.5	50°33.7	-12°17.6	Shaula	96°12.0	-37°07.2					
21	40°14.6	177°40.0	-14°00.1	145°17.7	-23°07.2	6°11.7	12°18.4	65°36.0	-12°17.5	Rasalhague	95°59.7	12°32.6					
22	55°17.1	192°39.5	-14°01.0	160°18.2	-23°07.5	21°14.3	12°18.4	80°38.3	-12°17.4	Etamin	90°43.1	51°29.1					
23	70°19.5	207°39.1	-14°01.9	175°18.7	-23°07.7	36°16.9	12°18.4	95°40.6	-12°17.4	Kaus Aust.	83°34.1	-34°22.4					
Mer.pass.:18:19			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.6			v2.3 d0.1 m0.9					
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec								
0	85°22.0	222°38.6	-14°02.8	190°19.2	-23°07.9	51°19.5	12°18.3	110°42.9	-12°17.3	Altair	62°01.2	8°55.8					
1	100°24.4	237°38.1	-14°03.7	205°19.7	-23°08.1	66°22.0	12°18.3	125°45.2	-12°17.2	Peacock	53°07.6	-56°39.7					
2	115°26.9	252°37.6	-14°04.5	220°20.2	-23°08.3	81°24.6	12°18.3	140°47.5	-12°17.2	Deneb	49°26.8	45°22.1					
3	130°29.4	267°37.1	-14°05.4	235°20.7	-23°08.5	96°27.2	12°18.3	155°49.8	-12°17.1	Enif	33°39.9	9°59.1					
4	145°31.8	282°36.7	-14°06.3	250°21.2	-23°08.7	111°29.8	12°18.2	170°52.1	-12°17.0	Alnair	27°34.2	-46°50.9					
5	160°34.3	297°36.2	-14°07.2	265°21.7	-23°08.9	126°32.4	12°18.2	185°54.4	-12°17.0	Fomalhaut	15°15.6	-29°29.9					
6	175°36.8	312°35.7	-14°08.1	280°22.2	-23°09.2	141°35.0	12°18.2	200°56.7	-12°16.9	Scheat	13°46.2	28°12.9					
7	190°39.2	327°35.2	-14°09.0	295°22.7	-23°09.4	156°37.5	12°18.1	215°59.0	-12°16.8	Markab	13°30.9	15°20.1					
8	205°41.7	342°34.7	-14°09.9	310°23.1	-23°09.6	171°40.1	12°18.1	231°01.3	-12°16.8	2023/12/	SHA	Mer.pass					
9	220°44.2	357°34.3	-14°10.8	325°23.6	-23°09.8	186°42.7	12°18.1	246°03.6	-12°16.7	Venus	139°37.3	09:08					
10	235°46.6	12°33.8	-14°11.7	340°24.1	-23°10.0	201°45.3	12°18.1	261°05.9	-12°16.6	Mars	106°31.6	11:20					
11	250°49.1	27°33.3	-14°12.6	355°24.6	-23°10.2	216°47.9	12°18.0	276°08.2	-12°16.6	Jupiter	325°51.3	20:39					
12	265°51.5	42°32.8	-14°13.5	10°25.1	-23°10.4	231°50.5	12°18.0	291°10.5	-12°16.5	Saturn	25°28.6	16:42					
13	280°54.0	57°32.3	-14°14.3	25°25.6	-23°10.6	246°53.0	12°18.0	306°12.8	-12°16.4	2023/12/	SHA	Mer.pass					
14	295°56.5	72°31.8	-14°15.2	40°26.1	-23°10.8	261°55.6	12°18.0	321°15.1	-12°16.4	Venus	138°27.1	09:09					
15	310°58.9	87°31.3	-14°16.1	55°26.6	-23°11.0	276°58.2	12°17.9	336°17.4	-12°16.3	Mars	105°44.5	11:19					
16	326°01.4	102°30.9	-14°17.0	70°27.1	-23°11.2	292°00.8	12°17.9	351°19.7	-12°16.2	Jupiter	325°54.5	20:35					
17	341°03.9	117°30.4	-14°17.9	85°27.6	-23°11.4	307°03.4	12°17.9	6°22.0	-12°16.2	Saturn	25°24.8	16:38					
18	356°06.3	132°29.9	-14°18.8	100°28.1	-23°11.6	322°05.9	12°17.8	21°24.3	-12°16.1	2023/12/	SHA	Mer.pass					
19	11°08.8	147°29.4	-14°19.7	115°28.5	-23°11.8	337°08.5	12°17.8	36°26.5	-12°16.0	Venus	137°16.6	09:10					
20	26°11.3	162°28.9	-14°20.6	130°29.0	-23°12.0	352°11.1	12°17.8	51°28.8	-12°16.0	Mars	104°57.2	11:18					
21	41°13.7	177°28.4	-14°21.4	145°29.5	-23°12.3	7°13.7	12°17.8	66°31.1	-12°15.9	Jupiter	325°57.5	20:31					
22	56°16.2	192°27.9	-14°22.3	160°30.0	-23°12.5	22°16.3	12°17.7	81°33.4	-12°15.8	Saturn	25°20.9	16:35					
23	71°18.7	207°27.4	-14°23.2	175°30.5	-23°12.7	37°18.8	12°17.7	96°35.7	-12°15.8	Horizontal paralax							
Mer.pass.:18:15			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.6			v2.3 d0.1 m0.9					
												Venus: 0.1					
												Mars: 0.1					

h Sun Moon

Fri	GHA	Dec	GHA	ν	Dec	d	HP	Twilight				Twilight		
0	181°18.8	-23°14.3	151°44.8	3.8	-27°03.4	5.1	59.4	Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	196°18.5	-23°14.5	166°07.6	3.8	-26°58.2	5.2	59.4	72	08:21	10:49	—:—	—:—	13:02	15:30
2	211°18.2	-23°14.6	180°30.4	3.9	-26°52.9	5.4	59.4	70	08:01	09:49	—:—	—:—	14:02	15:50
3	226°17.9	-23°14.7	194°53.3	3.9	-26°47.3	5.6	59.4	68	07:45	09:14	—:—	—:—	14:37	16:05
4	241°17.6	-23°14.9	209°16.3	4.0	-26°41.6	5.8	59.4	66	07:32	08:49	10:28	13:22	15:02	16:18
5	256°17.3	-23°15.0	223°39.2	4.0	-26°35.7	6.0	59.4	64	07:21	08:30	09:47	14:04	15:21	16:29
6	271°17.0	-23°15.1	238°02.3	4.1	-26°29.7	6.2	59.4	62	07:12	08:14	09:19	14:32	15:37	16:39
7	286°16.7	-23°15.3	252°25.4	4.1	-26°23.4	6.4	59.4	60	07:04	08:00	08:58	14:53	15:50	16:47
8	301°16.4	-23°15.4	266°48.6	4.2	-26°17.0	6.5	59.4	58	06:56	07:49	08:40	15:10	16:02	16:55
9	316°16.1	-23°15.5	281°11.8	4.3	-26°10.3	6.7	59.4	56	06:49	07:39	08:26	15:25	16:12	17:01
10	331°15.8	-23°15.7	295°35.1	4.3	-26°03.5	6.9	59.5	54	06:43	07:30	08:13	15:38	16:21	17:07
11	346°15.4	-23°15.8	309°58.5	4.4	-25°56.6	7.1	59.5	52	06:38	07:21	08:02	15:49	16:29	17:13
12	1°15.1	-23°15.9	324°21.9	4.5	-25°49.4	7.2	59.5	50	06:32	07:14	07:52	15:58	16:37	17:18
13	16°14.8	-23°16.1	338°45.4	4.5	-25°42.1	7.4	59.5	45	06:21	06:58	07:32	16:19	16:53	17:30
14	31°14.5	-23°16.2	353°09.0	4.6	-25°34.6	7.6	59.5	40	06:10	06:45	07:15	16:36	17:06	17:40
15	46°14.2	-23°16.3	7°32.7	4.7	-25°26.9	7.8	59.5	35	06:01	06:33	07:01	16:50	17:18	17:50
16	61°13.9	-23°16.5	21°56.4	4.8	-25°19.0	7.9	59.5	30	05:52	06:22	06:49	17:02	17:29	17:58
17	76°13.6	-23°16.6	36°20.2	4.9	-25°11.0	8.1	59.5	20	05:36	06:04	06:28	17:23	17:47	18:15
18	91°13.3	-23°16.7	50°44.1	4.9	-25°02.8	8.3	59.5	10	05:20	05:46	06:09	17:42	18:05	18:31
19	106°13.0	-23°16.8	65°08.1	5.0	-24°54.5	8.4	59.5	0	05:03	05:29	05:52	17:59	18:22	18:48
20	121°12.7	-23°17.0	79°32.1	5.1	-24°46.0	8.6	59.5	-10	04:44	05:11	05:34	18:17	18:40	19:07
21	136°12.4	-23°17.1	93°56.3	5.2	-24°37.3	8.8	59.5	-20	04:22	04:51	05:15	18:36	19:00	19:29
22	151°12.1	-23°17.2	108°20.5	5.3	-24°28.4	8.9	59.5	-30	03:53	04:26	04:53	18:58	19:25	19:58
23	166°11.8	-23°17.3	122°44.8	5.4	-24°19.4	9.1	59.5	-35	03:34	04:11	04:40	19:11	19:40	20:17
	SD.=16.2	d=-0.1			S.D.=16.2			-40	03:11	03:53	04:25	19:26	19:58	20:40
								-45	02:41	03:30	04:08	19:44	20:21	21:11
								-50	01:56	03:01	03:45	20:06	20:50	21:56
								-52	01:28	02:46	03:34	20:17	21:06	22:23
								-54	00:44	02:28	03:22	20:29	21:23	23:08
								-56	—:—	02:06	03:08	20:43	21:45	—:—
								-58	—:—	01:37	02:51	20:60	22:15	—:—
								-60	—:—	00:48	02:31	21:20	23:04	—:—

December 18, 19 ,20 (Mon., Tue., Wed.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	86°21.1	222°26.9	-14°24.1	190°31.0	-23°12.9	52°21.4	12°17.7	111°38.0	-12°15.7	Alpheratz	357°35.7	29°13.5					
1	101°23.6	237°26.5	-14°25.0	205°31.5	-23°13.1	67°24.0	12°17.7	126°40.3	-12°15.6	Ankaa	353°07.9	-42°10.8					
2	116°26.0	252°26.0	-14°25.9	220°32.0	-23°13.3	82°26.6	12°17.6	141°42.6	-12°15.6	Schedar	349°31.9	56°40.4					
3	131°28.5	267°25.5	-14°26.7	235°32.4	-23°13.5	97°29.1	12°17.6	156°44.9	-12°15.5	Diphda	348°48.0	-17°51.4					
4	146°31.0	282°25.0	-14°27.6	250°32.9	-23°13.7	112°31.7	12°17.6	171°47.2	-12°15.4	Achernar	335°20.6	-57°07.2					
5	161°33.4	297°24.5	-14°28.5	265°33.4	-23°13.9	127°34.3	12°17.6	186°49.5	-12°15.4	Hamal	327°52.0	23°34.7					
6	176°35.9	312°24.0	-14°29.4	280°33.9	-23°14.1	142°36.9	12°17.5	201°51.8	-12°15.3	Polaris	314°05.4	89°22.1					
7	191°38.4	327°23.5	-14°30.3	295°34.4	-23°14.3	157°39.4	12°17.5	216°54.1	-12°15.2	Akamar	315°12.1	-40°12.7					
8	206°40.8	342°23.0	-14°31.1	310°34.9	-23°14.5	172°42.0	12°17.5	231°56.4	-12°15.2	Menkar	314°06.8	4°11.0					
9	221°43.3	357°22.5	-14°32.0	325°35.4	-23°14.7	187°44.6	12°17.5	246°58.7	-12°15.1	Mirfak	308°29.1	49°56.9					
10	236°45.8	12°22.0	-14°32.9	340°35.9	-23°14.9	202°47.2	12°17.4	262°01.0	-12°15.0	Aldebaran	290°40.3	16°33.5					
11	251°48.2	27°21.5	-14°33.8	355°36.3	-23°15.1	217°49.7	12°17.4	277°03.3	-12°15.0	Rigel	281°04.4	-8°10.4					
12	266°50.7	42°21.0	-14°34.6	10°36.8	-23°15.3	232°52.3	12°17.4	292°05.6	-12°14.9	Capella	280°22.7	46°01.4					
13	281°53.2	57°20.5	-14°35.5	25°37.3	-23°15.5	247°54.9	12°17.4	307°07.9	-12°14.8	Bellatrix	278°23.5	6°22.3					
14	296°55.6	72°20.0	-14°36.4	40°37.8	-23°15.7	262°57.5	12°17.3	322°10.2	-12°14.8	Elnath	278°02.6	28°37.7					
15	311°58.1	87°19.5	-14°37.3	55°38.3	-23°15.9	278°00.0	12°17.3	337°12.5	-12°14.7	Alnilam	275°38.3	-1°11.2					
16	327°00.5	102°19.0	-14°38.1	70°38.8	-23°16.1	293°02.6	12°17.3	352°14.8	-12°14.6	Betelgeuse	270°52.7	7°24.7					
17	342°03.0	117°18.5	-14°39.0	85°39.3	-23°16.2	308°05.2	12°17.3	7°17.0	-12°14.6	Canopus	263°52.2	-52°42.4					
18	357°05.5	132°18.0	-14°39.9	100°39.7	-23°16.4	323°07.8	12°17.3	22°19.3	-12°14.5	Sirius	258°26.6	-16°44.7					
19	12°07.9	147°17.5	-14°40.8	115°40.2	-23°16.6	338°10.3	12°17.2	37°21.6	-12°14.4	Adara	255°06.2	-29°00.2					
20	27°10.4	162°17.0	-14°41.6	130°40.7	-23°16.8	353°12.9	12°17.2	52°23.9	-12°14.3	Procyon	244°51.4	5°10.0					
21	42°12.9	177°16.5	-14°42.5	145°41.2	-23°17.0	8°15.5	12°17.2	67°26.2	-12°14.3	Pollux	243°17.9	27°58.1					
22	57°15.3	192°16.0	-14°43.4	160°41.7	-23°17.2	23°18.0	12°17.2	82°28.5	-12°14.2	Avior	234°14.6	-59°34.9					
23	72°17.8	207°15.5	-14°44.3	175°42.2	-23°17.4	38°20.6	12°17.1	97°30.8	-12°14.1	Suhail	222°46.7	-43°31.5					
Mer.pass.:18:11			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.5			v2.3 d0.1 m0.9					

Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	87°20.3	222°15.0	-14°45.1	190°42.6	-23°17.6	53°23.2	12°17.1	112°33.1	-12°14.1					
1	102°22.7	237°14.5	-14°46.0	205°43.1	-23°17.8	68°25.7	12°17.1	127°35.4	-12°14.0					
2	117°25.2	252°14.0	-14°46.9	220°43.6	-23°18.0	83°28.3	12°17.1	142°37.7	-12°13.9					
3	132°27.7	267°13.5	-14°47.7	235°44.1	-23°18.2	98°30.9	12°17.0	157°40.0	-12°13.9					
4	147°30.1	282°13.0	-14°48.6	250°44.6	-23°18.4	113°33.4	12°17.0	172°42.3	-12°13.8					
5	162°32.6	297°12.5	-14°49.5	265°45.1	-23°18.6	128°36.0	12°17.0	187°44.6	-12°13.7					
6	177°35.0	312°12.0	-14°50.3	280°45.5	-23°18.8	143°38.6	12°17.0	202°46.9	-12°13.7					
7	192°37.5	327°11.5	-14°51.2	295°46.0	-23°18.9	158°41.1	12°17.0	217°49.2	-12°13.6					
8	207°40.0	342°11.0	-14°52.1	310°46.5	-23°19.1	173°43.7	12°16.9	232°51.4	-12°13.5					
9	222°42.4	357°10.5	-14°52.9	325°47.0	-23°19.3	188°46.3	12°16.9	247°53.7	-12°13.5					
10	237°44.9	12°10.0	-14°53.8	340°47.5	-23°19.5	203°48.8	12°16.9	262°56.0	-12°13.4					
11	252°47.4	27°09.4	-14°54.7	355°48.0	-23°19.7	218°51.4	12°16.9	277°58.3	-12°13.3					
12	267°49.8	42°08.9	-14°55.5	10°48.4	-23°19.9	233°54.0	12°16.8	293°00.6	-12°13.2					
13	282°52.3	57°08.4	-14°56.4	25°48.9	-23°20.1	248°56.5	12°16.8	308°02.9	-12°13.2					
14	297°54.8	72°07.9	-14°57.3	40°49.4	-23°20.3	263°59.1	12°16.8	323°05.2	-12°13.1					
15	312°57.2	87°07.4	-14°58.1	55°49.9	-23°20.5	279°01.7	12°16.8	338°07.5	-12°13.0					
16	327°59.7	102°06.9	-14°59.0	70°50.4	-23°20.6	294°04.2	12°16.8	353°09.8	-12°13.0					
17	343°02.1	117°06.4	-14°59.8	85°50.8	-23°20.8	309°06.8	12°16.7	8°12.1	-12°12.9					
18	358°04.6	132°05.9	-15°00.7	100°51.3	-23°21.0	324°09.4	12°16.7	23°14.4	-12°12.8					
19	13°07.1	147°05.4	-15°01.6	115°51.8	-23°21.2	339°11.9	12°16.7	38°16.6	-12°12.8					
20	28°09.5	162°04.8	-15°02.4	130°52.3	-23°21.4	354°14.5	12°16.7	53°18.9	-12°12.7					
21	43°12.0	177°04.3	-15°03.3	145°52.8	-23°21.6	9°17.1	12°16.7	68°21.2	-12°12.6					
22	58°14.5	192°03.8	-15°04.1	160°53.3	-23°21.8	24°19.6	12°16.6	83°23.5	-12°12.6					
23	73°16.9	207°03.3	-15°05.0	175°53.7	-23°21.9	39°22.2	12°16.6	98°25.8	-12°12.5					
Mer.pass.:18:07			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.5			v2.3 d0.1 m0.9		

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	88°19.4	222°02.8	-15°05.9	190°54.2	-23°22.1	54°24.7	12°16.6	113°28.1	-12°12.4					
1	103°21.9	237°02.3	-15°06.7	205°54.7	-23°22.3	69°27.3	12°16.6	128°30.4	-12°12.3					
2	118°24.3	252°01.7	-15°07.6	220°55.2	-23°22.5	84°29.9	12°16.6	143°32.7	-12°12.3					
3	133°26.8	267°01.2	-15°08.4	235°55.6	-23°22.7	99°32.4	12°16.5	158°35.0	-12°12.2					
4	148°29.3	282°00.7	-15°09.3	250°56.1	-23°22.9	114°35.0	12°16.5	173°37.3	-12°12.1					
5	163°31.7	297°00.2	-15°10.1	265°56.6	-23°23.0	129°37.5	12°16.5	188°39.5	-12°12.1					
6	178°34.2	311°59.7	-15°11.0	280°57.1	-23°23.2	144°40.1	12°16.5	203°41.8	-12°12.0					
7	193°36.6	326°59.2	-15°11.9	295°57.6	-23°23.4	159°42.7	12°16.5	218°44.1	-12°11.9					
8	208°39.1	341°58.6	-15°12.7	310°58.0	-23°23.6	174°45.2	12°16.4	233°46.4	-12°11.9					
9	223°41.6	356°58.1	-15°13.6	325°58.5	-23°23.8	189°47.8	12°16.4	248°48.7	-12°11.8					
10	238°44.0	11°57.6	-15°14.4	340°59.0	-23°23.9	204°50.3	12°16.4	263°51.0	-12°11.7					
11	253°46.5	26°57.1	-15°15.3	355°59.5	-23°24.1	219°52.9	12°16.4	278°53.3	-12°11.6					
12	268°49.0	41°56.5	-15°16.1	10°60.0	-23°24.3	234°55.4	12°16.4	293°55.6	-12°11.6					
13	283°51.4	56°56.0	-15°17.0	26°00.4	-23°24.5	249°58.0	12°16.4	308°57.9	-12°11.5					
14	298°53.9	71°55.5	-15°17.8	41°00.9	-23°24.6	265°00.6	12°16.3	324°00.1	-12°11.4					
15	313°56.4	86°55.0	-15°18.7	56°01.4	-23°24.8	280°03.1	12°16.3	339°02.4	-12°11.4					
16	328°58.8	101°54.5	-15°19.5	71°01.9	-23°25.0	295°05.7	12°16.3	354°04.7	-12°11.3					
17	344°01.3	116°53.9	-15°20.4	86°02.3	-23°25.2	310°08.2	12°16.3	9°07.0	-12°11.2					
18	359°03.7	131°53.4	-15°21.2	101°02.8	-23°25.4	325°10.8	12°16.3	24°09.3	-12°11.1					
19	14°06.2	146°52.9	-15°22.1	116°03.3	-23°25.5	340°13.3	12°16.2	39°11.6	-12°11.1					
20	29°08.7	161°52.3	-15°22.9	131°03.8	-23°25.7	355°15.9	12°16.2	54°13.9	-12°11.0					
21	44°11.1	176°51.8	-15°23.7	146°04.2	-23°25.9	10°18.4	12°16.2	69°16.2	-12°10.9					
22	59°13.6	191°51.3	-15°24.6	161°04.7	-23°26.1	25°21.0	12°16.2	84°18.4	-12°10.9					
23	74°16.1	206°50.8	-15°25.4	176°05.2	-23°26.2	40°23.5	12°16.2	99°20.7	-12°10.8					
Mer.pass.:18:03			v-0.5 d-0.9 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.5			v2.3 d0.1 m0.9		

2023/12/	SHA	Mer.pass	
	Venus	136°05.8 09:11	
	Mars	104°09.9 11:18	
	Jupiter	326°00.3 20:27	
	Saturn	25°16.9 16:31	
	2023/12/	SHA	Mer.pass
		Venus	134°54.8 09:11
		Mars	103°22.4 11:17
		Jupiter	326°02.9 20:23
		Saturn	25°12.8 16:27
2023/12/	SHA	Mer.pass	
	Venus	133°43.4 09:12	
	Mars	102°34.8 11:16	
	Jupiter	326°05.3 20:19	
	Saturn	25°08.7 16:24	
Horizontal parallax			
Venus:		0.1	
Mars:		0.1	

Sun			Moon												
Mon	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	180°56.9	-23°22.3	110°31.8	9.9	-14°15.5	14.9	59.5	72	08:24	10:55	--	--	12:59	15:30	
1	195°56.6	-23°22.3	125°00.8	10.0	-14°00.6	14.9	59.5	70	08:04	09:53	--	--	14:01	15:50	
2	210°56.3	-23°22.4	139°29.9	10.1	-13°45.7	15.0	59.5	68	07:48	09:17	--	--	14:36	16:06	
3	225°56.0	-23°22.5	153°59.0	10.2	-13°30.7	15.1	59.5	66	07:35	08:52	10:33	13:21	15:02	16:19	
4	240°55.7	-23°22.6	168°28.3	10.3	-13°15.6	15.1	59.5	64	07:24	08:32	09:50	14:03	15:21	16:30	
5	255°55.4	-23°22.7	182°57.6	10.3	-13°00.4	15.2	59.5	62	07:14	08:16	09:22	14:32	15:37	16:39	
6	270°55.1	-23°22.7	197°27.0	10.4	-12°45.2	15.3	59.5	60	07:06	08:03	09:00	14:53	15:51	16:48	
7	285°54.8	-23°22.8	211°56.4	10.5	-12°29.9	15.3	59.5	58	06:58	07:51	08:43	15:11	16:03	16:55	
8	300°54.4	-23°22.9	226°26.0	10.6	-12°14.5	15.4	59.4	56	06:52	07:41	08:28	15:26	16:13	17:02	
9	315°54.1	-23°23.0	240°55.6	10.6	-11°59.1	15.4	59.4	54	06:45	07:32	08:16	15:38	16:22	17:08	
10	330°53.8	-23°23.0	255°25.3	10.7	-11°43.6	15.5	59.4	52	06:40	07:23	08:04	15:49	16:30	17:14	
11	345°53.5	-23°23.1	269°55.0	10.8	-11°28.1	15.6	59.4	50	06:34	07:16	07:55	15:59	16:38	17:19	
12	0°53.2	-23°23.2	284°24.9	10.9	-11°12.5	15.6	59.4	45	06:23	06:60	07:34	16:20	16:54	17:31	
13	15°52.9	-23°23.3	298°54.8	10.9	-10°56.8	15.7	59.4	40	06:12	06:46	07:17	16:37	17:07	17:42	
14	30°52.6	-23°23.3	313°24.7	11.0	-10°41.1	15.7	59.4	35	06:03	06:35	07:03	16:51	17:19	17:51	
15	45°52.3	-23°23.4	327°54.8	11.1	-10°25.4	15.8	59.4	30	05:54	06:24	06:50	17:03	17:30	17:60	
16	60°52.0	-23°23.5	342°24.9	11.1	-10°09.6	15.8	59.4	20	05:38	06:05	06:29	17:25	17:49	18:16	
17	75°51.7	-23°23.5	356°55.0	11.2	-9°53.7	15.9	59.4	10	05:21	05:48	06:11	17:43	18:06	18:32	
18	90°51.4	-23°23.6	11°25.2	11.3	-9°37.8	15.9	59.4	0	05:04	05:31	05:53	18:01	18:23	18:49	
19	105°51.1	-23°23.7	25°55.5	11.3	-9°21.9	16.0	59.3	-10	04:45	05:13	05:36	18:18	18:41	19:08	
20	120°50.8	-23°23.7	40°25.9	11.4	-9°05.9	16.0	59.3	-20	04:23	04:52	05:17	18:37	19:02	19:31	
21	135°50.4	-23°23.8	54°56.3	11.4	-8°49.9	16.0	59.3	-30	03:54	04:27	04:55	18:59	19:27	20:00	
22	150°50.1	-23°23.9	69°26.8	11.5	-8°33.8	16.1	59.3	-35	03:35	04:12	04:42	19:12	19:42	20:19	
23	165°49.8	-23°23.9	83°57.3	11.6	-8°17.7	16.1	59.3	-40	03:12	03:54	04:26	19:27	20:00	20:42	
SD.=16.3			d=-0.1		S.D.=16.2										
								-45	02:41	03:31	04:08	19:46	20:23	21:13	
								-50	01:56	03:01	03:46	20:08	20:53	21:58	
								-52	01:28	02:46	03:35	20:19	21:08	22:26	
								-54	00:41	02:28	03:23	20:31	21:26	23:13	
								-56	--	02:06	03:08	20:46	21:48	--	
								-58	--	01:36	02:52	21:02	22:18	--	
								-60	--	00:46	02:31	21:23	23:09	--	
								Lat.	Moonrise			Moonset			
									Mon	Tue	Wed	Mon	Tue	Wed	
								72	13:32	12:50	12:14	21:26	23:52	--	
								70	13:15	12:43	12:16	21:41	23:54	--	
								68	13:01	12:38	12:18	21:52	23:56	--	
								66	12:49	12:34	12:20	22:02	23:58	--	
								64	12:39	12:30	12:21	22:10	23:59	--	
								62	12:31	12:27	12:22	22:16	--	00:00	
								60	12:24	12:24	12:23	22:22	--	00:01	
								58	12:18	12:21	12:24	22:27	--	00:02	
								56	12:12	12:19	12:25	22:31	--	00:03	
								54	12:07	12:17	12:26	22:35	--	00:04	
								52	12:02	12:15	12:27	22:39	--	00:04	
								50	11:58	12:13	12:27	22:42	--	00:05	
								45	11:49	12:10	12:29	22:49	--	00:06	
								40	11:41	12:06	12:30	22:55	--	00:07	
								35	11:34	12:04	12:31	22:60	--	00:08	
								30	11:29	12:01	12:32	23:04	--	00:09	
								20	11:18	11:57	12:34	23:12	--	00:10	
								10	11:09	11:53	12:35	23:18	--	00:11	
								0	11:01	11:50	12:37	23:24	--	00:12	
								-10	10:52	11:46	12:38	23:30	--	00:13	
								-20	10:43	11:42	12:40	23:37	--	00:14	
								-30	10:33	11:38	12:42	23:44	--	00:15	
								-35	10:27	11:36	12:43	23:48	--	00:16	
								-40	10:20	11:33	12:44	23:52	--	00:17	
								-45	10:12	11:30	12:46	23:58	--	00:18	
								-50	10:02	11:26	12:47	--	00:04	00:19	
								-52	09:58	11:24	12:48	--	00:07	00:19	
								-54	09:53	11:22	12:49	--	00:10	00:19	
								-56	09:47	11:20	12:50	00:05	00:13	00:20	
								-58	09:41	11:17	12:51	00:13	00:17	00:21	
								-60	09:34	11:15	12:52	00:21	00:21	00:21	
								Sun			Moon				
								Day	Eqn.of Time	Mer.	Mer.Pass.		Age		
									00 ^h	12 ^h	Pass	Upper	Lower		
								18	03:48	03:33	11:56	17:12	04:47	6(36%)	
								19	03:18	03:03	11:56	18:00	05:37	7(47%)	
								20	02:49	02:34	11:57	18:47	06:24	8(58%)	
								Sun			Moon				

December 21, 22 ,23 (Thu., Fri., Sat.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Thu	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec			
0	89°18.5	221°50.2	-15°26.3	191°05.7	-23°26.4	55°26.1	12°16.2	114°23.0	-12°10.7	Alpheratz	357°35.7	29°13.5					
1	104°21.0	236°49.7	-15°27.1	206°06.1	-23°26.6	70°28.7	12°16.1	129°25.3	-12°10.7	Ankaa	353°07.9	-42°10.8					
2	119°23.5	251°49.2	-15°28.0	221°06.6	-23°26.8	85°31.2	12°16.1	144°27.6	-12°10.6	Schedar	349°32.0	56°40.4					
3	134°25.9	266°48.6	-15°28.8	236°07.1	-23°26.9	100°33.8	12°16.1	159°29.9	-12°10.5	Diphda	348°48.0	-17°51.4					
4	149°28.4	281°48.1	-15°29.7	251°07.6	-23°27.1	115°36.3	12°16.1	174°32.2	-12°10.4	Achernar	335°20.6	-57°07.2					
5	164°30.9	296°47.6	-15°30.5	266°08.0	-23°27.3	130°38.9	12°16.1	189°34.4	-12°10.4	Hamal	327°52.0	23°34.7					
6	179°33.3	311°47.1	-15°31.3	281°08.5	-23°27.4	145°41.4	12°16.1	204°36.7	-12°10.3	Polaris	314°06.2	89°22.1					
7	194°35.8	326°46.5	-15°32.2	296°09.0	-23°27.6	160°44.0	12°16.0	219°39.0	-12°10.2	Akamar	315°12.1	-40°12.7					
8	209°38.2	341°46.0	-15°33.0	311°09.5	-23°27.8	175°46.5	12°16.0	234°41.3	-12°10.2	Menkar	314°06.8	4°11.0					
9	224°40.7	356°45.5	-15°33.9	326°09.9	-23°28.0	190°49.1	12°16.0	249°43.6	-12°10.1	Mirfak	308°29.1	49°56.9					
10	239°43.2	11°44.9	-15°34.7	341°10.4	-23°28.1	205°51.6	12°16.0	264°45.9	-12°10.0	Aldebaran	290°40.3	16°33.5					
11	254°45.6	26°44.4	-15°35.5	356°10.9	-23°28.3	220°54.2	12°16.0	279°48.2	-12°09.9	Rigel	281°04.4	-8°10.4					
12	269°48.1	41°43.9	-15°36.4	11°11.4	-23°28.5	235°56.7	12°16.0	294°50.4	-12°09.9	Capella	280°22.7	46°01.4					
13	284°50.6	56°43.3	-15°37.2	26°11.8	-23°28.6	250°59.3	12°15.9	309°52.7	-12°09.8	Bellatrix	278°23.5	6°22.3					
14	299°53.0	71°42.8	-15°38.0	41°12.3	-23°28.8	266°01.8	12°15.9	324°55.0	-12°09.7	Elnath	278°02.6	28°37.7					
15	314°55.5	86°42.2	-15°38.9	56°12.8	-23°29.0	281°04.4	12°15.9	339°57.3	-12°09.7	Alnilam	275°38.3	-1°11.2					
16	329°58.0	101°41.7	-15°39.7	71°13.3	-23°29.1	296°06.9	12°15.9	354°59.6	-12°09.6	Betelgeuse	270°52.7	7°24.7					
17	345°00.4	116°41.2	-15°40.5	86°13.7	-23°29.3	311°09.4	12°15.9	10°01.9	-12°09.5	Canopus	263°52.2	-52°42.4					
18	0°02.9	131°40.6	-15°41.4	101°14.2	-23°29.5	326°12.0	12°15.9	25°04.2	-12°09.4	Sirius	258°26.6	-16°44.7					
19	15°05.4	146°40.1	-15°42.2	116°14.7	-23°29.6	341°14.5	12°15.9	40°06.4	-12°09.4	Adara	255°06.2	-29°00.2					
20	30°07.8	161°39.6	-15°43.0	131°15.1	-23°29.8	356°17.1	12°15.8	55°08.7	-12°09.3	Procyon	244°51.4	5°10.0					
21	45°10.3	176°39.0	-15°43.9	146°15.6	-23°30.0	11°19.6	12°15.8	70°11.0	-12°09.2	Pollux	243°17.9	27°58.1					
22	60°12.7	191°38.5	-15°44.7	161°16.1	-23°30.1	26°22.2	12°15.8	85°13.3	-12°09.1	Avior	234°14.6	-59°34.9					
23	75°15.2	206°37.9	-15°45.5	176°16.6	-23°30.3	41°24.7	12°15.8	100°15.6	-12°09.1	Suhail	222°46.6	-43°31.5					
Mer.pass.:17:59			v-0.5 d-0.8 m-4.0			v0.5 d-0.2 m1.4			v2.6 d-0.0 m-2.5			v2.3 d0.1 m0.9					
Fri	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	90°17.7	221°37.4	-15°46.4	191°17.0	-23°30.5	56°27.3	12°15.8	115°17.9	-12°09.0	Miaplacidus	221°37.9	-69°48.6					
1	105°20.1	236°36.9	-15°47.2	206°17.5	-23°30.6	71°29.8	12°15.8	130°20.1	-12°08.9	Alphard	217°48.4	-8°45.7					
2	120°22.6	251°36.3	-15°48.0	221°18.0	-23°30.8	86°32.4	12°15.8	145°22.4	-12°08.9	Regulus	207°35.2	11°51.0					
3	135°25.1	266°35.8	-15°48.9	236°18.4	-23°30.9	101°34.9	12°15.7	160°24.7	-12°08.8	Dubhe	193°41.9	61°37.1					
4	150°27.5	281°35.2	-15°49.7	251°18.9	-23°31.1	116°37.4	12°15.7	175°27.0	-12°08.7	Denebola	182°25.8	14°26.3					
5	165°30.0	296°34.7	-15°50.5	266°19.4	-23°31.3	131°40.0	12°15.7	190°29.3	-12°08.6	Gienah	175°44.5	-17°40.4					
6	180°32.5	311°34.1	-15°51.3	281°19.9	-23°31.4	146°42.5	12°15.7	205°31.6	-12°08.6	Acrux	173°01.2	-63°13.6					
7	195°34.9	326°33.6	-15°52.2	296°20.3	-23°31.6	161°45.1	12°15.7	220°33.8	-12°08.5	Gacrux	171°52.7	-57°14.5					
8	210°37.4	341°33.0	-15°53.0	311°20.8	-23°31.7	176°47.6	12°15.7	235°36.1	-12°08.4	Alioth	166°13.9	55°49.5					
9	225°39.8	356°32.5	-15°53.8	326°21.3	-23°31.9	191°50.2	12°15.7	250°38.4	-12°08.4	Spica	158°23.4	-11°17.1					
10	240°42.3	11°32.0	-15°54.6	341°21.7	-23°32.1	206°52.7	12°15.6	265°40.7	-12°08.3	Alcaid	152°52.9	49°11.4					
11	255°44.8	26°31.4	-15°55.5	356°22.2	-23°32.2	221°55.2	12°15.6	280°43.0	-12°08.2	Hadar	148°37.6	-60°29.0					
12	270°47.2	41°30.9	-15°56.3	11°22.7	-23°32.4	236°57.8	12°15.6	295°45.3	-12°08.1	Menkent	147°58.9	-36°29.1					
13	285°49.7	56°30.3	-15°57.1	26°23.1	-23°32.5	252°00.3	12°15.6	310°47.5	-12°08.1	Arcturus	145°48.8	19°03.7					
14	300°52.2	71°29.8	-15°57.9	41°23.6	-23°32.7	267°02.9	12°15.6	325°49.8	-12°08.0	Rigil Kent.	139°42.0	-60°55.8					
15	315°54.6	86°29.2	-15°58.7	56°24.1	-23°32.9	282°05.4	12°15.6	340°52.1	-12°07.9	Zubenelg.	136°57.2	-16°08.4					
16	330°57.1	101°28.7	-15°59.6	71°24.6	-23°33.0	297°07.9	12°15.6	355°54.4	-12°07.8	Kochab	137°20.6	74°03.1					
17	345°59.6	116°28.1	-16°00.4	86°25.0	-23°33.2	312°10.5	12°15.6	10°56.7	-12°07.8	Alphecca	126°04.8	26°38.0					
18	1°02.0	131°27.6	-16°01.2	101°25.5	-23°33.3	327°13.0	12°15.5	25°58.9	-12°07.7	Antares	112°17.3	-26°29.0					
19	16°04.5	146°27.0	-16°02.0	116°26.0	-23°33.5	342°15.6	12°15.5	41°01.2	-12°07.6	Atria	107°12.8	-69°04.1					
20	31°07.0	161°26.5	-16°02.8	131°26.4	-23°33.6	357°18.1	12°15.5	56°03.5	-12°07.6	Sabik	102°04.1	-15°45.3					
21	46°09.4	176°25.9	-16°03.7	146°26.9	-23°33.8	12°20.6	12°15.5	71°05.8	-12°07.5	Shaula	96°12.0	-37°07.2					
22	61°11.9	191°25.3	-16°04.5	161°27.4	-23°34.0	27°23.2	12°15.5	86°08.1	-12°07.4	Rasalhague	95°59.7	12°32.6					
23	76°14.3	206°24.8	-16°05.3	176°27.8	-23°34.1	42°25.7	12°15.5	101°10.3	-12°07.3	Etamin	90°43.1	51°29.1					
Mer.pass.:17:55			v-0.5 d-0.8 m-4.0			v0.5 d-0.2 m1.4			v2.5 d-0.0 m-2.5			v2.3 d0.1 m0.9					
Sat	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec					
0	91°16.8	221°24.2	-16°06.1	191°28.3	-23°34.3	57°28.2	12°15.5	116°12.6	-12°07.3	Kaus Aust.	83°34.1	-34°22.4					
1	106°19.3	236°23.7	-16°06.9	206°28.8	-23°34.4	72°30.8	12°15.5	131°14.9	-12°07.2	Vega	80°34.3	38°48.3					
2	121°21.7	251°23.1	-16°07.7	221°29.2	-23°34.6	87°33.3	12°15.5	146°17.2	-12°07.1	Nunki	75°49.2	-26°16.1					
3	136°24.2	266°22.6	-16°08.5	236°29.7	-23°34.7	102°35.8	12°15.4	161°19.5	-12°07.0	Altair	62°01.2	8°55.8					
4	151°26.7	281°22.0	-16°09.4	251°30.2	-23°34.9	117°38.4	12°15.4	176°21.7	-12°07.0	Peacock	53°07.6	-56°39.7					
5	166°29.1	296°21.5	-16°10.2	266°30.6	-23°35.0	132°40.9	12°15.4	191°24.0	-12°06.9	Deneb	49°26.8	45°22.0					
6	181°31.6	311°20.9	-16°11.0	281°31.1	-23°35.2	147°43.4	12°15.4	206°26.3	-12°06.8	Enif	33°39.9	9°59.1					
7	196°34.1	326°20.3	-16°11.8	296°31.6	-23°35.3	162°46.0	12°15.4	221°28.6	-12°06.7	Alnair	27°34.3	-46°50.9					
8	211°36.5	341°19.8	-16°12.6	311°32.0	-23°35.5												

Sun			Moon				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	180°34.7	-23°26.0	75°33.9	12.6	5°06.9	16.2	58.7
1	195°34.4	-23°26.0	90°05.5	12.6	5°23.1	16.1	58.7
2	210°34.1	-23°26.0	104°37.1	12.6	5°39.2	16.1	58.7
3	225°33.8	-23°26.1	119°08.7	12.6	5°55.3	16.1	58.6
4	240°33.5	-23°26.1	133°40.2	12.6	6°11.3	16.0	58.6
5	255°33.1	-23°26.1	148°11.8	12.5	6°27.3	16.0	58.6
6	270°32.8	-23°26.1	162°43.3	12.5	6°43.3	16.0	58.6
7	285°32.5	-23°26.1	177°14.8	12.5	6°59.2	15.9	58.6
8	300°32.2	-23°26.1	191°46.3	12.5	7°15.1	15.9	58.6
9	315°31.9	-23°26.2	206°17.8	12.5	7°31.0	15.8	58.5
10	330°31.6	-23°26.2	220°49.3	12.4	7°46.8	15.8	58.5
11	345°31.3	-23°26.2	235°20.7	12.4	8°02.5	15.7	58.5
12	0°31.0	-23°26.2	249°52.1	12.4	8°18.2	15.7	58.5
13	15°30.7	-23°26.2	264°23.5	12.4	8°33.9	15.6	58.5
14	30°30.4	-23°26.2	278°54.8	12.3	8°49.5	15.6	58.5
15	45°30.0	-23°26.2	293°26.1	12.3	9°05.1	15.5	58.5
16	60°29.7	-23°26.2	307°57.4	12.3	9°20.6	15.5	58.4
17	75°29.4	-23°26.3	322°28.7	12.2	9°36.1	15.4	58.4
18	90°29.1	-23°26.3	336°59.9	12.2	9°51.5	15.4	58.4
19	105°28.8	-23°26.3	351°31.1	12.2	10°06.8	15.3	58.4
20	120°28.5	-23°26.3	6°02.2	12.1	10°22.1	15.3	58.4
21	135°28.2	-23°26.3	20°33.3	12.1	10°37.3	15.2	58.4
22	150°27.9	-23°26.3	35°04.4	12.1	10°52.5	15.1	58.3
23	165°27.6	-23°26.3	49°35.5	12.0	11°07.6	15.1	58.3
SD.=16.3			d=-0.0			S.D.=16.0	
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	180°27.2	-23°26.3	64°06.5	12.0	11°22.7	15.0	58.3
1	195°26.9	-23°26.3	78°37.4	11.9	11°37.7	15.0	58.3
2	210°26.6	-23°26.3	93°08.4	11.9	11°52.6	14.9	58.3
3	225°26.3	-23°26.3	107°39.3	11.9	12°07.5	14.8	58.3
4	240°26.0	-23°26.3	122°10.1	11.8	12°22.2	14.8	58.2
5	255°25.7	-23°26.3	136°40.9	11.8	12°37.0	14.7	58.2
6	270°25.4	-23°26.3	151°11.6	11.7	12°51.6	14.6	58.2
7	285°25.1	-23°26.3	165°42.4	11.7	13°06.2	14.5	58.2
8	300°24.8	-23°26.3	180°13.0	11.6	13°20.7	14.5	58.2
9	315°24.5	-23°26.3	194°43.6	11.6	13°35.1	14.4	58.2
10	330°24.1	-23°26.3	209°14.2	11.5	13°49.5	14.3	58.1
11	345°23.8	-23°26.3	223°44.7	11.5	14°03.8	14.2	58.1
12	0°23.5	-23°26.3	238°15.2	11.4	14°18.0	14.2	58.1
13	15°23.2	-23°26.3	252°45.6	11.4	14°32.1	14.1	58.1
14	30°22.9	-23°26.3	267°15.9	11.3	14°46.2	14.0	58.1
15	45°22.6	-23°26.2	281°46.3	11.3	15°00.1	13.9	58.1
16	60°22.3	-23°26.2	296°16.5	11.2	15°14.0	13.8	58.0
17	75°22.0	-23°26.2	310°46.7	11.2	15°27.8	13.8	58.0
18	90°21.7	-23°26.2	325°16.9	11.1	15°41.5	13.7	58.0
19	105°21.4	-23°26.2	339°47.0	11.1	15°55.2	13.6	58.0
20	120°21.0	-23°26.2	354°17.0	11.0	16°08.7	13.5	58.0
21	135°20.7	-23°26.2	8°47.0	11.0	16°22.1	13.4	57.9
22	150°20.4	-23°26.2	23°16.9	10.9	16°35.5	13.3	57.9
23	165°20.1	-23°26.1	37°46.8	10.8	16°48.8	13.2	57.9
SD.=16.3			d=-0.0			S.D.=15.9	
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	180°19.8	-23°26.1	52°16.6	10.8	17°01.9	13.1	57.9
1	195°19.5	-23°26.1	66°46.3	10.7	17°15.0	13.0	57.9
2	210°19.2	-23°26.1	81°16.0	10.7	17°28.0	12.9	57.9
3	225°18.9	-23°26.1	95°45.6	10.6	17°40.9	12.8	57.8
4	240°18.6	-23°26.0	110°15.2	10.5	17°53.7	12.7	57.8
5	255°18.3	-23°26.0	124°44.7	10.5	18°06.4	12.6	57.8
6	270°17.9	-23°26.0	139°14.1	10.4	18°19.0	12.5	57.8
7	285°17.6	-23°26.0	153°43.5	10.4	18°31.4	12.4	57.8
8	300°17.3	-23°26.0	168°12.9	10.3	18°43.8	12.3	57.7
9	315°17.0	-23°25.9	182°42.1	10.2	18°56.1	12.2	57.7
10	330°16.7	-23°25.9	197°11.3	10.2	19°08.3	12.1	57.7
11	345°16.4	-23°25.9	211°40.4	10.1	19°20.3	12.0	57.7
12	0°16.1	-23°25.9	226°09.5	10.0	19°32.3	11.9	57.7
13	15°15.8	-23°25.8	240°38.5	10.0	19°44.1	11.8	57.7
14	30°15.5	-23°25.8	255°07.5	9.9	19°55.9	11.7	57.6
15	45°15.2	-23°25.8	269°36.3	9.8	20°07.5	11.6	57.6
16	60°14.8	-23°25.7	284°05.1	9.8	20°19.0	11.5	57.6
17	75°14.5	-23°25.7	298°33.9	9.7	20°30.4	11.3	57.6
18	90°14.2	-23°25.7	313°02.6	9.7	20°41.7	11.2	57.6
19	105°13.9	-23°25.7	327°31.2	9.6	20°52.9	11.1	57.5
20	120°13.6	-23°25.6	341°59.8	9.5	21°03.9	11.0	57.5
21	135°13.3	-23°25.6	356°28.2	9.5	21°14.9	10.9	57.5
22	150°13.0	-23°25.6	10°56.7	9.4	21°25.7	10.7	57.5
23	165°12.7	-23°25.5	25°25.0	9.3	21°36.3	10.6	57.5
SD.=16.3			d=0.0			S.D.=15.8	
Twilight		Twilight		Twilight		Twilight	
Lat.	Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
72	08:26	10:58	—:—	—:—	12:59	15:31	
70	08:06	09:55	—:—	—:—	14:02	15:51	
68	07:50	09:19	—:—	—:—	14:37	16:07	
66	07:37	08:54	10:35	13:22	15:03	16:20	
64	07:26	08:34	09:52	14:04	15:23	16:31	
62	07:16	08:18	09:24	14:33	15:39	16:41	
60	07:08	08:05	09:02	14:55	15:52	16:49	
58	07:00	07:53	08:45	15:12	16:04	16:57	
56	06:53	07:43	08:30	15:27	16:14	17:04	
54	06:47	07:33	08:17	15:40	16:23	17:10	
52	06:41	07:25	08:06	15:51	16:32	17:15	
50	06:36	07:18	07:56	16:01	16:39	17:21	
45	06:24	07:02	07:35	16:21	16:55	17:33	
40	06:14	06:48	07:19	16:38	17:09	17:43	
35	06:04	06:36	07:04	16:53	17:21	17:52	
30	05:56	06:26	06:52	17:05	17:31	18:01	
20	05:39	06:07	06:31	17:26	17:50	18:18	
10	05:23	05:49	06:12	17:45	18:08	18:34	
0	05:06	05:32	05:55	18:02	18:25	18:51	
-10	04:47	05:14	05:37	18:20	18:43	19:10	
-20	04:24	04:53	05:18	18:39	19:03	19:33	
-30	03:55	04:28	04:56	19:01	19:28	20:02	
-35	03:36	04:13	04:43	19:14	19:44	20:20	
-40	03:13	03:55	04:28	19:29	20:02	20:44	
-45	02:43	03:32	04:10	19:47	20:25	21:14	
-50	01:57	03:03	03:47	20:10	20:54	22:00	
-52	01:29	02:47	03:36	20:21	21:09	22:28	
-54	00:42	02:29	03:24	20:33	21:28	23:15	
-56	—:—	02:07	03:10	20:47	21:50	—:—	
-58	—:—	01:37	02:53	21:04	22:20	—:—	
-60	—:—	00:46	02:32	21:25	23:11	—:—	
Moonrise		Moonset		Moonrise		Moonset	
Lat.	Thu	Fri	Sat	Thu	Fri	Sat	
72	11:36	10:47	—:—	02:12	04:43	—:—	
70	11:48	11:13	10:06	02:03	04:19	07:11	
68	11:57	11:33	10:55	01:56	04:01	06:23	
66	12:05	11:49	11:27	01:51	03:47	05:53	
64	12:12	12:02	11:51	01:46	03:35	05:30	
62	12:18	12:14	12:09	01:42	03:25	05:12	
60	12:23	12:23	12:25	01:38	03:17	04:57	
58	12:28	12:32	12:38	01:35	03:09	04:45	
56	12:32	12:39	12:50	01:33	03:03	04:34	
54	12:35	12:46	13:00	01:30	02:57	04:25	
52	12:39	12:52	13:09	01:28	02:52	04:17	
50	12:42	12:58	13:17	01:26	02:47	04:09	
45	12:48	13:10	13:35	01:22	02:37	03:53	
40	12:54	13:20	13:49	01:18	02:29	03:40	
35	12:59	13:28	14:01	01:15	02:22	03:29	
30	13:03	13:36	14:12	01:12	02:15	03:20	
20	13:11	13:49	14:31</				

December 24, 25 ,26 (Sun., Mon., Tue.)

Aries				Venus		Mars		Jupiter		Saturn		Stars		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	92°16.0	221°10.8	-16°25.5	191°39.5	-23°37.8	58°29.0	12°15.2	117°07.3	-12°05.5	Alpheratz	357°35.7	29°13.5		
1	107°18.4	236°10.2	-16°26.3	206°39.9	-23°38.0	73°31.5	12°15.2	132°09.6	-12°05.4	Ankaa	353°08.0	-42°10.8		
2	122°20.9	251°09.6	-16°27.1	221°40.4	-23°38.1	88°34.1	12°15.2	147°11.9	-12°05.3	Schedar	349°32.0	56°40.4		
3	137°23.3	266°09.1	-16°27.9	236°40.9	-23°38.3	103°36.6	12°15.2	162°14.2	-12°05.3	Diphda	348°48.0	-17°51.4		
4	152°25.8	281°08.5	-16°28.7	251°41.3	-23°38.4	118°39.1	12°15.2	177°16.4	-12°05.2	Achernar	335°20.6	-57°07.2		
5	167°28.3	296°07.9	-16°29.5	266°41.8	-23°38.5	133°41.6	12°15.2	192°18.7	-12°05.1	Hamal	327°52.0	23°34.7		
6	182°30.7	311°07.4	-16°30.3	281°42.3	-23°38.7	148°44.2	12°15.2	207°21.0	-12°05.0	Polaris	314°06.8	89°22.1		
7	197°33.2	326°06.8	-16°31.1	296°42.7	-23°38.8	163°46.7	12°15.2	222°23.3	-12°05.0	Akamar	315°12.1	-40°12.7		
8	212°35.7	341°06.2	-16°31.9	311°43.2	-23°39.0	178°49.2	12°15.2	237°25.5	-12°04.9	Menkar	314°06.8	4°11.0		
9	227°38.1	356°05.7	-16°32.7	326°43.6	-23°39.1	193°51.7	12°15.2	252°27.8	-12°04.8	Mirfak	308°29.1	49°56.9		
10	242°40.6	11°05.1	-16°33.5	341°44.1	-23°39.3	208°54.3	12°15.2	267°30.1	-12°04.7	Aldebaran	290°40.3	16°33.5		
11	257°43.1	26°04.5	-16°34.2	356°44.6	-23°39.4	223°56.8	12°15.2	282°32.4	-12°04.7	Rigel	281°04.4	-8°10.4		
12	272°45.5	41°03.9	-16°35.0	11°45.0	-23°39.5	238°59.3	12°15.1	297°34.6	-12°04.6	Capella	280°22.7	46°01.4		
13	287°48.0	56°03.4	-16°35.8	26°45.5	-23°39.7	254°01.8	12°15.1	312°36.9	-12°04.5	Bellatrix	278°23.5	6°22.3		
14	302°50.5	71°02.8	-16°36.6	41°46.0	-23°39.8	269°04.4	12°15.1	327°39.2	-12°04.4	Elnath	278°02.6	28°37.7		
15	317°52.9	86°02.2	-16°37.4	56°46.4	-23°39.9	284°06.9	12°15.1	342°41.5	-12°04.4	Alnilam	275°38.3	-1°11.2		
16	332°55.4	101°01.6	-16°38.2	71°46.9	-23°40.1	299°09.4	12°15.1	357°43.7	-12°04.3	Betelgeuse	270°52.7	7°24.7		
17	347°57.8	116°01.1	-16°39.0	86°47.3	-23°40.2	314°11.9	12°15.1	12°46.0	-12°04.2	Canopus	263°52.2	-52°42.4		
18	3°00.3	131°00.5	-16°39.8	101°47.8	-23°40.4	329°14.5	12°15.1	27°48.3	-12°04.1	Sirius	258°26.6	-16°44.7		
19	18°02.8	145°59.9	-16°40.6	116°48.3	-23°40.5	344°17.0	12°15.1	42°50.6	-12°04.1	Adara	255°06.2	-29°00.2		
20	33°05.2	160°59.3	-16°41.4	131°48.7	-23°40.6	359°19.5	12°15.1	57°52.8	-12°04.0	Procyon	244°51.3	5°10.0		
21	48°07.7	175°58.8	-16°42.1	146°49.2	-23°40.8	14°22.0	12°15.1	72°55.1	-12°03.9	Pollux	243°17.9	27°58.1		
22	63°10.2	190°58.2	-16°42.9	161°49.6	-23°40.9	29°24.5	12°15.1	87°57.4	-12°03.8	Avior	234°14.6	-59°34.9		
23	78°12.6	205°57.6	-16°43.7	176°50.1	-23°41.0	44°27.1	12°15.1	102°59.7	-12°03.8	Suhail	222°46.6	-43°31.5		
Mer.pass.:17:48				v-0.6 d-0.8 m-4.0		v0.5 d-0.1 m1.4		v2.5 d-0.0 m-2.5		v2.3 d0.1 m0.9		Miaplacidus	221°37.8	-69°48.6
												Alphard	217°48.4	-8°45.7
												Regulus	207°35.1	11°51.0
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	93°15.1	220°57.0	-16°44.5	191°50.6	-23°41.2	59°29.6	12°15.1	118°01.9	-12°03.7	Dubhe	193°41.8	61°37.1		
1	108°17.6	235°56.4	-16°45.3	206°51.0	-23°41.3	74°32.1	12°15.1	133°04.2	-12°03.6	Denebola	182°25.7	14°26.2		
2	123°20.0	250°55.9	-16°46.1	221°51.5	-23°41.4	89°34.6	12°15.1	148°06.5	-12°03.5	Gienah	175°44.5	-17°40.4		
3	138°22.5	265°55.3	-16°46.8	236°51.9	-23°41.6	104°37.1	12°15.1	163°08.8	-12°03.5	Acrux	173°01.2	-63°13.6		
4	153°24.9	280°54.7	-16°47.6	251°52.4	-23°41.7	119°39.6	12°15.0	178°11.0	-12°03.4	Gacrux	171°52.7	-57°14.5		
5	168°27.4	295°54.1	-16°48.4	266°52.9	-23°41.8	134°42.2	12°15.0	193°13.3	-12°03.3	Alioth	166°13.9	55°49.5		
6	183°29.9	310°53.5	-16°49.2	281°53.3	-23°42.0	149°44.7	12°15.0	208°15.6	-12°03.2	Spica	158°23.3	-11°17.1		
7	198°32.3	325°52.9	-16°50.0	296°53.8	-23°42.1	164°47.2	12°15.0	223°17.9	-12°03.1	Alcaid	152°52.9	49°11.4		
8	213°34.8	340°52.4	-16°50.8	311°54.2	-23°42.2	179°49.7	12°15.0	238°20.1	-12°03.1	Hadar	148°37.6	-60°29.0		
9	228°37.3	355°51.8	-16°51.5	326°54.7	-23°42.4	194°52.2	12°15.0	253°22.4	-12°03.0	Menkent	147°58.9	-36°29.1		
10	243°39.7	10°51.2	-16°52.3	341°55.1	-23°42.5	209°54.8	12°15.0	268°24.7	-12°02.9	Arcturus	145°48.7	19°03.7		
11	258°42.2	25°50.6	-16°53.1	356°55.6	-23°42.6	224°57.3	12°15.0	283°27.0	-12°02.8	Rigil Kent.	139°41.9	-60°55.8		
12	273°44.7	40°50.0	-16°53.9	11°56.1	-23°42.7	239°59.8	12°15.0	298°29.2	-12°02.8	Zubenelg.	136°57.2	-16°08.4		
13	288°47.1	55°49.4	-16°54.6	26°56.5	-23°42.9	255°02.3	12°15.0	313°31.5	-12°02.7	Kochab	137°20.5	74°03.1		
14	303°49.6	70°48.8	-16°55.4	41°57.0	-23°43.0	270°04.8	12°15.0	328°33.8	-12°02.6	Alphecca	126°04.8	26°37.9		
15	318°52.1	85°48.3	-16°56.2	56°57.4	-23°43.1	285°07.3	12°15.0	343°36.0	-12°02.5	Antares	112°17.2	-26°29.0		
16	333°54.5	100°47.7	-16°57.0	71°57.9	-23°43.3	300°09.8	12°15.0	358°38.3	-12°02.5	Atria	107°12.8	-69°04.1		
17	348°57.0	115°47.1	-16°57.7	86°58.4	-23°43.4	315°12.4	12°15.0	13°40.6	-12°02.4	Sabik	102°04.1	-15°45.3		
18	3°59.4	130°46.5	-16°58.5	101°58.8	-23°43.5	330°14.9	12°15.0	28°42.9	-12°02.3	Shaula	96°12.0	-37°07.2		
19	19°01.9	145°45.9	-16°59.3	116°59.3	-23°43.6	345°17.4	12°15.0	43°45.1	-12°02.2	Rasalhague	95°59.7	12°32.5		
20	34°04.4	160°45.3	-17°00.1	131°59.7	-23°43.8	0°19.9	12°15.0	58°47.4	-12°02.2	Etamin	90°43.1	51°29.1		
21	49°06.8	175°44.7	-17°00.8	147°00.2	-23°43.9	15°22.4	12°15.0	73°49.7	-12°02.1	Kaus Aust.	83°34.1	-34°22.4		
22	64°09.3	190°44.1	-17°01.6	162°00.6	-23°44.0	30°24.9	12°15.0	88°52.0	-12°02.0	Vega	80°34.3	38°48.3		
23	79°11.8	205°43.5	-17°02.4	177°01.1	-23°44.1	45°27.4	12°15.0	103°54.2	-12°01.9	Nunki	75°49.2	-26°16.1		
Mer.pass.:17:44				v-0.6 d-0.8 m-3.9		v0.5 d-0.1 m1.4		v2.5 d-0.0 m-2.5		v2.3 d0.1 m0.9		Altair	62°01.2	8°55.8
												Peacock	53°07.6	-56°39.6
												Deneb	49°26.8	45°22.0
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	94°14.2	220°42.9	-17°03.1	192°01.6	-23°44.3	60°29.9	12°15.0	118°56.5	-12°01.9	Enif	33°39.9	9°59.1		
1	109°16.7	235°42.3	-17°03.9	207°02.0	-23°44.4	75°32.5	12°15.0	133°58.8	-12°01.8	Alnair	27°34.3	-46°50.9		
2	124°19.2	250°41.8	-17°04.7	222°02.5	-23°44.5	90°35.0	12°15.0	149°01.0	-12°01.7	Fomalhaut	15°15.7	-29°29.9		
3	139°21.6	265°41.2	-17°05.4	237°02.9	-23°44.6	105°37.5	12°15.0	164°03.3	-12°01.6	Scheat	13°46.2	28°12.9		
4	154°24.1	280°40.6	-17°06.2	252°03.4	-23°44.8	120°40.0	12°15.0	179°05.6	-12°01.5	Markab	13°30.9	15°20.1		
5	169°26.6	295°40.0	-17°07.0	267°03.8	-23°44.9	135°42.5	12°15.0	194°07.9	-12°01.5	2023/12/			SHA	Mer.pass
6	184°29.0	310°39.4	-17°07.7	282°04.3	-23°45.0	150°45.0	12°15.0	209°10.1	-12°01.4	Venus	128°54.8	09:16		
7	199°31.5	325°38.8	-17°08.5	297°04.7	-23°45.1	165°47.5	12°15.0	224°12.4	-12°01.3	Mars	99°23.5	11:13		
8	214°33.9	340°38.2	-17°09.3	312°05.2	-23°45.2	180°50.0	12°15.0	239°14.7	-12°01.2	Jupiter	326°13.1	20:03		
9	229°36.4	355°37.6	-17°10.0	327°05.7	-23°45.4	195°52.5	12°15.0	254°16.9	-12°01.2	Saturn	24°51.4	16:09		
10	244°38.9	10°37.0	-17°10.8	342°06.1	-23°45.5	210°55.0	12°15.0	269°19.2	-12°01.1	2023/12/			SHA	Mer.pass
11	259°41.3	25°36.4	-17°11.5	357°06.6	-23°45.6	225°57.5	12°15.0	284°21.5	-12°01.0	Venus	127°41.9	09:17		
12	274°43.8	40°35.8	-17°12.3	12°07.0	-23°45.7	241°00.1	12°15.0	299°23.7	-12°00.9	Mars	98°35.5	11:12		

Sun			Moon											
Sun	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	180°12.4	-23°25.5	39°53.3	9.3	21°46.9	10.5	57.4	72	Naut.	Civil	Sunrise	Sunset	Civil	Naut.
1	195°12.1	-23°25.4	54°21.6	9.2	21°57.4	10.4	57.4	70	08:27	10:57	--	--	13:03	15:33
2	210°11.7	-23°25.4	68°49.8	9.1	22°07.7	10.3	57.4	68	08:07	09:55	--	--	14:05	15:53
3	225°11.4	-23°25.4	83°17.9	9.1	22°17.9	10.1	57.4	66	07:51	09:20	--	--	14:40	16:09
4	240°11.1	-23°25.3	97°45.9	9.0	22°27.9	10.0	57.4	64	07:38	08:55	10:35	13:25	15:05	16:22
5	255°10.8	-23°25.3	112°13.9	9.0	22°37.9	9.9	57.4	62	07:27	08:35	09:53	14:07	15:25	16:33
6	270°10.5	-23°25.2	126°41.8	8.9	22°47.7	9.7	57.3	60	07:17	08:19	09:25	14:35	15:41	16:43
7	285°10.2	-23°25.2	141°09.7	8.8	22°57.3	9.6	57.3	58	07:09	08:06	09:03	14:57	15:54	16:51
8	300°09.9	-23°25.2	155°37.5	8.8	23°06.9	9.5	57.3	56	07:01	07:54	08:46	15:14	16:06	16:59
9	315°09.6	-23°25.1	170°05.2	8.7	23°16.3	9.3	57.3	54	06:55	07:44	08:31	15:29	16:16	17:05
10	330°09.3	-23°25.1	184°32.9	8.7	23°25.6	9.2	57.3	52	06:48	07:35	08:18	15:41	16:25	17:12
11	345°09.0	-23°25.0	199°00.5	8.6	23°34.7	9.1	57.2	50	06:43	07:26	08:07	15:53	16:33	17:17
12	0°08.6	-23°25.0	213°28.1	8.5	23°43.7	8.9	57.2	48	06:37	07:19	07:57	16:02	16:41	17:22
13	15°08.3	-23°24.9	227°55.6	8.5	23°52.6	8.8	57.2	45	06:26	07:03	07:37	16:23	16:57	17:34
14	30°08.0	-23°24.9	242°23.0	8.4	24°01.3	8.7	57.2	40	06:15	06:49	07:20	16:40	17:11	17:45
15	45°07.7	-23°24.8	256°50.4	8.4	24°09.9	8.5	57.2	35	06:06	06:38	07:06	16:54	17:22	17:54
16	60°07.4	-23°24.8	271°17.8	8.3	24°18.4	8.4	57.1	30	05:57	06:27	06:53	17:07	17:33	18:03
17	75°07.1	-23°24.7	285°45.0	8.2	24°26.7	8.2	57.1	20	05:41	06:08	06:32	17:28	17:52	18:19
18	90°06.8	-23°24.7	300°12.3	8.2	24°34.9	8.1	57.1	10	05:24	05:51	06:14	17:46	18:09	18:35
19	105°06.5	-23°24.6	314°39.4	8.1	24°42.9	8.0	57.1	0	05:07	05:34	05:56	18:04	18:26	18:52
20	120°06.2	-23°24.6	329°06.5	8.1	24°50.8	7.8	57.1	-10	04:48	05:16	05:39	18:21	18:44	19:11
21	135°05.9	-23°24.5	343°33.6	8.0	24°58.5	7.7	57.0	-20	04:26	04:55	05:20	18:40	19:05	19:34
22	150°05.5	-23°24.5	358°00.6	8.0	25°06.1	7.5	57.0	-30	03:57	04:30	04:58	19:02	19:30	20:03
23	165°05.2	-23°24.4	12°27.6	7.9	25°13.6	7.4	57.0	-35	03:38	04:15	04:45	19:15	19:45	20:22
	SD.=16.3	d=0.0	S.D.=15.7					-40	03:15	03:57	04:29	19:30	20:03	20:45
								-45	02:44	03:34	04:11	19:48	20:26	21:15
								-50	01:59	03:04	03:49	20:11	20:55	22:01
Mon	GHA	Dec	GHA	ν	Dec	d	HP	-52	01:31	02:49	03:38	20:22	21:10	22:29
0	180°04.9	-23°24.4	26°54.5	7.9	25°20.9	7.2	57.0	-54	00:44	02:31	03:26	20:34	21:28	23:15
1	195°04.6	-23°24.3	41°21.4	7.8	25°28.0	7.1	57.0	-56	--	02:09	03:11	20:48	21:51	--
2	210°04.3	-23°24.3	55°48.2	7.8	25°35.1	6.9	56.9	-58	--	01:39	02:55	21:05	22:20	--
3	225°04.0	-23°24.2	70°14.9	7.7	25°41.9	6.8	56.9	-60	--	00:48	02:34	21:25	23:10	--
4	240°03.7	-23°24.1	84°41.7	7.7	25°48.6	6.6	56.9							
5	255°03.4	-23°24.1	99°08.4	7.7	25°55.2	6.5	56.9							
6	270°03.1	-23°24.0	113°35.0	7.6	26°01.6	6.3	56.9							
7	285°02.8	-23°24.0	128°01.6	7.6	26°07.9	6.2	56.8							
8	300°02.5	-23°23.9	142°28.2	7.5	26°14.0	6.0	56.8							
9	315°02.1	-23°23.8	156°54.7	7.5	26°19.9	5.9	56.8							
10	330°01.8	-23°23.8	171°21.2	7.5	26°25.7	5.7	56.8							
11	345°01.5	-23°23.7	185°47.6	7.4	26°31.4	5.6	56.8							
12	0°01.2	-23°23.6	200°14.0	7.4	26°36.8	5.4	56.7							
13	15°00.9	-23°23.6	214°40.4	7.4	26°42.2	5.3	56.7							
14	30°00.6	-23°23.5	229°06.8	7.3	26°47.4	5.1	56.7							
15	45°00.3	-23°23.4	243°33.1	7.3	26°52.4	4.9	56.7							
16	59°00.0	-23°23.4	257°59.4	7.3	26°57.2	4.8	56.6							
17	74°59.7	-23°23.3	272°25.7	7.3	27°01.9	4.6	56.6							
18	89°59.4	-23°23.2	286°51.9	7.2	27°06.5	4.5	56.6							
19	104°59.1	-23°23.2	301°18.1	7.2	27°10.9	4.3	56.6							
20	119°58.7	-23°23.1	315°44.3	7.2	27°15.1	4.2	56.6							
21	134°58.4	-23°23.0	330°10.5	7.2	27°19.2	4.0	56.5							
22	149°58.1	-23°22.9	344°36.7	7.2	27°23.1	3.8	56.5							
23	164°57.8	-23°22.9	359°02.8	7.1	27°26.8	3.7	56.5							
	SD.=16.3	d=0.1	S.D.=15.5											
Tue	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Moonrise			Moonset		
0	179°57.5	-23°22.8	13°28.9	7.1	27°30.4	3.5	56.5	72	--	--	--	--	--	--
1	194°57.2	-23°22.7	27°55.1	7.1	27°33.9	3.4	56.5	70	--	--	--	--	--	--
2	209°56.9	-23°22.6	42°21.2	7.1	27°37.1	3.2	56.4	68	--	--	--	--	--	--
3	224°56.6	-23°22.6	56°47.3	7.1	27°40.2	3.0	56.4	66	10:38	--	--	08:31	--	--
4	239°56.3	-23°22.5	71°13.4	7.1	27°43.2	2.9	56.4	64	11:32	--	--	07:37	--	--
5	254°56.0	-23°22.4	85°39.4	7.1	27°46.0	2.7	56.4	62	12:05	12:01	11:54	07:05	09:04	11:08
6	269°55.7	-23°22.3	100°05.5	7.1	27°48.6	2.5	56.4	60	12:30	12:41	13:09	06:41	08:24	09:53
7	284°55.4	-23°22.2	114°31.6	7.1	27°51.1	2.4	56.3	58	12:49	13:09	13:45	06:22	07:57	09:17
8	299°55.0	-23°22.2	128°57.7	7.1	27°53.4	2.2	56.3	56	13:06	13:30	14:11	06:07	07:35	08:52
9	314°54.7	-23°22.1	143°23.7	7.1	27°55.5	2.1	56.3	54	13:20	13:48	14:31	05:53	07:17	08:31
10	329°54.4	-23°22.0	157°49.8	7.1	27°57.5	1.9	56.3	52	13:32	14:04	14:48	05:41	07:02	08:14
11	344°54.1	-23°21.9	172°15.9	7.1	27°59.3	1.7	56.3	50	13:43	14:17	15:03	05:31	06:49	07:60
12	359°53.8	-23°21.8	186°42.0	7.1	28°01.0	1.6	56.2	45	14:06	14:44	15:33	05:09	06:23	07:30
13	14°53.5	-23°21.7	201°08.1	7.1	28°02.5	1.4	56.2	40	14:24	15:06	15:56	04:52	06:02	07:07
14	29°53.2	-23°21.7	215°34.2	7.1	28°03.8	1.3	56.2	35	14:40	15:24	16:16	04:37	05:44	06:48
15	44°52.9	-23°21.6	230°00.3	7.1	28°05.0	1.1	56.2	30	14:53	15:40	16:32	04:25	05:29	06:31
16	59°52.6	-23°21.5	244°26.5	7.1	28°06.0	0.9	56.1	20	15:16	16:06	17:00	04:03	05:04	06:03
17	74°52.3	-23°21.4	258°52.6	7.2	28°06.9	0.8	56.1	10	15:36	16:29	17:24	03:45	04:42	05:40
18	89°52.0	-23°21.3	273°18.8	7.2	28°07.5	0.6	56.1	0	15:55	16:50	17:47	03:27	04:21	05:18
19	104°51.7	-23°21.2	287°45.0	7.2	28°08.1	0.5	56.1	-10	16:14	17:12	18:09	03:10	04:01	04:55
20	119°51.4	-23°21.1	302°11.2	7.2	28°08.5	0.3	56.1	-20	16:35	17:35	18:33	02:52	03:39	04:32
21	134°51.0	-23°21.0	316°37.4	7.2	28°08.7	0.1	56.0	-30	16:58	18:02	19:02	02:31	03:14	04:04
22	149°50.7	-23°20.9	331°03.7	7.3	28°08.7	-0.0	56.0	-35	17:12	18:18	19:18	02:18	02:60	03:48
23	164°50.4	-23°20.8	345°30.0	7.3	28°08.6	-0.2	56.0	-40	17:29	18:37	19:38	02:04	02:42	03:29
	SD.=16.3	d=0.1	S.D.=15.4					-45	17:48	18:59	20:01	01:48	02:22	03:06
								-50	18:13	19:28	20:32	01:27	01:57	02:36
								-52	18:25	19:42	20:47	01:18	01:44	02:22
								-54	18:39	19:59	21:05	01:07	01:30	02:05
								-56	18:54	20:19	21:26	00:54	01:14	01:45
								-58	19:13	20:43	21:53	00:40	00:54	01:20
								-60	19:37	21:17	22:31	00:24	00:30	00:47
								Day	Sun		Mer.	Moon		Age
									Eqn.of Time	Pass	Mer.Pass.			
									00 ^h	12 ^h	Upper	Lower		
								24	00:49	00:35	11:59	22:08	09:41	12(93%)
								25	00:20	00:05	11:59	23:03	10:35	13(97%)
								26	00:10	00:25	12:00	00:00	11:32	14(100%)

December 27, 28 ,29 (Wed., Thu., Fri.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec		
0	95°13.4	220°28.6	-17°21.4	192°12.5	-23°47.1	61°30.1	12°14.9	119°51.0	-11°60.0	Alpheratz	357°35.7	29°13.5					
1	110°15.8	235°27.9	-17°22.1	207°12.9	-23°47.2	76°32.6	12°14.9	134°53.2	-11°59.9	Ankaa	353°08.0	-42°10.8					
2	125°18.3	250°27.3	-17°22.9	222°13.4	-23°47.3	91°35.1	12°14.9	149°55.5	-11°59.8	Schedar	349°32.0	56°40.4					
3	140°20.8	265°26.7	-17°23.6	237°13.8	-23°47.4	106°37.6	12°14.9	164°57.8	-11°59.8	Diphda	348°48.0	-17°51.4					
4	155°23.2	280°26.1	-17°24.4	252°14.3	-23°47.6	121°40.1	12°14.9	180°00.1	-11°59.7	Achernar	335°20.6	-57°07.2					
5	170°25.7	295°25.5	-17°25.1	267°14.7	-23°47.7	136°42.6	12°14.9	195°02.3	-11°59.6	Hamal	327°52.0	23°34.7					
6	185°28.2	310°24.9	-17°25.9	282°15.2	-23°47.8	151°45.1	12°14.9	210°04.6	-11°59.5	Polaris	314°07.5	89°22.2					
7	200°30.6	325°24.3	-17°26.6	297°15.6	-23°47.9	166°47.6	12°14.9	225°06.9	-11°59.5	Akamar	315°12.1	-40°12.7					
8	215°33.1	340°23.7	-17°27.4	312°16.1	-23°48.0	181°50.1	12°15.0	240°09.1	-11°59.4	Menkar	314°06.8	4°11.0					
9	230°35.6	355°23.1	-17°28.1	327°16.5	-23°48.1	196°52.6	12°15.0	255°11.4	-11°59.3	Mirfak	308°29.1	49°56.9					
10	245°38.0	10°22.5	-17°28.8	342°17.0	-23°48.2	211°55.1	12°15.0	270°13.7	-11°59.2	Aldebaran	290°40.3	16°33.5					
11	260°40.5	25°21.9	-17°29.6	357°17.4	-23°48.3	226°57.6	12°15.0	285°15.9	-11°59.1	Rigel	281°04.4	-8°10.4					
12	275°42.9	40°21.2	-17°30.3	12°17.9	-23°48.4	242°00.1	12°15.0	300°18.2	-11°59.1	Capella	280°22.7	46°01.4					
13	290°45.4	55°20.6	-17°31.1	27°18.3	-23°48.6	257°02.6	12°15.0	315°20.5	-11°59.0	Bellatrix	278°23.5	6°22.3					
14	305°47.9	70°20.0	-17°31.8	42°18.8	-23°48.7	272°05.1	12°15.0	330°22.7	-11°58.9	Elnath	278°02.6	28°37.7					
15	320°50.3	85°19.4	-17°32.6	57°19.2	-23°48.8	287°07.6	12°15.0	345°25.0	-11°58.8	Alnilam	275°38.3	-1°11.2					
16	335°52.8	100°18.8	-17°33.3	72°19.7	-23°48.9	302°10.1	12°15.0	0°27.3	-11°58.7	Betelgeuse	270°52.7	7°24.7					
17	350°55.3	115°18.2	-17°34.0	87°20.1	-23°49.0	317°12.6	12°15.0	15°29.5	-11°58.7	Canopus	263°52.2	-52°42.5					
18	5°57.7	130°17.6	-17°34.8	102°20.6	-23°49.1	332°15.1	12°15.0	30°31.8	-11°58.6	Sirius	258°26.5	-16°44.7					
19	21°00.2	145°16.9	-17°35.5	117°21.0	-23°49.2	347°17.6	12°15.0	45°34.1	-11°58.5	Adara	255°06.1	-29°00.2					
20	36°02.7	160°16.3	-17°36.2	132°21.5	-23°49.3	2°20.1	12°15.0	60°36.3	-11°58.4	Procyon	244°51.3	5°10.0					
21	51°05.1	175°15.7	-17°37.0	147°21.9	-23°49.4	17°22.6	12°15.0	75°38.6	-11°58.4	Pollux	243°17.9	27°58.1					
22	66°07.6	190°15.1	-17°37.7	162°22.4	-23°49.5	32°25.1	12°15.0	90°40.9	-11°58.3	Avior	234°14.5	-59°35.0					
23	81°10.1	205°14.5	-17°38.5	177°22.8	-23°49.6	47°27.6	12°15.0	105°43.1	-11°58.2	Suhail	222°46.6	-43°31.6					
Mer.pass.:17:36			v-0.6 d-0.8 m-3.9			v0.5 d-0.1 m1.4			v2.5 d0.0 m-2.5			v2.3 d0.1 m0.9					

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	96°12.5	220°13.9	-17°39.2	192°23.3	-23°49.7	62°30.1	12°15.0	120°45.4	-11°58.1					
1	111°15.0	235°13.2	-17°39.9	207°23.7	-23°49.8	77°32.6	12°15.0	135°47.7	-11°58.0					
2	126°17.4	250°12.6	-17°40.7	222°24.2	-23°49.9	92°35.1	12°15.0	150°49.9	-11°58.0					
3	141°19.9	265°12.0	-17°41.4	237°24.6	-23°50.0	107°37.6	12°15.0	165°52.2	-11°57.9					
4	156°22.4	280°11.4	-17°42.1	252°25.1	-23°50.1	122°40.1	12°15.0	180°54.5	-11°57.8					
5	171°24.8	295°10.8	-17°42.9	267°25.5	-23°50.2	137°42.5	12°15.0	195°56.7	-11°57.7					
6	186°27.3	310°10.1	-17°43.6	282°26.0	-23°50.3	152°45.0	12°15.0	210°59.0	-11°57.6					
7	201°29.8	325°09.5	-17°44.3	297°26.4	-23°50.4	167°47.5	12°15.0	226°01.2	-11°57.6					
8	216°32.2	340°08.9	-17°45.0	312°26.9	-23°50.5	182°50.0	12°15.0	241°03.5	-11°57.5					
9	231°34.7	355°08.3	-17°45.8	327°27.3	-23°50.6	197°52.5	12°15.0	256°05.8	-11°57.4					
10	246°37.2	10°07.6	-17°46.5	342°27.8	-23°50.7	212°55.0	12°15.0	271°08.0	-11°57.3					
11	261°39.6	25°07.0	-17°47.2	357°28.2	-23°50.8	227°57.5	12°15.0	286°10.3	-11°57.2					
12	276°42.1	40°06.4	-17°47.9	12°28.7	-23°50.9	242°60.0	12°15.0	301°12.6	-11°57.2					
13	291°44.6	55°05.8	-17°48.7	27°29.1	-23°51.0	258°02.5	12°15.0	316°14.8	-11°57.1					
14	306°47.0	70°05.1	-17°49.4	42°29.6	-23°51.1	273°05.0	12°15.0	331°17.1	-11°57.0					
15	321°49.5	85°04.5	-17°50.1	57°30.0	-23°51.2	288°07.5	12°15.0	346°19.4	-11°56.9					
16	336°51.9	100°03.9	-17°50.8	72°30.5	-23°51.3	303°09.9	12°15.1	1°21.6	-11°56.8					
17	351°54.4	115°03.3	-17°51.6	87°30.9	-23°51.4	318°12.4	12°15.1	16°23.9	-11°56.8					
18	6°56.9	130°02.6	-17°52.3	102°31.3	-23°51.5	333°14.9	12°15.1	31°26.2	-11°56.7					
19	21°59.3	145°02.0	-17°53.0	117°31.8	-23°51.6	348°17.4	12°15.1	46°28.4	-11°56.6					
20	37°01.8	160°01.4	-17°53.7	132°32.2	-23°51.7	3°19.9	12°15.1	61°30.7	-11°56.5					
21	52°04.3	175°00.8	-17°54.4	147°32.7	-23°51.8	18°22.4	12°15.1	76°32.9	-11°56.4					
22	67°06.7	190°00.1	-17°55.2	162°33.1	-23°51.9	33°24.9	12°15.1	91°35.2	-11°56.4					
23	82°09.2	204°59.5	-17°55.9	177°33.6	-23°52.0	48°27.4	12°15.1	106°37.5	-11°56.3					
Mer.pass.:17:32			v-0.6 d-0.7 m-3.9			v0.4 d-0.1 m1.4			v2.5 d0.0 m-2.5			v2.3 d0.1 m0.9		

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec					
0	97°11.7	219°58.9	-17°56.6	192°34.0	-23°52.1	63°29.8	12°15.1	121°39.7	-11°56.2					
1	112°14.1	234°58.2	-17°57.3	207°34.5	-23°52.2	78°32.3	12°15.1	136°42.0	-11°56.1					
2	127°16.6	249°57.6	-17°58.0	222°34.9	-23°52.3	93°34.8	12°15.1	151°44.3	-11°56.0					
3	142°19.0	264°57.0	-17°58.7	237°35.4	-23°52.4	108°37.3	12°15.1	166°46.5	-11°56.0					
4	157°21.5	279°56.3	-17°59.5	252°35.8	-23°52.5	123°39.8	12°15.1	181°48.8	-11°55.9					
5	172°24.0	294°55.7	-18°00.2	267°36.3	-23°52.5	138°42.3	12°15.1	196°51.0	-11°55.8					
6	187°26.4	309°55.1	-18°00.9	282°36.7	-23°52.6	153°44.8	12°15.1	211°53.3	-11°55.7					
7	202°28.9	324°54.4	-18°01.6	297°37.1	-23°52.7	168°47.2	12°15.1	226°55.6	-11°55.6					
8	217°31.4	339°53.8	-18°02.3	312°37.6	-23°52.8	183°49.7	12°15.1	241°57.8	-11°55.6					
9	232°33.8	354°53.2	-18°03.0	327°38.0	-23°52.9	198°52.2	12°15.2	257°00.1	-11°55.5					
10	247°36.3	9°52.5	-18°03.7	342°38.5	-23°53.0	213°54.7	12°15.2	272°02.4	-11°55.4					
11	262°38.8	24°51.9	-18°04.4	357°38.9	-23°53.1	228°57.2	12°15.2	287°04.6	-11°55.3					
12	277°41.2	39°51.2	-18°05.1	12°39.4	-23°53.2	243°59.7	12°15.2	302°06.9	-11°55.2					
13	292°43.7	54°50.6	-18°05.8	27°39.8	-23°53.3	259°02.1	12°15.2	317°09.1	-11°55.2					
14	307°46.2	69°50.0	-18°06.5	42°40.3	-23°53.3	274°04.6	12°15.2	332°11.4	-11°55.1					
15	322°48.6	84°49.3	-18°07.3	57°40.7	-23°53.4	289°07.1	12°15.2	347°13.7	-11°55.0					
16	337°51.1	99°48.7	-18°08.0	72°41.1	-23°53.5	304°09.6	12°15.2	2°15.9	-11°54.9					
17	352°53.5	114°48.0	-18°08.7	87°41.6	-23°53.6	319°12.1	12°15.2	17°18.2	-11°54.8					
18	7°56.0	129°47.4	-18°09.4	102°42.0	-23°53.7	334°14.5	12°15.2	32°20.5	-11°54.8					
19	22°58.5	144°46.8	-18°10.1	117°42.5	-23°53.8	349°17.0	12°15.2	47°22.7	-11°54.7					
20	38°00.9	159°46.1	-18°10.8	132°42.9	-23°53.9	4°19.5	12°15.2	62°25.0	-11°54.6					
21	53°03.4	174°45.5	-18°11.5	147°43.4	-23°53.9	19°22.0	12°15.2	77°27.2	-11°54.5					
22	68°05.9	189°44.8	-18°12.2	162°43.8	-23°54.0	34°24.5	12°15.3	92°29.5	-11°54.4					
23	83°08.3	204°44.2	-18°12.9	177°44.2	-23°54.1	49°26.9	12°15.3	107°31.8	-11°54.4					
Mer.pass.:17:28			v-0.6 d-0.7 m-3.9			v0.4 d-0.1 m1.4			v2.5 d0.0 m-2.5			v2.3 d0.1 m0.9		

2023/12/	SHA	Mer.pass	
	Venus	125°15.2 09:18	
	Mars	96°59.1 11:11	
	Jupiter	326°16.7 19:51	
	Saturn	24°37.6 15:58	
	2023/12/	SHA	Mer.pass
		Venus	124°01.3 09:19
		Mars	96°10.8 11:10
		Jupiter	326°17.6 19:47
		Saturn	24°32.9 15:55
2023/12/	SHA	Mer.pass	
	Venus	122°47.2 09:20	
	Mars	95°22.4 11:09	
	Jupiter	326°18.2 19:43	
	Saturn	24°28.1 15:51	
Horizontal parallax			
Venus:		0.1	
Mars:		0.1	

Sun			Moon											
Wed	GHA	Dec	GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight		
0	179°50.1	-23°20.7	359°56.3	7.3	28°08.4	-0.3	56.0	72	08:27	10:53	--	--	13:10	15:36
1	194°49.8	-23°20.6	14°22.7	7.4	28°07.9	-0.5	56.0	70	08:07	09:54	--	--	14:09	15:56
2	209°49.5	-23°20.5	28°49.0	7.4	28°07.4	-0.7	55.9	68	07:51	09:20	--	--	14:43	16:12
3	224°49.2	-23°20.5	43°15.5	7.4	28°06.6	-0.8	55.9	66	07:38	08:55	10:34	13:29	15:08	16:25
4	239°48.9	-23°20.4	57°41.9	7.5	28°05.7	-1.0	55.9	64	07:27	08:35	09:53	14:10	15:28	16:36
5	254°48.6	-23°20.3	72°08.4	7.5	28°04.7	-1.1	55.9	62	07:18	08:20	09:25	14:38	15:43	16:45
6	269°48.3	-23°20.2	86°34.9	7.6	28°03.5	-1.3	55.9	60	07:09	08:06	09:03	14:59	15:57	16:54
7	284°48.0	-23°20.1	101°01.5	7.6	28°02.1	-1.4	55.8	58	07:02	07:55	08:46	15:17	16:08	17:01
8	299°47.7	-23°20.0	115°28.1	7.6	28°00.6	-1.6	55.8	56	06:55	07:44	08:32	15:31	16:19	17:08
9	314°47.4	-23°19.9	129°54.8	7.7	27°58.9	-1.7	55.8	54	06:49	07:35	08:19	15:44	16:28	17:14
10	329°47.1	-23°19.7	144°21.5	7.7	27°57.1	-1.9	55.8	52	06:44	07:27	08:08	15:55	16:36	17:19
11	344°46.7	-23°19.6	158°48.2	7.8	27°55.1	-2.1	55.8	50	06:38	07:20	07:58	16:05	16:43	17:25
12	359°46.4	-23°19.5	173°15.0	7.8	27°53.0	-2.2	55.7	45	06:27	07:04	07:38	16:25	16:59	17:36
13	14°46.1	-23°19.4	187°41.9	7.9	27°50.7	-2.4	55.7	40	06:16	06:50	07:21	16:42	17:12	17:47
14	29°45.8	-23°19.3	202°08.8	7.9	27°48.3	-2.5	55.7	35	06:07	06:39	07:07	16:56	17:24	17:56
15	44°45.5	-23°19.2	216°35.8	8.0	27°45.7	-2.7	55.7	30	05:58	06:28	06:55	17:08	17:35	18:05
16	59°45.2	-23°19.1	231°02.8	8.0	27°43.0	-2.8	55.6	20	05:42	06:09	06:33	17:29	17:53	18:21
17	74°44.9	-23°19.0	245°29.8	8.1	27°40.1	-3.0	55.6	10	05:26	05:52	06:15	17:48	18:11	18:37
18	89°44.6	-23°18.9	259°57.0	8.2	27°37.1	-3.1	55.6	0	05:09	05:35	05:58	18:05	18:28	18:54
19	104°44.3	-23°18.8	274°24.2	8.2	27°33.9	-3.2	55.6	-10	04:50	05:17	05:40	18:23	18:46	19:13
20	119°44.0	-23°18.7	288°51.4	8.3	27°30.6	-3.4	55.6	-20	04:28	04:57	05:21	18:41	19:06	19:35
21	134°43.7	-23°18.6	303°18.7	8.3	27°27.2	-3.5	55.5	-30	03:59	04:32	04:59	19:03	19:31	20:04
22	149°43.4	-23°18.5	317°46.1	8.4	27°23.5	-3.7	55.5	-35	03:40	04:17	04:46	19:16	19:46	20:23
23	164°43.1	-23°18.3	332°13.6	8.5	27°19.8	-3.8	55.5	-40	03:17	03:59	04:31	19:31	20:04	20:46
SD.=16.3 d=0.1 S.D.=15.3								-45	02:47	03:36	04:13	19:49	20:26	21:16
								-50	02:01	03:07	03:51	20:11	20:56	22:01
								-52	01:34	02:52	03:40	20:22	21:11	22:28
								-54	00:49	02:34	03:28	20:34	21:29	23:12
								-56	--	02:12	03:14	20:49	21:50	--
								-58	--	01:42	02:57	21:05	22:20	--
								-60	--	00:54	02:37	21:25	23:07	--
								Lat.	Moonrise			Moonset		
								Wed	Thu	Fri	Wed	Thu	Fri	
								72	--	--	--	--	--	--
								70	--	--	--	--	--	--
								68	--	--	--	--	--	--
								66	--	--	15:29	--	--	13:08
								64	--	--	16:19	--	--	12:17
								62	13:03	15:01	16:50	11:56	11:50	11:45
								60	14:10	15:38	17:13	10:49	11:12	11:22
								58	14:45	16:05	17:32	10:14	10:46	11:02
								56	15:10	16:25	17:47	09:48	10:24	10:46
								54	15:30	16:43	18:00	09:28	10:07	10:33
								52	15:47	16:57	18:12	09:11	09:52	10:20
								50	16:02	17:10	18:22	08:56	09:39	10:10
								45	16:31	17:36	18:44	08:27	09:12	09:47
								40	16:54	17:57	19:01	08:04	08:51	09:29
								35	17:13	18:14	19:15	07:44	08:33	09:14
								30	17:29	18:29	19:28	07:28	08:18	09:01
								20	17:57	18:54	19:49	07:00	07:52	08:38
								10	18:20	19:15	20:07	06:36	07:29	08:18
								0	18:42	19:35	20:24	06:14	07:08	07:59
								-10	19:04	19:55	20:42	05:51	06:47	07:41
								-20	19:28	20:17	20:60	05:27	06:24	07:21
								-30	19:55	20:41	21:21	04:59	05:58	06:57
								-35	20:11	20:56	21:33	04:42	05:42	06:43
								-40	20:30	21:12	21:47	04:23	05:24	06:27
								-45	20:53	21:32	22:03	03:59	05:01	06:08
								-50	21:21	21:57	22:23	03:29	04:33	05:44
								-52	21:35	22:09	22:33	03:14	04:19	05:32
								-54	21:52	22:23	22:44	02:56	04:03	05:19
								-56	22:11	22:39	22:56	02:35	03:44	05:04
								-58	22:35	22:58	23:10	02:08	03:20	04:45
								-60	23:07	23:21	23:26	01:30	02:48	04:23
								Day	Sun		Mer.	Moon		Age
									Eqn.of Time	Mer. Pass	Mer.Pass.	Lower		
								00 ^h	12 ^h		Upper			
								27	00:40	00:54	12:00	00:00	12:28	15(100%)
								28	01:09	01:24	12:01	00:55	13:21	16(98%)
								29	01:38	01:53	12:01	01:47	14:12	17(94%)
Thu	GHA	Dec	GHA	ν	Dec	d	HP							
0	179°42.8	-23°18.2	346°41.1	8.5	27°15.9	-4.0	55.5							
1	194°42.5	-23°18.1	1°08.7	8.6	27°11.9	-4.1	55.5							
2	209°42.2	-23°18.0	15°36.3	8.7	27°07.7	-4.2	55.4							
3	224°41.8	-23°17.9	30°04.0	8.8	27°03.4	-4.4	55.4							
4	239°41.5	-23°17.8	44°31.8	8.8	26°58.9	-4.5	55.4							
5	254°41.2	-23°17.6	58°59.7	8.9	26°54.3	-4.7	55.4							
6	269°40.9	-23°17.5	73°27.6	9.0	26°49.6	-4.8	55.4							
7	284°40.6	-23°17.4	87°55.6	9.0	26°44.7	-4.9	55.4							
8	299°40.3	-23°17.3	102°23.7	9.1	26°39.7	-5.1	55.3							
9	314°40.0	-23°17.2	116°51.9	9.2	26°34.6	-5.2	55.3							
10	329°39.7	-23°17.0	131°20.1	9.3	26°29.3	-5.3	55.3							
11	344°39.4	-23°16.9	145°48.4	9.4	26°23.9	-5.5	55.3							
12	359°39.1	-23°16.8	160°16.8	9.4	26°18.4	-5.6	55.3							
13	14°38.8	-23°16.7	174°45.3	9.5	26°12.7	-5.7	55.2							
14	29°38.5	-23°16.5	189°13.9	9.6	26°06.9	-5.9	55.2							
15	44°38.2	-23°16.4	203°42.5	9.7	26°01.0	-6.0	55.2							
16	59°37.9	-23°16.3	218°11.2	9.8	25°54.9	-6.1	55.2							
17	74°37.6	-23°16.2	232°40.0	9.8	25°48.8	-6.2	55.2							
18	89°37.3	-23°16.0	247°08.9	9.9	25°42.5	-6.4	55.1							
19	104°37.0	-23°15.9	261°37.9	10.0	25°36.1	-6.5	55.1							
20	119°36.7	-23°15.8	276°06.9	10.1	25°29.5	-6.6	55.1							
21	134°36.4	-23°15.6	290°36.1	10.2	25°22.8	-6.7	55.1							
22	149°36.1	-23°15.5	305°05.3	10.3	25°16.1	-6.8	55.1							
23	164°35.8	-23°15.4	319°34.6	10.4	25°09.1	-7.0	55.1							
SD.=16.3 d=0.1 S.D.=15.1														
Fri	GHA	Dec	GHA	ν	Dec	d	HP							
0	179°35.4	-23°15.2	334°04.0	10.4	25°02.1	-7.1	55.0							
1	194°35.1	-23°15.1	348°33.5	10.5	24°55.0	-7.2	55.0							
2	209°34.8	-23°15.0	3°03.1	10.6	24°47.7	-7.3	55.0							
3	224°34.5	-23°14.8	17°32.7	10.7	24°40.4	-7.4	55.0							
4	239°34.2	-23°14.7	32°02.5	10.8	24°32.9	-7.5	55.0							
5	254°33.9	-23°14.6	46°32.3	10.9	24°25.3	-7.7	54.9							
6	269°33.6	-23°14.4	61°02.3	11.0	24°17.6	-7.8	54.9							
7	284°33.3	-23°14.3	75°32.3	11.1	24°09.7	-7.9	54.9							
8	299°33.0	-23°14.1	90°02.4	11.2	24°01.8	-8.0	54.9							
9	314°32.7	-23°14.0	104°32.6	11.2	23°53.8	-8.1	54.9							
10	329°32.4	-23°13.9	119°02.9	11.3	23°45.6	-8.2	54.9							
11	344°32.1	-23°13.7	133°33.2	11.4	23°37.4	-8.3	54.8							
12	359°31.8	-23°13.6	148°03.7	11.5	23°29.0	-8.4	54.8							
13	14°31.5	-23°13.4	162°34.3	11.6	23°20.6	-8.5	54.8							
14	29°31.2	-23°13.3	177°04.9	11.7	23°12.0	-8.6	54.8							
15	44°30.9	-23°13.1	191°35.6	11.8	23°03.4	-8.7	54.8							
16	59°30.6	-23°13.0	206°06.4	11.9	22°54.6	-8.8	54.8							
17	74°30.3	-23°12.8	220°37.4	12.0	22°45.7	-8.9	54.7							
18	89°30.0	-23°12.7	235°08.4	12.0	22°36.8	-9.0	54.7							
19	104°29.7	-23°12.6	249°39.4	12.1	22°27.7	-9.1	54.7							
20	119°29.4	-23°12.4	264°10.6	12.2	22°18.6	-9.2	54.7							
21	134°29.1	-23°12.3	278°41.9	12.3	22°09.3	-9.3	54.7							
22	149°28.8	-23°12.1	293°13.2	12.4	22°00.0	-9.4	54.7							
23	164°28.5	-23°11.9	307°44.7	12.5	21°50.6	-9.5	54.7							
SD.=16.3 d=0.1 S.D.=15.0														

December 30, 31 ,01 (Sat., Sun., Mon.)

Aries		Venus		Mars		Jupiter		Saturn		Stars	
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec
0	98°10.8	219°43.6	-18°13.6	192°44.7	-23°54.2	64°29.4	12°15.3	122°34.0	-11°54.3	Alpheratz	357°35.7 29°13.5
1	113°13.3	234°42.9	-18°14.3	207°45.1	-23°54.3	79°31.9	12°15.3	137°36.3	-11°54.2	Ankaa	353°08.0 -42°10.8
2	128°15.7	249°42.3	-18°15.0	222°45.6	-23°54.4	94°34.4	12°15.3	152°38.5	-11°54.1	Schedar	349°32.0 56°40.4
3	143°18.2	264°41.6	-18°15.7	237°46.0	-23°54.4	109°36.8	12°15.3	167°40.8	-11°54.0	Diphda	348°48.0 -17°51.5
4	158°20.7	279°41.0	-18°16.4	252°46.5	-23°54.5	124°39.3	12°15.3	182°43.1	-11°54.0	Achernar	335°20.6 -57°07.2
5	173°23.1	294°40.3	-18°17.0	267°46.9	-23°54.6	139°41.8	12°15.3	197°45.3	-11°53.9	Hamal	327°52.0 23°34.7
6	188°25.6	309°39.7	-18°17.7	282°47.3	-23°54.7	154°44.3	12°15.3	212°47.6	-11°53.8	Polaris	314°08.6 89°22.2
7	203°28.0	324°39.0	-18°18.4	297°47.8	-23°54.8	169°46.7	12°15.3	227°49.8	-11°53.7	Akamar	315°12.1 -40°12.7
8	218°30.5	339°38.4	-18°19.1	312°48.2	-23°54.8	184°49.2	12°15.4	242°52.1	-11°53.6	Menkar	314°06.8 4°11.0
9	233°33.0	354°37.7	-18°19.8	327°48.7	-23°54.9	199°51.7	12°15.4	257°54.4	-11°53.5	Mirfak	308°29.1 49°56.9
10	248°35.4	9°37.1	-18°20.5	342°49.1	-23°55.0	214°54.2	12°15.4	272°56.6	-11°53.5	Aldebaran	290°40.3 16°33.5
11	263°37.9	24°36.4	-18°21.2	357°49.6	-23°55.1	229°56.6	12°15.4	287°58.9	-11°53.4	Rigel	281°04.4 -8°10.5
12	278°40.4	39°35.8	-18°21.9	12°50.0	-23°55.2	244°59.1	12°15.4	303°01.1	-11°53.3	Capella	280°22.7 46°01.4
13	293°42.8	54°35.1	-18°22.6	27°50.4	-23°55.2	260°01.6	12°15.4	318°03.4	-11°53.2	Bellatrix	278°23.5 6°22.3
14	308°45.3	69°34.5	-18°23.3	42°50.9	-23°55.3	275°04.1	12°15.4	333°05.6	-11°53.1	Elnath	278°02.6 28°37.7
15	323°47.8	84°33.8	-18°23.9	57°51.3	-23°55.4	290°06.5	12°15.4	348°07.9	-11°53.1	Alnilam	275°38.3 -1°11.2
16	338°50.2	99°33.2	-18°24.6	72°51.8	-23°55.5	305°09.0	12°15.4	3°10.2	-11°53.0	Betelgeuse	270°52.7 7°24.7
17	353°52.7	114°32.5	-18°25.3	87°52.2	-23°55.5	320°11.5	12°15.4	18°12.4	-11°52.9	Canopus	263°52.2 -52°42.5
18	8°55.2	129°31.9	-18°26.0	102°52.6	-23°55.6	335°14.0	12°15.5	33°14.7	-11°52.8	Sirius	258°26.5 -16°44.7
19	23°57.6	144°31.2	-18°26.7	117°53.1	-23°55.7	350°16.4	12°15.5	48°16.9	-11°52.7	Adara	255°06.1 -29°00.2
20	39°00.1	159°30.6	-18°27.4	132°53.5	-23°55.8	5°18.9	12°15.5	63°19.2	-11°52.6	Procyon	244°51.3 5°10.0
21	54°02.5	174°29.9	-18°28.1	147°54.0	-23°55.8	20°21.4	12°15.5	78°21.5	-11°52.6	Pollux	243°17.9 27°58.1
22	69°05.0	189°29.3	-18°28.7	162°54.4	-23°55.9	35°23.8	12°15.5	93°23.7	-11°52.5	Avior	234°14.5 -59°35.0
23	84°07.5	204°28.6	-18°29.4	177°54.8	-23°56.0	50°26.3	12°15.5	108°26.0	-11°52.4	Suhail	222°46.6 -43°31.6
Mer.pass.:17:24		v-0.6 d-0.7 m-3.9		v0.4 d-0.1 m1.4		v2.5 d0.0 m-2.5		v2.3 d0.1 m0.9		Miaplacidus	221°37.7 -69°48.7
										Alphard	217°48.3 -8°45.7
										Regulus	207°35.1 11°51.0
										Dubhe	193°41.7 61°37.0
										Denebola	182°25.7 14°26.2
										Gienah	175°44.4 -17°40.4
										Acrux	173°01.1 -63°13.6
										Gacrux	171°52.6 -57°14.5
										Alioth	166°13.8 55°49.5
										Spica	158°23.3 -11°17.1
										Alcaid	152°52.8 49°11.4
										Hadar	148°37.5 -60°29.0
										Menkent	147°58.8 -36°29.1
										Arcturus	145°48.7 19°03.6
										Rigel Kent.	139°41.9 -60°55.8
										Zubenelg.	136°57.2 -16°08.4
										Kochab	137°20.4 74°03.1
										Alphecca	126°04.7 26°37.9
										Antares	112°17.2 -26°29.0
										Atria	107°12.7 -69°04.1
										Sabik	102°04.1 -15°45.3
										Shaula	96°11.9 -37°07.2
										Rasalhague	95°59.7 12°32.5
										Etamin	90°43.1 51°29.0
										Kaus Aust.	83°34.0 -34°22.4
										Vega	80°34.3 38°48.2
										Nunki	75°49.2 -26°16.1
										Altair	62°01.2 8°55.8
										Peacock	53°07.6 -56°39.6
										Deneb	49°26.8 45°22.0
										Enif	33°39.9 9°59.1
										Alnair	27°34.3 -46°50.9
										Fomalhaut	15°15.7 -29°29.9
										Scheat	13°46.2 28°12.8
										Markab	13°30.9 15°20.1
										2023/12/	SHA Mer.pass
										Venus	121°32.8 09:22
										Mars	94°33.9 11:09
										Jupiter	326°18.6 19:39
										Saturn	24°23.2 15:47
										2023/12/	SHA Mer.pass
										Venus	120°18.0 09:23
										Mars	93°45.3 11:08
										Jupiter	326°18.8 19:35
										Saturn	24°18.3 15:44
										2024/1/1	SHA Mer.pass
										Venus	119°03.0 09:24
										Mars	92°56.7 11:07
										Jupiter	326°18.9 19:31
										Saturn	24°13.3 15:40
										Horizontal paralax	
										Venus:	0.1
										Mars:	0.1
Mer.pass.:17:16		v-0.7 d-0.7 m-3.9		v0.4 d-0.1 m1.4		v2.5 d0.0 m-2.5		v2.3 d0.1 m0.9			

Sun				Moon												
Sat	GHA	Dec		GHA	ν	Dec	d	HP	Lat.	Twilight			Twilight			
0	179°28.2	-23°11.8		322°16.2	12.6	21°41.1	-9.6	54.6		Naut.	Civil	Sunrise	Sunset	Civil	Naut.	
1	194°27.9	-23°11.6		336°47.8	12.7	21°31.5	-9.7	54.6	72	08:25	10:47	—:—	—:—	13:19	15:41	
2	209°27.6	-23°11.5		351°19.5	12.7	21°21.8	-9.7	54.6	70	08:06	09:51	—:—	—:—	14:15	16:00	
3	224°27.3	-23°11.3		5°51.3	12.8	21°12.0	-9.8	54.6	68	07:50	09:18	—:—	—:—	14:48	16:16	
4	239°27.0	-23°11.2		20°23.2	12.9	21°02.1	-9.9	54.6	66	07:38	08:54	10:30	13:36	15:12	16:28	
5	254°26.7	-23°11.0		34°55.1	13.0	20°52.1	-10.0	54.6	64	07:27	08:35	09:51	14:15	15:31	16:39	
6	269°26.4	-23°10.9		49°27.2	13.1	20°42.1	-10.1	54.6	62	07:18	08:19	09:24	14:42	15:47	16:48	
7	284°26.1	-23°10.7		63°59.3	13.2	20°32.0	-10.2	54.5	60	07:09	08:06	09:03	15:03	15:60	16:56	
8	299°25.8	-23°10.5		78°31.5	13.3	20°21.8	-10.2	54.5	58	07:02	07:55	08:46	15:20	16:11	17:04	
9	314°25.5	-23°10.4		93°03.8	13.3	20°11.5	-10.3	54.5	56	06:56	07:44	08:31	15:34	16:21	17:10	
10	329°25.2	-23°10.2		107°36.2	13.4	20°01.1	-10.4	54.5	54	06:50	07:36	08:19	15:47	16:30	17:16	
11	344°24.9	-23°10.1		122°08.7	13.5	19°50.7	-10.5	54.5	52	06:44	07:28	08:08	15:58	16:38	17:22	
12	359°24.6	-23°09.9		136°41.2	13.6	19°40.1	-10.6	54.5	50	06:39	07:20	07:59	16:07	16:46	17:27	
13	14°24.3	-23°09.7		151°13.9	13.7	19°29.5	-10.6	54.5	45	06:27	07:04	07:38	16:28	17:01	17:38	
14	29°24.0	-23°09.6		165°46.6	13.8	19°18.9	-10.7	54.5	40	06:17	06:51	07:22	16:44	17:15	17:49	
15	44°23.7	-23°09.4		180°19.4	13.8	19°08.1	-10.8	54.4	35	06:08	06:40	07:08	16:58	17:26	17:58	
16	59°23.4	-23°09.2		194°52.2	13.9	18°57.3	-10.9	54.4	30	05:59	06:29	06:55	17:10	17:37	18:06	
17	74°23.1	-23°09.1		209°25.2	14.0	18°46.4	-10.9	54.4	20	05:43	06:11	06:35	17:31	17:55	18:23	
18	89°22.8	-23°08.9		223°58.2	14.1	18°35.4	-11.0	54.4	10	05:27	05:54	06:16	17:49	18:12	18:38	
19	104°22.5	-23°08.7		238°31.3	14.1	18°24.4	-11.1	54.4	0	05:10	05:37	05:59	18:07	18:29	18:55	
20	119°22.2	-23°08.6		253°04.5	14.2	18°13.3	-11.1	54.4	-10	04:52	05:19	05:42	18:24	18:47	19:14	
21	134°21.9	-23°08.4		267°37.8	14.3	18°02.1	-11.2	54.4	-20	04:29	04:59	05:23	18:43	19:07	19:36	
22	149°21.6	-23°08.2		282°11.1	14.4	17°50.8	-11.3	54.4	-30	04:01	04:34	05:01	19:04	19:32	20:05	
23	164°21.3	-23°08.1		296°44.5	14.5	17°39.5	-11.3	54.4	-35	03:42	04:19	04:48	19:17	19:47	20:23	
	SD.=16.3	d=0.2		S.D.=14.9					-40	03:19	04:01	04:34	19:32	20:05	20:46	
									-45	02:49	03:39	04:16	19:50	20:27	21:16	
									-50	02:05	03:10	03:54	20:12	20:56	21:60	
									-52	01:39	02:55	03:43	20:22	21:10	22:26	
									-54	00:57	02:37	03:31	20:34	21:28	23:07	
									-56	—:—	02:16	03:17	20:48	21:49	—:—	
									-58	—:—	01:47	03:01	21:04	22:17	—:—	
									-60	—:—	01:02	02:41	21:24	23:02	—:—	
										Moonrise			Moonset			
									Lat.	Sat	Sun	Mon	Sat	Sun	Mon	
									72	—:—	18:33	20:47	—:—	13:15	12:26	
									70	16:24	19:01	20:60	13:51	12:44	12:11	
									68	17:17	19:22	21:10	12:58	12:22	11:58	
									66	17:48	19:39	21:18	12:25	12:04	11:48	
									64	18:12	19:52	21:25	12:00	11:49	11:40	
									62	18:30	20:03	21:31	11:41	11:37	11:33	
									60	18:45	20:13	21:36	11:25	11:26	11:26	
									58	18:58	20:21	21:41	11:12	11:17	11:21	
									56	19:09	20:28	21:45	10:60	11:09	11:16	
									54	19:19	20:35	21:48	10:50	11:02	11:11	
									52	19:27	20:40	21:51	10:41	10:55	11:07	
									50	19:35	20:46	21:54	10:32	10:49	11:03	
									45	19:51	20:57	22:01	10:15	10:37	10:55	
									40	20:04	21:06	22:06	10:00	10:26	10:48	
									35	20:15	21:14	22:11	09:48	10:17	10:42	
									30	20:25	21:21	22:15	09:37	10:09	10:37	
									20	20:42	21:33	22:21	09:19	09:55	10:28	
									10	20:57	21:43	22:27	09:02	09:43	10:20	
									0	21:10	21:53	22:33	08:47	09:31	10:12	
									-10	21:24	22:02	22:39	08:32	09:19	10:05	
									-20	21:38	22:13	22:45	08:15	09:07	09:56	
									-30	21:54	22:24	22:51	07:56	08:52	09:47	
									-35	22:04	22:31	22:55	07:45	08:44	09:41	
									-40	22:15	22:38	22:59	07:32	08:34	09:35	
									-45	22:27	22:47	23:05	07:16	08:23	09:28	
									-50	22:43	22:58	23:11	06:57	08:09	09:19	
									-52	22:50	23:03	23:13	06:48	08:03	09:15	
									-54	22:58	23:08	23:16	06:38	07:55	09:10	
									-56	23:06	23:14	23:20	06:26	07:47	09:05	
									-58	23:16	23:21	23:23	06:13	07:38	08:60	
									-60	23:28	23:28	23:27	05:57	07:28	08:53	
										Sun			Moon			
									Day	Eqn.of Time	Mer.		Mer.Pass.		Age	
										00 ^h	12 ^h	Pass	Upper	Lower		
									30	02:07	02:22	12:02	02:35	14:58	18(88%)	
									31	02:36	02:51	12:02	03:20	15:41	19(82%)	
									1	03:05	03:19	12:03	04:02	16:22	20(74%)	
										Sun			Moon			
										SD.=16.3	d=0.2		S.D.=14.8			