

February 02, 03, 04 UT (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	132°12.2	169°54.3	S16°17.9	182°00.2	S19°24.2	23°27.8	N22°37.8	132°29.7	S02°29.6	Alpheratz	357°34.1	29°14.2
1	147°14.7	184°53.6	16.9	197°00.6	23.7	38°30.6	37.8	147°32.0	29.5	Ankaa	353°06.5	-42°10.0
2	162°17.1	199°53.0	16.0	212°01.1	23.2	53°33.3	37.9	162°34.2	29.4	Schedar	349°30.3	56°41.1
3	177°19.6	214°52.3	· · 15.0	227°01.5	· · 22.7	68°36.1	· · 37.9	177°36.5	· · 29.3	Diphda	348°46.6	-17°50.7
4	192°22.1	229°51.7	14.1	242°02.0	22.2	83°38.8	38.0	192°38.7	29.2	Achernar	335°19.7	-57°06.5
5	207°24.5	244°51.0	13.1	257°02.4	21.7	98°41.6	38.0	207°40.9	29.1	Hamal	327°50.2	23°35.2
6	222°27.0	259°50.4	S16°12.1	272°02.9	S19°21.2	113°44.3	N22°38.0	222°43.2	S02°29.0	Polaris	313°31.5	89°22.8
7	237°29.5	274°49.7	11.2	287°03.4	20.7	128°47.1	38.1	237°45.4	28.9	Acamar	315°11.0	-40°12.2
8	252°31.9	289°49.1	10.2	302°03.8	20.2	143°49.9	38.1	252°47.6	28.8	Menkar	314°05.2	4°11.5
9	267°34.4	304°48.5	· · 09.3	317°04.3	· · 19.7	158°52.6	· · 38.2	267°49.9	· · 28.7	Mirfak	308°26.9	49°57.4
10	282°36.8	319°47.8	08.3	332°04.7	19.2	173°55.4	38.2	282°52.1	28.5	Aldebaran	290°38.4	16°33.7
11	297°39.3	334°47.2	07.3	347°05.2	18.7	188°58.1	38.2	297°54.4	28.4	Rigel	281°02.8	-8°10.4
12	312°41.8	349°46.5	S16°06.4	2°05.6	S19°18.2	204°00.9	N22°38.3	312°56.6	S02°28.3	Capella	280°20.3	46°01.6
13	327°44.2	4°45.9	05.4	17°06.1	17.7	219°03.6	38.3	327°58.8	28.2	Bellatrix	278°21.7	6°22.4
14	342°46.7	19°45.2	04.5	32°06.6	17.2	234°06.4	38.3	343°01.1	28.1	Elnath	278°00.5	28°37.8
15	357°49.2	34°44.6	· · 03.5	47°07.0	· · 16.7	249°09.1	· · 38.4	358°03.3	· · 28.0	Alnilam	275°36.6	-1°11.2
16	12°51.6	49°44.0	02.5	62°07.5	16.2	264°11.9	38.4	13°05.5	27.9	Betelgeuse	270°50.9	7°24.7
17	27°54.1	64°43.3	01.6	77°07.9	15.7	279°14.6	38.5	28°07.8	27.8	Canopus	263°51.5	-52°42.7
18	42°56.6	79°42.7	S16°00.6	92°08.4	S19°15.2	294°17.4	N22°38.5	43°10.0	S02°27.7	Sirius	258°25.1	-16°45.2
19	57°59.0	94°42.1	15°59.6	107°08.9	14.7	309°20.2	38.5	58°12.3	27.6	Adhara	255°04.8	-29°00.6
20	73°01.5	109°41.4	58.6	122°09.3	14.2	324°22.9	38.6	73°14.5	27.5	Procyon	244°49.6	5°09.4
21	88°04.0	124°40.8	· · 57.7	137°09.8	· · 13.7	339°25.7	· · 38.6	88°16.7	· · 27.4	Pollux	243°15.8	27°57.7
22	103°06.4	139°40.1	56.7	152°10.2	13.2	354°28.4	38.7	103°19.0	27.3	Avior	234°13.7	-59°35.6
23	118°08.9	154°39.5	55.7	167°10.7	12.7	9°31.2	38.7	118°21.2	27.2	Suhail	222°45.2	-43°32.3
Mer.pass. 15:09		ν -0.6' d -1.0' m -3.91		ν 0.5' d -0.5' m 1.11		ν 2.8' d 0.0' m -2.62		ν 2.2' d -0.1' m 1.03		Miaplacidus 221°37.2 -69°49.4		
										Alphard 217°46.5 -8°46.4		
										Regulus 207°33.2 11°50.2		
										Dubhe 193°39.3 61°36.4		
										Denebola 182°23.8 14°25.4		
										Gienah 175°42.4 -17°41.3		
										Acrux 172°58.7 -63°14.5		
										Gacrux 171°50.3 -57°15.4		
										Alioth 166°11.9 55°48.7		
										Spica 158°21.2 -11°17.9		
										Alkaid 152°51.1 49°10.6		
										Hadar 148°34.6 -60°29.7		
										Menkent 147°56.5 -36°29.8		
										Arcturus 145°47.0 19°02.5		
										Rigil Kent. 139°39.0 -60°56.4		
										Kochab 137°19.8 74°02.4		
										Zuben'ubi 136°55.0 -16°09.1		
										Alphecca 126°03.0 26°37.3		
										Antares 112°14.9 -26°29.4		
										Atria 107°08.6 -69°04.2		
										Sabik 102°01.9 -15°45.5		
										Shaula 96°09.4 -37°07.3		
										Rasalhague 95°57.9 12°32.3		
										Eltanin 90°42.1 51°28.8		
										Kaus Aust. 83°31.6 -34°22.3		
										Vega 80°33.0 38°48.2		
										Nunki 75°47.0 -26°15.9		
										Altair 61°59.4 8°56.1		
										Peacock 53°04.9 -56°39.1		
										Deneb 49°25.7 45°22.3		
										Enif 33°38.2 9°59.6		
										Al Na'ir 27°32.2 -46°50.2		
										Fomalhaut 15°13.8 -29°29.2		
										Scheat 13°44.6 28°13.5		
										Markab 13°29.3 15°20.7		
										Feb 02 Mon SHA Mer.pass		
										Venus 37°42.1 12:41		
										Mars 49°48.0 11:52		
										Jupiter 251°15.6 22:22		
										Saturn 0°17.5 15:08		
										Feb 03 Tue SHA Mer.pass		
										Venus 36°27.5 12:42		
										Mars 48°59.8 11:51		
										Jupiter 251°22.6 22:18		
										Saturn 0°12.1 15:04		
										Feb 04 Wed SHA Mer.pass		
										Venus 35°13.3 12:43		
										Mars 48°11.8 11:50		
										Jupiter 251°29.4 22:13		
										Saturn 0°06.6 15:01		
										Horizontal parallax		
										Venus: 0.1		
										Mars: 0.1		
Mer.pass. 15:01		ν -0.6' d -1.0' m -3.91		ν 0.5' d -0.5' m 1.11		ν 2.7' d 0.0' m -2.61		ν 2.2' d -0.1' m 1.03				

Sun				Moon			
h	GHA	Dec		GHA	ν	Dec	d
Mon							HP
0	176°35.9	S16°52.3		354°55.1	8.9'	N18°41.6	-13.1'
1	191°35.8	51.6		9°23.0	9.0'	18°28.5	-13.2'
2	206°35.8	50.9		23°51.0	9.1'	18°15.3	-13.3'
3	221°35.7	· · 50.2		38°19.1	9.2'	18°02.0	-13.4'
4	236°35.6	49.5		52°47.3	9.3'	17°48.5	-13.5'
5	251°35.5	48.7		67°15.6	9.5'	17°35.1	-13.6'
6	266°35.5	S16°48.0		81°44.1	9.6'	N17°21.5	-13.7'
7	281°35.4	47.3		96°12.6	9.7'	17°07.8	-13.7'
8	296°35.3	46.6		110°41.3	9.8'	16°54.1	-13.8'
9	311°35.2	· · 45.8		125°10.1	9.9'	16°40.2	-13.9'
10	326°35.2	45.1		139°39.0	10.0'	16°26.3	-14.0'
11	341°35.1	44.4		154°08.1	10.1'	16°12.3	-14.1'
12	356°35.0	S16°43.7		168°37.2	10.2'	N15°58.3	-14.1'
13	11°34.9	42.9		183°06.4	10.4'	15°44.2	-14.2'
14	26°34.9	42.2		197°35.8	10.5'	15°30.0	-14.3'
15	41°34.8	· · 41.5		212°05.2	10.6'	15°15.7	-14.3'
16	56°34.7	40.8		226°34.8	10.7'	15°01.4	-14.4'
17	71°34.7	40.0		241°04.5	10.8'	14°47.0	-14.5'
18	86°34.6	S16°39.3		255°34.3	10.9'	N14°32.5	-14.5'
19	101°34.5	38.6		270°04.1	11.0'	14°18.0	-14.6'
20	116°34.4	37.8		284°34.1	11.1'	14°03.4	-14.6'
21	131°34.4	· · 37.1		299°04.2	11.2'	13°48.8	-14.7'
22	146°34.3	36.4		313°34.4	11.3'	13°34.1	-14.7'
23	161°34.2	35.6		328°04.7	11.4'	13°19.3	-14.8'
	SD = 16.2'	d = -0.7'				SD = 16.1'	

Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	176°34.2	S16°34.9	342°35.1	11.5'	N13°04.5	-14.8'	58.3'
1	191°34.1	34.2	357°05.6	11.6'	12°49.7	-14.9'	58.2'
2	206°34.0	33.4	11°36.1	11.7'	12°34.8	-14.9'	58.2'
3	221°34.0	· · 32.7	26°06.8	11.8'	12°19.9	-15.0'	58.2'
4	236°33.9	32.0	40°37.6	11.9'	12°04.9	-15.0'	58.1'
5	251°33.8	31.2	55°08.5	12.0'	11°49.8	-15.1'	58.1'
6	266°33.8	S16°30.5	69°39.4	12.1'	N11°34.8	-15.1'	58.1'
7	281°33.7	29.8	84°10.5	12.1'	11°19.7	-15.2'	58.1'
8	296°33.6	29.0	98°41.6	12.2'	11°04.5	-15.2'	58.0'
9	311°33.6	· · 28.3	113°12.8	12.3'	10°49.3	-15.2'	58.0'
10	326°33.5	27.6	127°44.2	12.4'	10°34.1	-15.3'	58.0'
11	341°33.4	26.8	142°15.6	12.5'	10°18.8	-15.3'	57.9'
12	356°33.4	S16°26.1	156°47.1	12.6'	N10°03.5	-15.3'	57.9'
13	11°33.3	25.3	171°18.6	12.7'	09°48.2	-15.3'	57.9'
14	26°33.3	24.6	185°50.3	12.7'	09°32.9	-15.4'	57.8'
15	41°33.2	· · 23.9	200°22.0	12.8'	09°17.5	-15.4'	57.8'
16	56°33.1	23.1	214°53.9	12.9'	09°02.1	-15.4'	57.8'
17	71°33.1	22.4	229°25.8	13.0'	08°46.7	-15.5'	57.7'
18	86°33.0	S16°21.6	243°57.7	13.1'	N08°31.2	-15.5'	57.7'
19	101°32.9	20.9	258°29.8	13.1'	08°15.7	-15.5'	57.7'
20	116°32.9	20.1	273°01.9	13.2'	08°00.3	-15.5'	57.6'
21	131°32.8	· · 19.4	287°34.1	13.3'	07°44.7	-15.5'	57.6'
22	146°32.8	18.7	302°06.4	13.3'	07°29.2	-15.5'	57.6'
23	161°32.7	17.9	316°38.7	13.4'	07°13.7	-15.6'	57.6'
	SD = 16.2'	d = -0.7'				SD = 15.9'	

Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	176°32.6	S16°17.2	331°11.2	13.5'	N06°58.1	-15.6'	57.5'
1	191°32.6	16.4	345°43.6	13.6'	06°42.5	-15.6'	57.5'
2	206°32.5	15.7	0°16.2	13.6'	06°27.0	-15.6'	57.5'
3	221°32.5	· · 14.9	14°48.8	13.7'	06°11.4	-15.6'	57.4'
4	236°32.4	14.2	29°21.5	13.8'	05°55.8	-15.6'	57.4'
5	251°32.3	13.4	43°54.3	13.8'	05°40.1	-15.6'	57.4'
6	266°32.3	S16°12.7	58°27.1	13.9'	N05°24.5	-15.6'	57.3'
7	281°32.2	12.0	72°59.9	13.9'	05°08.9	-15.6'	57.3'
8	296°32.2	11.2	87°32.9	14.0'	04°53.3	-15.6'	57.3'
9	311°32.1	· · 10.5	102°05.9	14.1'	04°37.6	-15.6'	57.2'
10	326°32.1	09.7	116°38.9	14.1'	04°22.0	-15.6'	57.2'
11	341°32.0	09.0	131°12.0	14.2'	04°06.4	-15.6'	57.2'
12	356°31.9	S16°08.2	145°45.2	14.2'	N03°50.8	-15.6'	57.1'
13	11°31.9	07.5	160°18.4	14.3'	03°35.1	-15.6'	57.1'
14	26°31.8	06.7	174°51.7	14.3'	03°19.5	-15.6'	57.1'
15	41°31.8	· · 05.9	189°25.0	14.4'	03°03.9	-15.6'	57.0'
16	56°31.7	05.2	203°58.4	14.4'	02°48.3	-15.6'	57.0'
17	71°31.7	04.4	218°31.8	14.5'	02°32.7	-15.6'	57.0'
18	86°31.6	S16°03.7	233°05.3	14.5'	N02°17.1	-15.6'	56.9'
19	101°31.6	02.9	247°38.8	14.6'	02°01.5	-15.6'	56.9'
20	116°31.5	02.2	262°12.3	14.6'	01°45.9	-15.6'	56.9'
21	131°31.5	· · 01.4	276°45.9	14.6'	01°30.3	-15.6'	56.8'
22	146°31.4	16°00.7	291°19.6	14.7'	01°14.8	-15.5'	56.8'
23	161°31.4	15°59.9	305°53.3	14.7'	00°59.2	-15.5'	56.8'
	SD = 16.2'	d = -0.7'				SD = 15.7'	

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

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

Day	Sun		Mer. Pass	Moon		Age
	Eqn. of Time	12 ^h		Mer. Pass.		
	00 ^h	mm:ss	hh:mm	Upper	Lower	15-17
				hh:mm	hh:mm	100-95%
02	13:36	13:40	12:14	00:21	12:47	
03	13:43	13:46	12:14	01:12	13:36	
04	13:49	13:52	12:14	01:59	14:21	

February 05, 06, 07 UT (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	135°09.6	169°09.0	S15°07.2	182°33.4	S18°47.7	26°45.7	N22°40.5	135°10.6	S02°22.0					Alpheratz	357°34.1 29°14.2		
1	150°12.1	184°08.4	06.2	197°33.9	47.1	41°48.5	40.6	150°12.9	21.9					Ankaa	353°06.5 -42°10.0		
2	165°14.5	199°07.8	05.2	212°34.4	46.6	56°51.2	40.6	165°15.1	21.8					Schedar	349°30.3 56°41.1		
3	180°17.0	214°07.2	•• 04.2	227°34.9	•• 46.1	71°53.9	•• 40.6	180°17.3	•• 21.7					Diphda	348°46.6 -17°50.7		
4	195°19.5	229°06.6	03.2	242°35.3	45.6	86°56.7	40.7	195°19.6	21.6					Achernar	335°19.7 -57°06.5		
5	210°21.9	244°06.0	02.1	257°35.8	45.0	101°59.4	40.7	210°21.8	21.5					Hamal	327°50.2 23°35.2		
6	225°24.4	259°05.4	S15°01.1	272°36.3	S18°44.5	117°02.2	N22°40.7	225°24.0	S02°21.4					Polaris	313°33.2 89°22.8		
7	240°26.9	274°04.8	15°00.1	287°36.7	44.0	132°04.9	40.8	240°26.3	21.3					Acamar	315°11.1 -40°12.2		
8	255°29.3	289°04.2	14°59.1	302°37.2	43.5	147°07.6	40.8	255°28.5	21.2					Menkar	314°05.2 4°11.5		
9	270°31.8	304°03.5	•• 58.1	317°37.7	•• 43.0	162°10.4	•• 40.8	270°30.7	•• 21.1					Mirfak	308°26.9 49°57.4		
10	285°34.3	319°02.9	57.1	332°38.1	42.4	177°13.1	40.9	285°33.0	21.0					Aldebaran	290°38.4 16°33.7		
11	300°36.7	334°02.3	56.1	347°38.6	41.9	192°15.8	40.9	300°35.2	20.9					Rigel	281°02.8 -8°10.4		
12	315°39.2	349°01.7	S14°55.0	2°39.1	S18°41.4	207°18.6	N22°41.0	315°37.4	S02°20.7					Capella	280°20.3 46°01.6		
13	330°41.7	4°01.1	54.0	17°39.6	40.9	222°21.3	41.0	330°39.6	20.6					Bellatrix	278°21.7 6°22.4		
14	345°44.1	19°00.5	53.0	32°40.0	40.3	237°24.1	41.0	345°41.9	20.5					Elnath	278°00.5 28°37.8		
15	0°46.6	33°59.9	•• 52.0	47°40.5	•• 39.8	252°26.8	•• 41.1	0°44.1	•• 20.4					Alnilam	275°36.6 -1°11.2		
16	15°49.0	48°59.3	51.0	62°41.0	39.3	267°29.5	41.1	15°46.3	20.3					Betelgeuse	270°50.9 7°24.7		
17	30°51.5	63°58.7	49.9	77°41.4	38.8	282°32.3	41.1	30°48.6	20.2					Canopus	263°51.6 -52°42.7		
18	45°54.0	78°58.1	S14°48.9	92°41.9	S18°38.2	297°35.0	N22°41.2	45°50.8	S02°20.1					Sirius	258°25.2 -16°45.2		
19	60°56.4	93°57.5	47.9	107°42.4	37.7	312°37.7	41.2	60°53.0	20.0					Adhara	255°04.8 -29°00.6		
20	75°58.9	108°56.9	46.9	122°42.8	37.2	327°40.5	41.2	75°55.3	19.9					Procyon	244°49.6 5°09.4		
21	91°01.4	123°56.3	•• 45.9	137°43.3	•• 36.6	342°43.2	•• 41.3	90°57.5	•• 19.8					Pollux	243°15.8 27°57.7		
22	106°03.8	138°55.7	44.8	152°43.8	36.1	357°45.9	41.3	105°59.7	19.7					Avior	234°13.7 -59°35.6		
23	121°06.3	153°55.1	43.8	167°44.3	35.6	12°48.7	41.3	121°01.9	19.6					Suhail	222°45.2 -43°32.3		
Mer.pass. 14:57			ν -0.6' d -1.0' m -3.91			ν 0.5' d -0.5' m 1.11			ν 2.7' d 0.0' m -2.60			ν 2.2' d -0.1' m 1.03			Miaplacidus 221°37.2 -69°49.4		
															Alphard 217°46.5 -8°46.4		
															Regulus 207°33.2 11°50.2		
															Dubhe 193°39.3 61°36.4		
															Denebola 182°23.8 14°25.4		
															Gienah 175°42.4 -17°41.3		
															Acrux 172°58.7 -63°14.5		
															Gacrux 171°50.3 -57°15.4		
															Alioth 166°11.8 55°48.7		
															Spica 158°21.2 -11°17.9		
															Alkaid 152°51.1 49°10.6		
															Hadar 148°34.6 -60°29.7		
															Menkent 147°56.5 -36°29.8		
															Arcturus 145°47.0 19°02.5		
															Rigel Kent. 139°39.0 -60°56.4		
															Kochab 137°19.7 74°02.4		
															Zuben'ubi 136°55.0 -16°09.1		
															Alphecca 126°03.0 26°37.3		
															Antares 112°14.9 -26°29.4		
															Atria 107°08.6 -69°04.2		
															Sabik 102°01.9 -15°45.5		
															Shaula 96°09.4 -37°07.3		
															Rasalhague 95°57.9 12°32.3		
															Eltanin 90°42.1 51°28.8		
															Kaus Aust. 83°31.6 -34°22.3		
															Vega 80°33.0 38°48.2		
															Nunki 75°46.9 -26°15.9		
															Altair 61°59.4 8°56.1		
															Peacock 53°04.9 -56°39.0		
															Deneb 49°25.7 45°22.3		
															Enif 33°38.2 9°59.6		
															Al Na'ir 27°32.2 -46°50.2		
															Fomalhaut 15°13.8 -29°29.2		
															Scheat 13°44.6 28°13.5		
															Markab 13°29.3 15°20.7		
Feb 05 Thu			SHA			Mer.pass											
			Venus 33°59.4			12:44											
			Mars 47°23.8			11:49											
			Jupiter 251°36.1			22:09											
			Saturn 0°01.0			14:57											
Feb 06 Fri			SHA			Mer.pass											
			Venus 32°45.8			12:45											
			Mars 46°36.0			11:49											
			Jupiter 251°42.6			22:05											
			Saturn 359°55.4			14:54											
Feb 07 Sat			SHA			Mer.pass											
			Venus 31°32.5			12:46											
			Mars 45°48.2			11:48											
			Jupiter 251°49.0			22:00											
			Saturn 359°49.8			14:50											
Horizontal parallax																	
			Venus: 0.1														
			Mars: 0.1														

h	Sun			Moon			
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	176°31.3	S15°59.2	320°27.0	14.8'	N00°43.7	-15.5'	56.7'
1	191°31.2	58.4	335°00.7	14.8'	00°28.2	-15.5'	56.7'
2	206°31.2	57.6	349°34.5	14.8'	N00°12.7	-15.5'	56.7'
3	221°31.1	· · 56.9	4°08.4	14.9'	S00°02.8	15.5'	56.6'
4	236°31.1	56.1	18°42.3	14.9'	00°18.2	15.4'	56.6'
5	251°31.0	55.4	33°16.2	14.9'	00°33.7	15.4'	56.6'
6	266°31.0	S15°54.6	47°50.1	15.0'	S00°49.1	15.4'	56.5'
7	281°30.9	53.9	62°24.1	15.0'	01°04.5	15.4'	56.5'
8	296°30.9	53.1	76°58.1	15.0'	01°19.8	15.3'	56.5'
9	311°30.8	· · 52.3	91°32.1	15.1'	01°35.2	15.3'	56.4'
10	326°30.8	51.6	106°06.1	15.1'	01°50.5	15.3'	56.4'
11	341°30.8	50.8	120°40.2	15.1'	02°05.8	15.3'	56.4'
12	356°30.7	S15°50.1	135°14.3	15.1'	S02°21.1	15.2'	56.4'
13	11°30.7	49.3	149°48.5	15.2'	02°36.3	15.2'	56.3'
14	26°30.6	48.5	164°22.6	15.2'	02°51.5	15.2'	56.3'
15	41°30.6	· · 47.8	178°56.8	15.2'	03°06.7	15.2'	56.3'
16	56°30.5	47.0	193°31.0	15.2'	03°21.9	15.1'	56.2'
17	71°30.5	46.2	208°05.2	15.2'	03°37.0	15.1'	56.2'
18	86°30.4	S15°45.5	222°39.4	15.2'	S03°52.1	15.1'	56.2'
19	101°30.4	44.7	237°13.7	15.3'	04°07.1	15.0'	56.1'
20	116°30.3	43.9	251°47.9	15.3'	04°22.1	15.0'	56.1'
21	131°30.3	· · 43.2	266°22.2	15.3'	04°37.1	14.9'	56.1'
22	146°30.2	42.4	280°56.5	15.3'	04°52.1	14.9'	56.0'
23	161°30.2	41.6	295°30.8	15.3'	05°07.0	14.9'	56.0'
SD = 16.2' $d = -0.8'$ SD = 15.5'							

Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°30.2	S15°40.9	310°05.1	15.3'	S05°21.9	14.8'	56.0'
1	191°30.1	40.1	324°39.4	15.3'	05°36.7	14.8'	56.0'
2	206°30.1	39.3	339°13.8	15.3'	05°51.5	14.8'	55.9'
3	221°30.0	· · 38.6	353°48.1	15.3'	06°06.3	14.7'	55.9'
4	236°30.0	37.8	8°22.5	15.4'	06°21.0	14.7'	55.9'
5	251°29.9	37.0	22°56.8	15.4'	06°35.7	14.6'	55.8'
6	266°29.9	S15°36.3	37°31.2	15.4'	S06°50.3	14.6'	55.8'
7	281°29.9	35.5	52°05.5	15.4'	07°04.9	14.5'	55.8'
8	296°29.8	34.7	66°39.9	15.4'	07°19.4	14.5'	55.7'
9	311°29.8	· · 33.9	81°14.2	15.4'	07°33.9	14.5'	55.7'
10	326°29.7	33.2	95°48.6	15.4'	07°48.4	14.4'	55.7'
11	341°29.7	32.4	110°23.0	15.4'	08°02.8	14.4'	55.7'
12	356°29.7	S15°31.6	124°57.3	15.4'	S08°17.1	14.3'	55.6'
13	11°29.6	30.9	139°31.7	15.3'	08°31.4	14.3'	55.6'
14	26°29.6	30.1	154°06.0	15.3'	08°45.7	14.2'	55.6'
15	41°29.6	· · 29.3	168°40.4	15.3'	08°59.9	14.2'	55.6'
16	56°29.5	28.5	183°14.7	15.3'	09°14.1	14.1'	55.5'
17	71°29.5	27.8	197°49.0	15.3'	09°28.2	14.1'	55.5'
18	86°29.4	S15°27.0	212°23.4	15.3'	S09°42.2	14.0'	55.5'
19	101°29.4	26.2	226°57.7	15.3'	09°56.3	14.0'	55.4'
20	116°29.4	25.4	241°32.0	15.3'	10°10.2	13.9'	55.4'
21	131°29.3	· · 24.6	256°06.2	15.3'	10°24.1	13.8'	55.4'
22	146°29.3	23.9	270°40.5	15.3'	10°37.9	13.8'	55.4'
23	161°29.3	23.1	285°14.8	15.2'	10°51.7	13.7'	55.3'
SD = 16.2' $d = -0.8'$ SD = 15.3'							

Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	176°29.2	S15°22.3	299°49.0	15.2'	S11°05.5	13.7'	55.3'
1	191°29.2	21.5	314°23.2	15.2'	11°19.1	13.6'	55.3'
2	206°29.2	20.8	328°55.5	15.2'	11°32.7	13.6'	55.3'
3	221°29.1	· · 20.0	343°31.6	15.2'	11°46.3	13.5'	55.2'
4	236°29.1	19.2	358°05.8	15.2'	11°59.8	13.4'	55.2'
5	251°29.0	18.4	12°40.0	15.1'	12°13.2	13.4'	55.2'
6	266°29.0	S15°17.6	27°14.1	15.1'	S12°26.6	13.3'	55.2'
7	281°29.0	16.8	41°48.2	15.1'	12°39.9	13.3'	55.1'
8	296°29.0	16.1	56°22.3	15.1'	12°53.2	13.2'	55.1'
9	311°28.9	· · 15.3	70°56.4	15.0'	13°06.4	13.1'	55.1'
10	326°28.9	14.5	85°30.4	15.0'	13°19.5	13.1'	55.1'
11	341°28.9	13.7	100°04.4	15.0'	13°32.5	13.0'	55.1'
12	356°28.8	S15°12.9	114°38.4	15.0'	S13°45.5	12.9'	55.0'
13	11°28.8	12.1	129°12.4	14.9'	13°58.5	12.9'	55.0'
14	26°28.8	11.4	143°46.3	14.9'	14°11.3	12.8'	55.0'
15	41°28.7	· · 10.6	158°20.2	14.9'	14°24.1	12.7'	55.0'
16	56°28.7	09.8	172°54.1	14.8'	14°36.8	12.7'	54.9'
17	71°28.7	09.0	187°27.9	14.8'	14°49.5	12.6'	54.9'
18	86°28.6	S15°08.2	202°01.7	14.8'	S15°02.1	12.5'	54.9'
19	101°28.6	07.4	216°35.5	14.7'	15°14.6	12.4'	54.9'
20	116°28.6	06.6	231°09.3	14.7'	15°27.1	12.4'	54.9'
21	131°28.6	· · 05.9	245°43.0	14.7'	15°39.4	12.3'	54.8'
22	146°28.5	05.1	260°16.6	14.6'	15°51.7	12.2'	54.8'
23	161°28.5	04.3	274°50.3	14.6'	16°04.0	12.2'	54.8'
SD = 16.2' $d = -0.8'$ SD = 15.1'							

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

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

Day	Sun		Mer. Pass	Moon		Age
	Eqn. of Time			Mer. Pass.		
	00 ^h	12 ^h	hh:mm	Upper	Lower	18-20
	mm:ss	mm:ss		hh:mm	hh:mm	89-74%
05	13:55	13:57	12:14	02:43	15:04	
06	13:59	14:01	12:14	03:26	15:47	
07	14:03	14:05	12:14	04:08	16:29	

February 08, 09, 10 UT (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	138°07.0	168°26.5	S13°52.8	183°07.6	S18°09.3	30°02.3	N22°43.0	137°51.1	S02°14.3					Alpheratz	357°34.1	29°14.1	
1	153°09.5	183°25.9	51.7	198°08.1	08.7	45°05.0	43.1	152°53.3	14.2					Ankaa	353°06.5	-42°10.0	
2	168°12.0	198°25.3	50.6	213°08.6	08.2	60°07.7	43.1	167°55.5	14.1					Schedar	349°30.4	56°41.0	
3	183°14.4	213°24.7	•• 49.6	228°09.0	•• 07.6	75°10.5	•• 43.1	182°57.7	•• 14.0					Diphda	348°46.6	-17°50.7	
4	198°16.9	228°24.2	48.5	243°09.5	07.1	90°13.2	43.2	198°00.0	13.9					Achernar	335°19.7	-57°06.5	
5	213°19.4	243°23.6	47.5	258°10.0	06.5	105°15.9	43.2	213°02.2	13.7					Hamal	327°50.3	23°35.2	
6	228°21.8	258°23.0	S13°46.4	273°10.5	S18°06.0	120°18.6	N22°43.2	228°04.4	S02°13.6					Polaris	313°34.6	89°22.8	
7	243°24.3	273°22.5	45.3	288°11.0	05.4	135°21.3	43.3	243°06.6	13.5					Acamar	315°11.1	-40°12.2	
8	258°26.7	288°21.9	44.3	303°11.5	04.9	150°24.1	43.3	258°08.9	13.4					Menkar	314°05.2	4°11.5	
9	273°29.2	303°21.3	•• 43.2	318°11.9	•• 04.3	165°26.8	•• 43.3	273°11.1	•• 13.3					Mirfak	308°26.9	49°57.4	
10	288°31.7	318°20.8	42.2	333°12.4	03.8	180°29.5	43.4	288°13.3	13.2					Aldebaran	290°38.4	16°33.7	
11	303°34.1	333°20.2	41.1	348°12.9	03.2	195°32.2	43.4	303°15.5	13.1					Rigel	281°02.8	-8°10.4	
12	318°36.6	348°19.6	S13°40.0	3°13.4	S18°02.7	210°34.9	N22°43.4	318°17.8	S02°13.0					Capella	280°20.3	46°01.6	
13	333°39.1	3°19.1	39.0	18°13.9	02.1	225°37.7	43.5	333°20.0	12.9					Bellatrix	278°21.7	6°22.3	
14	348°41.5	18°18.5	37.9	33°14.3	01.6	240°40.4	43.5	348°22.2	12.8					Elnath	278°00.5	28°37.8	
15	3°44.0	33°17.9	•• 36.8	48°14.8	•• 01.0	255°43.1	•• 43.5	3°24.4	•• 12.7					Alnilam	275°36.6	-1°11.2	
16	18°46.5	48°17.4	35.8	63°15.3	18°00.5	270°45.8	43.6	18°26.7	12.5					Betelgeuse	270°50.9	7°24.7	
17	33°48.9	63°16.8	34.7	78°15.8	17°59.9	285°48.5	43.6	33°28.9	12.4					Canopus	263°51.6	-52°42.7	
18	48°51.4	78°16.2	S13°33.6	93°16.3	S17°59.4	300°51.2	N22°43.6	48°31.1	S02°12.3					Sirius	258°25.2	-16°45.3	
19	63°53.9	93°15.7	32.5	108°16.8	58.8	315°53.9	43.7	63°33.3	12.2					Adhara	255°04.8	-29°00.6	
20	78°56.3	108°15.1	31.5	123°17.3	58.3	330°56.7	43.7	78°35.6	12.1					Procyon	244°49.6	5°09.4	
21	93°58.8	123°14.5	•• 30.4	138°17.7	•• 57.7	345°59.4	•• 43.7	93°37.8	•• 12.0					Pollux	243°15.8	27°57.7	
22	109°01.2	138°14.0	29.3	153°18.2	57.2	1°02.1	43.8	108°40.0	11.9					Avior	234°13.8	-59°35.7	
23	124°03.7	153°13.4	28.3	168°18.7	56.6	16°04.8	43.8	123°42.2	11.8					Suhail	222°45.2	-43°32.4	
Mer.pass. 14:45			ν -0.6' d -1.1' m -3.91	ν 0.5' d -0.5' m 1.12	ν 2.7' d 0.0' m -2.59	ν 2.2' d -0.1' m 1.02											
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	139°06.2	168°12.9	S13°27.2	183°19.2	S17°56.1	31°07.5	N22°43.8	138°44.4	S02°11.7					Denebola	182°23.8	14°25.4	
1	154°08.6	183°12.3	26.1	198°19.7	55.5	46°10.2	43.9	153°46.7	11.6					Gienah	175°42.4	-17°41.3	
2	169°11.1	198°11.7	25.0	213°20.2	55.0	61°12.9	43.9	168°48.9	11.5					Acrux	172°58.6	-63°14.5	
3	184°13.6	213°11.2	•• 24.0	228°20.6	•• 54.4	76°15.7	•• 43.9	183°51.1	•• 11.3					Gacrux	171°50.3	-57°15.5	
4	199°16.0	228°10.6	22.9	243°21.1	53.9	91°18.4	44.0	198°53.3	11.2					Alioth	166°11.8	55°48.7	
5	214°18.5	243°10.1	21.8	258°21.6	53.3	106°21.1	44.0	213°55.6	11.1					Spica	158°21.2	-11°17.9	
6	229°21.0	258°09.5	S13°20.7	273°22.1	S17°52.7	121°23.8	N22°44.0	228°57.8	S02°11.0					Alkaid	152°51.1	49°10.6	
7	244°23.4	273°08.9	19.7	288°22.6	52.2	136°26.5	44.0	244°00.0	10.9					Hadar	148°34.5	-60°29.7	
8	259°25.9	288°08.4	18.6	303°23.1	51.6	151°29.2	44.1	259°02.2	10.8					Menkent	147°56.4	-36°29.8	
9	274°28.3	303°07.8	•• 17.5	318°23.6	•• 51.1	166°31.9	•• 44.1	274°04.4	•• 10.7					Arcturus	145°47.0	19°02.5	
10	289°30.8	318°07.3	16.4	333°24.0	50.5	181°34.6	44.1	289°06.7	10.6					Rigel Kent.	139°38.9	-60°56.4	
11	304°33.3	333°06.7	15.3	348°24.5	50.0	196°37.4	44.2	304°08.9	10.5					Kochab	137°19.7	74°02.4	
12	319°35.7	348°06.2	S13°14.3	3°25.0	S17°49.4	211°40.1	N22°44.2	319°11.1	S02°10.4					Zuben'ubi	136°55.0	-16°09.1	
13	334°38.2	3°05.6	13.2	18°25.5	48.9	226°42.8	44.2	334°13.3	10.2					Alphecca	126°03.0	26°37.3	
14	349°40.7	18°05.1	12.1	33°26.0	48.3	241°45.5	44.3	349°15.6	10.1					Antares	112°14.8	-26°29.4	
15	4°43.1	33°04.5	•• 11.0	48°26.5	•• 47.7	256°48.2	•• 44.3	4°17.8	•• 10.0					Atria	107°08.5	-69°04.2	
16	19°45.6	48°03.9	09.9	63°27.0	47.2	271°50.9	44.3	19°20.0	09.9					Sabik	102°01.9	-15°45.5	
17	34°48.1	63°03.4	08.8	78°27.5	46.6	286°53.6	44.4	34°22.2	09.8					Shaula	96°09.4	-37°07.3	
18	49°50.5	78°02.8	S13°07.8	93°27.9	S17°46.1	301°56.3	N22°44.4	49°24.4	S02°09.7					Rasalhague	95°57.9	12°32.3	
19	64°53.0	93°02.3	06.7	108°28.4	45.5	316°59.0	44.4	64°26.7	09.6					Eltanin	90°42.1	51°28.8	
20	79°55.5	108°01.7	05.6	123°28.9	44.9	332°01.7	44.5	79°28.9	09.5					Kaus Aust.	83°31.6	-34°22.3	
21	94°57.9	123°01.2	•• 04.5	138°29.4	•• 44.4	347°04.4	•• 44.5	94°31.1	•• 09.4					Vega	80°32.9	38°48.2	
22	110°00.4	138°00.6	03.4	153°29.9	43.8	2°07.2	44.5	109°33.3	09.3					Nunki	75°46.9	-26°15.9	
23	125°02.8	153°00.1	02.3	168°30.4	43.3	17°09.9	44.6	124°35.6	09.1					Altair	61°59.4	8°56.1	
Mer.pass. 14:41			ν -0.6' d -1.1' m -3.91	ν 0.5' d -0.6' m 1.12	ν 2.7' d 0.0' m -2.58	ν 2.2' d -0.1' m 1.02											
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec				
0	140°05.3	167°59.5	S13°01.2	183°30.9	S17°42.7	32°12.6	N22°44.6	139°37.8	S02°09.0					Feb 08 Sun	SHA	Mer.pass	
1	155°07.8	182°59.0	13°00.1	198°31.4	42.1	47°15.3	44.6	154°40.0	08.9					Venus	30°19.4	12:47	
2	170°10.2	197°58.4	12°59.1	213°31.8	41.6	62°18.0	44.6	169°42.2	08.8					Mars	45°00.6	11:47	
3	185°12.7	212°57.9	•• 58.0	228°32.3	•• 41.0	77°20.7	•• 44.7	184°44.4	•• 08.7					Jupiter	251°55.3	21:56	
4	200°15.2	227°57.3	56.9	243°32.8	40.4	92°23.4	44.7	199°46.7	08.6					Saturn	359°44.0	14:46	
5	215°17.6	242°56.8	55.8	258°33.3	39.9	107°26.1	44.7	214°48.9	08.5								
6	230°20.1	257°56.2	S12°54.7	273°33.8	S17°39.3	122°28.8	N22°44.8	229°51.1	S02°08.4								
7	245°22.6	272°55.7	53.6	288°34.3	38.8	137°31.5	44.8	244°53.3	08.3								
8	260°25.0	287°55.2	52.5	303°34.8	38.2	152°34.2	44.8	259°55.5	08.2								
9	275°27.5	302°54.6	•• 51.4	318°35.3	•• 37.6	167°36.9	•• 44.9	274°57.8	•• 08.0								
10	290°30.0	317°54.1	50.3	333°35.8	37.1	182°39.6	44.9	290°00.0	07.9								
11	305°32.4	332°53.5	49.2	348°36.3	36.5	197°42.3	44.9	305°02.2	07.8								
12	320°34.9	347°53.0	S12°48.1	3°36.7	S17°35.9	212°45.0	N22°45.0	320°04.4	S02°07.7								
13	335°37.3	2°52.4	47.0	18°37.2	35.4	227°47.7	45.0	335°06.6	07.6								
14	350°39.8	17°51.9	45.9	33°37.7	34.8	242°50.4	45.0	350°08.9	07.5								
15	5°42.3	32°51.3	•• 44.8	48°38.2	•• 34.2	257°53.1	•• 45.1	5°11.1	•• 07.4								
16	20°44.7	47°50.8	43.7	63°38.7	33.7	272°55.8	45.1	20°13.3	07.3								
17	35°47.2	62°50.3	42.6	78°39.2	33.1	287°58.5	45.1	35°15.5	07.2								
18	50°49.7	77°49.7	S12°41.5	93°39.7	S17°32.5	303°01.2	N22°45.1	50°17.7	S02°07.0								
19	65°52.1	92°49.2	40.4	108°40.2	32.0	318°04.0	45.2	65°20.0	06.9								
20	80°54.6	107°48.6	39.3	123°40.7	31.4	333°06.7	45.2	80°22.2	06.8								
21	95°57.1	122°48.1	•• 38.2	138°41.2	•• 30.8	348°09.4	•• 45.2	95°24.4	•• 06.7								
22	110°59.5	137°47.6	37.1	153°41.7	30												

h	Sun			Moon			
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	176°28.5	S15°03.5	289°23.9	14.6'	S16°16.1	12.1'	54.8'
1	191°28.4	02.7	303°57.5	14.5'	16°28.2	12.0'	54.8'
2	206°28.4	01.9	318°31.0	14.5'	16°40.2	11.9'	54.7'
3	221°28.4	· · 01.1	333°04.5	14.4'	16°52.1	11.9'	54.7'
4	236°28.4	15°00.3	347°37.9	14.4'	17°04.0	11.8'	54.7'
5	251°28.3	14°59.5	2°11.3	14.4'	17°15.8	11.7'	54.7'
6	266°28.3	S14°58.7	16°44.7	14.3'	S17°27.5	11.6'	54.7'
7	281°28.3	58.0	31°18.0	14.3'	17°39.1	11.5'	54.6'
8	296°28.3	57.2	45°51.3	14.2'	17°50.6	11.5'	54.6'
9	311°28.2	· · 56.4	60°24.5	14.2'	18°02.1	11.4'	54.6'
10	326°28.2	55.6	74°57.7	14.1'	18°13.5	11.3'	54.6'
11	341°28.2	54.8	89°30.9	14.1'	18°24.8	11.2'	54.6'
12	356°28.2	S14°54.0	104°04.0	14.1'	S18°36.0	11.1'	54.6'
13	11°28.2	53.2	118°37.0	14.0'	18°47.1	11.1'	54.5'
14	26°28.1	52.4	133°10.1	14.0'	18°58.2	11.0'	54.5'
15	41°28.1	· · 51.6	147°43.0	13.9'	19°09.1	10.9'	54.5'
16	56°28.1	50.8	162°15.9	13.9'	19°20.0	10.8'	54.5'
17	71°28.1	50.0	176°48.8	13.8'	19°30.8	10.7'	54.5'
18	86°28.0	S14°49.2	191°21.6	13.8'	S19°41.5	10.6'	54.5'
19	101°28.0	48.4	205°54.4	13.7'	19°52.2	10.5'	54.5'
20	116°28.0	47.6	220°27.1	13.7'	20°02.7	10.4'	54.4'
21	131°28.0	· · 46.8	234°59.8	13.6'	20°13.1	10.4'	54.4'
22	146°28.0	46.0	249°32.4	13.6'	20°23.5	10.3'	54.4'
23	161°27.9	45.2	264°05.0	13.5'	20°33.8	10.2'	54.4'
SD = 16.2' $d = -0.8'$			SD = 14.9'				

Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	176°27.9	S14°44.4	278°37.5	13.5'	S20°43.9	10.1'	54.4'
1	191°27.9	43.6	293°09.9	13.4'	20°54.0	10.0'	54.4'
2	206°27.9	42.8	307°42.4	13.4'	21°04.0	9.9'	54.4'
3	221°27.9	· · 42.0	322°14.7	13.3'	21°13.9	9.8'	54.4'
4	236°27.8	41.2	336°47.0	13.2'	21°23.7	9.7'	54.3'
5	251°27.8	40.4	351°19.3	13.2'	21°33.4	9.6'	54.3'
6	266°27.8	S14°39.6	5°51.5	13.1'	S21°43.0	9.5'	54.3'
7	281°27.8	38.8	20°23.6	13.1'	21°52.6	9.4'	54.3'
8	296°27.8	38.0	34°55.7	13.0'	22°02.0	9.3'	54.3'
9	311°27.8	· · 37.2	49°27.7	13.0'	22°11.3	9.2'	54.3'
10	326°27.7	36.4	63°59.7	12.9'	22°20.5	9.1'	54.3'
11	341°27.7	35.6	78°31.6	12.9'	22°29.7	9.0'	54.3'
12	356°27.7	S14°34.8	93°03.4	12.8'	S22°38.7	8.9'	54.3'
13	11°27.7	34.0	107°35.2	12.7'	22°47.6	8.8'	54.3'
14	26°27.7	33.2	122°07.0	12.7'	22°56.5	8.7'	54.2'
15	41°27.7	· · 32.4	136°38.7	12.6'	23°05.2	8.6'	54.2'
16	56°27.7	31.6	151°10.3	12.6'	23°13.8	8.5'	54.2'
17	71°27.6	30.7	165°41.9	12.5'	23°22.4	8.4'	54.2'
18	86°27.6	S14°29.9	180°13.4	12.5'	S23°30.8	8.3'	54.2'
19	101°27.6	29.1	194°44.9	12.4'	23°39.1	8.2'	54.2'
20	116°27.6	28.3	209°16.3	12.3'	23°47.3	8.1'	54.2'
21	131°27.6	· · 27.5	223°47.6	12.3'	23°55.4	8.0'	54.2'
22	146°27.6	26.7	238°18.9	12.2'	24°03.4	7.9'	54.2'
23	161°27.6	25.9	252°50.1	12.2'	24°11.3	7.8'	54.2'
SD = 16.2' $d = -0.8'$			SD = 14.8'				

Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	176°27.6	S14°25.1	267°21.3	12.1'	S24°19.1	7.7'	54.2'
1	191°27.6	24.3	281°52.4	12.1'	24°26.8	7.6'	54.2'
2	206°27.5	23.5	296°23.4	12.0'	24°34.3	7.5'	54.2'
3	221°27.5	· · 22.6	310°54.4	11.9'	24°41.8	7.3'	54.2'
4	236°27.5	21.8	325°25.4	11.9'	24°49.2	7.2'	54.2'
5	251°27.5	21.0	339°56.2	11.8'	24°56.4	7.1'	54.2'
6	266°27.5	S14°20.2	354°27.0	11.8'	S25°03.5	7.0'	54.2'
7	281°27.5	19.4	8°57.8	11.7'	25°10.5	6.9'	54.2'
8	296°27.5	18.6	23°28.5	11.6'	25°17.4	6.8'	54.1'
9	311°27.5	· · 17.8	37°59.2	11.6'	25°24.2	6.7'	54.1'
10	326°27.5	17.0	52°29.7	11.5'	25°30.9	6.6'	54.1'
11	341°27.5	16.1	67°00.3	11.5'	25°37.4	6.4'	54.1'
12	356°27.5	S14°15.3	81°30.7	11.4'	S25°43.9	6.3'	54.1'
13	11°27.4	14.5	96°01.2	11.4'	25°50.2	6.2'	54.1'
14	26°27.4	13.7	110°31.5	11.3'	25°56.4	6.1'	54.1'
15	41°27.4	· · 12.9	125°01.8	11.2'	26°02.5	6.0'	54.1'
16	56°27.4	12.1	139°32.1	11.2'	26°08.5	5.8'	54.1'
17	71°27.4	11.2	154°02.3	11.1'	26°14.3	5.7'	54.1'
18	86°27.4	S14°10.4	168°32.4	11.1'	S26°20.0	5.6'	54.1'
19	101°27.4	09.6	183°02.5	11.0'	26°25.6	5.5'	54.1'
20	116°27.4	08.8	197°32.5	11.0'	26°31.1	5.4'	54.1'
21	131°27.4	· · 08.0	212°02.5	10.9'	26°36.5	5.2'	54.1'
22	146°27.4	07.2	226°32.4	10.9'	26°41.7	5.1'	54.1'
23	161°27.4	06.3	241°02.3	10.8'	26°46.8	5.0'	54.1'
SD = 16.2' $d = -0.8'$			SD = 14.8'				

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

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

Day	Sun		Mer. Pass	Moon		Age 21-23 65-46%
	Eqn. of Time 00 ^h mm:ss	12 ^h mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
08	14:06	14:07	12:14	04:51	17:13	
09	14:08	14:09	12:14	05:36	17:59	
10	14:10	14:10	12:14	06:23	18:47	

February 11, 12, 13 UT (Wed., Thu., Fri.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	141°04.4	167°46.5	S12°34.9	183°42.7	S17°29.1	33°17.5	N22°45.3	140°31.1	S02°06.4	Alpheratz	357°34.1	29°14.1
1	156°06.9	182°45.9	33.8	198°43.1	28.6	48°20.2	45.4	155°33.3	06.3	Ankaa	353°06.5	-42°10.0
2	171°09.4	197°45.4	32.7	213°43.6	28.0	63°22.9	45.4	170°35.5	06.2	Schedar	349°30.4	56°41.0
3	186°11.8	212°44.9	· · 31.6	228°44.1	· · 27.4	78°25.6	· · 45.4	185°37.7	· · 06.0	Diphda	348°46.6	-17°50.7
4	201°14.3	227°44.3	30.5	243°44.6	26.8	93°28.3	45.4	200°39.9	05.9	Achernar	335°19.7	-57°06.5
5	216°16.8	242°43.8	29.4	258°45.1	26.3	108°30.9	45.5	215°42.1	05.8	Hamal	327°50.3	23°35.2
6	231°19.2	257°43.3	S12°28.3	273°45.6	S17°25.7	123°33.6	N22°45.5	230°44.4	S02°05.7	Polaris	313°35.9	89°22.8
7	246°21.7	272°42.7	27.2	288°46.1	25.1	138°36.3	45.5	245°46.6	05.6	Acamar	315°11.1	-40°12.2
8	261°24.2	287°42.2	26.1	303°46.6	24.6	153°39.0	45.6	260°48.8	05.5	Menkar	314°05.2	4°11.5
9	276°26.6	302°41.7	· · 25.0	318°47.1	· · 24.0	168°41.7	· · 45.6	275°51.0	· · 05.4	Mirfak	308°26.9	49°57.4
10	291°29.1	317°41.1	23.9	333°47.6	23.4	183°44.4	45.6	290°53.2	05.3	Aldebaran	290°38.4	16°33.7
11	306°31.6	332°40.6	22.8	348°48.1	22.8	198°47.1	45.7	305°55.5	05.2	Rigel	281°02.8	-8°10.4
12	321°34.0	347°40.1	S12°21.7	3°48.6	S17°22.3	213°49.8	N22°45.7	320°57.7	S02°05.0	Capella	280°20.3	46°01.6
13	336°36.5	2°39.5	20.6	18°49.1	21.7	228°52.5	45.7	335°59.9	04.9	Bellatrix	278°21.7	6°22.3
14	351°38.9	17°39.0	19.4	33°49.6	21.1	243°55.2	45.7	351°02.1	04.8	Elnath	278°00.5	28°37.8
15	6°41.4	32°38.5	· · 18.3	48°50.1	· · 20.5	258°57.9	· · 45.8	6°04.3	· · 04.7	Alnilam	275°36.6	-1°11.2
16	21°43.9	47°37.9	17.2	63°50.6	20.0	274°00.6	45.8	21°06.5	04.6	Betelgeuse	270°50.9	7°24.7
17	36°46.3	62°37.4	16.1	78°51.1	19.4	289°03.3	45.8	36°08.8	04.5	Canopus	263°51.6	-52°42.8
18	51°48.8	77°36.9	S12°15.0	93°51.6	S17°18.8	304°06.0	N22°45.9	51°11.0	S02°04.4	Sirius	258°25.2	-16°45.3
19	66°51.3	92°36.3	13.9	108°52.0	18.2	319°08.7	45.9	66°13.2	04.3	Adhara	255°04.8	-29°00.6
20	81°53.7	107°35.8	12.8	123°52.5	17.7	334°11.4	45.9	81°15.4	04.2	Procyon	244°49.6	5°09.4
21	96°56.2	122°35.3	· · 11.7	138°53.0	· · 17.1	349°14.1	· · 46.0	96°17.6	· · 04.0	Pollux	243°15.8	27°57.7
22	111°58.7	137°34.8	10.5	153°53.5	16.5	4°16.8	46.0	111°19.8	03.9	Avior	234°13.8	-59°35.7
23	127°01.1	152°34.2	09.4	168°54.0	15.9	19°19.5	46.0	126°22.1	03.8	Suhail	222°45.2	-43°32.4
Mer.pass. 14:33		ν -0.5' d -1.1' m -3.91		ν 0.5' d -0.6' m 1.12		ν 2.7' d 0.0' m -2.57		ν 2.2' d -0.1' m 1.02				

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	142°03.6	167°33.7	S12°08.3	183°54.5	S17°15.4	34°22.2	N22°46.0	141°24.3	S02°03.7	Alphard	217°46.5	-8°46.4
1	157°06.1	182°33.2	07.2	198°55.0	14.8	49°24.9	46.1	156°26.5	03.6	Regulus	207°33.1	11°50.2
2	172°08.5	197°32.7	06.1	213°55.5	14.2	64°27.5	46.1	171°28.7	03.5	Dubhe	193°39.2	61°36.4
3	187°11.0	212°32.1	· · 05.0	228°56.0	· · 13.6	79°30.2	· · 46.1	186°30.9	· · 03.4	Denebola	182°23.7	14°25.4
4	202°13.4	227°31.6	03.8	243°56.5	13.1	94°32.9	46.2	201°33.2	03.3	Gienah	175°42.4	-17°41.3
5	217°15.9	242°31.1	02.7	258°57.0	12.5	109°35.6	46.2	216°35.4	03.1	Acrux	172°58.6	-63°14.5
6	232°18.4	257°30.6	S12°01.6	273°57.5	S17°11.9	124°38.3	N22°46.2	231°37.6	S02°03.0	Gacrux	171°50.2	-57°15.5
7	247°20.8	272°30.0	12°00.5	288°58.0	11.3	139°41.0	46.2	246°39.8	02.9	Alioth	166°11.8	55°48.7
8	262°23.3	287°29.5	11°59.4	303°58.5	10.7	154°43.7	46.3	261°42.0	02.8	Spica	158°21.2	-11°18.0
9	277°25.8	302°29.0	· · 58.2	318°59.0	· · 10.2	169°46.4	· · 46.3	276°44.2	· · 02.7	Alkaid	152°51.1	-49°10.6
10	292°28.2	317°28.5	57.1	333°59.5	09.6	184°49.1	46.3	291°46.5	02.6	Hadar	148°34.5	-60°29.8
11	307°30.7	332°27.9	56.0	349°00.0	09.0	199°51.8	46.4	306°48.7	02.5	Menkent	147°56.4	-36°29.8
12	322°33.2	347°27.4	S11°54.9	4°00.5	S17°08.4	214°54.5	N22°46.4	321°50.9	S02°02.4	Arcturus	145°47.0	19°02.5
13	337°35.6	2°26.9	53.7	19°01.0	07.8	229°57.1	46.4	336°53.1	02.3	Rigel Kent.	139°38.9	-60°56.4
14	352°38.1	17°26.4	52.6	34°01.5	07.3	244°59.8	46.5	351°55.3	02.1	Kochab	137°19.6	74°02.4
15	7°40.6	32°25.9	· · 51.5	49°02.0	· · 06.7	260°02.5	· · 46.5	6°57.5	· · 02.0	Zuben'ubi	136°54.9	-16°09.1
16	22°43.0	47°25.3	50.4	64°02.5	06.1	275°05.2	46.5	21°59.7	01.9	Alphecca	126°03.0	26°37.3
17	37°45.5	62°24.8	49.2	79°03.0	05.5	290°07.9	46.5	37°02.0	01.8	Antares	112°14.8	-26°29.4
18	52°47.9	77°24.3	S11°48.1	94°03.5	S17°04.9	305°10.6	N22°46.6	52°04.2	S02°01.7	Atria	107°08.4	-69°04.2
19	67°50.4	92°23.8	47.0	109°04.0	04.3	320°13.3	46.6	67°06.4	01.6	Sabik	102°01.9	-15°45.5
20	82°52.9	107°23.3	45.9	124°04.5	03.8	335°16.0	46.6	82°08.6	01.5	Shaula	96°09.3	-37°07.3
21	97°55.3	122°22.7	· · 44.7	139°05.0	· · 03.2	350°18.6	· · 46.7	97°10.8	· · 01.4	Rasalhague	95°57.9	12°32.3
22	112°57.8	137°22.2	43.6	154°05.5	02.6	5°21.3	46.7	112°13.0	01.2	Eltanin	90°42.1	51°28.8
23	128°00.3	152°21.7	42.5	169°06.0	02.0	20°24.0	46.7	127°15.3	01.1	Kaus Aust.	83°31.6	-34°22.3
Mer.pass. 14:29		ν -0.5' d -1.1' m -3.91		ν 0.5' d -0.6' m 1.12		ν 2.7' d 0.0' m -2.56		ν 2.2' d -0.1' m 1.02				

Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	143°02.7	167°21.2	S11°41.4	184°06.5	S17°01.4	35°26.7	N22°46.7	142°17.5	S02°01.0	Nunki	75°46.9	-26°15.9
1	158°05.2	182°20.7	40.2	199°07.0	00.8	50°29.4	46.8	157°19.7	00.9	Altair	61°59.4	8°56.1
2	173°07.7	197°20.2	39.1	214°07.5	17°00.3	65°32.1	46.8	172°21.9	00.8	Peacock	53°04.8	-56°39.0
3	188°10.1	212°19.6	· · 38.0	229°08.0	16°59.7	80°34.8	· · 46.8	187°24.1	· · 00.7	Deneb	49°25.6	45°22.3
4	203°12.6	227°19.1	36.8	244°08.5	59.1	95°37.4	46.9	202°26.3	00.6	Enif	33°38.2	9°59.6
5	218°15.1	242°18.6	35.7	259°09.0	58.5	110°40.1	46.9	217°28.5	00.5	Al Na'ir	27°32.2	-46°50.2
6	233°17.5	257°18.1	S11°34.6	274°09.5	S16°57.9	125°42.8	N22°46.9	232°30.8	S02°00.3	Fomalhaut	15°13.8	-29°29.2
7	248°20.0	272°17.6	33.4	289°10.0	57.3	140°45.5	46.9	247°33.0	00.2	Scheat	13°44.6	28°13.5
8	263°22.4	287°17.1	32.3	304°10.5	56.7	155°48.2	47.0	262°35.2	00.1	Markab	13°29.3	15°20.7
9	278°24.9	302°16.6	· · 31.2	319°11.0	· · 56.1	170°50.9	· · 47.0	277°37.4	02°00.0			
10	293°27.4	317°16.1	30.0	334°11.5	55.6	185°53.5	47.0	292°39.6	01°59.9	Feb 11 Wed	SHA	Mer.pass
11	308°29.8	332°15.5	28.9	349°12.0	55.0	200°56.2	47.0	307°41.8	59.8	Venus	26°42.0	12:49
12	323°32.3	347°15.0	S11°27.8	4°12.5	S16°54.4	215°58.9	N22°47.1	322°44.0	S01°59.7	Mars	42°38.2	11:45
13	338°34.8	2°14.5	26.6	19°13.0	53.8	231°01.6	47.1	337°46.3	59.6	Jupiter	252°13.0	21:43
14	353°37.2	17°14.0	25.5	34°13.6	53.2	246°04.3	47.1	352°48.5	59.4	Saturn	359°26.6	14:36
15	8°39.7	32°13.5	· · 24.3	49°14.1	· · 52.6	261°06.9	· · 47.2	7°50.7	· · 59.3			
16	23°42.2	47°13.0	23.2	64°14.6	52.0	276°09.6	47.2	22°52.9	59.2	Feb 12 Thu	SHA	Mer.pass
17	38°44.6	62°12.5	22.1	79°15.1	51.4	291°12.3	47.2	37°55.1	59.1	Venus	25°30.1	12:50
18	53°47.1	77°12.0	S11°20.9	94°15.6	S16°50.8	306°15.0	N22°47.2	52°57.3	S01°59.0	Mars	41°50.9	11:44
19	68°49.5	92°11.5	19.8	109°16.1	50.3	321°17.7	47.3	67°59.5	58.9	Jupiter	252°18.6	21:39
20	83°52.0	107°11.0	18.6	124°16.6	49.7	336°20.3	47.3	83°01.8	58.8	Saturn	359°20.7	14:32
21	98°54.5	122°10.5	· · 17.5	139°17.1	· · 49							

h	Sun			Moon			
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	176°27.4	S14°05.5	255°32.1	10.8'	S26°51.8	4.9'	54.1'
1	191°27.4	04.7	270°01.9	10.7'	26°56.7	4.7'	54.1'
2	206°27.4	03.9	284°31.6	10.7'	27°01.4	4.6'	54.1'
3	221°27.4	· · 03.0	299°01.3	10.6'	27°06.1	4.5'	54.2'
4	236°27.4	02.2	313°30.9	10.6'	27°10.6	4.4'	54.2'
5	251°27.4	01.4	328°00.4	10.5'	27°14.9	4.2'	54.2'
6	266°27.4	S14°00.6	342°30.0	10.5'	S27°19.2	4.1'	54.2'
7	281°27.4	13°59.8	356°59.4	10.4'	27°23.3	4.0'	54.2'
8	296°27.4	58.9	11°28.8	10.4'	27°27.2	3.9'	54.2'
9	311°27.4	· · 58.1	25°58.2	10.3'	27°31.1	3.7'	54.2'
10	326°27.4	57.3	40°27.5	10.3'	27°34.8	3.6'	54.2'
11	341°27.4	56.5	54°56.8	10.2'	27°38.4	3.5'	54.2'
12	356°27.4	S13°55.6	69°26.1	10.2'	S27°41.9	3.3'	54.2'
13	11°27.4	54.8	83°55.3	10.2'	27°45.2	3.2'	54.2'
14	26°27.4	54.0	98°24.4	10.1'	27°48.4	3.1'	54.2'
15	41°27.4	· · 53.2	112°53.5	10.1'	27°51.4	2.9'	54.2'
16	56°27.4	52.3	127°22.6	10.0'	27°54.4	2.8'	54.2'
17	71°27.4	51.5	141°51.6	10.0'	27°57.2	2.7'	54.2'
18	86°27.4	S13°50.7	156°20.6	10.0'	S27°59.8	2.5'	54.2'
19	101°27.4	49.9	170°49.6	9.9'	28°02.4	2.4'	54.2'
20	116°27.4	49.0	185°18.5	9.9'	28°04.8	2.3'	54.2'
21	131°27.4	· · 48.2	199°47.4	9.8'	28°07.0	2.1'	54.3'
22	146°27.4	47.4	214°16.2	9.8'	28°09.1	2.0'	54.3'
23	161°27.4	46.5	228°45.0	9.8'	28°11.1	1.8'	54.3'
SD = 16.2' $d = -0.8'$			SD = 14.8'				

Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	176°27.4	S13°45.7	243°13.8	9.7'	S28°13.0	1.7'	54.3'
1	191°27.4	44.9	257°42.6	9.7'	28°14.7	1.6'	54.3'
2	206°27.4	44.0	272°11.3	9.7'	28°16.3	1.4'	54.3'
3	221°27.4	· · 43.2	286°40.0	9.7'	28°17.7	1.3'	54.3'
4	236°27.4	42.4	301°08.6	9.6'	28°19.0	1.2'	54.3'
5	251°27.4	41.5	315°37.2	9.6'	28°20.2	1.0'	54.3'
6	266°27.4	S13°40.7	330°05.8	9.6'	S28°21.2	0.9'	54.3'
7	281°27.4	39.9	344°34.4	9.5'	28°22.1	0.7'	54.3'
8	296°27.5	39.1	359°03.0	9.5'	28°22.8	0.6'	54.4'
9	311°27.5	· · 38.2	13°31.5	9.5'	28°23.4	0.5'	54.4'
10	326°27.5	37.4	28°00.0	9.5'	28°23.9	0.3'	54.4'
11	341°27.5	36.6	42°28.5	9.5'	28°24.2	0.2'	54.4'
12	356°27.5	S13°35.7	56°56.9	9.4'	S28°24.4	0.0'	54.4'
13	11°27.5	34.9	71°25.4	9.4'	28°24.4	-0.1'	54.4'
14	26°27.5	34.0	85°53.8	9.4'	28°24.3	-0.2'	54.4'
15	41°27.5	· · 33.2	100°22.2	9.4'	28°24.1	-0.4'	54.4'
16	56°27.5	32.4	114°50.6	9.4'	28°23.7	-0.5'	54.5'
17	71°27.5	31.5	129°18.9	9.4'	28°23.2	-0.7'	54.5'
18	86°27.5	S13°30.7	143°47.3	9.4'	S28°22.5	-0.8'	54.5'
19	101°27.6	29.9	158°15.7	9.3'	28°21.7	-0.9'	54.5'
20	116°27.6	29.0	172°44.0	9.3'	28°20.8	-1.1'	54.5'
21	131°27.6	· · 28.2	187°12.3	9.3'	28°19.7	-1.2'	54.5'
22	146°27.6	27.3	201°40.7	9.3'	28°18.4	-1.4'	54.5'
23	161°27.6	26.5	216°09.0	9.3'	28°17.1	-1.5'	54.6'
SD = 16.2' $d = -0.8'$			SD = 14.8'				

Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°27.6	S13°25.7	230°37.3	9.3'	S28°15.5	-1.7'	54.6'
1	191°27.6	24.8	245°05.6	9.3'	28°13.9	-1.8'	54.6'
2	206°27.6	24.0	259°33.9	9.3'	28°12.1	-1.9'	54.6'
3	221°27.7	· · 23.2	274°02.2	9.3'	28°10.1	-2.1'	54.6'
4	236°27.7	22.3	288°30.5	9.3'	28°08.0	-2.2'	54.6'
5	251°27.7	21.5	302°58.8	9.3'	28°05.8	-2.4'	54.6'
6	266°27.7	S13°20.6	317°27.1	9.3'	S28°03.4	-2.5'	54.7'
7	281°27.7	19.8	331°55.4	9.3'	28°00.9	-2.7'	54.7'
8	296°27.7	18.9	346°23.7	9.3'	27°58.3	-2.8'	54.7'
9	311°27.7	· · 18.1	0°52.0	9.3'	27°55.4	-2.9'	54.7'
10	326°27.8	17.3	15°20.3	9.3'	27°52.5	-3.1'	54.7'
11	341°27.8	16.4	29°48.6	9.3'	27°49.4	-3.2'	54.7'
12	356°27.8	S13°15.6	44°17.0	9.3'	S27°46.2	-3.4'	54.8'
13	11°27.8	14.7	58°45.3	9.4'	27°42.8	-3.5'	54.8'
14	26°27.8	13.9	73°13.7	9.4'	27°39.3	-3.7'	54.8'
15	41°27.8	· · 13.0	87°42.0	9.4'	27°35.6	-3.8'	54.8'
16	56°27.9	12.2	102°10.4	9.4'	27°31.8	-3.9'	54.8'
17	71°27.9	11.3	116°38.8	9.4'	27°27.9	-4.1'	54.9'
18	86°27.9	S13°10.5	131°07.2	9.4'	S27°23.8	-4.2'	54.9'
19	101°27.9	09.7	145°35.6	9.4'	27°19.6	-4.4'	54.9'
20	116°27.9	08.8	160°04.1	9.5'	27°15.2	-4.5'	54.9'
21	131°27.9	· · 08.0	174°32.5	9.5'	27°10.7	-4.6'	54.9'
22	146°28.0	07.1	189°01.0	9.5'	27°06.1	-4.8'	54.9'
23	161°28.0	06.3	203°29.5	9.5'	27°01.3	-4.9'	55.0'
SD = 16.2' $d = -0.8'$			SD = 14.9'				

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

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

Day	Sun		Mer. Pass	Moon		Age
	Eqn. of Time 00 ^h mm:ss	12 ^h mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
11	14:10	14:10	12:14	07:12	19:38	
12	14:10	14:10	12:14	08:04	20:30	
13	14:10	14:09	12:14	08:56	21:23	

February 14, 15, 16 UT (Sat., Sun., Mon.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	144°01.9	167°08.9	S11°14.1	184°18.6	S16°47.3	36°31.1	N22°47.4	143°10.6	S01°58.3	Alpheratz	357°34.1	29°14.1
1	159°04.3	182°08.4	12.9	199°19.1	46.7	51°33.7	47.4	158°12.8	58.2	Ankaa	353°06.5	-42°10.0
2	174°06.8	197°07.9	11.8	214°19.6	46.1	66°36.4	47.5	173°15.0	58.1	Schedar	349°30.4	56°41.0
3	189°09.3	212°07.4	•• 10.7	229°20.1	•• 45.5	81°39.1	•• 47.5	188°17.3	•• 58.0	Diphda	348°46.6	-17°50.7
4	204°11.7	227°06.9	09.5	244°20.6	44.9	96°41.8	47.5	203°19.5	57.9	Achernar	335°19.8	-57°06.5
5	219°14.2	242°06.4	08.4	259°21.1	44.3	111°44.4	47.5	218°21.7	57.7	Hamal	327°50.3	23°35.2
6	234°16.7	257°05.9	S11°07.2	274°21.6	S16°43.7	126°47.1	N22°47.6	233°23.9	S01°57.6	Polaris	313°37.3	89°22.8
7	249°19.1	272°05.4	06.1	289°22.1	43.1	141°49.8	47.6	248°26.1	57.5	Acamar	315°11.1	-40°12.2
8	264°21.6	287°04.9	04.9	304°22.7	42.6	156°52.5	47.6	263°28.3	57.4	Menkar	314°05.2	4°11.5
9	279°24.0	302°04.4	•• 03.8	319°23.2	•• 42.0	171°55.1	•• 47.7	278°30.5	•• 57.3	Mirfak	308°26.9	49°57.4
10	294°26.5	317°03.9	02.6	334°23.7	41.4	186°57.8	47.7	293°32.7	57.2	Aldebaran	290°38.5	16°33.7
11	309°29.0	332°03.4	01.5	349°24.2	40.8	202°00.5	47.7	308°35.0	57.1	Rigel	281°02.8	-8°10.4
12	324°31.4	347°02.9	S11°00.3	4°24.7	S16°40.2	217°03.2	N22°47.7	323°37.2	S01°57.0	Capella	280°20.3	46°01.6
13	339°33.9	2°02.4	10°59.2	19°25.2	39.6	232°05.8	47.8	338°39.4	56.8	Bellatrix	278°21.7	6°22.3
14	354°36.4	17°01.9	58.0	34°25.7	39.0	247°08.5	47.8	353°41.6	56.7	Elnath	278°00.5	28°37.8
15	9°38.8	32°01.4	•• 56.9	49°26.2	•• 38.4	262°11.2	•• 47.8	8°43.8	•• 56.6	Alnilam	275°36.6	-1°11.2
16	24°41.3	47°00.9	55.7	64°26.7	37.8	277°13.9	47.8	23°46.0	56.5	Betelgeuse	270°50.9	7°24.7
17	39°43.8	62°00.4	54.6	79°27.2	37.2	292°16.5	47.9	38°48.2	56.4	Canopus	263°51.6	-52°42.8
18	54°46.2	76°59.9	S10°53.4	94°27.7	S16°36.6	307°19.2	N22°47.9	53°50.4	S01°56.3	Sirius	258°25.2	-16°45.3
19	69°48.7	91°59.4	52.3	109°28.2	36.0	322°21.9	47.9	68°52.7	56.2	Adhara	255°04.8	-29°00.6
20	84°51.2	106°58.9	51.1	124°28.7	35.4	337°24.5	47.9	83°54.9	56.0	Procyon	244°49.6	5°09.4
21	99°53.6	121°58.4	•• 50.0	139°29.3	•• 34.8	352°27.2	•• 48.0	98°57.1	•• 55.9	Pollux	243°15.8	27°57.7
22	114°56.1	136°57.9	48.8	154°29.8	34.2	7°29.9	48.0	113°59.3	55.8	Avior	234°13.8	-59°35.7
23	129°58.5	151°57.4	47.7	169°30.3	33.6	22°32.6	48.0	129°01.5	55.7	Suhail	222°45.2	-43°32.4
Mer.pass. 14:22		ν -0.5' d -1.1' m -3.91		ν 0.5' d -0.6' m 1.12		ν 2.7' d 0.0' m -2.55		ν 2.2' d -0.1' m 1.02		Miaplacidus	221°37.2	-69°49.5
										Alphard	217°46.5	-8°46.4
										Regulus	207°33.1	11°50.2
										Dubhe	193°39.2	61°36.4
										Denebola	182°23.7	14°25.4
										Gienah	175°42.4	-17°41.3
										Acrux	172°58.6	-63°14.5
										Gacrux	171°50.2	-57°15.5
										Alioth	166°11.8	55°48.8
										Spica	158°21.1	-11°18.0
										Alkaid	152°51.0	49°10.6
										Hadar	148°34.4	-60°29.8
										Menkent	147°56.4	-36°29.9
										Arcturus	145°46.9	19°02.5
										Rigil Kent.	139°38.8	-60°56.4
										Kochab	137°19.6	74°02.4
										Zuben'ubi	136°54.9	-16°09.1
										Alphecca	126°02.9	26°37.3
										Antares	112°14.8	-26°29.4
										Atria	107°08.4	-69°04.2
										Sabik	102°01.8	-15°45.5
										Shaula	96°09.3	-37°07.3
										Rasalhague	95°57.8	12°32.3
										Eltanin	90°42.0	51°28.8
										Kaus Aust.	83°31.5	-34°22.3
										Vega	80°32.9	38°48.2
										Nunki	75°46.9	-26°15.9
										Altair	61°59.3	8°56.1
										Peacock	53°04.8	-56°39.0
										Deneb	49°25.6	45°22.3
										Enif	33°38.2	9°59.6
										Al Na'ir	27°32.2	-46°50.1
										Fomalhaut	15°13.8	-29°29.1
										Scheat	13°44.6	28°13.5
										Markab	13°29.3	15°20.7
Feb 14 Sat		SHA		Mer.pass								
Venus		23°07.1		12:52								
Mars		40°16.7		11:42								
Jupiter		252°29.2		21:30								
Saturn		359°08.7		14:25								
Feb 15 Sun		SHA		Mer.pass								
Venus		21°55.9		12:53								
Mars		39°29.8		11:42								
Jupiter		252°34.2		21:26								
Saturn		359°02.7		14:22								
Feb 16 Mon		SHA		Mer.pass								
Venus		20°45.0		12:53								
Mars		38°42.9		11:41								
Jupiter		252°39.1		21:22								
Saturn		358°56.6		14:18								
Horizontal parallax												
Venus: 0.1												
Mars: 0.1												

h	Sun			Moon			
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	176°28.0	S13°05.4	217°58.0	9.5'	S26°56.4	-5.1'	55.0'
1	191°28.0	04.6	232°26.6	9.6'	26°51.3	-5.2'	55.0'
2	206°28.0	03.7	246°55.1	9.6'	26°46.1	-5.3'	55.0'
3	221°28.1	· · 02.9	261°23.7	9.6'	26°40.8	-5.5'	55.0'
4	236°28.1	02.0	275°52.3	9.6'	26°35.3	-5.6'	55.1'
5	251°28.1	01.2	290°21.0	9.7'	26°29.7	-5.8'	55.1'
6	266°28.1	S13°00.3	304°49.7	9.7'	S26°23.9	-5.9'	55.1'
7	281°28.1	12°59.5	319°18.4	9.7'	26°18.0	-6.0'	55.1'
8	296°28.2	58.6	333°47.1	9.8'	26°12.0	-6.2'	55.1'
9	311°28.2	· · 57.8	348°15.8	9.8'	26°05.8	-6.3'	55.2'
10	326°28.2	56.9	2°44.6	9.8'	25°59.5	-6.4'	55.2'
11	341°28.2	56.1	17°13.5	9.9'	25°53.1	-6.6'	55.2'
12	356°28.3	S12°55.2	31°42.3	9.9'	S25°46.5	-6.7'	55.2'
13	11°28.3	54.4	46°11.2	9.9'	25°39.8	-6.8'	55.3'
14	26°28.3	53.5	60°40.1	10.0'	25°33.0	-7.0'	55.3'
15	41°28.3	· · 52.6	75°09.1	10.0'	25°26.0	-7.1'	55.3'
16	56°28.4	51.8	89°38.1	10.0'	25°18.9	-7.2'	55.3'
17	71°28.4	50.9	104°07.1	10.1'	25°11.7	-7.4'	55.3'
18	86°28.4	S12°50.1	118°36.2	10.1'	S25°04.3	-7.5'	55.4'
19	101°28.4	49.2	133°05.3	10.1'	24°56.8	-7.6'	55.4'
20	116°28.5	48.4	147°34.4	10.2'	24°49.2	-7.8'	55.4'
21	131°28.5	· · 47.5	162°03.6	10.2'	24°41.4	-7.9'	55.4'
22	146°28.5	46.7	176°32.8	10.3'	24°33.5	-8.0'	55.5'
23	161°28.5	45.8	191°02.1	10.3'	24°25.5	-8.1'	55.5'
SD = 16.2'			d = -0.8'				
			SD = 15.0'				

Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	176°28.6	S12°44.9	205°31.4	10.3'	S24°17.4	-8.3'	55.5'
1	191°28.6	44.1	220°00.8	10.4'	24°09.1	-8.4'	55.5'
2	206°28.6	43.2	234°30.2	10.4'	24°00.7	-8.5'	55.5'
3	221°28.7	· · 42.4	248°59.6	10.5'	23°52.2	-8.7'	55.6'
4	236°28.7	41.5	263°29.1	10.5'	23°43.5	-8.8'	55.6'
5	251°28.7	40.7	277°58.6	10.6'	23°34.7	-8.9'	55.6'
6	266°28.7	S12°39.8	292°28.1	10.6'	S23°25.8	-9.0'	55.6'
7	281°28.8	38.9	306°57.7	10.7'	23°16.8	-9.1'	55.7'
8	296°28.8	38.1	321°27.4	10.7'	23°07.7	-9.3'	55.7'
9	311°28.8	· · 37.2	335°57.1	10.7'	22°58.4	-9.4'	55.7'
10	326°28.9	36.4	350°26.8	10.8'	22°49.0	-9.5'	55.7'
11	341°28.9	35.5	4°56.6	10.8'	22°39.5	-9.6'	55.8'
12	356°28.9	S12°34.6	19°26.5	10.9'	S22°29.9	-9.7'	55.8'
13	11°29.0	33.8	33°56.3	10.9'	22°20.1	-9.9'	55.8'
14	26°29.0	32.9	48°26.3	11.0'	22°10.3	-10.0'	55.8'
15	41°29.0	· · 32.0	62°56.2	11.0'	22°00.3	-10.1'	55.9'
16	56°29.0	31.2	77°26.2	11.1'	21°50.2	-10.2'	55.9'
17	71°29.1	30.3	91°56.3	11.1'	21°40.0	-10.3'	55.9'
18	86°29.1	S12°29.5	106°26.4	11.2'	S21°29.7	-10.4'	55.9'
19	101°29.1	28.6	120°56.6	11.2'	21°19.2	-10.6'	56.0'
20	116°29.2	27.7	135°26.8	11.3'	21°08.7	-10.7'	56.0'
21	131°29.2	· · 26.9	149°57.0	11.3'	20°58.0	-10.8'	56.0'
22	146°29.2	26.0	164°27.3	11.3'	20°47.2	-10.9'	56.0'
23	161°29.3	25.1	178°57.7	11.4'	20°36.4	-11.0'	56.0'
SD = 16.2'			d = -0.9'				
			SD = 15.1'				

Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	176°29.3	S12°24.3	193°28.1	11.4'	S20°25.4	-11.1'	56.1'
1	191°29.4	23.4	207°58.5	11.5'	20°14.3	-11.2'	56.1'
2	206°29.4	22.5	222°29.0	11.5'	20°03.1	-11.3'	56.1'
3	221°29.4	· · 21.7	236°59.5	11.6'	19°51.8	-11.4'	56.1'
4	236°29.5	20.8	251°30.1	11.6'	19°40.3	-11.5'	56.2'
5	251°29.5	19.9	266°00.7	11.7'	19°28.8	-11.6'	56.2'
6	266°29.5	S12°19.1	280°31.4	11.7'	S19°17.2	-11.7'	56.2'
7	281°29.6	18.2	295°02.1	11.8'	19°05.5	-11.8'	56.2'
8	296°29.6	17.3	309°32.9	11.8'	18°53.6	-11.9'	56.3'
9	311°29.6	· · 16.5	324°03.7	11.9'	18°41.7	-12.0'	56.3'
10	326°29.7	15.6	338°34.5	11.9'	18°29.7	-12.1'	56.3'
11	341°29.7	14.7	353°05.4	11.9'	18°17.5	-12.2'	56.3'
12	356°29.8	S12°13.9	7°36.4	12.0'	S18°05.3	-12.3'	56.4'
13	11°29.8	13.0	22°07.4	12.0'	17°53.0	-12.4'	56.4'
14	26°29.8	12.1	36°38.4	12.1'	17°40.6	-12.5'	56.4'
15	41°29.9	· · 11.2	51°09.5	12.1'	17°28.1	-12.6'	56.4'
16	56°29.9	10.4	65°40.6	12.2'	17°15.5	-12.7'	56.5'
17	71°30.0	09.5	80°11.8	12.2'	17°02.8	-12.8'	56.5'
18	86°30.0	S12°08.6	94°43.0	12.2'	S16°50.0	-12.9'	56.5'
19	101°30.0	07.8	109°14.2	12.3'	16°37.1	-13.0'	56.5'
20	116°30.1	06.9	123°45.5	12.3'	16°24.1	-13.1'	56.6'
21	131°30.1	· · 06.0	138°16.8	12.4'	16°11.1	-13.1'	56.6'
22	146°30.2	05.1	152°48.2	12.4'	15°57.9	-13.2'	56.6'
23	161°30.2	04.3	167°19.6	12.5'	15°44.7	-13.3'	56.6'
SD = 16.2'			d = -0.9'				
			SD = 15.3'				

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

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

Day	Sun			Moon		Age 27-29 12-2%
	Eqn. of Time		Mer.	Mer. Pass.		
	00 ^h	12 ^h	Pass	Upper	Lower	
	mm:ss	mm:ss	hh:mm	hh:mm	hh:mm	
14	14:08	14:07	12:14	09:49	22:14	
15	14:06	14:04	12:14	10:40	23:04	
16	14:03	14:01	12:14	11:29	23:52	

February 17, 18, 19 UT (Tue., Wed., Thu.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	146°59.3	166°33.6	S09°50.5	184°55.5	S16°03.9	39°43.0	N22°49.3	145°49.8	S01°50.1	Alpheratz	357°34.1	29°14.1
1	162°01.8	181°33.1	49.4	199°56.0	03.3	54°45.7	49.3	160°52.0	50.0	Ankaa	353°06.5	-42°10.0
2	177°04.2	196°32.7	48.2	214°56.5	02.7	69°48.3	49.3	175°54.2	49.9	Schedar	349°30.4	56°41.0
3	192°06.7	211°32.2	· · 47.0	229°57.0	· · 02.1	84°51.0	· · 49.3	190°56.4	· · 49.8	Diphda	348°46.6	-17°50.7
4	207°09.1	226°31.7	45.8	244°57.5	01.4	99°53.6	49.4	205°58.6	49.6	Achernar	335°19.8	-57°06.5
5	222°11.6	241°31.2	44.6	259°58.1	00.8	114°56.3	49.4	221°00.8	49.5	Hamal	327°50.3	23°35.2
6	237°14.1	256°30.8	S09°43.5	274°58.6	S16°00.2	129°58.9	N22°49.4	236°03.0	S01°49.4	Polaris	313°38.9	89°22.8
7	252°16.5	271°30.3	42.3	289°59.1	15°59.6	145°01.6	49.4	251°05.2	49.3	Acamar	315°11.1	-40°12.2
8	267°19.0	286°29.8	41.1	304°59.6	59.0	160°04.2	49.5	266°07.5	49.2	Menkar	314°05.2	4°11.5
9	282°21.5	301°29.3	· · 39.9	320°00.1	· · 58.4	175°06.9	· · 49.5	281°09.7	· · 49.1	Mirfak	308°27.0	49°57.4
10	297°23.9	316°28.9	38.7	335°00.7	57.7	190°09.5	49.5	296°11.9	49.0	Aldebaran	290°38.5	16°33.7
11	312°26.4	331°28.4	37.6	350°01.2	57.1	205°12.2	49.5	311°14.1	48.8	Rigel	281°02.8	-8°10.4
12	327°28.9	346°27.9	S09°36.4	5°01.7	S15°56.5	220°14.8	N22°49.6	326°16.3	S01°48.7	Capella	280°20.3	46°01.6
13	342°31.3	1°27.5	35.2	20°02.2	55.9	235°17.5	49.6	341°18.5	48.6	Bellatrix	278°21.7	6°22.3
14	357°33.8	16°27.0	34.0	35°02.8	55.3	250°20.1	49.6	356°20.7	48.5	Elnath	278°00.5	28°37.8
15	12°36.2	31°26.5	· · 32.8	50°03.3	· · 54.7	265°22.8	· · 49.6	11°22.9	· · 48.4	Alnilam	275°36.6	-1°11.2
16	27°38.7	46°26.1	31.6	65°03.8	54.0	280°25.4	49.7	26°25.1	48.3	Betelgeuse	270°50.9	7°24.7
17	42°41.2	61°25.6	30.5	80°04.3	53.4	295°28.1	49.7	41°27.3	48.2	Canopus	263°51.6	-52°42.8
18	57°43.6	76°25.1	S09°29.3	95°04.8	S15°52.8	310°30.7	N22°49.7	56°29.5	S01°48.0	Sirius	258°25.2	-16°45.3
19	72°46.1	91°24.6	28.1	110°05.4	52.2	325°33.4	49.7	71°31.7	47.9	Adhara	255°04.9	-29°00.6
20	87°48.6	106°24.2	26.9	125°05.9	51.6	340°36.0	49.7	86°33.9	47.8	Procyon	244°49.6	5°09.4
21	102°51.0	121°23.7	· · 25.7	140°06.4	· · 50.9	355°38.7	· · 49.8	101°36.1	· · 47.7	Pollux	243°15.8	27°57.7
22	117°53.5	136°23.2	24.5	155°06.9	50.3	10°41.3	49.8	116°38.4	47.6	Avior	234°13.8	-59°35.7
23	132°56.0	151°22.8	23.3	170°07.4	49.7	25°44.0	49.8	131°40.6	47.5	Suhail	222°45.2	-43°32.4
Mer.pass. 14:10		ν -0.5' d -1.2' m -3.91		ν 0.5' d -0.6' m 1.13		ν 2.7' d 0.0' m -2.53		ν 2.2' d -0.1' m 1.01				

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	147°58.4	166°22.3	S09°22.1	185°08.0	S15°49.1	40°46.6	N22°49.8	146°42.8	S01°47.3	Denebola	182°23.7	14°25.4
1	163°00.9	181°21.8	21.0	200°08.5	48.5	55°49.3	49.9	161°45.0	47.2	Gienah	175°42.4	-17°41.3
2	178°03.4	196°21.4	19.8	215°09.0	47.8	70°51.9	49.9	176°47.2	47.1	Acrux	172°58.5	-63°14.5
3	193°05.8	211°20.9	· · 18.6	230°09.5	· · 47.2	85°54.6	· · 49.9	191°49.4	· · 47.0	Gacrux	171°50.2	-57°15.5
4	208°08.3	226°20.4	17.4	245°10.1	46.6	100°57.2	49.9	206°51.6	46.9	Alioth	166°11.7	55°48.8
5	223°10.7	241°20.0	16.2	260°10.6	46.0	115°59.9	50.0	221°53.8	46.8	Spica	158°21.1	-11°18.0
6	238°13.2	256°19.5	S09°15.0	275°11.1	S15°45.4	131°02.5	N22°50.0	236°56.0	S01°46.7	Alkaid	152°51.0	49°10.6
7	253°15.7	271°19.1	13.8	290°11.6	44.7	146°05.1	50.0	251°58.2	46.5	Hadar	148°34.4	-60°29.8
8	268°18.1	286°18.6	12.6	305°12.2	44.1	161°07.8	50.0	267°00.4	46.4	Menkent	147°56.3	-36°29.9
9	283°20.6	301°18.1	· · 11.4	320°12.7	· · 43.5	176°10.4	· · 50.0	282°02.6	· · 46.3	Arcturus	145°46.9	19°02.5
10	298°23.1	316°17.7	10.2	335°13.2	42.9	191°13.1	50.1	297°04.8	46.2	Rigel Kent.	139°38.8	-60°56.4
11	313°25.5	331°17.2	09.1	350°13.7	42.2	206°15.7	50.1	312°07.0	46.1	Kochab	137°19.5	74°02.4
12	328°28.0	346°16.7	S09°07.9	5°14.3	S15°41.6	221°18.4	N22°50.1	327°09.2	S01°46.0	Zuben'ubi	136°54.9	-16°09.1
13	343°30.5	1°16.3	06.7	20°14.8	41.0	236°21.0	50.1	342°11.4	45.8	Alphecca	126°02.9	26°37.3
14	358°32.9	16°15.8	05.5	35°15.3	40.4	251°23.6	50.2	357°13.6	45.7	Antares	112°14.8	-26°29.4
15	13°35.4	31°15.4	· · 04.3	50°15.8	· · 39.8	266°26.3	· · 50.2	12°15.9	· · 45.6	Atria	107°08.3	-69°04.2
16	28°37.9	46°14.9	03.1	65°16.4	39.1	281°28.9	50.2	27°18.1	45.5	Sabik	102°01.8	-15°45.5
17	43°40.3	61°14.4	01.9	80°16.9	38.5	296°31.6	50.2	42°20.3	45.4	Shaula	96°09.3	-37°07.3
18	58°42.8	76°14.0	S09°00.7	95°17.4	S15°37.9	311°34.2	N22°50.3	57°22.5	S01°45.3	Rasalhague	95°57.8	12°32.2
19	73°45.2	91°13.5	08°59.5	110°17.9	37.3	326°36.8	50.3	72°24.7	45.1	Eltanin	90°42.0	51°28.8
20	88°47.7	106°13.1	58.3	125°18.5	36.6	341°39.5	50.3	87°26.9	45.0	Kaus Aust.	83°31.5	-34°22.3
21	103°50.2	121°12.6	· · 57.1	140°19.0	· · 36.0	356°42.1	· · 50.3	102°29.1	· · 44.9	Vega	80°32.9	38°48.2
22	118°52.6	136°12.1	55.9	155°19.5	35.4	117°44.8	50.3	117°31.3	44.8	Nunki	75°46.9	-26°15.9
23	133°55.1	151°11.7	54.7	170°20.0	34.7	26°47.4	50.4	132°33.5	44.7	Altair	61°59.3	8°56.1
Mer.pass. 14:06		ν -0.5' d -1.2' m -3.91		ν 0.5' d -0.6' m 1.13		ν 2.6' d 0.0' m -2.52		ν 2.2' d -0.1' m 1.01				

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	148°57.6	166°11.2	S08°53.5	185°20.6	S15°34.1	41°50.0	N22°50.4	147°35.7	S01°44.6	Fomalhaut	15°13.8	-29°29.1
1	164°00.0	181°10.8	52.3	200°21.1	33.5	56°52.7	50.4	162°37.9	44.5	Scheat	13°44.6	28°13.5
2	179°02.5	196°10.3	51.1	215°21.6	32.9	71°55.3	50.4	177°40.1	44.3	Markab	13°29.3	15°20.7
3	194°05.0	211°09.8	· · 49.9	230°22.2	· · 32.2	86°58.0	· · 50.5	192°42.3	· · 44.2	Feb 17 Tue		
4	209°07.4	226°09.4	48.7	245°22.7	31.6	102°00.6	50.5	207°44.5	44.1	Venus	19°34.3	12:54
5	224°09.9	241°08.9	47.5	260°23.2	31.0	117°03.2	50.5	222°46.7	44.0	Mars	37°56.2	11:40
6	239°12.3	256°08.5	S08°46.3	275°23.7	S15°30.4	132°05.9	N22°50.5	237°48.9	S01°43.9	Jupiter	252°43.7	21:17
7	254°14.8	271°08.0	45.1	290°24.3	29.7	147°08.5	50.5	252°51.1	43.8	Saturn	358°50.5	14:15
8	269°17.3	286°07.6	43.9	305°24.8	29.1	162°11.1	50.6	267°53.3	43.6	Feb 18 Wed		
9	284°19.7	301°07.1	· · 42.7	320°25.3	· · 28.5	177°13.8	· · 50.6	282°55.5	· · 43.5	Venus	18°23.9	12:55
10	299°22.2	316°06.7	41.5	335°25.9	27.8	192°16.4	50.6	297°57.7	43.4	Mars	37°09.5	11:39
11	314°24.7	331°06.2	40.3	350°26.4	27.2	207°19.0	50.6	313°00.0	43.3	Jupiter	252°48.2	21:13
12	329°27.1	346°05.8	S08°39.1	5°26.9	S15°26.6	222°21.7	N22°50.6	328°02.2	S01°43.2	Saturn	358°44.3	14:11
13	344°29.6	1°05.3	37.9	20°27.4	25.9	237°24.3	50.7	343°04.4	43.1	Feb 19 Thu		
14	359°32.1	16°04.8	36.7	35°28.0	25.3	252°26.9	50.7	358°06.6	42.9	Venus	17°13.7	12:56
15	14°34.5	31°04.4	· · 35.5	50°28.5	· · 24.7	267°29.6	· · 50.7	13°08.8	· · 42.8	Mars	36°23.0	11:38
16	29°37.0	46°03.9	34.3	65°29.0	24.0	282°32.2	50.7	28°11.0	42.7	Jupiter	252°52.5	21:09
17	44°39.5	61°03.5	33.1	80°29.6	23.4	297°34.8	50.8	43°13.2	42.6	Saturn	358°38.1	14:08
18	59°41.9	76°03.0	S08°31.9	95°30.1	S15°22.8	312°37.5	N22°50.8	58°15.4	S01°42.5	Horizontal parallax		
19	74°44.4	91°02.6	30.7	110°30.6	22.2	327°40.1	50.8	73°17.6	42.4	Venus:	0.1	
20	89°46.8	106°02.1	29.5	125°31.2	21.5	342°42.7	50.8	88°19.8	42.2	Mars:	0.1	
21	104°49.3	121°01.7	· · 28.3	140°31.7	· · 20.9	357°45.4	· · 50.8	103°22.0	· · 42.1			
22	119°51.8	136°01.2	27.1	155°32.2	20.3	12°48.0	50.9	118°24.2	42.0			
23	134°54.2	151°00.8	25.9	170°32.7	19.6	27°50.6	50.9	133°26.4	41.9			
Mer.pass. 14:02		ν -0.5' d -1.2' m -3.91		ν 0.5' d -0.6' m 1.13		ν 2.6' d 0.0' m -2.51		ν 2.2' d -0.1' m 1.01				

DUT1 = UT1-UTC = +0.0688 sec $\Delta T = TT-UT1 = +69.1152$ sec

2026 February 17 to Feb. 19 UT

h Sun Moon						
Tue	GHA	Dec	GHA	ν	Dec	d HP
0	176°30.2	S12°03.4	181°51.1	12.5'	S15°31.4	-13.4' 56.7'
1	191°30.3	02.5	196°22.6	12.5'	15°18.0	-13.5' 56.7'
2	206°30.3	01.6	210°54.1	12.6'	15°04.5	-13.6' 56.7'
3	221°30.4	12°00.8	225°25.7	12.6'	14°50.9	-13.6' 56.7'
4	236°30.4	11°59.9	239°57.3	12.6'	14°37.3	-13.7' 56.8'
5	251°30.5	59.0	254°28.9	12.7'	14°23.5	-13.8' 56.8'
6	266°30.5	S11°58.1	269°00.6	12.7'	S14°09.7	-13.9' 56.8'
7	281°30.5	57.3	283°32.3	12.8'	13°55.9	-14.0' 56.8'
8	296°30.6	56.4	298°04.1	12.8'	13°41.9	-14.0' 56.9'
9	311°30.6	· · 55.5	312°35.9	12.8'	13°27.9	-14.1' 56.9'
10	326°30.7	54.6	327°07.7	12.9'	13°13.8	-14.2' 56.9'
11	341°30.7	53.8	341°39.6	12.9'	12°59.6	-14.3' 56.9'
12	356°30.8	S11°52.9	356°11.5	12.9'	S12°45.3	-14.3' 57.0'
13	11°30.8	52.0	10°43.4	13.0'	12°31.0	-14.4' 57.0'
14	26°30.9	51.1	25°15.3	13.0'	12°16.6	-14.5' 57.0'
15	41°30.9	· · 50.2	39°47.3	13.0'	12°02.2	-14.5' 57.0'
16	56°31.0	49.4	54°19.3	13.0'	11°47.6	-14.6' 57.1'
17	71°31.0	48.5	68°51.4	13.1'	11°33.0	-14.7' 57.1'
18	86°31.0	S11°47.6	83°23.4	13.1'	S11°18.4	-14.7' 57.1'
19	101°31.1	46.7	97°55.5	13.1'	11°03.7	-14.8' 57.1'
20	116°31.1	45.8	112°27.6	13.1'	10°48.9	-14.8' 57.1'
21	131°31.2	· · 45.0	126°59.8	13.2'	10°34.0	-14.9' 57.2'
22	146°31.2	44.1	141°32.0	13.2'	10°19.1	-15.0' 57.2'
23	161°31.3	43.2	156°04.1	13.2'	10°04.2	-15.0' 57.2'
SD = 16.2' $d = -0.9'$			SD = 15.5'			
Wed	GHA	Dec	GHA	ν	Dec	d HP
0	176°31.3	S11°42.3	170°36.4	13.2'	S09°49.1	-15.1' 57.2'
1	191°31.4	41.4	185°08.6	13.3'	09°34.1	-15.1' 57.3'
2	206°31.4	40.6	199°40.9	13.3'	09°18.9	-15.2' 57.3'
3	221°31.5	· · 39.7	214°13.1	13.3'	09°03.7	-15.2' 57.3'
4	236°31.5	38.8	228°45.4	13.3'	08°48.5	-15.3' 57.3'
5	251°31.6	37.9	243°17.8	13.3'	08°33.2	-15.3' 57.4'
6	266°31.6	S11°37.0	257°50.1	13.4'	S08°17.9	-15.4' 57.4'
7	281°31.7	36.1	272°22.5	13.4'	08°02.5	-15.4' 57.4'
8	296°31.7	35.3	286°54.8	13.4'	07°47.0	-15.5' 57.4'
9	311°31.8	· · 34.4	301°27.2	13.4'	07°31.5	-15.5' 57.4'
10	326°31.8	33.5	315°59.6	13.4'	07°16.0	-15.6' 57.5'
11	341°31.9	32.6	330°32.0	13.4'	07°00.4	-15.6' 57.5'
12	356°32.0	S11°31.7	345°04.4	13.4'	S06°44.8	-15.7' 57.5'
13	11°32.0	30.8	359°36.9	13.4'	06°29.1	-15.7' 57.5'
14	26°32.1	29.9	14°09.3	13.4'	06°13.4	-15.7' 57.6'
15	41°32.1	· · 29.1	28°41.8	13.5'	05°57.7	-15.8' 57.6'
16	56°32.2	28.2	43°14.2	13.5'	05°41.9	-15.8' 57.6'
17	71°32.2	27.3	57°46.7	13.5'	05°26.1	-15.9' 57.6'
18	86°32.3	S11°26.4	72°19.1	13.5'	S05°10.2	-15.9' 57.6'
19	101°32.3	25.5	86°51.6	13.5'	04°54.4	-15.9' 57.7'
20	116°32.4	24.6	101°24.1	13.5'	04°38.4	-16.0' 57.7'
21	131°32.4	· · 23.7	115°56.6	13.5'	04°22.5	-16.0' 57.7'
22	146°32.5	22.8	130°29.1	13.5'	04°06.5	-16.0' 57.7'
23	161°32.6	22.0	145°01.5	13.5'	03°50.5	-16.0' 57.7'
SD = 16.2' $d = -0.9'$			SD = 15.6'			
Thu	GHA	Dec	GHA	ν	Dec	d HP
0	176°32.6	S11°21.1	159°34.0	13.5'	S03°34.4	-16.1' 57.8'
1	191°32.7	20.2	174°06.5	13.5'	03°18.4	-16.1' 57.8'
2	206°32.7	19.3	188°39.0	13.5'	03°02.3	-16.1' 57.8'
3	221°32.8	· · 18.4	203°11.4	13.5'	02°46.1	-16.1' 57.8'
4	236°32.8	17.5	217°43.9	13.5'	02°30.0	-16.2' 57.8'
5	251°32.9	16.6	232°16.4	13.5'	02°13.8	-16.2' 57.9'
6	266°33.0	S11°15.7	246°48.8	13.4'	S01°57.7	-16.2' 57.9'
7	281°33.0	14.8	261°21.3	13.4'	01°41.5	-16.2' 57.9'
8	296°33.1	13.9	275°53.7	13.4'	01°25.2	-16.2' 57.9'
9	311°33.1	· · 13.1	290°26.1	13.4'	01°09.0	-16.3' 57.9'
10	326°33.2	12.2	304°58.5	13.4'	00°52.7	-16.3' 58.0'
11	341°33.3	11.3	319°30.9	13.4'	00°36.5	-16.3' 58.0'
12	356°33.3	S11°10.4	334°03.3	13.4'	S00°20.2	-16.3' 58.0'
13	11°33.4	09.5	348°35.7	13.3'	S00°03.9	-16.3' 58.0'
14	26°33.4	08.6	3°08.0	13.3'	N00°12.4	16.3' 58.0'
15	41°33.5	· · 07.7	17°40.3	13.3'	00°28.7	16.3' 58.0'
16	56°33.6	06.8	32°12.6	13.3'	00°45.0	16.3' 58.1'
17	71°33.6	05.9	46°44.9	13.3'	01°01.3	16.3' 58.1'
18	86°33.7	S11°05.0	61°17.2	13.2'	N01°17.7	16.3' 58.1'
19	101°33.7	04.1	75°49.4	13.2'	01°34.0	16.3' 58.1'
20	116°33.8	03.2	90°21.7	13.2'	01°50.3	16.3' 58.1'
21	131°33.9	· · 02.3	104°53.9	13.2'	02°06.7	16.3' 58.2'
22	146°33.9	01.4	119°26.0	13.1'	02°23.0	16.3' 58.2'
23	161°34.0	00.5	133°58.2	13.1'	02°39.3	16.3' 58.2'
SD = 16.2' $d = -0.9'$			SD = 15.8'			

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

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

Day	Sun		Mer. Pass hh:mm	Moon		Age 0-2 0-3%
	Eqn.of Time 00 ^h mm:ss	12 ^h mm:ss		Mer.Pass. Upper hh:mm	Lower hh:mm	
17	13:59	13:57	12:14	12:16	—:—	
18	13:55	13:52	12:14	13:02	00:39	
19	13:50	13:47	12:14	13:47	01:24	

February 20, 21, 22 UT (Fri., Sat., Sun.)

Aries			Venus			Mars			Jupiter			Saturn			Stars		
Fri	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		SHA	Dec	
0	140°56.7	166°00.3	S08°24.6	185°33.3	S15°19.0	42°53.3	N22°50.9	148°28.6	S01°41.8			Alpheratz	357°34.1	29°14.1			
1	164°59.2	180°59.9	23.4	200°33.8	18.4	57°55.9	50.9	163°30.8	41.7			Ankaa	353°06.5	-42°10.0			
2	180°01.6	195°59.4	22.2	215°34.3	17.7	72°58.5	50.9	178°33.0	41.5			Schedar	349°30.4	56°41.0			
3	195°04.1	210°59.0	· · 21.0	230°34.9	· · 17.1	88°01.2	· · 51.0	193°35.2	· · 41.4			Diphda	348°46.6	-17°50.7			
4	210°06.6	225°58.5	19.8	245°35.4	16.5	103°03.8	51.0	208°37.4	41.3			Achernar	335°19.8	-57°06.5			
5	225°09.0	240°58.1	18.6	260°35.9	15.8	118°06.4	51.0	223°39.6	41.2			Hamal	327°50.3	23°35.2			
6	240°11.5	255°57.7	S08°17.4	275°36.5	S15°15.2	133°09.0	N22°51.0	238°41.8	S01°41.1			Polaris	313°40.5	89°22.8			
7	255°13.9	270°57.2	16.2	290°37.0	14.5	148°11.7	51.1	253°44.0	41.0			Acamar	315°11.2	-40°12.2			
8	270°16.4	285°56.8	15.0	305°37.5	13.9	163°14.3	51.1	268°46.2	40.8			Menkar	314°05.2	4°11.5			
9	285°18.9	300°56.3	· · 13.8	320°38.1	· · 13.3	178°16.9	· · 51.1	283°48.4	· · 40.7			Mirfak	308°27.0	49°57.4			
10	300°21.3	315°55.9	12.6	335°38.6	12.6	193°19.5	51.1	298°50.6	40.6			Aldebaran	290°38.5	16°33.7			
11	315°23.8	330°55.4	11.3	350°39.1	12.0	208°22.2	51.1	313°52.8	40.5			Rigel	281°02.9	-8°10.4			
12	330°26.3	345°55.0	S08°10.1	5°39.7	S15°11.4	223°24.8	N22°51.2	328°55.0	S01°40.4			Capella	280°20.3	46°01.6			
13	345°28.7	0°54.5	08.9	20°40.2	10.7	238°27.4	51.2	343°57.2	40.3			Bellatrix	278°21.8	6°22.3			
14	0°31.2	15°54.1	07.7	35°40.7	10.1	253°30.0	51.2	358°59.4	40.1			Elnath	278°00.5	28°37.8			
15	15°33.7	30°53.6	· · 06.5	50°41.3	· · 09.5	268°32.7	· · 51.2	14°01.6	· · 40.0			Alnilam	275°36.6	-1°11.2			
16	30°36.1	45°53.2	05.3	65°41.8	08.8	283°35.3	51.2	29°03.8	39.9			Betelgeuse	270°50.9	7°24.7			
17	45°38.6	60°52.8	04.1	80°42.3	08.2	298°37.9	51.3	44°06.0	39.8			Canopus	263°51.7	-52°42.8			
18	60°41.1	75°52.3	S08°02.9	95°42.9	S15°07.5	313°40.5	N22°51.3	59°08.3	S01°39.7			Sirius	258°25.2	-16°45.3			
19	75°43.5	90°51.9	01.6	110°43.4	06.9	328°43.2	51.3	74°10.5	39.6			Adhara	255°04.9	-29°00.6			
20	90°46.0	105°51.4	08°00.4	125°43.9	06.3	343°45.8	51.3	89°12.7	39.4			Procyon	244°49.6	5°09.4			
21	105°48.4	120°51.0	07°59.2	140°44.5	· · 05.6	358°48.4	· · 51.3	104°14.9	· · 39.3			Pollux	243°15.9	27°57.7			
22	120°50.9	135°50.5	58.0	155°45.0	05.0	13°51.0	51.4	119°17.1	39.2			Avior	234°13.8	-59°35.7			
23	135°53.4	150°50.1	56.8	170°45.6	04.3	28°53.7	51.4	134°19.3	39.1			Suhail	222°45.2	-43°32.4			
Mer.pass. 13:58			ν -0.4' d -1.2' m -3.91	ν 0.5' d -0.6' m 1.13	ν 2.6' d 0.0' m -2.51	ν 2.2' d -0.1' m 1.01											

Sat	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec	
0	150°55.8	165°49.7	S07°55.6	185°46.1	S15°03.7	43°56.3	N22°51.4	149°21.5	S01°39.0		
1	165°58.3	180°49.2	54.3	200°46.6	03.1	58°58.9	51.4	164°23.7	38.9		
2	181°00.8	195°48.8	53.1	215°47.2	02.4	74°01.5	51.4	179°25.9	38.7		
3	196°03.2	210°48.3	· · 51.9	230°47.7	· · 01.8	89°04.1	· · 51.5	194°28.1	· · 38.6		
4	211°05.7	225°47.9	50.7	245°48.2	01.1	104°06.8	51.5	209°30.3	38.5		
5	226°08.2	240°47.5	49.5	260°48.8	15°00.5	119°09.4	51.5	224°32.5	38.4		
6	241°10.6	255°47.0	S07°48.3	275°49.3	S14°59.9	134°12.0	N22°51.5	239°34.7	S01°38.3		
7	256°13.1	270°46.6	47.0	290°49.8	59.2	149°14.6	51.5	254°36.9	38.2		
8	271°15.5	285°46.1	45.8	305°50.4	58.6	164°17.2	51.6	269°39.1	38.0		
9	286°18.0	300°45.7	· · 44.6	320°50.9	· · 57.9	179°19.9	· · 51.6	284°41.3	· · 37.9		
10	301°20.5	315°45.3	43.4	335°51.5	57.3	194°22.5	51.6	299°43.5	37.8		
11	316°22.9	330°44.8	42.2	350°52.0	56.6	209°25.1	51.6	314°45.7	37.7		
12	331°25.4	345°44.4	S07°40.9	5°52.5	S14°56.0	224°27.7	N22°51.6	329°47.9	S01°37.6		
13	346°27.9	0°44.0	39.7	20°53.1	55.4	239°30.3	51.7	344°50.1	37.5		
14	1°30.3	15°43.5	38.5	35°53.6	54.7	254°33.0	51.7	359°52.3	37.3		
15	16°32.8	30°43.1	· · 37.3	50°54.1	· · 54.1	269°35.6	· · 51.7	14°54.5	· · 37.2		
16	31°35.3	45°42.7	36.1	65°54.7	53.4	284°38.2	51.7	29°56.7	37.1		
17	46°37.7	60°42.2	34.8	80°55.2	52.8	299°40.8	51.7	44°58.9	37.0		
18	61°40.2	75°41.8	S07°33.6	95°55.8	S14°52.1	314°43.4	N22°51.8	60°01.1	S01°36.9		
19	76°42.7	90°41.4	32.4	110°56.3	51.5	329°46.0	51.8	75°03.3	36.7		
20	91°45.1	105°40.9	31.2	125°56.8	50.8	344°48.6	51.8	90°05.5	36.6		
21	106°47.6	120°40.5	· · 29.9	140°57.4	· · 50.2	359°51.3	· · 51.8	105°07.7	· · 36.5		
22	121°50.0	135°40.0	28.7	155°57.9	49.6	14°53.9	51.8	120°09.9	36.4		
23	136°52.5	150°39.6	27.5	170°58.5	48.9	29°56.5	51.9	135°12.1	36.3		
Mer.pass. 13:54			ν -0.4' d -1.2' m -3.91	ν 0.5' d -0.6' m 1.13	ν 2.6' d 0.0' m -2.50	ν 2.2' d -0.1' m 1.01					

Sun	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec	
0	151°55.0	165°39.2	S07°26.3	185°59.0	S14°48.3	44°59.1	N22°51.9	150°14.3	S01°36.2		
1	166°57.4	180°38.7	25.0	200°59.5	47.6	60°01.7	51.9	165°16.5	36.0		
2	181°59.9	195°38.3	23.8	216°00.1	47.0	75°04.3	51.9	180°18.7	35.9		
3	197°02.4	210°37.9	· · 22.6	231°00.6	· · 46.3	90°06.9	· · 51.9	195°20.9	· · 35.8		
4	212°04.8	225°37.5	21.4	246°01.2	45.7	105°09.6	51.9	210°23.1	35.7		
5	227°07.3	240°37.0	20.1	261°01.7	45.0	120°12.2	52.0	225°25.3	35.6		
6	242°09.8	255°36.6	S07°18.9	276°02.2	S14°44.4	135°14.8	N22°52.0	240°27.5	S01°35.5		
7	257°12.2	270°36.2	17.7	291°02.8	43.7	150°17.4	52.0	255°29.7	35.3		
8	272°14.7	285°35.7	16.5	306°03.3	43.1	165°20.0	52.0	270°31.9	35.2		
9	287°17.2	300°35.3	· · 15.2	321°03.9	· · 42.4	180°22.6	· · 52.0	285°34.1	· · 35.1		
10	302°19.6	315°34.9	14.0	336°04.4	41.8	195°25.2	52.1	300°36.3	35.0		
11	317°22.1	330°34.4	12.8	351°05.0	41.1	210°27.8	52.1	315°38.5	34.9		
12	332°24.5	345°34.0	S07°11.5	6°05.5	S14°40.5	225°30.4	N22°52.1	330°40.7	S01°34.8		
13	347°27.0	0°33.6	10.3	21°06.0	39.8	240°33.0	52.1	345°42.9	34.6		
14	2°29.5	15°33.2	09.1	36°06.6	39.2	255°35.7	52.1	0°45.1	34.5		
15	17°31.9	30°32.7	· · 07.9	51°07.1	· · 38.5	270°38.3	· · 52.2	15°47.3	· · 34.4		
16	32°34.4	45°32.3	06.6	66°07.7	37.9	285°40.9	52.2	30°49.5	34.3		
17	47°36.9	60°31.9	05.4	81°08.2	37.2	300°43.5	52.2	45°51.7	34.2		
18	62°39.3	75°31.4	S07°04.2	96°08.8	S14°36.6	315°46.1	N22°52.2	60°53.9	S01°34.0		
19	77°41.8	90°31.0	02.9	111°09.3	35.9	330°48.7	52.2	75°56.1	33.9		
20	92°44.3	105°30.6	01.7	126°09.8	35.3	345°51.3	52.2	90°58.3	33.8		
21	107°46.7	120°30.2	07°00.5	141°10.4	· · 34.6	0°53.9	· · 52.3	106°00.5	· · 33.7		
22	122°49.2	135°29.7	06°59.2	156°10.9	34.0	15°56.5	52.3	121°02.7	33.6		
23	137°51.6	150°29.3	58.0	171°11.5	33.3	30°59.1	52.3	136°04.9	33.5		
Mer.pass. 13:50			ν -0.4' d -1.2' m -3.91	ν 0.5' d -0.6' m 1.13	ν 2.6' d 0.0' m -2.49	ν 2.2' d -0.1' m 1.00					

Feb 20 Fri			SHA	Mer.pass
Venus			16°03.6	12:56
Mars			35°36.6	11:37
Jupiter			252°56.6	21:05
Saturn			358°31.9	14:04

Feb 21 Sat			SHA	Mer.pass
Venus			14°53.8	12:57
Mars			34°50.3	11:37
Jupiter			253°00.4	21:01
Saturn			358°25.6	14:01

Feb 22 Sun			SHA	Mer.pass
Venus			13°44.2	12:58
Mars			34°04.0	11:36
Jupiter			253°04.1	20:56
Saturn			358°19.3	13:57

Horizontal parallax		
Venus:		0.1
Mars:		0.1

DUT1 = UT1-UTC = +0.0665 sec $\Delta T = TT-UT1 = +69.1175$ sec

2026 February 20 to Feb. 22 UT

h	Sun			Moon			
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	176°34.1	S10°59.6	148°30.3	13.1'	N02°55.6	16.3'	58.2'
1	191°34.1	58.7	163°02.4	13.1'	03°11.9	16.3'	58.2'
2	206°34.2	57.8	177°34.4	13.0'	03°28.3	16.3'	58.2'
3	221°34.2	· · 56.9	192°06.4	13.0'	03°44.6	16.3'	58.3'
4	236°34.3	56.0	206°38.4	12.9'	04°00.8	16.3'	58.3'
5	251°34.4	55.1	221°10.4	12.9'	04°17.1	16.3'	58.3'
6	266°34.4	S10°54.3	235°42.3	12.9'	N04°33.4	16.3'	58.3'
7	281°34.5	53.4	250°14.2	12.8'	04°49.7	16.2'	58.3'
8	296°34.6	52.5	264°46.0	12.8'	05°05.9	16.2'	58.3'
9	311°34.6	· · 51.6	279°17.8	12.8'	05°22.1	16.2'	58.3'
10	326°34.7	50.7	293°49.6	12.7'	05°38.3	16.2'	58.4'
11	341°34.8	49.8	308°21.3	12.7'	05°54.5	16.2'	58.4'
12	356°34.8	S10°48.9	322°52.9	12.6'	N06°10.7	16.1'	58.4'
13	11°34.9	48.0	337°24.6	12.6'	06°26.8	16.1'	58.4'
14	26°35.0	47.1	351°56.1	12.5'	06°42.9	16.1'	58.4'
15	41°35.0	· · 46.2	6°27.7	12.5'	06°59.0	16.1'	58.4'
16	56°35.1	45.3	20°59.2	12.4'	07°15.1	16.0'	58.5'
17	71°35.2	44.4	35°30.6	12.4'	07°31.1	16.0'	58.5'
18	86°35.2	S10°43.4	50°02.0	12.3'	N07°47.1	16.0'	58.5'
19	101°35.3	42.5	64°33.3	12.3'	08°03.1	15.9'	58.5'
20	116°35.4	41.6	79°04.6	12.2'	08°19.1	15.9'	58.5'
21	131°35.5	· · 40.7	93°35.8	12.2'	08°35.0	15.9'	58.5'
22	146°35.5	39.8	108°07.0	12.1'	08°50.8	15.8'	58.5'
23	161°35.6	38.9	122°38.1	12.1'	09°06.7	15.8'	58.5'
SD = 16.2' $d = -0.9'$ SD = 15.9'							
Sat	GHA	Dec	GHA	ν	Dec	d	HP
0	176°35.7	S10°38.0	137°09.2	12.0'	N09°22.5	15.8'	58.6'
1	191°35.7	37.1	151°40.1	11.9'	09°38.2	15.7'	58.6'
2	206°35.8	36.2	166°11.1	11.9'	09°53.9	15.7'	58.6'
3	221°35.9	· · 35.3	180°42.0	11.8'	10°09.6	15.6'	58.6'
4	236°36.0	34.4	195°12.8	11.7'	10°25.2	15.6'	58.6'
5	251°36.0	33.5	209°43.5	11.7'	10°40.8	15.5'	58.6'
6	266°36.1	S10°32.6	224°14.2	11.6'	N10°56.3	15.5'	58.6'
7	281°36.2	31.7	238°44.8	11.5'	11°11.8	15.4'	58.7'
8	296°36.2	30.8	253°15.4	11.5'	11°27.3	15.4'	58.7'
9	311°36.3	· · 29.9	267°45.8	11.4'	11°42.6	15.3'	58.7'
10	326°36.4	29.0	282°16.2	11.3'	11°58.0	15.3'	58.7'
11	341°36.5	28.1	296°46.6	11.3'	12°13.2	15.2'	58.7'
12	356°36.5	S10°27.2	311°16.9	11.2'	N12°28.4	15.2'	58.7'
13	11°36.6	26.3	325°47.0	11.1'	12°43.6	15.1'	58.7'
14	26°36.7	25.4	340°17.2	11.0'	12°58.7	15.0'	58.7'
15	41°36.8	· · 24.4	354°47.2	11.0'	13°13.7	15.0'	58.7'
16	56°36.8	23.5	9°17.2	10.9'	13°28.7	14.9'	58.8'
17	71°36.9	22.6	23°47.1	10.8'	13°43.6	14.8'	58.8'
18	86°37.0	S10°21.7	38°16.9	10.7'	N13°58.4	14.8'	58.8'
19	101°37.1	20.8	52°46.6	10.7'	14°13.2	14.7'	58.8'
20	116°37.1	19.9	67°16.3	10.6'	14°27.9	14.6'	58.8'
21	131°37.2	· · 19.0	81°45.9	10.5'	14°42.5	14.5'	58.8'
22	146°37.3	18.1	96°15.3	10.4'	14°57.0	14.5'	58.8'
23	161°37.4	17.2	110°44.8	10.3'	15°11.5	14.4'	58.8'
SD = 16.2' $d = -0.9'$ SD = 16.0'							
Sun	GHA	Dec	GHA	ν	Dec	d	HP
0	176°37.4	S10°16.3	125°14.1	10.2'	N15°25.9	14.3'	58.8'
1	191°37.5	15.4	139°43.3	10.2'	15°40.2	14.2'	58.8'
2	206°37.6	14.4	154°12.5	10.1'	15°54.5	14.2'	58.9'
3	221°37.7	· · 13.5	168°41.6	10.0'	16°08.6	14.1'	58.9'
4	236°37.8	12.6	183°10.5	9.9'	16°22.7	14.0'	58.9'
5	251°37.8	11.7	197°39.4	9.8'	16°36.7	13.9'	58.9'
6	266°37.9	S10°10.8	212°08.2	9.7'	N16°50.6	13.8'	58.9'
7	281°38.0	09.9	226°36.9	9.6'	17°04.4	13.7'	58.9'
8	296°38.1	09.0	241°05.6	9.5'	17°18.1	13.6'	58.9'
9	311°38.1	· · 08.1	255°34.1	9.4'	17°31.7	13.5'	58.9'
10	326°38.2	07.2	270°02.5	9.3'	17°45.3	13.4'	58.9'
11	341°38.3	06.2	284°30.9	9.3'	17°58.7	13.3'	58.9'
12	356°38.4	S10°05.3	298°59.1	9.2'	N18°12.0	13.2'	58.9'
13	11°38.5	04.4	313°27.3	9.1'	18°25.3	13.1'	58.9'
14	26°38.6	03.5	327°55.4	9.0'	18°38.4	13.0'	59.0'
15	41°38.6	· · 02.6	342°23.3	8.9'	18°51.5	12.9'	59.0'
16	56°38.7	01.7	356°51.2	8.8'	19°04.4	12.8'	59.0'
17	71°38.8	10°00.8	11°19.0	8.7'	19°17.2	12.7'	59.0'
18	86°38.9	S09°59.8	25°46.7	8.6'	N19°30.0	12.6'	59.0'
19	101°39.0	58.9	40°14.3	8.5'	19°42.6	12.5'	59.0'
20	116°39.0	58.0	54°41.7	8.4'	19°55.1	12.4'	59.0'
21	131°39.1	· · 57.1	69°09.1	8.3'	20°07.5	12.3'	59.0'
22	146°39.2	56.2	83°36.4	8.2'	20°19.8	12.2'	59.0'
23	161°39.3	55.3	98°03.6	8.1'	20°31.9	12.0'	59.0'
SD = 16.2' $d = -0.9'$ SD = 16.0'							

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

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

Day	Sun		Mer. Pass	Moon		Age 3-5 7-23%
	Eqn. of Time 00 ^h mm:ss	12 ^h mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
20	13:44	13:41	12:14	14:33	02:10	
21	13:37	13:34	12:14	15:22	02:57	
22	13:30	13:26	12:13	16:13	03:47	

February 23, 24, 25 UT (Mon., Tue., Wed.)

Aries		Venus		Mars		Jupiter		Saturn		Stars		
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	SHA	Dec	
0	152°54.1	165°28.9	S06°56.8	186°12.0	S14°32.7	46°01.7	N22°52.3	151°07.1	S01°33.3	Alpheratz	357°34.1	29°14.1
1	167°56.6	180°28.5	55.6	201°12.6	32.0	61°04.3	52.3	166°09.3	33.2	Ankaa	353°06.6	-42°10.0
2	182°59.0	195°28.0	54.3	216°13.1	31.4	76°06.9	52.4	181°11.5	33.1	Schedar	349°30.4	56°41.0
3	198°01.5	210°27.6	· · 53.1	231°13.7	· · 30.7	91°09.5	· · 52.4	196°13.7	· · 33.0	Diphda	348°46.6	-17°50.7
4	213°04.0	225°27.2	51.9	246°14.2	30.1	106°12.1	52.4	211°15.9	32.9	Achernar	335°19.8	-57°06.5
5	228°06.4	240°26.8	50.6	261°14.7	29.4	121°14.7	52.4	226°18.1	32.7	Hamal	327°50.3	23°35.2
6	243°08.9	255°26.3	S06°49.4	276°15.3	S14°28.8	136°17.3	N22°52.4	241°20.3	S01°32.6	Polaris	313°41.8	89°22.8
7	258°11.4	270°25.9	48.1	291°15.8	28.1	151°19.9	52.4	256°22.5	32.5	Acamar	315°11.2	-40°12.2
8	273°13.8	285°25.5	46.9	306°16.4	27.4	166°22.5	52.5	271°24.7	32.4	Menkar	314°05.3	4°11.5
9	288°16.3	300°25.1	· · 45.7	321°16.9	· · 26.8	181°25.1	· · 52.5	286°26.9	· · 32.3	Mirfak	308°27.0	49°57.4
10	303°18.8	315°24.6	44.4	336°17.5	26.1	196°27.8	52.5	301°29.1	32.2	Aldebaran	290°38.5	16°33.7
11	318°21.2	330°24.2	43.2	351°18.0	25.5	211°30.4	52.5	316°31.3	32.0	Rigel	281°02.9	-8°10.4
12	333°23.7	345°23.8	S06°42.0	6°18.6	S14°24.8	226°33.0	N22°52.5	331°33.5	S01°31.9	Capella	280°20.4	46°01.6
13	348°26.1	0°23.4	40.7	21°19.1	24.2	241°35.6	52.6	346°35.7	31.8	Bellatrix	278°21.8	6°22.3
14	3°28.6	15°23.0	39.5	36°19.7	23.5	256°38.2	52.6	1°37.9	31.7	Elnath	278°00.6	28°37.8
15	18°31.1	30°22.5	· · 38.3	51°20.2	· · 22.9	271°40.8	· · 52.6	16°40.1	· · 31.6	Alnilam	275°36.7	-1°11.2
16	33°33.5	45°22.1	37.0	66°20.8	22.2	286°43.4	52.6	31°42.3	31.4	Betelgeuse	270°50.9	7°24.6
17	48°36.0	60°21.7	35.8	81°21.3	21.5	301°46.0	52.6	46°44.5	31.3	Canopus	263°51.7	-52°42.8
18	63°38.5	75°21.3	S06°34.5	96°21.9	S14°20.9	316°48.5	N22°52.6	61°46.7	S01°31.2	Sirius	258°25.2	-16°45.3
19	78°40.9	90°20.9	33.3	111°22.4	20.2	331°51.1	52.7	76°48.9	31.1	Adhara	255°04.9	-29°00.6
20	93°43.4	105°20.4	32.1	126°23.0	19.6	346°53.7	52.7	91°51.1	31.0	Procyon	244°49.6	5°09.4
21	108°45.9	120°20.0	· · 30.8	141°23.5	· · 18.9	1°56.3	· · 52.7	106°53.3	· · 30.9	Pollux	243°15.9	27°57.7
22	123°48.3	135°19.6	29.6	156°24.1	18.3	16°58.9	52.7	121°55.5	30.7	Avior	234°13.8	-59°35.8
23	138°50.8	150°19.2	28.4	171°24.6	17.6	32°01.5	52.7	136°57.7	30.6	Suhail	222°45.2	-43°32.4
Mer.pass. 13:46		ν -0.4' d -1.2' m -3.91		ν 0.5' d -0.7' m 1.14		ν 2.6' d 0.0' m -2.49		ν 2.2' d -0.1' m 1.00				

Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	153°53.3	165°18.8	S06°27.1	186°25.1	S14°16.9	47°04.1	N22°52.7	151°59.8	S01°30.5	Denebola	182°23.7	14°25.4
1	168°55.7	180°18.3	25.9	201°25.7	16.3	62°06.7	52.8	167°02.0	30.4	Gienah	175°42.3	-17°41.3
2	183°58.2	195°17.9	24.6	216°26.2	15.6	77°09.3	52.8	182°04.2	30.3	Acrux	172°58.5	-63°14.6
3	199°00.6	210°17.5	· · 23.4	231°26.8	· · 15.0	92°11.9	· · 52.8	197°06.4	· · 30.1	Gacrux	171°50.1	-57°15.5
4	214°03.1	225°17.1	22.2	246°27.3	14.3	107°14.5	52.8	212°08.6	30.0	Alioth	166°11.7	55°48.8
5	229°05.6	240°16.7	20.9	261°27.9	13.6	122°17.1	52.8	227°10.8	29.9	Spica	158°21.1	-11°18.0
6	244°08.0	255°16.3	S06°19.7	276°28.4	S14°13.0	137°19.7	N22°52.8	242°13.0	S01°29.8	Alkaid	152°51.0	49°10.6
7	259°10.5	270°15.8	18.4	291°29.0	12.3	152°22.3	52.9	257°15.2	29.7	Hadar	148°34.3	-60°29.8
8	274°13.0	285°15.4	17.2	306°29.5	11.7	167°24.9	52.9	272°17.4	29.6	Menkent	147°56.3	-36°29.9
9	289°15.4	300°15.0	· · 15.9	321°30.1	· · 11.0	182°27.5	· · 52.9	287°19.6	· · 29.4	Arcturus	145°46.9	19°02.5
10	304°17.9	315°14.6	14.7	336°30.6	10.3	197°30.1	52.9	302°21.8	29.3	Rigel Kent.	139°38.7	-60°56.4
11	319°20.4	330°14.2	13.5	351°31.2	09.7	212°32.7	52.9	317°24.0	29.2	Kochab	137°19.4	74°02.5
12	334°22.8	345°13.8	S06°12.2	6°31.7	S14°09.0	227°35.3	N22°52.9	332°26.2	S01°29.1	Zuben'ubi	136°54.9	-16°09.1
13	349°25.3	0°13.4	11.0	21°32.3	08.4	242°37.9	53.0	347°28.4	29.0	Alphecca	126°02.9	26°37.3
14	4°27.8	15°12.9	09.7	36°32.9	07.7	257°40.4	53.0	2°30.6	28.8	Antares	112°14.7	-26°29.4
15	19°30.2	30°12.5	· · 08.5	51°33.4	· · 07.0	272°43.0	· · 53.0	17°32.8	· · 28.7	Atria	107°08.2	-69°04.2
16	34°32.7	45°12.1	07.2	66°34.0	06.4	287°45.6	53.0	32°35.0	28.6	Sabik	102°01.8	-15°45.5
17	49°35.1	60°11.7	06.0	81°34.5	05.7	302°48.2	53.0	47°37.2	28.5	Shaula	96°09.2	-37°07.3
18	64°37.6	75°11.3	S06°04.8	96°35.1	S14°05.0	317°50.8	N22°53.0	62°39.4	S01°28.4	Rasalhague	95°57.8	12°32.2
19	79°40.1	90°10.9	03.5	111°35.6	04.4	332°53.4	53.1	77°41.6	28.2	Eltanin	90°42.0	51°28.8
20	94°42.5	105°10.5	02.3	126°36.2	03.7	347°56.0	53.1	92°43.8	28.1	Kaus Aust.	83°31.5	-34°22.3
21	109°45.0	120°10.0	06°01.0	141°36.7	· · 03.1	2°58.6	· · 53.1	107°46.0	· · 28.0	Vega	80°32.8	38°48.2
22	124°47.5	135°09.6	05°59.8	156°37.5	02.4	18°01.2	53.1	122°48.2	27.9	Nunki	75°46.8	-26°15.8
23	139°49.9	150°09.2	58.5	171°37.8	01.7	33°03.8	53.1	137°50.4	27.8	Altair	61°59.3	8°56.1
Mer.pass. 13:42		ν -0.4' d -1.2' m -3.91		ν 0.5' d -0.7' m 1.14		ν 2.6' d 0.0' m -2.48		ν 2.2' d -0.1' m 1.00				

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec			
0	154°52.4	165°08.8	S05°57.3	186°38.4	S14°01.1	48°06.3	N22°53.1	152°52.6	S01°27.7	Feb 23 Mon	SHA	Mer.pass
1	169°54.9	180°08.4	56.0	201°38.9	14°00.4	63°08.9	53.2	167°54.8	27.5	Venus	12°34.8	12:58
2	184°57.3	195°08.0	54.8	216°39.5	13°59.7	78°11.5	53.2	182°57.0	27.4	Mars	33°17.9	11:35
3	199°59.8	210°07.6	· · 53.5	231°40.0	· · 59.1	93°14.1	· · 53.2	197°59.2	· · 27.3	Jupiter	253°07.6	20:52
4	215°02.2	225°07.2	52.3	246°40.6	58.4	108°16.7	53.2	213°01.4	27.2	Saturn	358°13.0	13:53
5	230°04.7	240°06.8	51.0	261°41.1	57.7	123°19.3	53.2	228°03.6	27.1			
6	245°07.2	255°06.3	S05°49.8	276°41.7	S13°57.1	138°21.9	N22°53.2	243°05.8	S01°26.9			
7	260°09.6	270°05.9	48.5	291°42.3	56.4	153°24.4	53.3	258°08.0	26.8	Feb 24 Tue	SHA	Mer.pass
8	275°12.1	285°05.5	47.3	306°42.8	55.7	168°27.0	53.3	273°10.1	26.7	Venus	11°25.5	12:59
9	290°14.6	300°05.1	· · 46.0	321°43.4	· · 55.1	183°29.6	· · 53.3	288°12.3	· · 26.6	Mars	32°31.9	11:34
10	305°17.0	315°04.7	44.8	336°43.9	54.4	198°32.2	53.3	303°14.5	26.5	Jupiter	253°10.9	20:48
11	320°19.5	330°04.3	43.5	351°44.5	53.7	213°34.8	53.3	318°16.7	26.3	Saturn	358°06.6	13:50
12	335°22.0	345°03.9	S05°42.3	6°45.0	S13°53.1	228°37.4	N22°53.3	333°18.9	S01°26.2			
13	350°24.4	0°03.5	41.0	21°45.6	52.4	243°39.9	53.3	348°21.1	26.1	Feb 25 Wed	SHA	Mer.pass
14	5°26.9	15°03.1	39.8	36°46.1	51.7	258°42.5	53.4	3°23.3	26.0	Venus	10°16.4	13:00
15	20°29.4	30°02.7	· · 38.5	51°46.7	· · 51.1	273°45.1	· · 53.4	18°25.5	· · 25.9	Mars	31°46.0	11:33
16	35°31.8	45°02.3	37.3	66°47.3	50.4	288°47.7	53.4	33°27.7	25.7	Jupiter	253°13.9	20:44
17	50°34.3	60°01.9	36.0	81°47.8	49.7	303°50.3	53.4	48°29.9	25.6	Saturn	358°00.2	13:46
18	65°36.7	75°01.4	S05°34.8	96°48.4	S13°49.1	318°52.9	N22°53.4	63°32.1	S01°25.5			
19	80°39.2	90°01.0	33.5	111°48.9	48.4	333°55.4	53.4	78°34.3	25.4	Horizontal parallax		
20	95°41.7	105°00.6	32.3	126°49.5	47.7	348°58.0	53.5	93°36.5	25.3	Venus:	0.1	
21	110°44.1	120°00.2	· · 31.0	141°50.0	· · 47.1	4°00.6	· · 53.5	108°38.7	· · 25.2	Mars:	0.1	
22	125°46.6	134°59.8	29.8	156°50.6	46.4	19°03.2	53.5	123°40.9	25.0			
23	140°49.1	149°59.4	28.5	171°51.1	45.7	34°05.8	53.5	138°43.1	24.9			
Mer.pass. 13:38		ν -0.4' d -1.2' m -3.91		ν 0.6' d -0.7' m 1.14		ν 2.6' d 0.0' m -2.47		ν 2.2' d -0.1' m 1.00				

h		Sun		Moon			
Mon	GHA	Dec	GHA	ν	Dec	d	HP
0	176°39.4	S09°54.3	112°30.7	8.0'	N20°44.0	11.9'	59.0'
1	191°39.5	53.4	126°57.7	7.9'	20°55.9	11.8'	59.0'
2	206°39.5	52.5	141°24.6	7.8'	21°07.7	11.7'	59.0'
3	221°39.6	· · 51.6	155°51.4	7.7'	21°19.4	11.6'	59.0'
4	236°39.7	50.7	170°18.1	7.6'	21°31.0	11.4'	59.0'
5	251°39.8	49.8	184°44.7	7.5'	21°42.4	11.3'	59.0'
6	266°39.9	S09°48.8	199°11.2	7.4'	N21°53.7	11.2'	59.1'
7	281°40.0	47.9	213°37.6	7.3'	22°04.9	11.0'	59.1'
8	296°40.1	47.0	228°03.9	7.2'	22°16.0	10.9'	59.1'
9	311°40.1	· · 46.1	242°30.1	7.1'	22°26.9	10.8'	59.1'
10	326°40.2	45.2	256°56.2	7.0'	22°37.7	10.6'	59.1'
11	341°40.3	44.2	271°22.2	6.9'	22°48.3	10.5'	59.1'
12	356°40.4	S09°43.3	285°48.1	6.8'	N22°58.8	10.4'	59.1'
13	11°40.5	42.4	300°13.9	6.7'	23°09.2	10.2'	59.1'
14	26°40.6	41.5	314°39.6	6.6'	23°19.4	10.1'	59.1'
15	41°40.7	· · 40.6	329°05.2	6.5'	23°29.5	9.9'	59.1'
16	56°40.8	39.6	343°30.7	6.4'	23°39.4	9.8'	59.1'
17	71°40.8	38.7	357°56.1	6.3'	23°49.2	9.7'	59.1'
18	86°40.9	S09°37.8	12°21.4	6.2'	N23°58.9	9.5'	59.1'
19	101°41.0	36.9	26°46.7	6.1'	24°08.4	9.4'	59.1'
20	116°41.1	36.0	41°11.8	6.0'	24°17.8	9.2'	59.1'
21	131°41.2	· · 35.0	55°36.8	5.9'	24°27.0	9.0'	59.1'
22	146°41.3	34.1	70°01.7	5.8'	24°36.0	8.9'	59.1'
23	161°41.4	33.2	84°26.6	5.7'	24°44.9	8.7'	59.1'
SD = 16.2'		$d = -0.9'$	SD = 16.1'				

Tue	GHA	Dec	GHA	ν	Dec	d	HP
0	176°41.5	S09°32.3	98°51.3	5.7'	N24°53.6	8.6'	59.1'
1	191°41.6	31.4	113°16.0	5.6'	25°02.2	8.4'	59.1'
2	206°41.7	30.4	127°40.6	5.5'	25°10.6	8.3'	59.1'
3	221°41.7	· · 29.5	142°05.0	5.4'	25°18.9	8.1'	59.1'
4	236°41.8	28.6	156°29.4	5.3'	25°27.0	7.9'	59.1'
5	251°41.9	27.7	170°53.7	5.2'	25°34.9	7.8'	59.1'
6	266°42.0	S09°26.7	185°18.0	5.1'	N25°42.7	7.6'	59.1'
7	281°42.1	25.8	199°42.1	5.0'	25°50.3	7.4'	59.1'
8	296°42.2	24.9	214°06.1	5.0'	25°57.8	7.3'	59.1'
9	311°42.3	· · 24.0	228°30.1	4.9'	26°05.0	7.1'	59.1'
10	326°42.4	23.0	242°54.0	4.8'	26°12.1	6.9'	59.1'
11	341°42.5	22.1	257°17.8	4.7'	26°19.1	6.8'	59.2'
12	356°42.6	S09°21.2	271°41.5	4.6'	N26°25.8	6.6'	59.2'
13	11°42.7	20.3	286°05.2	4.6'	26°32.4	6.4'	59.2'
14	26°42.8	19.3	300°28.7	4.5'	26°38.8	6.2'	59.2'
15	41°42.9	· · 18.4	314°52.2	4.4'	26°45.0	6.1'	59.2'
16	56°43.0	17.5	329°15.7	4.4'	26°51.1	5.9'	59.2'
17	71°43.0	16.6	343°39.0	4.3'	26°56.9	5.7'	59.2'
18	86°43.1	S09°15.6	358°02.3	4.2'	N27°02.6	5.5'	59.2'
19	101°43.2	14.7	12°25.5	4.2'	27°08.1	5.3'	59.2'
20	116°43.3	13.8	26°48.7	4.1'	27°13.5	5.1'	59.2'
21	131°43.4	· · 12.8	41°11.8	4.0'	27°18.6	5.0'	59.2'
22	146°43.5	11.9	55°34.8	4.0'	27°23.6	4.8'	59.2'
23	161°43.6	11.0	69°57.8	3.9'	27°28.4	4.6'	59.2'
SD = 16.2'		$d = -0.9'$	SD = 16.1'				

Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	176°43.7	S09°10.1	84°20.7	3.9'	N27°33.0	4.4'	59.2'
1	191°43.8	09.1	98°43.6	3.8'	27°37.4	4.2'	59.2'
2	206°43.9	08.2	113°06.4	3.8'	27°41.6	4.0'	59.2'
3	221°44.0	· · 07.3	127°29.2	3.7'	27°45.6	3.8'	59.2'
4	236°44.1	06.3	141°51.9	3.7'	27°49.4	3.7'	59.2'
5	251°44.2	05.4	156°14.6	3.6'	27°53.1	3.5'	59.2'
6	266°44.3	S09°04.5	170°37.2	3.6'	N27°56.6	3.3'	59.2'
7	281°44.4	03.6	184°59.8	3.5'	27°59.8	3.1'	59.2'
8	296°44.5	02.6	199°22.3	3.5'	28°02.9	2.9'	59.2'
9	311°44.6	· · 01.7	213°44.8	3.5'	28°05.8	2.7'	59.2'
10	326°44.7	09°00.8	228°07.3	3.4'	28°08.5	2.5'	59.2'
11	341°44.8	08°59.8	242°29.8	3.4'	28°11.0	2.3'	59.2'
12	356°44.9	S08°58.9	256°52.2	3.4'	N28°13.3	2.1'	59.2'
13	11°45.0	58.0	271°14.6	3.4'	28°15.4	1.9'	59.1'
14	26°45.1	57.0	285°36.9	3.3'	28°17.3	1.7'	59.1'
15	41°45.2	· · 56.1	299°59.3	3.3'	28°19.0	1.5'	59.1'
16	56°45.3	55.2	314°21.6	3.3'	28°20.5	1.3'	59.1'
17	71°45.4	54.2	328°43.9	3.3'	28°21.9	1.1'	59.1'
18	86°45.5	S08°53.3	343°06.2	3.3'	N28°23.0	0.9'	59.1'
19	101°45.6	52.4	357°28.5	3.3'	28°23.9	0.7'	59.1'
20	116°45.7	51.4	11°50.8	3.3'	28°24.7	0.5'	59.1'
21	131°45.8	· · 50.5	26°13.0	3.3'	28°25.2	0.3'	59.1'
22	146°45.9	49.6	40°35.3	3.3'	28°25.5	0.1'	59.1'
23	161°46.0	48.6	54°57.6	3.3'	28°25.7	-0.1'	59.1'
SD = 16.2'		$d = -0.9'$	SD = 16.1'				

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

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

Day	Sun		Mer. Pass	Moon		Age 6-8 33-56%
	Eqn. of Time 00 ^h mm:ss	12 ^h mm:ss		Upper hh:mm	Lower hh:mm	
23	13:22	13:18	12:13	17:09	04:40	
24	13:14	13:10	12:13	18:08	05:38	
25	13:05	13:00	12:13	19:11	06:39	