

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

	Aries			Venus			Mars			Jupiter			Saturn		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	177°32.6	161°41.7	N05°47.2	192°08.3	S07°24.1	70°59.3	N22°55.8	172°59.0	S00°20.4						
1	192°35.0	176°41.3	48.5	207°09.0	23.4	86°01.6	55.8	188°01.1	20.2						
2	207°37.5	191°40.9	49.7	222°09.6	22.6	101°04.0	55.8	203°03.3	20.1						
3	222°40.0	206°40.6	· · 51.0	237°10.2	· · 21.8	116°06.4	· · 55.8	218°05.5	· · 20.0						
4	237°42.4	221°40.2	52.3	252°10.9	21.1	131°08.8	55.8	233°07.7	19.9						
5	252°44.9	236°39.8	53.5	267°11.5	20.3	146°11.2	55.8	248°09.9	19.7						
6	267°47.4	251°39.4	N05°54.8	282°12.2	S07°19.6	161°13.6	N22°55.8	263°12.0	S00°19.6						
7	282°49.8	266°39.0	56.0	297°12.8	18.8	176°16.0	55.8	278°14.2	19.5						
8	297°52.3	281°38.7	57.3	312°13.4	18.0	191°18.3	55.8	293°16.4	19.4						
9	312°54.8	296°38.3	· · 58.5	327°14.1	· · 17.3	206°20.7	· · 55.8	308°18.6	· · 19.2						
10	327°57.2	311°37.9	05°59.8	342°14.7	16.5	221°23.1	55.8	323°20.7	19.1						
11	342°59.7	326°37.5	06°01.1	357°15.3	15.7	236°25.5	55.8	338°22.9	19.0						
12	358°02.1	341°37.1	N06°02.3	12°16.0	S07°15.0	251°27.9	N22°55.8	353°25.1	S00°18.9						
13	13°04.6	356°36.8	03.6	27°16.6	14.2	266°30.3	55.8	8°27.3	18.7						
14	28°07.1	11°36.4	04.8	42°17.3	13.5	281°32.6	55.7	23°29.5	18.6						
15	43°09.5	26°36.0	· · 06.1	57°17.9	· · 12.7	296°35.0	· · 55.7	38°31.6	· · 18.5						
16	58°12.0	41°35.6	07.4	72°18.5	11.9	311°37.4	55.7	53°33.8	18.4						
17	73°14.5	56°35.2	08.6	87°19.2	11.2	326°39.8	55.7	68°36.0	18.3						
18	88°16.9	71°34.9	N06°09.9	102°19.8	S07°10.4	341°42.2	N22°55.7	83°38.2	S00°18.1						
19	103°19.4	86°34.5	11.1	117°20.5	09.6	356°44.5	55.7	98°40.3	18.0						
20	118°21.9	101°34.1	12.4	132°21.1	08.9	11°46.9	55.7	113°42.5	17.9						
21	133°24.3	116°33.7	· · 13.6	147°21.7	· · 08.1	26°49.3	· · 55.7	128°44.7	· · 17.8						
22	148°26.8	131°33.3	14.9	162°22.4	07.4	41°51.7	55.7	143°46.9	17.6						
23	163°29.2	146°33.0	16.2	177°23.0	06.6	56°54.1	55.7	158°49.1	17.5						
Mer.pass.	12:08	ν -0.4' d 1.3' m -3.92		ν 0.6' d -0.8' m 1.17		ν 2.4' d -0.0' m -2.29		ν 2.2' d -0.1' m 0.93							

	SHA		Dec
Alpheratz	357°34.1	29°14.0	
Ankaa	353°06.6	-42°09.9	
Schedar	349°30.5	56°40.9	
Diphda	348°46.6	-17°50.7	
Achernar	335°19.9	-57°06.3	
Hamal	327°50.4	23°35.2	
Polaris	313°52.2	89°22.7	
Acamar	315°11.3	-40°12.2	
Menkar	314°05.3	4°11.5	
Mirfak	308°27.1	49°57.4	
Aldebaran	290°38.6	16°33.7	
Rigel	281°03.0	-8°10.4	
Capella	280°20.5	46°01.6	
Bellatrix	278°21.9	6°22.3	
Elnath	278°00.7	28°37.8	
Alnilam	275°36.8	-1°11.2	
Betelgeuse	270°51.0	7°24.6	
Canopus	263°51.9	-52°42.8	
Sirius	258°25.3	-16°45.3	
Adhara	255°05.0	-29°00.7	
Procyon	244°49.7	5°09.4	
Pollux	243°15.9	27°57.8	
Avior	234°14.0	-59°35.9	
Suhail	222°45.3	-43°32.5	
Miaplacidus	221°37.4	-69°49.7	
Alphard	217°46.5	-8°46.5	
Regulus	207°33.1	11°50.2	
Dubhe	193°39.1	61°36.5	
Denebola	182°23.6	14°25.4	
Gienah	175°42.3	-17°41.4	
Acrux	172°58.3	-63°14.7	
Gacrux	171°50.0	-57°15.7	
Alioth	166°11.5	55°48.9	
Spica	158°21.0	-11°18.0	
Alkaid	152°50.8	49°10.7	
Hadar	148°34.1	-60°29.9	
Menkent	147°56.1	-36°30.0	
Arcturus	145°46.7	19°02.5	
Rigel Kent.	139°38.5	-60°56.5	
Kochab	137°18.9	74°02.5	
Zuben'ubi	136°54.7	-16°09.2	
Alphecca	126°02.7	26°37.3	
Antares	112°14.5	-26°29.4	
Atria	107°07.7	-69°04.2	
Sabik	102°01.6	-15°45.5	
Shaula	96°09.0	-37°07.3	
Rasalhague	95°57.6	12°32.2	
Eltanin	90°41.7	51°28.7	
Kaus Aust.	83°31.2	-34°22.3	
Vega	80°32.6	38°48.1	
Nunki	75°46.6	-26°15.8	
Altair	61°59.1	8°56.1	
Peacock	53°04.5	-56°38.9	
Deneb	49°25.4	45°22.2	
Enif	33°38.1	9°59.6	
Al Na'ir	27°32.1	-46°50.0	
Fomalhaut	15°13.8	-29°29.0	
Scheat	13°44.6	28°13.4	
Markab	13°29.2	15°20.7	

Mar 20 Fri	SHA	Mer.pass
Venus	344°09.1	13:14
Mars	14°35.8	11:11
Jupiter	253°26.7	19:13
Saturn	355°26.4	12:26

Mar 21 Sat	SHA	Mer.pass
Venus	343°00.9	13:14
Mars	13°51.9	11:10
Jupiter	253°24.7	19:09
Saturn	355°19.5	12:23

Mar 22 Sun	SHA	Mer.pass
Venus	341°52.5	13:15
Mars	13°08.2	11:09
Jupiter	253°22.6	19:05
Saturn	355°12.7	12:19

Horizontal parallax		
Venus:		0.1
Mars:		0.1

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	178°31.7	161°32.6	N06°17.4	192°23.7	S07°05.8	71°56.4	N22°55.7	173°51.2	S00°17.4
1	193°34.2	176°32.2	18.7	207°24.3	05.1	86°58.8	55.7	188°53.4	17.3
2	208°36.6	191°31.8	19.9	222°24.9	04.3	102°01.2	55.7	203°55.6	17.1
3	223°39.1	206°31.4	· · 21.2	237°25.6	· · 03.5	117°03.6	· · 55.7	218°57.8	· · 17.0
4	238°41.6	221°31.0	22.4	252°26.2	02.8	132°05.9	55.6	233°59.9	16.9
5	253°44.0	236°30.7	23.7	267°26.9	02.0	147°08.3	55.6	249°02.1	16.8
6	268°46.5	251°30.3	N06°24.9	282°27.5	S07°01.2	162°10.7	N22°55.6	264°04.3	S00°16.7
7	283°49.0	266°29.9	26.2	297°28.1	07°00.5	177°13.1	55.6	279°06.5	16.5
8	298°51.4	281°29.5	27.4	312°28.8	06°59.7	192°15.4	55.6	294°08.7	16.4
9	313°53.9	296°29.1	· · 28.7	327°29.4	· · 58.9	207°17.8	· · 55.6	309°10.8	· · 16.3
10	328°56.4	311°28.7	30.0	342°30.1	58.2	222°20.2	55.6	324°13.0	16.2
11	343°58.8	326°28.4	31.2	357°30.7	57.4	237°22.6	55.6	339°15.2	16.0
12	359°01.3	341°28.0	N06°32.5	12°31.4	S06°56.7	252°24.9	N22°55.6	354°17.4	S00°15.9
13	14°03.7	356°27.6	33.7	27°32.0	55.9	267°27.3	55.6	9°19.5	15.8
14	29°06.2	11°27.2	35.0	42°32.6	55.1	282°29.7	55.6	24°21.7	15.7
15	44°08.7	26°26.8	· · 36.2	57°33.3	· · 54.4	297°32.1	· · 55.6	39°23.9	· · 15.5
16	59°11.1	41°26.4	37.5	72°33.9	53.6	312°34.4	55.6	54°26.1	15.4
17	74°13.6	56°26.1	38.7	87°34.6	52.8	327°36.8	55.5	69°28.3	15.3
18	89°16.1	71°25.7	N06°40.0	102°35.2	S06°52.1	342°39.2	N22°55.5	84°30.4	S00°15.2
19	104°18.5	86°25.3	41.2	117°35.8	51.3	357°41.6	55.5	99°32.6	15.1
20	119°21.0	101°24.9	42.5	132°36.5	50.5	12°43.9	55.5	114°34.8	14.9
21	134°23.5	116°24.5	· · 43.7	147°37.1	· · 49.8	27°46.3	· · 55.5	129°37.0	· · 14.8
22	149°25.9	131°24.1	45.0	162°37.8	49.0	42°48.7	55.5	144°39.1	14.7
23	164°28.4	146°23.7	46.2	177°38.4	48.2	57°51.0	55.5	159°41.3	14.6
Mer.pass.	12:04	ν -0.4' d 1.3' m -3.92		ν 0.6' d -0.8' m 1.17		ν 2.4' d -0.0' m -2.28		ν 2.2' d -0.1' m 0.92	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	179°30.9	161°23.3	N06°47.5	192°39.1	S06°47.5	72°53.4	N22°55.5	174°43.5	S00°14.4
1	194°33.3	176°23.0	48.7	207°39.7	46.7	87°55.8	55.5	189°45.7	14.3
2	209°35.8	191°22.6	50.0	222°40.3	45.9	102°58.1	55.5	204°47.9	14.2
3	224°38.2	206°22.2	· · 51.2	237°41.0	· · 45.2	118°00.5	· · 55.5	219°50.0	· · 14.1
4	239°40.7	221°21.8	52.5	252°41.6	44.4	133°02.9	55.5	234°52.2	13.9
5	254°43.2	236°21.4	53.7	267°42.3	43.6	148°05.2	55.5	249°54.4	13.8
6	269°45.6	251°21.0	N06°55.0	282°42.9	S06°42.9	163°07.6	N22°55.4	264°56.6	S00°13.7
7	284°48.1	266°20.6	56.2	297°43.6	42.1	178°10.0	55.4	279°58.7	13.6
8	299°50.6	281°20.3	57.5	312°44.2	41.3	193°12.4	55.4	295°00.9	13.5
9	314°53.0	296°19.9	06°58.7	327°44.9	· · 40.6	208°14.7	· · 55.4	310°03.1	· · 13.3
10	329°55.5	311°19.5	07°00.0	342°45.5	39.8	223°17.1	55.4	325°05.3	13.2
11	344°58.0	326°19.1	01.2	357°46.1	39.0	238°19.4	55.4	340°07.5	13.1
12	0°00.4	341°18.7	N07°02.4	12°46.8	S06°38.3	253°21.8	N22°55.4	355°09.6	S00°13.0
13	15°02.9	356°18.3	03.7	27°47.4	37.5	268°24.2	55.4	10°11.8	12.8
14	30°05.3	11°17.9	04.9	42°48.1	36.7	283°26.5	55.4	25°14.0	12.7
15	45°07.8	26°17.5	· · 06.2	57°48.7	· · 36.0	298°28.9	· · 55.4	40°16.2	· · 12.6
16	60°10.3	41°17.1	07.4	72°49.4	35.2	313°31.3	55.4	55°18.3	12.5
17	75°12.7	56°16.8	08.7	87°50.0	34.4	328°33.6	55.4	70°20.5	12.3
18	90°15.2	71°16.4	N07°09.9	102°50.7	S06°33.7	343°36.0	N22°55.3	85°22.7	S00°12.2
19	105°17.7	86°16.0	11.2	117°51.3	32.9	358°38.4	55.3	100°24.9	12.1
20	120°20.1	101°15.6	12.4	132°5					

h	Sun			Moon				
	GHA	Dec		GHA	$\nu$	Dec	$d$	HP
0	178°06.3	S00°14.6		167°52.6	11.6'	N07°15.3	16.4'	59.1'
1	193°06.4	13.6		182°23.2	11.6'	07°31.8	16.4'	59.2'
2	208°06.6	12.6		196°53.8	11.5'	07°48.2	16.4'	59.2'
3	223°06.8	· · 11.6		211°24.3	11.4'	08°04.5	16.3'	59.2'
4	238°07.0	10.6		225°54.7	11.4'	08°20.9	16.3'	59.2'
5	253°07.2	09.6		240°25.1	11.3'	08°37.2	16.3'	59.2'
6	268°07.4	S00°08.7		254°55.4	11.2'	N08°53.5	16.2'	59.3'
7	283°07.5	07.7		269°25.6	11.2'	09°09.7	16.2'	59.3'
8	298°07.7	06.7		283°55.8	11.1'	09°25.9	16.2'	59.3'
9	313°07.9	· · 05.7		298°25.9	11.0'	09°42.0	16.1'	59.3'
10	328°08.1	04.7		312°56.0	11.0'	09°58.2	16.1'	59.3'
11	343°08.3	03.7		327°25.9	10.9'	10°14.2	16.0'	59.3'
12	358°08.5	S00°02.7		341°55.8	10.8'	N10°30.2	16.0'	59.3'
13	13°08.6	01.7		356°25.7	10.8'	10°46.2	15.9'	59.4'
14	28°08.8	S00°00.8		10°55.4	10.7'	11°02.1	15.9'	59.4'
15	43°09.0	N00°00.2		25°25.1	10.6'	11°18.0	15.8'	59.4'
16	58°09.2	01.2		39°54.7	10.5'	11°33.8	15.8'	59.4'
17	73°09.4	02.2		54°24.2	10.5'	11°49.6	15.7'	59.4'
18	88°09.6	N00°03.2		68°53.7	10.4'	N12°05.3	15.6'	59.4'
19	103°09.7	04.2		83°23.1	10.3'	12°20.9	15.6'	59.4'
20	118°09.9	05.2		97°52.4	10.2'	12°36.5	15.5'	59.5'
21	133°10.1	· · 06.2		112°21.6	10.1'	12°52.0	15.5'	59.5'
22	148°10.3	07.2		126°50.8	10.1'	13°07.5	15.4'	59.5'
23	163°10.5	08.1		141°19.8	10.0'	13°22.9	15.3'	59.5'
SD = 16.1'		$d = -1.0'$		SD = 16.1'				

Sat	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°10.7	N00°09.1	155°48.8	9.9'	N13°38.2	15.2'	59.5'
1	193°10.8	10.1	170°17.7	9.8'	13°53.4	15.2'	59.5'
2	208°11.0	11.1	184°46.5	9.7'	14°08.6	15.1'	59.5'
3	223°11.2	· · 12.1	199°15.2	9.6'	14°23.7	15.0'	59.5'
4	238°11.4	13.1	213°43.9	9.6'	14°38.7	14.9'	59.5'
5	253°11.6	14.1	228°12.4	9.5'	14°53.7	14.9'	59.6'
6	268°11.8	N00°15.1	242°40.9	9.4'	N15°08.6	14.8'	59.6'
7	283°12.0	16.0	257°09.3	9.3'	15°23.3	14.7'	59.6'
8	298°12.1	17.0	271°37.6	9.2'	15°38.0	14.6'	59.6'
9	313°12.3	· · 18.0	286°05.8	9.1'	15°52.7	14.5'	59.6'
10	328°12.5	19.0	300°33.9	9.0'	16°07.2	14.4'	59.6'
11	343°12.7	20.0	315°02.0	8.9'	16°21.6	14.4'	59.6'
12	358°12.9	N00°21.0	329°29.9	8.8'	N16°36.0	14.3'	59.6'
13	13°13.1	22.0	343°57.7	8.8'	16°50.3	14.2'	59.6'
14	28°13.3	23.0	358°25.5	8.7'	17°04.4	14.1'	59.6'
15	43°13.4	· · 24.0	12°53.1	8.6'	17°18.5	14.0'	59.6'
16	58°13.6	24.9	27°20.7	8.5'	17°32.5	13.9'	59.6'
17	73°13.8	25.9	41°48.2	8.4'	17°46.3	13.8'	59.6'
18	88°14.0	N00°26.9	56°15.5	8.3'	N18°00.1	13.7'	59.6'
19	103°14.2	27.9	70°42.8	8.2'	18°13.8	13.6'	59.7'
20	118°14.4	28.9	85°10.0	8.1'	18°27.3	13.4'	59.7'
21	133°14.6	· · 29.9	99°37.1	8.0'	18°40.8	13.3'	59.7'
22	148°14.7	30.9	114°04.1	7.9'	18°54.1	13.2'	59.7'
23	163°14.9	31.9	128°31.0	7.8'	19°07.3	13.1'	59.7'
SD = 16.1'		$d = 1.0'$	SD = 16.2'				

Sun	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°15.1	N00°32.8	142°57.8	7.7'	N19°20.4	13.0'	59.7'
1	193°15.3	33.8	157°24.5	7.6'	19°33.4	12.9'	59.7'
2	208°15.5	34.8	171°51.1	7.5'	19°46.3	12.8'	59.7'
3	223°15.7	· · 35.8	186°17.6	7.4'	19°59.1	12.6'	59.7'
4	238°15.9	36.8	200°44.0	7.3'	20°11.7	12.5'	59.7'
5	253°16.0	37.8	215°10.4	7.2'	20°24.2	12.4'	59.7'
6	268°16.2	N00°38.8	229°36.6	7.1'	N20°36.6	12.3'	59.7'
7	283°16.4	39.8	244°02.7	7.0'	20°48.9	12.1'	59.7'
8	298°16.6	40.7	258°28.7	6.9'	21°01.0	12.0'	59.7'
9	313°16.8	· · 41.7	272°54.6	6.8'	21°13.0	11.9'	59.7'
10	328°17.0	42.7	287°20.5	6.7'	21°24.9	11.7'	59.7'
11	343°17.2	43.7	301°46.2	6.6'	21°36.6	11.6'	59.7'
12	358°17.3	N00°44.7	316°11.8	6.5'	N21°48.3	11.5'	59.7'
13	13°17.5	45.7	330°37.4	6.4'	21°59.7	11.3'	59.7'
14	28°17.7	46.7	345°02.8	6.3'	22°11.0	11.2'	59.7'
15	43°17.9	· · 47.6	359°28.2	6.3'	22°22.2	11.0'	59.7'
16	58°18.1	48.6	13°53.4	6.2'	22°33.3	10.9'	59.7'
17	73°18.3	49.6	28°18.6	6.1'	22°44.2	10.8'	59.7'
18	88°18.5	N00°50.6	42°43.7	6.0'	N22°54.9	10.6'	59.7'
19	103°18.6	51.6	57°08.6	5.9'	23°05.5	10.5'	59.7'
20	118°18.8	52.6	71°33.5	5.8'	23°16.0	10.3'	59.7'
21	133°19.0	· · 53.6	85°58.3	5.7'	23°26.3	10.2'	59.7'
22	148°19.2	54.6	100°23.0	5.6'	23°36.5	10.0'	59.7'
23	163°19.4	55.5	114°47.6	5.5'	23°46.5	9.8'	59.7'
SD = 16.0'		$d = 1.0'$	SD = 16.3'				

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

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

Day	Sun		Mer. Pass	Moon		Age 1-3
	Eqn. of Time	12h		Upper	Lower	
20	07:35	07:26	12:07	13:15	00:50	
21	07:17	07:08	12:07	14:07	01:40	
22	07:00	06:51	12:07	15:02	02:34	

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

Aries		Venus		Mars		Jupiter		Saturn	
Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	180°30.0	161°14.0	N07°17.4	192°54.5	S06°29.0	73°50.2	N22°55.3	175°35.8	S00°11.5
1	195°32.5	176°13.6	18.6	207°55.2	28.3	88°52.5	55.3	190°37.9	11.4
2	210°34.9	191°13.2	19.9	222°55.8	27.5	103°54.9	55.3	205°40.1	11.2
3	225°37.4	206°12.9	· · 21.1	237°56.5	· · 26.7	118°57.3	· · 55.3	220°42.3	· · 11.1
4	240°39.8	221°12.5	22.4	252°57.1	26.0	133°59.6	55.3	235°44.5	11.0
5	255°42.3	236°12.1	23.6	267°57.8	25.2	149°02.0	55.2	250°46.7	10.9
6	270°44.8	251°11.7	N07°24.8	282°58.4	S06°24.4	164°04.3	N22°55.2	265°48.8	S00°10.7
7	285°47.2	266°11.3	26.1	297°59.1	23.7	179°06.7	55.2	280°51.0	10.6
8	300°49.7	281°10.9	27.3	312°59.7	22.9	194°09.1	55.2	295°53.2	10.5
9	315°52.2	296°10.5	· · 28.6	328°00.3	· · 22.1	209°11.4	· · 55.2	310°55.4	· · 10.4
10	330°54.6	311°10.1	29.8	343°01.0	21.4	224°13.8	55.2	325°57.5	10.3
11	345°57.1	326°09.7	31.0	358°01.6	20.6	239°16.1	55.2	340°59.7	10.1
12	0°59.6	341°09.3	N07°32.3	13°02.3	S06°19.8	254°18.5	N22°55.2	356°01.9	S00°10.0
13	16°02.0	356°08.9	33.5	28°02.9	19.1	269°20.8	55.2	11°04.1	09.9
14	31°04.5	11°08.5	34.8	43°03.6	18.3	284°23.2	55.2	26°06.3	09.8
15	46°07.0	26°08.1	· · 36.0	58°04.2	· · 17.5	299°25.6	· · 55.2	41°08.4	· · 09.6
16	61°09.4	41°07.7	37.2	73°04.9	16.7	314°27.9	55.1	56°10.6	09.5
17	76°11.9	56°07.3	38.5	88°05.5	16.0	329°30.3	55.1	71°12.8	09.4
18	91°14.3	71°07.0	N07°39.7	103°06.2	S06°15.2	344°32.6	N22°55.1	86°15.0	S00°09.3
19	106°16.8	86°06.6	40.9	118°06.8	14.4	359°35.0	55.1	101°17.1	09.1
20	121°19.3	101°06.2	42.2	133°07.5	13.7	14°37.3	55.1	116°19.3	09.0
21	136°21.7	116°05.8	· · 43.4	148°08.1	· · 12.9	29°39.7	· · 55.1	131°21.5	· · 08.9
22	151°24.2	131°05.4	44.7	163°08.8	12.1	44°42.0	55.1	146°23.7	08.8
23	166°26.7	146°05.0	45.9	178°09.4	11.4	59°44.4	55.1	161°25.8	08.7
Mer.pass. 11:56		ν -0.4' d 1.2' m -3.92		ν 0.6' d -0.8' m 1.17		ν 2.4' d -0.0' m -2.27		ν 2.2' d -0.1' m 0.91	

Stars	
SHA	Dec
Alpheratz	357°34.1 29°14.0
Ankaa	353°06.6 -42°09.9
Schedar	349°30.5 56°40.9
Diphda	348°46.6 -17°50.7
Achernar	335°20.0 -57°06.3
Hamal	327°50.4 23°35.2
Polaris	313°53.0 89°22.7
Acamar	315°11.3 -40°12.1
Menkar	314°05.3 4°11.5
Mirfak	308°27.2 49°57.4
Aldebaran	290°38.6 16°33.7
Rigel	281°03.0 -8°10.4
Capella	280°20.5 46°01.6
Bellatrix	278°21.9 6°22.3
Elnath	278°00.7 28°37.8
Anilam	275°36.8 -1°11.2
Betelgeuse	270°51.0 7°24.6
Canopus	263°51.9 -52°42.8
Sirius	258°25.3 -16°45.3
Adhara	255°05.0 -29°00.7
Procyon	244°49.7 5°09.4
Pollux	243°16.0 27°57.8
Avior	234°14.0 -59°35.9
Suhail	222°45.3 -43°32.5
Miaplacidus	221°37.5 -69°49.7
Alphard	217°46.5 -8°46.5
Regulus	207°33.1 11°50.2
Dubhe	193°39.1 61°36.6
Denebola	182°23.6 14°25.4
Gienah	175°42.2 -17°41.4
Acrux	172°58.3 -63°14.7
Gacrux	171°50.0 -57°15.7
Alioth	166°11.5 55°48.9
Spica	158°21.0 -11°18.1
Alkaid	152°50.8 49°10.7
Hadar	148°34.1 -60°29.9
Menkent	147°56.1 -36°30.0
Arcturus	145°46.7 19°02.5
Rigel Kent.	139°38.4 -60°56.6
Kochab	137°18.9 74°02.5
Zuben'ubi	136°54.7 -16°09.2
Alphecca	126°02.7 26°37.3
Antares	112°14.5 -26°29.4
Atria	107°07.6 -69°04.2
Sabik	102°01.6 -15°45.5
Shaula	96°09.0 -37°07.3
Rasalhague	95°57.6 12°32.2
Eltanin	90°41.7 51°28.7
Kaus Aust.	83°31.2 -34°22.3
Vega	80°32.6 38°48.1
Nunki	75°46.6 -26°15.8
Altair	61°59.1 8°56.1
Peacock	53°04.5 -56°38.9
Deneb	49°25.4 45°22.1
Enif	33°38.1 9°59.6
Al Na'ir	27°32.0 -46°50.0
Fomalhaut	15°13.8 -29°29.0
Scheat	13°44.6 28°13.4
Markab	13°29.2 15°20.7

Aries		Venus		Mars		Jupiter		Saturn	
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	181°29.1	161°04.6	N07°47.1	193°10.1	S06°10.6	74°46.7	N22°55.1	176°28.0	S00°08.5
1	196°31.6	176°04.2	48.4	208°10.7	09.8	89°49.1	55.1	191°30.2	08.4
2	211°34.1	191°03.8	49.6	223°11.4	09.0	104°51.4	55.0	206°32.4	08.3
3	226°36.5	206°03.4	· · 50.8	238°12.0	· · 08.3	119°53.8	· · 55.0	221°34.6	· · 08.2
4	241°39.0	221°03.0	52.1	253°12.7	07.5	134°56.1	55.0	236°36.7	08.0
5	256°41.5	236°02.6	53.3	268°13.3	06.7	149°58.5	55.0	251°38.9	07.9
6	271°43.9	251°02.2	N07°54.5	283°14.0	S06°06.0	165°00.9	N22°55.0	266°41.1	S00°07.8
7	286°46.4	266°01.8	55.8	298°14.6	05.2	180°03.2	55.0	281°43.3	07.7
8	301°48.8	281°01.4	57.0	313°15.3	04.4	195°05.6	55.0	296°45.4	07.5
9	316°51.3	296°01.0	· · 58.2	328°15.9	· · 03.6	210°07.9	· · 55.0	311°47.6	· · 07.4
10	331°53.8	311°00.6	07°59.5	343°16.6	02.9	225°10.3	55.0	326°49.8	07.3
11	346°56.2	326°00.2	08°00.7	358°17.2	02.1	240°12.6	55.0	341°52.0	07.2
12	1°58.7	340°59.8	N08°01.9	13°17.9	S06°01.3	255°14.9	N22°54.9	356°54.2	S00°07.1
13	17°01.2	355°59.4	03.2	28°18.5	06°00.6	270°17.3	54.9	11°56.3	06.9
14	32°03.6	10°59.0	04.4	43°19.2	05°59.8	285°19.6	54.9	26°58.5	06.8
15	47°06.1	25°58.6	· · 05.6	58°19.8	· · 59.0	300°22.0	· · 54.9	42°00.7	· · 06.7
16	62°08.6	40°58.2	06.9	73°20.5	58.2	315°24.3	54.9	57°02.9	06.6
17	77°11.0	55°57.8	08.1	88°21.1	57.5	330°26.7	54.9	72°05.0	06.4
18	92°13.5	70°57.4	N08°09.3	103°21.8	S05°56.7	345°29.0	N22°54.9	87°07.2	S00°06.3
19	107°15.9	85°57.0	10.6	118°22.4	55.9	0°31.4	54.9	102°09.4	06.2
20	122°18.4	100°56.6	11.8	133°23.1	55.2	15°33.7	54.9	117°11.6	06.1
21	137°20.9	115°56.2	· · 13.0	148°23.7	· · 54.4	30°36.1	· · 54.8	132°13.8	· · 05.9
22	152°23.3	130°55.8	14.2	163°24.4	53.6	45°38.4	54.8	147°15.9	05.8
23	167°25.8	145°55.4	15.5	178°25.0	52.8	60°40.8	54.8	162°18.1	05.7
Mer.pass. 11:52		ν -0.4' d 1.2' m -3.92		ν 0.6' d -0.8' m 1.17		ν 2.4' d -0.0' m -2.26		ν 2.2' d -0.1' m 0.91	

Aries		Venus		Mars		Jupiter		Saturn	
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	182°28.3	160°55.0	N08°16.7	193°25.7	S05°52.1	75°43.1	N22°54.8	177°20.3	S00°05.6
1	197°30.7	175°54.6	17.9	208°26.3	51.3	90°45.5	54.8	192°22.5	05.5
2	212°33.2	190°54.2	19.2	223°27.0	50.5	105°47.8	54.8	207°24.6	05.3
3	227°35.7	205°53.8	· · 20.4	238°27.6	· · 49.8	120°50.1	· · 54.8	222°26.8	· · 05.2
4	242°38.1	220°53.4	21.6	253°28.3	49.0	135°52.5	54.8	237°29.0	05.1
5	257°40.6	235°53.0	22.8	268°28.9	48.2	150°54.8	54.8	252°31.2	05.0
6	272°43.1	250°52.6	N08°24.1	283°29.6	S05°47.4	165°57.2	N22°54.7	267°33.3	S00°04.8
7	287°45.5	265°52.2	25.3	298°30.2	46.7	180°59.5	54.7	282°35.5	04.7
8	302°48.0	280°51.8	26.5	313°30.9	45.9	196°01.9	54.7	297°37.7	04.6
9	317°50.4	295°51.4	· · 27.7	328°31.5	· · 45.1	211°04.2	· · 54.7	312°39.9	· · 04.5
10	332°52.9	310°51.0	29.0	343°32.2	44.3	226°06.5	54.7	327°42.1	04.3
11	347°55.4	325°50.6	30.2	358°32.8	43.6	241°08.9	54.7	342°44.2	04.2
12	2°57.8	340°50.2	N08°31.4	13°33.5	S05°42.8	256°11.2	N22°54.7	357°46.4	S00°04.1
13	18°00.3	355°49.8	32.6	28°34.1	42.0	271°13.6	54.7	12°48.6	04.0
14	33°02.8	10°49.4	33.9	43°34.8	41.3	286°15.9	54.7	27°50.8	03.9
15	48°05.2	25°49.0	· · 35.1	58°35.5	· · 40.5	301°18.2	· · 54.6	42°52.9	· · 03.7
16	63°07.7	40°48.6	36.3	73°36.1	39.7	316°20.6	54.6	57°55.1	03.6
17	78°10.2	55°48.2	37.5	88°36.8	38.9	331°22.9	54.6	72°57.3	03.5
18	93°12.6	70°47.8	N08°38.8	103°37.4	S05°38.2	346°25.3	N22°54.6	87°59.5	S00°03.4
19	108°15.1	85°47.4	40.0	118°38.1	37.4	1°27.6	54.6	103°01.7	03.2
20	123°17.6	100°47.0	41.2	133°38.7	36.6	16°29.9	54.6	118°03.8	03.1
21	138°20.0	115°46.5	· · 42.4	148°39.4	· · 35.8	31°32.3	· · 54.6	133°06.0	· · 03.0
22	153°22.5	130°46.1	43.6	163°40.0	35.1	46°34.6	54.6	148°08.2	02.9
23	168°24.9	145°45.7	44.9	178°40.7	34.3	61°36.9	54.6	163°10.4	02.8
Mer.pass. 11:48		ν -0.4' d 1.2' m -3.92		ν 0.7' d -0.8' m 1.17		ν 2.3' d -0.0' m -2.25		ν 2.2' d -0.1' m 0.91	

Mar 23 Mon	SHA	Mer.pass
Venus	340°44.0	13:15
Mars	12°24.5	11:08
Jupiter	253°20.2	19:02
Saturn	355°05.8	12:16

Mar 24 Tue	SHA	Mer.pass
Venus	339°35.5	13:16
Mars	11°40.9	11:07
Jupiter	253°17.6	18:58
Saturn	354°58.9	12:12

Mar 25 Wed	SHA	Mer.pass
Venus	338°26.8	13:17
Mars	10°57.4	11:06
Jupiter	253°14.8	18:54
Saturn	354°52.0	12:09

Horizontal parallax	
Venus:	0.1
Mars:	0.1

Sun			Moon				
h	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°19.6	N00°56.5	129°12.1	5.4'	N23°56.3	9.7'	59.7'
1	193°19.8	57.5	143°36.5	5.3'	24°06.0	9.5'	59.7'
2	208°20.0	58.5	158°00.9	5.3'	24°15.5	9.4'	59.7'
3	223°20.1	00°59.5	172°25.1	5.2'	24°24.9	9.2'	59.7'
4	238°20.3	01°00.5	186°49.3	5.1'	24°34.1	9.0'	59.7'
5	253°20.5	01.5	201°13.4	5.0'	24°43.1	8.9'	59.6'
6	268°20.7	N01°02.4	215°37.4	4.9'	N24°52.0	8.7'	59.6'
7	283°20.9	03.4	230°01.3	4.8'	25°00.7	8.5'	59.6'
8	298°21.1	04.4	244°25.1	4.8'	25°09.2	8.4'	59.6'
9	313°21.3	· · 05.4	258°48.9	4.7'	25°17.6	8.2'	59.6'
10	328°21.5	06.4	273°12.6	4.6'	25°25.8	8.0'	59.6'
11	343°21.6	07.4	287°36.2	4.5'	25°33.8	7.9'	59.6'
12	358°21.8	N01°08.4	301°59.7	4.4'	N25°41.7	7.7'	59.6'
13	13°22.0	09.3	316°23.1	4.4'	25°49.4	7.5'	59.6'
14	28°22.2	10.3	330°46.5	4.3'	25°56.9	7.3'	59.6'
15	43°22.4	· · 11.3	345°09.8	4.2'	26°04.2	7.1'	59.6'
16	58°22.6	12.3	359°33.1	4.2'	26°11.3	7.0'	59.6'
17	73°22.8	13.3	13°56.2	4.1'	26°18.3	6.8'	59.6'
18	88°23.0	N01°14.3	28°19.3	4.0'	N26°25.1	6.6'	59.6'
19	103°23.1	15.3	42°42.4	4.0'	26°31.7	6.4'	59.6'
20	118°23.3	16.2	57°05.3	3.9'	26°38.1	6.2'	59.6'
21	133°23.5	· · 17.2	71°28.3	3.9'	26°44.3	6.1'	59.5'
22	148°23.7	18.2	85°51.1	3.8'	26°50.4	5.9'	59.5'
23	163°23.9	19.2	100°13.9	3.8'	26°56.3	5.7'	59.5'
SD = 16.0' d = 1.0'			SD = 16.3'				

Tue	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°24.1	N01°20.2	114°36.7	3.7'	N27°01.9	5.5'	59.5'
1	193°24.3	21.2	128°59.4	3.6'	27°07.4	5.3'	59.5'
2	208°24.5	22.2	143°22.0	3.6'	27°12.7	5.1'	59.5'
3	223°24.6	· · 23.1	157°44.6	3.6'	27°17.8	4.9'	59.5'
4	238°24.8	24.1	172°07.2	3.5'	27°22.7	4.7'	59.5'
5	253°25.0	25.1	186°29.7	3.5'	27°27.5	4.5'	59.5'
6	268°25.2	N01°26.1	200°52.2	3.4'	N27°32.0	4.3'	59.5'
7	283°25.4	27.1	215°14.6	3.4'	27°36.4	4.2'	59.5'
8	298°25.6	28.1	229°37.0	3.4'	27°40.5	4.0'	59.4'
9	313°25.8	· · 29.0	243°59.4	3.3'	27°44.5	3.8'	59.4'
10	328°26.0	30.0	258°21.7	3.3'	27°48.2	3.6'	59.4'
11	343°26.1	31.0	272°44.0	3.3'	27°51.8	3.4'	59.4'
12	358°26.3	N01°32.0	287°06.3	3.3'	N27°55.2	3.2'	59.4'
13	13°26.5	33.0	301°28.5	3.2'	27°58.3	3.0'	59.4'
14	28°26.7	34.0	315°50.8	3.2'	28°01.3	2.8'	59.4'
15	43°26.9	· · 34.9	330°13.0	3.2'	28°04.1	2.6'	59.4'
16	58°27.1	35.9	344°35.2	3.2'	28°06.7	2.4'	59.4'
17	73°27.3	36.9	358°57.4	3.2'	28°09.1	2.2'	59.3'
18	88°27.5	N01°37.9	13°19.5	3.2'	N28°11.3	2.0'	59.3'
19	103°27.6	38.9	27°41.7	3.2'	28°13.3	1.8'	59.3'
20	118°27.8	39.9	42°03.9	3.2'	28°15.1	1.6'	59.3'
21	133°28.0	· · 40.9	56°26.0	3.2'	28°16.7	1.4'	59.3'
22	148°28.2	41.8	70°48.2	3.2'	28°18.1	1.2'	59.3'
23	163°28.4	42.8	85°10.3	3.2'	28°19.3	1.0'	59.3'
SD = 16.0' d = 1.0'			SD = 16.2'				

Wed	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°28.6	N01°43.8	99°32.5	3.2'	N28°20.3	0.8'	59.3'
1	193°28.8	44.8	113°54.7	3.2'	28°21.1	0.6'	59.2'
2	208°29.0	45.8	128°16.8	3.2'	28°21.7	0.4'	59.2'
3	223°29.2	· · 46.8	142°39.0	3.2'	28°22.1	0.2'	59.2'
4	238°29.3	47.7	157°01.2	3.2'	28°22.3	0.0'	59.2'
5	253°29.5	48.7	171°23.4	3.2'	28°22.3	-0.2'	59.2'
6	268°29.7	N01°49.7	185°45.7	3.3'	N28°22.1	-0.4'	59.2'
7	283°29.9	50.7	200°08.0	3.3'	28°21.8	-0.6'	59.2'
8	298°30.1	51.7	214°30.2	3.3'	28°21.2	-0.8'	59.1'
9	313°30.3	· · 52.7	228°52.6	3.4'	28°20.4	-1.0'	59.1'
10	328°30.5	53.6	243°14.9	3.4'	28°19.5	-1.2'	59.1'
11	343°30.7	54.6	257°37.3	3.4'	28°18.3	-1.4'	59.1'
12	358°30.9	N01°55.6	271°59.7	3.5'	N28°16.9	-1.5'	59.1'
13	13°31.0	56.6	286°22.2	3.5'	28°15.4	-1.7'	59.1'
14	28°31.2	57.6	300°44.7	3.5'	28°13.7	-1.9'	59.1'
15	43°31.4	· · 58.5	315°07.2	3.6'	28°11.7	-2.1'	59.0'
16	58°31.6	01°59.5	329°29.8	3.6'	28°09.6	-2.3'	59.0'
17	73°31.8	02°00.5	343°52.4	3.7'	28°07.3	-2.5'	59.0'
18	88°32.0	N02°01.5	358°15.1	3.7'	N28°04.8	-2.7'	59.0'
19	103°32.2	02.5	12°37.9	3.8'	28°02.1	-2.9'	59.0'
20	118°32.4	03.5	27°00.6	3.8'	27°59.2	-3.1'	59.0'
21	133°32.5	· · 04.4	41°23.5	3.9'	27°56.1	-3.3'	59.0'
22	148°32.7	05.4	55°46.4	4.0'	27°52.9	-3.4'	58.9'
23	163°32.9	06.4	70°09.4	4.0'	27°49.4	-3.6'	58.9'
SD = 16.0' d = 1.0'			SD = 16.2'				

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

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

Day	Sun		Mer. Pass	Moon		Age 4-6 20-41%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Upper hh:mm	Lower hh:mm	
23	06:42	06:33	12:07	16:02	03:32	
24	06:24	06:15	12:06	17:04	04:33	
25	06:06	05:57	12:06	18:07	05:36	

March 26, 27, 28 UT (Thu., Fri., Sat.)

	Aries			Venus			Mars			Jupiter			Saturn		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	183°27.4	160°45.3	N08°46.1	193°41.3	S05°33.5	76°39.3	N22°54.5	178°12.5	S00°02.6						
1	198°29.9	175°44.9	47.3	208°42.0	32.7	91°41.6	54.5	193°14.7	02.5						
2	213°32.3	190°44.5	48.5	223°42.6	32.0	106°43.9	54.5	208°16.9	02.4						
3	228°34.8	205°44.1	· · 49.7	238°43.3	· · 31.2	121°46.3	· · 54.5	223°19.1	· · 02.3						
4	243°37.3	220°43.7	51.0	253°44.0	30.4	136°48.6	54.5	238°21.3	02.1						
5	258°39.7	235°43.3	52.2	268°44.6	29.6	151°51.0	54.5	253°23.4	02.0						
6	273°42.2	250°42.9	N08°53.4	283°45.3	S05°28.9	166°53.3	N22°54.5	268°25.6	S00°01.9						
7	288°44.7	265°42.5	54.6	298°45.9	28.1	181°55.6	54.5	283°27.8	01.8						
8	303°47.1	280°42.1	55.8	313°46.6	27.3	196°58.0	54.4	298°30.0	01.6						
9	318°49.6	295°41.7	· · 57.0	328°47.2	· · 26.5	212°00.3	· · 54.4	313°32.1	· · 01.5						
10	333°52.1	310°41.3	58.3	343°47.9	25.8	227°02.6	54.4	328°34.3	01.4						
11	348°54.5	325°40.8	08°59.5	358°48.5	25.0	242°05.0	54.4	343°36.5	01.3						
12	3°57.0	340°40.4	N09°00.7	13°49.2	S05°24.2	257°07.3	N22°54.4	358°38.7	S00°01.2						
13	18°59.4	355°40.0	01.9	28°49.8	23.4	272°09.6	54.4	13°40.8	01.0						
14	34°01.9	10°39.6	03.1	43°50.5	22.7	287°11.9	54.4	28°43.0	00.9						
15	49°04.4	25°39.2	· · 04.3	58°51.2	· · 21.9	302°14.3	· · 54.4	43°45.2	· · 00.8						
16	64°06.8	40°38.8	05.6	73°51.8	21.1	317°16.6	54.3	58°47.4	00.7						
17	79°09.3	55°38.4	06.8	88°52.5	20.3	332°18.9	54.3	73°49.6	00.5						
18	94°11.8	70°38.0	N09°08.0	103°53.1	S05°19.6	347°21.3	N22°54.3	88°51.7	S00°00.4						
19	109°14.2	85°37.6	09.2	118°53.8	18.8	2°23.6	54.3	103°53.9	00.3						
20	124°16.7	100°37.1	10.4	133°54.4	18.0	17°25.9	54.3	118°56.1	00.2						
21	139°19.2	115°36.7	· · 11.6	148°55.1	· · 17.2	32°28.3	· · 54.3	133°58.3	S00°00.1						
22	154°21.6	130°36.3	12.8	163°55.8	16.5	47°30.6	54.3	149°00.4	N00°00.1						
23	169°24.1	145°35.9	14.1	178°56.4	15.7	62°32.9	54.3	164°02.6	00.2						
Mer.pass. 11:44 $\nu$ -0.4' d 1.2' m -3.92 $\nu$ 0.7' d -0.8' m 1.17 $\nu$ 2.3' d -0.0' m -2.25 $\nu$ 2.2' d -0.1' m 0.91															

	SHA		Dec
Alpheratz	357°34.1	29°14.0	
Ankaa	353°06.6	-42°09.9	
Schedar	349°30.5	56°40.9	
Diphda	348°46.6	-17°50.6	
Achernar	335°20.0	-57°06.3	
Hamal	327°50.4	23°35.2	
Polaris	313°53.7	89°22.7	
Acamar	315°11.3	-40°12.1	
Menkar	314°05.3	4°11.5	
Mirfak	308°27.2	49°57.4	
Aldebaran	290°38.6	16°33.7	
Rigel	281°03.0	-8°10.4	
Capella	280°20.5	46°01.6	
Bellatrix	278°21.9	6°22.3	
Elnath	278°00.7	28°37.8	
Anilam	275°36.8	-1°11.2	
Betelgeuse	270°51.0	7°24.6	
Canopus	263°52.0	-52°42.8	
Sirius	258°25.3	-16°45.3	
Adhara	255°05.0	-29°00.7	
Procyon	244°49.7	5°09.4	
Pollux	243°16.0	27°57.8	
Avior	234°14.1	-59°35.9	
Suhail	222°45.3	-43°32.6	
Miaplacidus	221°37.5	-69°49.7	
Alphard	217°46.5	-8°46.5	
Regulus	207°33.1	11°50.2	
Dubhe	193°39.1	61°36.6	
Denebola	182°23.6	14°25.4	
Gienah	175°42.2	-17°41.4	
Acrux	172°58.3	-63°14.8	
Gacrux	171°50.0	-57°15.7	
Alioth	166°11.5	55°48.9	
Spica	158°20.9	-11°18.1	
Alkaid	152°50.7	49°10.7	
Hadar	148°34.0	-60°30.0	
Menkent	147°56.1	-36°30.0	
Arcturus	145°46.7	19°02.5	
Rigel Kent.	139°38.4	-60°56.6	
Kochab	137°18.9	74°02.5	
Zuben'ubi	136°54.6	-16°09.2	
Alphecca	126°02.6	26°37.3	
Antares	112°14.4	-26°29.4	
Atria	107°07.6	-69°04.2	
Sabik	102°01.5	-15°45.5	
Shaula	96°08.9	-37°07.3	
Rasalhague	95°57.5	12°32.2	
Eltanin	90°41.6	51°28.7	
Kaus Aust.	83°31.2	-34°22.3	
Vega	80°32.6	38°48.1	
Nunki	75°46.6	-26°15.8	
Altair	61°59.1	8°56.1	
Peacock	53°04.4	-56°38.9	
Deneb	49°25.4	45°22.1	
Enif	33°38.1	9°59.6	
Al Na'ir	27°32.0	-46°50.0	
Fomalhaut	15°13.7	-29°29.0	
Scheat	13°44.6	28°13.4	
Markab	13°29.2	15°20.7	

Mar 26 Thu	SHA	Mer.pass
Venus	337°17.9	13:17
Mars	10°13.9	11:05
Jupiter	253°11.9	18:50
Saturn	354°45.1	12:05

Mar 27 Fri	SHA	Mer.pass
Venus	336°08.9	13:18
Mars	9°30.5	11:04
Jupiter	253°08.7	18:47
Saturn	354°38.2	12:02

Mar 28 Sat	SHA	Mer.pass
Venus	334°59.8	13:19
Mars	8°47.2	11:03
Jupiter	253°05.3	18:43
Saturn	354°31.4	11:58

Horizontal parallax		
Venus:	0.1	
Mars:	0.1	

	Aries			Venus			Mars			Jupiter			Saturn		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	184°26.6	160°35.5	N09°15.3	193°57.1	S05°14.9	77°35.2	N22°54.2	179°04.8	N00°00.3						
1	199°29.0	175°35.1	16.5	208°57.7	14.1	92°37.6	54.2	194°07.0	00.4						
2	214°31.5	190°34.7	17.7	223°58.4	13.4	107°39.9	54.2	209°09.2	00.6						
3	229°33.9	205°34.3	· · 18.9	238°59.0	· · 12.6	122°42.2	· · 54.2	224°11.3	· · 00.7						
4	244°36.4	220°33.8	20.1	253°59.7	11.8	137°44.6	54.2	239°13.5	00.8						
5	259°38.9	235°33.4	21.3	269°00.4	11.0	152°46.9	54.2	254°15.7	00.9						
6	274°41.3	250°33.0	N09°22.5	284°01.0	S05°10.3	167°49.2	N22°54.2	269°17.9	N00°01.0						
7	289°43.8	265°32.6	23.7	299°01.7	09.5	182°51.5	54.2	284°20.0	01.2						
8	304°46.3	280°32.2	24.9	314°02.3	08.7	197°53.9	54.1	299°22.2	01.3						
9	319°48.7	295°31.8	· · 26.1	329°03.0	· · 07.9	212°56.2	· · 54.1	314°24.4	· · 01.4						
10	334°51.2	310°31.4	27.4	344°03.6	07.2	227°58.5	54.1	329°26.6	01.5						
11	349°53.7	325°30.9	28.6	359°04.3	06.4	243°00.8	54.1	344°28.7	01.7						
12	4°56.1	340°30.5	N09°29.8	14°05.0	S05°05.6	258°03.2	N22°54.1	359°30.9	N00°01.8						
13	19°58.6	355°30.1	31.0	29°05.6	04.8	273°05.5	54.1	14°33.1	01.9						
14	35°01.0	10°29.7	32.2	44°06.3	04.1	288°07.8	54.1	29°35.3	02.0						
15	50°03.5	25°29.3	· · 33.4	59°06.9	· · 03.3	303°10.1	· · 54.1	44°37.5	· · 02.2						
16	65°06.0	40°28.9	34.6	74°07.6	02.5	318°12.4	54.0	59°39.6	02.3						
17	80°08.4	55°28.4	35.8	89°08.2	01.7	333°14.8	54.0	74°41.8	02.4						
18	95°10.9	70°28.0	N09°37.0	104°08.9	S05°00.9	348°17.1	N22°54.0	89°44.0	N00°02.5						
19	110°13.4	85°27.6	38.2	119°09.6	05°00.2	3°19.4	54.0	104°46.2	02.6						
20	125°15.8	100°27.2	39.4	134°10.2	04°59.4	18°21.7	54.0	119°48.3	02.8						
21	140°18.3	115°26.8	· · 40.6	149°10.9	· · 58.6	33°24.1	· · 54.0	134°50.5	· · 02.9						
22	155°20.8	130°26.4	41.8	164°11.5	57.8	48°26.4	54.0	149°52.7	03.0						
23	170°23.2	145°25.9	43.0	179°12.2	57.1	63°28.7	53.9	164°54.9	03.1						
Mer.pass. 11:40 $\nu$ -0.4' d 1.2' m -3.92 $\nu$ 0.7' d -0.8' m 1.18 $\nu$ 2.3' d -0.0' m -2.24 $\nu$ 2.2' d 0.1' m 0.91															

	Aries			Venus			Mars			Jupiter			Saturn		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	185°25.7	160°25.5	N09°44.2	194°12.9	S04°56.3	78°31.0	N22°53.9	179°57.1	N00°03.3						
1	200°28.2	175°25.1	45.4	209°13.5	55.5	93°33.3	53.9	194°59.2	03.4						
2	215°30.6	190°24.7	46.6	224°14.2	54.7	108°35.7	53.9	210°01.4	03.5						
3	230°33.1	205°24.3	· · 47.8	239°14.8	· · 54.0	123°38.0	· · 53.9	225°03.6	· · 03.6						
4	245°35.5	220°23.8	49.0	254°15.5	53.2	138°40.3	53.9	240°05.8	03.7						
5	260°38.0	235°23.4	50.2	269°16.2	52.4	153°42.6	53.9	255°07.9	03.9						
6	275°40.5	250°23.0	N09°51.4	284°16.8	S04°51.6	168°44.9	N22°53.8	270°10.1	N00°04.0						
7	290°42.9	265°22.6	52.6	299°17.5	50.8	183°47.2	53.8	285°12.3	04.1						
8	305°45.4	280°22.2	53.8	314°18.1	50.1	198°49.6	53.8	300°14.5	04.2						
9	320°47.9	295°21.7	· · 55.0	329°18.8	· · 49.3	213°51.9	· · 53.8	315°16.7	· · 04.4						
10	335°50.3	310°21.3	56.2	344°19.5	48.5	228°54.2	53.8	330°18.8	04.5						
11	350°52.8	325°20.9	57.4	359°20.1	47.7	243°56.5	53.8	345°21.0	04.6						
12	5°55.3	340°20.5	N09°58.6	14°20.8	S04°47.0	258°58.8	N22°53.8	0°23.2	N00°04.7						
13	20°57.7	355°20.0	09°59.8	29°21.4	46.2	274°01.1	53.8	15°25.							

h	Sun			Moon			
Thu	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°33.1	N02°07.4	84°32.4	4.1'	N27°45.8	-3.8'	58.9'
1	193°33.3	08.4	98°55.5	4.2'	27°42.0	-4.0'	58.9'
2	208°33.5	09.3	113°18.7	4.2'	27°38.0	-4.2'	58.9'
3	223°33.7	· · 10.3	127°41.9	4.3'	27°33.8	-4.4'	58.9'
4	238°33.9	11.3	142°05.2	4.4'	27°29.4	-4.5'	58.8'
5	253°34.1	12.3	156°28.6	4.5'	27°24.9	-4.7'	58.8'
6	268°34.2	N02°13.3	170°52.0	4.5'	N27°20.2	-4.9'	58.8'
7	283°34.4	14.2	185°15.6	4.6'	27°15.3	-5.1'	58.8'
8	298°34.6	15.2	199°39.2	4.7'	27°10.2	-5.2'	58.8'
9	313°34.8	· · 16.2	214°02.9	4.8'	27°05.0	-5.4'	58.8'
10	328°35.0	17.2	228°26.7	4.9'	26°59.5	-5.6'	58.7'
11	343°35.2	18.2	242°50.5	4.9'	26°53.9	-5.8'	58.7'
12	358°35.4	N02°19.2	257°14.5	5.0'	N26°48.2	-5.9'	58.7'
13	13°35.6	20.1	271°38.5	5.1'	26°42.2	-6.1'	58.7'
14	28°35.8	21.1	286°02.6	5.2'	26°36.1	-6.3'	58.7'
15	43°35.9	· · 22.1	300°26.8	5.3'	26°29.9	-6.4'	58.7'
16	58°36.1	23.1	314°51.1	5.4'	26°23.4	-6.6'	58.6'
17	73°36.3	24.1	329°15.5	5.5'	26°16.8	-6.8'	58.6'
18	88°36.5	N02°25.0	343°40.0	5.6'	N26°10.0	-6.9'	58.6'
19	103°36.7	26.0	358°04.6	5.7'	26°03.1	-7.1'	58.6'
20	118°36.9	27.0	12°29.3	5.8'	25°56.0	-7.2'	58.6'
21	133°37.1	· · 28.0	26°54.0	5.9'	25°48.8	-7.4'	58.6'
22	148°37.3	29.0	41°18.9	6.0'	25°41.4	-7.6'	58.5'
23	163°37.5	29.9	55°43.9	6.1'	25°33.8	-7.7'	58.5'
	SD = 16.0'	$d = 1.0'$	SD = 16.1'				

Fri	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°37.6	N02°30.9	70°08.9	6.2'	N25°26.1	-7.9'	58.5'
1	193°37.8	31.9	84°34.1	6.3'	25°18.2	-8.0'	58.5'
2	208°38.0	32.9	98°59.4	6.4'	25°10.2	-8.2'	58.5'
3	223°38.2	· · 33.8	113°24.8	6.5'	25°02.0	-8.3'	58.5'
4	238°38.4	34.8	127°50.3	6.6'	24°53.7	-8.5'	58.4'
5	253°38.6	35.8	142°15.9	6.7'	24°45.3	-8.6'	58.4'
6	268°38.8	N02°36.8	156°41.5	6.8'	N24°36.6	-8.8'	58.4'
7	283°39.0	37.8	171°07.3	6.9'	24°27.9	-8.9'	58.4'
8	298°39.2	38.7	185°33.2	7.0'	24°19.0	-9.0'	58.4'
9	313°39.3	· · 39.7	199°59.3	7.1'	24°10.0	-9.2'	58.4'
10	328°39.5	40.7	214°25.4	7.2'	24°00.8	-9.3'	58.3'
11	343°39.7	41.7	228°51.6	7.3'	23°51.5	-9.4'	58.3'
12	358°39.9	N02°42.7	243°17.9	7.4'	N23°42.0	-9.6'	58.3'
13	13°40.1	43.6	257°44.4	7.5'	23°32.4	-9.7'	58.3'
14	28°40.3	44.6	272°10.9	7.7'	23°22.7	-9.8'	58.3'
15	43°40.5	· · 45.6	286°37.6	7.8'	23°12.9	-10.0'	58.2'
16	58°40.7	46.6	301°04.4	7.9'	23°02.9	-10.1'	58.2'
17	73°40.9	47.5	315°31.2	8.0'	22°52.8	-10.2'	58.2'
18	88°41.0	N02°48.5	329°58.2	8.1'	N22°42.6	-10.4'	58.2'
19	103°41.2	49.5	344°25.3	8.2'	22°32.2	-10.5'	58.2'
20	118°41.4	50.5	358°52.5	8.3'	22°21.8	-10.6'	58.2'
21	133°41.6	· · 51.5	13°19.8	8.4'	22°11.2	-10.7'	58.1'
22	148°41.8	52.4	27°47.2	8.5'	22°00.4	-10.8'	58.1'
23	163°42.0	53.4	42°14.8	8.6'	21°49.6	-10.9'	58.1'
	SD = 16.0'	$d = 1.0'$	SD = 16.0'				

Sat	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°42.2	N02°54.4	56°42.4	8.7'	N21°38.7	-11.1'	58.1'
1	193°42.4	55.4	71°10.1	8.9'	21°27.6	-11.2'	58.1'
2	208°42.6	56.3	85°38.0	9.0'	21°16.4	-11.3'	58.0'
3	223°42.8	· · 57.3	100°06.0	9.1'	21°05.2	-11.4'	58.0'
4	238°42.9	58.3	114°34.0	9.2'	20°53.8	-11.5'	58.0'
5	253°43.1	02°59.3	129°02.2	9.3'	20°42.3	-11.6'	58.0'
6	268°43.3	N03°00.2	143°30.5	9.4'	N20°30.7	-11.7'	58.0'
7	283°43.5	01.2	157°58.9	9.5'	20°18.9	-11.8'	57.9'
8	298°43.7	02.2	172°27.4	9.6'	20°07.1	-11.9'	57.9'
9	313°43.9	· · 03.2	186°56.0	9.7'	19°55.2	-12.0'	57.9'
10	328°44.1	04.2	201°24.7	9.8'	19°43.2	-12.1'	57.9'
11	343°44.3	05.1	215°53.5	9.9'	19°31.1	-12.2'	57.9'
12	358°44.5	N03°06.1	230°22.4	10.0'	N19°18.9	-12.3'	57.9'
13	13°44.6	07.1	244°51.4	10.1'	19°06.6	-12.4'	57.8'
14	28°44.8	08.1	259°20.5	10.2'	18°54.2	-12.5'	57.8'
15	43°45.0	· · 09.0	273°49.7	10.3'	18°41.7	-12.6'	57.8'
16	58°45.2	10.0	288°19.1	10.4'	18°29.1	-12.7'	57.8'
17	73°45.4	11.0	302°48.5	10.5'	18°16.5	-12.8'	57.8'
18	88°45.6	N03°12.0	317°18.0	10.6'	N18°03.7	-12.8'	57.7'
19	103°45.8	12.9	331°47.6	10.7'	17°50.9	-12.9'	57.7'
20	118°46.0	13.9	346°17.4	10.8'	17°37.9	-13.0'	57.7'
21	133°46.2	· · 14.9	0°47.2	10.9'	17°24.9	-13.1'	57.7'
22	148°46.3	15.9	15°17.1	11.0'	17°11.9	-13.2'	57.7'
23	163°46.5	16.8	29°47.1	11.1'	16°58.7	-13.2'	57.6'
	SD = 16.0'	$d = 1.0'$	SD = 15.8'				

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

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

Day	Sun		Mer. Pass	Moon		Age 7-9 52-74%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
26	05:48	05:38	12:06	19:08	06:38	
27	05:29	05:20	12:05	20:05	07:37	
28	05:11	05:02	12:05	20:57	08:31	

March 29, 30, 31 UT (Sun., Mon., Tue.)

	Aries			Venus			Mars			Jupiter			Saturn		
Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	186°24.8	160°15.4	N10°13.0	194°28.7	S04°37.6	79°26.6	N22°53.6	180°49.3	N00°06.2						
1	201°27.3	175°14.9	14.2	209°29.4	36.8	94°28.9	53.6	195°51.5	06.3						
2	216°29.8	190°14.5	15.4	224°30.0	36.1	109°31.2	53.6	210°53.7	06.4						
3	231°32.2	205°14.1	· · 16.5	239°30.7	· · 35.3	124°33.5	· · 53.5	225°55.8	· · 06.6						
4	246°34.7	220°13.7	17.7	254°31.4	34.5	139°35.8	53.5	240°58.0	06.7						
5	261°37.2	235°13.2	18.9	269°32.0	33.7	154°38.2	53.5	256°00.2	06.8						
6	276°39.6	250°12.8	N10°20.1	284°32.7	S04°32.9	169°40.5	N22°53.5	271°02.4	N00°06.9						
7	291°42.1	265°12.4	21.3	299°33.3	32.2	184°42.8	53.5	286°04.6	07.0						
8	306°44.5	280°12.0	22.5	314°34.0	31.4	199°45.1	53.5	301°06.7	07.2						
9	321°47.0	295°11.5	· · 23.7	329°34.7	· · 30.6	214°47.4	· · 53.5	316°08.9	· · 07.3						
10	336°49.5	310°11.1	24.9	344°35.3	29.8	229°49.7	53.4	331°11.1	07.4						
11	351°51.9	325°10.7	26.1	359°36.0	29.1	244°52.0	53.4	346°13.3	07.5						
12	6°54.4	340°10.2	N10°27.2	14°36.6	S04°28.3	259°54.3	N22°53.4	1°15.4	N00°07.7						
13	21°56.9	355°09.8	28.4	29°37.3	27.5	274°56.6	53.4	16°17.6	07.8						
14	36°59.3	10°09.4	29.6	44°38.0	26.7	289°58.9	53.4	31°19.8	07.9						
15	52°01.8	25°09.0	· · 30.8	59°38.6	· · 25.9	305°01.2	· · 53.4	46°22.0	· · 08.0						
16	67°04.3	40°08.5	32.0	74°39.3	25.2	320°03.5	53.4	61°24.2	08.1						
17	82°06.7	55°08.1	33.2	89°40.0	24.4	335°05.9	53.3	76°26.3	08.3						
18	97°09.2	70°07.7	N10°34.4	104°40.6	S04°23.6	350°08.2	N22°53.3	91°28.5	N00°08.4						
19	112°11.6	85°07.2	35.6	119°41.3	22.8	5°10.5	53.3	106°30.7	08.5						
20	127°14.1	100°06.8	36.7	134°42.0	22.0	20°12.8	53.3	121°32.9	08.6						
21	142°16.6	115°06.4	· · 37.9	149°42.6	· · 21.3	35°15.1	· · 53.3	136°35.0	· · 08.8						
22	157°19.0	130°05.9	39.1	164°43.3	20.5	50°17.4	53.3	151°37.2	08.9						
23	172°21.5	145°05.5	40.3	179°43.9	19.7	65°19.7	53.2	166°39.4	09.0						
Mer.pass.	11:32	ν -0.4' d 1.2' m -3.92		ν 0.7' d -0.8' m 1.18		ν 2.3' d -0.0' m -2.22		ν 2.2' d 0.1' m 0.91							

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	187°24.0	160°05.1	N10°41.5	194°44.6	S04°18.9	80°22.0	N22°53.2	181°41.6	N00°09.1
1	202°26.4	175°04.6	42.6	209°45.3	18.1	95°24.3	53.2	196°43.8	09.2
2	217°28.9	190°04.2	43.8	224°45.9	17.4	110°26.6	53.2	211°45.9	09.4
3	232°31.4	205°03.8	· · 45.0	239°46.6	· · 16.6	125°28.9	· · 53.2	226°48.1	· · 09.5
4	247°33.8	220°03.3	46.2	254°47.3	15.8	140°31.2	53.2	241°50.3	09.6
5	262°36.3	235°02.9	47.4	269°47.9	15.0	155°33.5	53.2	256°52.5	09.7
6	277°38.8	250°02.5	N10°48.6	284°48.6	S04°14.2	170°35.8	N22°53.1	271°54.6	N00°09.8
7	292°41.2	265°02.0	49.7	299°49.3	13.5	185°38.1	53.1	286°56.8	10.0
8	307°43.7	280°01.6	50.9	314°49.9	12.7	200°40.4	53.1	301°59.0	10.1
9	322°46.1	295°01.2	· · 52.1	329°50.6	· · 11.9	215°42.7	· · 53.1	317°01.2	· · 10.2
10	337°48.6	310°00.7	53.3	344°51.3	11.1	230°45.0	53.1	332°03.4	10.3
11	352°51.1	325°00.3	54.4	359°51.9	10.3	245°47.3	53.1	347°05.5	10.5
12	7°53.5	339°59.9	N10°55.6	14°52.6	S04°09.6	260°49.6	N22°53.0	2°07.7	N00°10.6
13	22°56.0	354°59.4	56.8	29°53.2	08.8	275°51.9	53.0	17°09.9	10.7
14	37°58.5	9°59.0	58.0	44°53.9	08.0	290°54.2	53.0	32°12.1	10.8
15	53°00.9	24°58.5	10°59.2	59°54.6	· · 07.2	305°56.5	· · 53.0	47°14.2	· · 10.9
16	68°03.4	39°58.1	11°00.3	74°55.2	06.4	320°58.8	53.0	62°16.4	11.1
17	83°05.9	54°57.7	01.5	89°55.9	05.7	336°01.1	53.0	77°18.6	11.2
18	98°08.3	69°57.2	N11°02.7	104°56.6	S04°04.9	351°03.4	N22°52.9	92°20.8	N00°11.3
19	113°10.8	84°56.8	03.9	119°57.2	04.1	6°05.7	52.9	107°22.9	11.4
20	128°13.2	99°56.3	05.0	134°57.9	03.3	21°08.0	52.9	122°25.1	11.6
21	143°15.7	114°55.9	· · 06.2	149°58.6	· · 02.5	36°10.3	· · 52.9	137°27.3	· · 11.7
22	158°18.2	129°55.5	07.4	164°59.2	01.8	51°12.6	52.9	152°29.5	11.8
23	173°20.6	144°55.0	08.5	179°59.9	01.0	66°14.9	52.9	167°31.7	11.9
Mer.pass.	11:29	ν -0.4' d 1.2' m -3.92		ν 0.7' d -0.8' m 1.18		ν 2.3' d -0.0' m -2.22		ν 2.2' d 0.1' m 0.92	

Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	188°23.1	159°54.6	N11°09.7	195°00.6	S04°00.2	81°17.2	N22°52.8	182°33.8	N00°12.0
1	203°25.6	174°54.1	10.9	210°01.2	03°59.4	96°19.5	52.8	197°36.0	12.2
2	218°28.0	189°53.7	12.1	225°01.9	58.6	111°21.8	52.8	212°38.2	12.3
3	233°30.5	204°53.3	· · 13.2	240°02.6	· · 57.9	126°24.1	· · 52.8	227°40.4	· · 12.4
4	248°33.0	219°52.8	14.4	255°03.2	57.1	141°26.4	52.8	242°42.5	12.5
5	263°35.4	234°52.4	15.6	270°03.9	56.3	156°28.7	52.8	257°44.7	12.6
6	278°37.9	249°51.9	N11°16.7	285°04.6	S03°55.5	171°31.0	N22°52.7	272°46.9	N00°12.8
7	293°40.4	264°51.5	17.9	300°05.2	54.7	186°33.3	52.7	287°49.1	12.9
8	308°42.8	279°51.1	19.1	315°05.9	53.9	201°35.5	52.7	302°51.3	13.0
9	323°45.3	294°50.6	· · 20.2	330°06.6	· · 53.2	216°37.8	· · 52.7	317°53.4	· · 13.1
10	338°47.7	309°50.2	21.4	345°07.2	52.4	231°40.1	52.7	332°55.6	13.3
11	353°50.2	324°49.7	22.6	0°07.9	51.6	246°42.4	52.7	347°57.8	13.4
12	8°52.7	339°49.3	N11°23.7	15°08.6	S03°50.8	261°44.7	N22°52.6	3°00.0	N00°13.5
13	23°55.1	354°48.8	24.9	30°09.2	50.0	276°47.0	52.6	18°02.1	13.6
14	38°57.6	9°48.4	26.1	45°09.9	49.3	291°49.3	52.6	33°04.3	13.7
15	54°00.1	24°47.9	· · 27.2	60°10.6	· · 48.5	306°51.6	· · 52.6	48°06.5	· · 13.9
16	69°02.5	39°47.5	28.4	75°11.2	47.7	321°53.9	52.6	63°08.7	14.0
17	84°05.0	54°47.1	29.6	90°11.9	46.9	336°56.2	52.6	78°10.9	14.1
18	99°07.5	69°46.6	N11°30.7	105°12.6	S03°46.1	351°58.5	N22°52.5	93°13.0	N00°14.2
19	114°09.9	84°46.2	31.9	120°13.2	45.4	7°00.8	52.5	108°15.2	14.4
20	129°12.4	99°45.7	33.1	135°13.9	44.6	22°03.0	52.5	123°17.4	14.5
21	144°14.8	114°45.3	· · 34.2	150°14.6	· · 43.8	37°05.3	· · 52.5	138°19.6	· · 14.6
22	159°17.3	129°44.8	35.4	165°15.2	43.0	52°07.6	52.5	153°21.8	14.7
23	174°19.8	144°44.4	36.5	180°15.9	42.2	67°09.9	52.5	168°23.9	14.8
Mer.pass.	11:25	ν -0.4' d 1.2' m -3.92		ν 0.7' d -0.8' m 1.18		ν 2.3' d -0.0' m -2.21		ν 2.2' d 0.1' m 0.92	

	SHA	Dec
Alpheratz	357°34.1	29°14.0
Ankaa	353°06.6	-42°09.8
Schedar	349°30.5	56°40.9
Diphda	348°46.6	-17°50.6
Achernar	335°20.0	-57°06.3
Hamal	327°50.4	23°35.2
Polaris	313°54.7	89°22.7
Acamar	315°11.3	-40°12.1
Menkar	314°05.3	4°11.5
Mirfak	308°27.2	49°57.4
Aldebaran	290°38.6	16°33.7
Rigel	281°03.0	-8°10.4
Capella	280°20.6	46°01.6
Bellatrix	278°21.9	6°22.3
Elnath	278°00.7	28°37.8
Alnilam	275°36.8	-1°11.2
Betelgeuse	270°51.1	7°24.6
Canopus	263°52.0	-52°42.8
Sirius	258°25.3	-16°45.3
Adhara	255°05.0	-29°00.7
Procyon	244°49.7	5°09.4
Pollux	243°16.0	27°57.8
Avior	234°14.1	-59°35.9
Suhail	222°45.3	-43°32.6
Miaplacidus	221°37.6	-69°49.7
Alphard	217°46.6	-8°46.5
Regulus	207°33.1	11°50.2
Dubhe	193°39.1	61°36.6
Denebola	182°23.6	14°25.4
Gienah	175°42.2	-17°41.4
Acrux	172°58.3	-63°14.8
Gacrux	171°50.0	-57°15.7
Alioth	166°11.5	55°48.9
Spica	158°20.9	-11°18.1
Alkaid	152°50.7	49°10.7
Hadar	148°34.0	-60°30.0
Menkent	147°56.1	-36°30.0
Arcturus	145°46.7	19°02.5
Rigel Kent.	139°38.4	-60°56.6
Kochab	137°18.8	74°02.6
Zuben'ubi	136°54.6	-16°09.2
Alphecca	126°02.6	26°37.3
Antares	112°14.4	-26°29.4
Atria	107°07.5	-69°04.3
Sabik	102°01.5	-15°45.5
Shaula	96°08.9	-37°07.3
Rasalhague	95°57.5	12°32.2
Eltanin	90°41.6	51°28.7
Kaus Aust.	83°31.2	-34°22.3
Vega	80°32.5	38°48.1
Nunki	75°46.5	-26°15.8
Altair	61°59.1	8°56.1
Peacock	53°04.4	-56°38.8
Deneb	49°25.4	45°22.1
Enif	33°38.0	9°59.6
Al Na'ir	27°32.0	-46°50.0
Fomalhaut	15°13.7	-29°29.0
Scheat	13°44.6	28°13.4
Markab	13°29.2	15°20.7

Mar 29 Sun	SHA	Mer.pass
Venus	333°50.5	13:19
Mars	8°03.9	11:02
Jupiter	253°01.8	18:39
Saturn	354°24.5	11:55

Mar 30 Mon	SHA	Mer.pass
Venus	332°41.1	13:20
Mars	7°20.6	11:01
Jupiter	252°58.0	18:36
Saturn	354°17.6	11:52

Mar 31 Tue	SHA	Mer.pass
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h	Sun			Moon			
Sun	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°46.7	N03°17.8	44°17.2	11.2'	N16°45.5	-13.3'	57.6'
1	193°46.9	18.8	58°47.4	11.3'	16°32.1	-13.4'	57.6'
2	208°47.1	19.8	73°17.7	11.4'	16°18.8	-13.5'	57.6'
3	223°47.3	· · 20.7	87°48.1	11.5'	16°05.3	-13.5'	57.6'
4	238°47.5	21.7	102°18.6	11.6'	15°51.8	-13.6'	57.5'
5	253°47.7	22.7	116°49.1	11.7'	15°38.2	-13.7'	57.5'
6	268°47.8	N03°23.6	131°19.8	11.7'	N15°24.5	-13.7'	57.5'
7	283°48.0	24.6	145°50.5	11.8'	15°10.8	-13.8'	57.5'
8	298°48.2	25.6	160°21.4	11.9'	14°56.9	-13.9'	57.5'
9	313°48.4	· · 26.6	174°52.3	12.0'	14°43.1	-13.9'	57.4'
10	328°48.6	27.5	189°23.3	12.1'	14°29.2	-14.0'	57.4'
11	343°48.8	28.5	203°54.4	12.2'	14°15.2	-14.0'	57.4'
12	358°49.0	N03°29.5	218°25.6	12.3'	N14°01.1	-14.1'	57.4'
13	13°49.2	30.5	232°56.8	12.3'	13°47.0	-14.2'	57.4'
14	28°49.4	31.4	247°28.2	12.4'	13°32.8	-14.2'	57.4'
15	43°49.5	· · 32.4	261°59.6	12.5'	13°18.6	-14.3'	57.3'
16	58°49.7	33.4	276°31.1	12.6'	13°04.4	-14.3'	57.3'
17	73°49.9	34.4	291°02.7	12.7'	12°50.0	-14.4'	57.3'
18	88°50.1	N03°35.3	305°34.3	12.7'	N12°35.7	-14.4'	57.3'
19	103°50.3	36.3	320°06.1	12.8'	12°21.2	-14.5'	57.3'
20	118°50.5	37.3	334°37.9	12.9'	12°06.8	-14.5'	57.2'
21	133°50.7	· · 38.2	349°09.8	13.0'	11°52.2	-14.6'	57.2'
22	148°50.9	39.2	3°41.7	13.0'	11°37.7	-14.6'	57.2'
23	163°51.1	40.2	18°13.8	13.1'	11°23.1	-14.7'	57.2'
SD = 16.0'			d = 1.0'		SD = 15.7'		

Mon	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°51.2	N03°41.2	32°45.9	13.2'	N11°08.4	-14.7'	57.2'
1	193°51.4	42.1	47°18.0	13.2'	10°53.7	-14.7'	57.1'
2	208°51.6	43.1	61°50.3	13.3'	10°39.0	-14.8'	57.1'
3	223°51.8	· · 44.1	76°22.6	13.4'	10°24.2	-14.8'	57.1'
4	238°52.0	45.0	90°55.0	13.4'	10°09.4	-14.8'	57.1'
5	253°52.2	46.0	105°27.4	13.5'	09°54.5	-14.9'	57.1'
6	268°52.4	N03°47.0	119°59.9	13.6'	N09°39.7	-14.9'	57.0'
7	283°52.6	48.0	134°32.5	13.6'	09°24.8	-14.9'	57.0'
8	298°52.7	48.9	149°05.1	13.7'	09°09.8	-15.0'	57.0'
9	313°52.9	· · 49.9	163°37.8	13.7'	08°54.8	-15.0'	57.0'
10	328°53.1	50.9	178°10.5	13.8'	08°39.8	-15.0'	56.9'
11	343°53.3	51.8	192°43.3	13.9'	08°24.8	-15.1'	56.9'
12	358°53.5	N03°52.8	207°16.2	13.9'	N08°09.7	-15.1'	56.9'
13	13°53.7	53.8	221°49.1	14.0'	07°54.6	-15.1'	56.9'
14	28°53.9	54.7	236°22.1	14.0'	07°39.5	-15.1'	56.9'
15	43°54.1	· · 55.7	250°55.1	14.1'	07°24.4	-15.2'	56.8'
16	58°54.3	56.7	265°28.2	14.1'	07°09.2	-15.2'	56.8'
17	73°54.4	57.7	280°01.3	14.2'	06°54.0	-15.2'	56.8'
18	88°54.6	N03°58.6	294°34.5	14.2'	N06°38.8	-15.2'	56.8'
19	103°54.8	03°59.6	309°07.8	14.3'	06°23.6	-15.2'	56.8'
20	118°55.0	04°00.6	323°41.0	14.3'	06°08.4	-15.3'	56.7'
21	133°55.2	· · 01.5	338°14.4	14.4'	05°53.1	-15.3'	56.7'
22	148°55.4	02.5	352°47.7	14.4'	05°37.9	-15.3'	56.7'
23	163°55.6	03.5	7°21.2	14.5'	05°22.6	-15.3'	56.7'
SD = 16.0'			d = 1.0'		SD = 15.6'		

Tue	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	178°55.8	N04°04.4	21°54.6	14.5'	N05°07.3	-15.3'	56.7'
1	193°55.9	05.4	36°28.1	14.5'	04°52.0	-15.3'	56.6'
2	208°56.1	06.4	51°01.7	14.6'	04°36.7	-15.3'	56.6'
3	223°56.3	· · 07.3	65°35.3	14.6'	04°21.4	-15.3'	56.6'
4	238°56.5	08.3	80°08.9	14.7'	04°06.0	-15.3'	56.6'
5	253°56.7	09.3	94°42.5	14.7'	03°50.7	-15.3'	56.6'
6	268°56.9	N04°10.2	109°16.2	14.7'	N03°35.4	-15.3'	56.5'
7	283°57.1	11.2	123°50.0	14.8'	03°20.0	-15.4'	56.5'
8	298°57.3	12.2	138°23.7	14.8'	03°04.7	-15.4'	56.5'
9	313°57.4	· · 13.1	152°57.5	14.8'	02°49.3	-15.4'	56.5'
10	328°57.6	14.1	167°31.4	14.9'	02°33.9	-15.4'	56.5'
11	343°57.8	15.1	182°05.2	14.9'	02°18.6	-15.4'	56.4'
12	358°58.0	N04°16.0	196°39.1	14.9'	N02°03.2	-15.4'	56.4'
13	13°58.2	17.0	211°13.1	14.9'	01°47.9	-15.3'	56.4'
14	28°58.4	18.0	225°47.0	15.0'	01°32.5	-15.3'	56.4'
15	43°58.6	· · 18.9	240°21.0	15.0'	01°17.2	-15.3'	56.4'
16	58°58.8	19.9	254°55.0	15.0'	01°01.9	-15.3'	56.3'
17	73°58.9	20.9	269°29.0	15.0'	00°46.5	-15.3'	56.3'
18	88°59.1	N04°21.8	284°03.1	15.1'	N00°31.2	-15.3'	56.3'
19	103°59.3	22.8	298°37.1	15.1'	00°15.9	-15.3'	56.3'
20	118°59.5	23.8	313°11.2	15.1'	N00°00.6	-15.3'	56.3'
21	133°59.7	· · 24.7	327°45.3	15.1'	S00°14.7	15.3'	56.2'
22	148°59.9	25.7	342°19.4	15.1'	00°30.0	15.3'	56.2'
23	164°00.1	26.7	356°53.6	15.2'	00°45.3	15.3'	56.2'
SD = 16.0'			d = 1.0'		SD = 15.5'		

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

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

Day	Sun		Mer. Pass	Moon		Age 10-12 83-95%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
29	04:53	04:44	12:05	21:45	09:21	
30	04:35	04:26	12:04	22:30	10:08	
31	04:17	04:08	12:04	23:13	10:51	

April 01, 02, 03 UT (Wed., Thu., Fri.)

	Aries			Venus			Mars			Jupiter			Saturn		
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	189°22.2	159°43.9	N11°37.7	195°16.6	S03°41.4	82°12.2	N22°52.4	183°26.1	N00°15.0						
1	204°24.7	174°43.5	38.9	210°17.2	40.7	97°14.5	52.4	198°28.3	15.1						
2	219°27.2	189°43.0	40.0	225°17.9	39.9	112°16.8	52.4	213°30.5	15.2						
3	234°29.6	204°42.6	· · 41.2	240°18.6	· · 39.1	127°19.1	· · 52.4	228°32.6	· · 15.3						
4	249°32.1	219°42.1	42.3	255°19.2	38.3	142°21.4	52.4	243°34.8	15.4						
5	264°34.6	234°41.7	43.5	270°19.9	37.5	157°23.6	52.4	258°37.0	15.6						
6	279°37.0	249°41.2	N11°44.7	285°20.6	S03°36.8	172°25.9	N22°52.3	273°39.2	N00°15.7						
7	294°39.5	264°40.8	45.8	300°21.3	36.0	187°28.2	52.3	288°41.4	15.8						
8	309°42.0	279°40.3	47.0	315°21.9	35.2	202°30.5	52.3	303°43.5	15.9						
9	324°44.4	294°39.9	· · 48.1	330°22.6	· · 34.4	217°32.8	· · 52.3	318°45.7	· · 16.1						
10	339°46.9	309°39.4	49.3	345°23.3	33.6	232°35.1	52.3	333°47.9	16.2						
11	354°49.3	324°39.0	50.4	0°23.9	32.8	247°37.4	52.2	348°50.1	16.3						
12	9°51.8	339°38.5	N11°51.6	15°24.6	S03°32.1	262°39.6	N22°52.2	3°52.2	N00°16.4						
13	24°54.3	354°38.1	52.7	30°25.3	31.3	277°41.9	52.2	18°54.4	16.5						
14	39°56.7	9°37.6	53.9	45°25.9	30.5	292°44.2	52.2	33°56.6	16.7						
15	54°59.2	24°37.2	· · 55.1	60°26.6	· · 29.7	307°46.5	· · 52.2	48°58.8	· · 16.8						
16	70°01.7	39°36.7	56.2	75°27.3	28.9	322°48.8	52.2	64°01.0	16.9						
17	85°04.1	54°36.3	57.4	90°27.9	28.1	337°51.1	52.1	79°03.1	17.0						
18	100°06.6	69°35.8	N11°58.5	105°28.6	S03°27.4	352°53.3	N22°52.1	94°05.3	N00°17.1						
19	115°09.1	84°35.3	11°59.7	120°29.3	26.6	7°55.6	52.1	109°07.5	17.3						
20	130°11.5	99°34.9	12°00.8	135°30.0	25.8	22°57.9	52.1	124°09.7	17.4						
21	145°14.0	114°34.4	· · 02.0	150°30.6	· · 25.0	38°00.2	· · 52.1	139°11.8	· · 17.5						
22	160°16.4	129°34.0	03.1	165°31.3	24.2	53°02.5	52.0	154°14.0	17.6						
23	175°18.9	144°33.5	04.3	180°32.0	23.5	68°04.8	52.0	169°16.2	17.7						
Mer.pass.	11:21	ν -0.4' d 1.2' m -3.92		ν 0.7' d -0.8' m 1.18		ν 2.3' d -0.0' m -2.20		ν 2.2' d 0.1' m 0.92							

	Aries			Venus			Mars			Jupiter			Saturn		
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	190°21.4	159°33.1	N12°05.4	195°32.6	S03°22.7	83°07.0	N22°52.0	184°18.4	N00°17.9						
1	205°23.8	174°32.6	06.6	210°33.3	21.9	98°09.3	52.0	199°20.6	18.0						
2	220°26.3	189°32.2	07.7	225°34.0	21.1	113°11.6	52.0	214°22.7	18.1						
3	235°28.8	204°31.7	· · 08.9	240°34.6	· · 20.3	128°13.9	· · 52.0	229°24.9	· · 18.2						
4	250°31.2	219°31.2	10.0	255°35.3	19.5	143°16.2	51.9	244°27.1	18.4						
5	265°33.7	234°30.8	11.2	270°36.0	18.8	158°18.4	51.9	259°29.3	18.5						
6	280°36.2	249°30.3	N12°12.3	285°36.7	S03°18.0	173°20.7	N22°51.9	274°31.4	N00°18.6						
7	295°38.6	264°29.9	13.4	300°37.3	17.2	188°23.0	51.9	289°33.6	18.7						
8	310°41.1	279°29.4	14.6	315°38.0	16.4	203°25.3	51.9	304°35.8	18.8						
9	325°43.6	294°28.9	· · 15.7	330°38.7	· · 15.6	218°27.5	· · 51.8	319°38.0	· · 19.0						
10	340°46.0	309°28.5	16.9	345°39.3	14.8	233°29.8	51.8	334°40.2	19.1						
11	355°48.5	324°28.0	18.0	0°40.0	14.1	248°32.1	51.8	349°42.3	19.2						
12	10°50.9	339°27.6	N12°19.2	15°40.7	S03°13.3	263°34.4	N22°51.8	4°44.5	N00°19.3						
13	25°53.4	354°27.1	20.3	30°41.3	12.5	278°36.7	51.8	19°46.7	19.4						
14	40°55.9	9°26.6	21.4	45°42.0	11.7	293°38.9	51.8	34°48.9	19.6						
15	55°58.3	24°26.2	· · 22.6	60°42.7	· · 10.9	308°41.2	· · 51.7	49°51.1	· · 19.7						
16	71°00.8	39°25.7	23.7	75°43.4	10.1	323°43.5	51.7	64°53.2	19.8						
17	86°03.3	54°25.3	24.9	90°44.0	09.4	338°45.8	51.7	79°55.4	19.9						
18	101°05.7	69°24.8	N12°26.0	105°44.7	S03°08.6	353°48.0	N22°51.7	94°57.6	N00°20.0						
19	116°08.2	84°24.3	27.1	120°45.4	07.8	8°50.3	51.7	109°59.8	20.2						
20	131°10.7	99°23.9	28.3	135°46.0	07.0	23°52.6	51.6	125°01.9	20.3						
21	146°13.1	114°23.4	· · 29.4	150°46.7	· · 06.2	38°54.9	· · 51.6	140°04.1	· · 20.4						
22	161°15.6	129°22.9	30.6	165°47.4	05.4	53°57.1	51.6	155°06.3	20.5						
23	176°18.1	144°22.5	31.7	180°48.1	04.7	68°59.4	51.6	170°08.5	20.7						
Mer.pass.	11:17	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.18		ν 2.3' d -0.0' m -2.20		ν 2.2' d 0.1' m 0.92							

	Aries			Venus			Mars			Jupiter			Saturn		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	191°20.5	159°22.0	N12°32.8	195°48.7	S03°03.9	84°01.7	N22°51.6	185°10.7	N00°20.8						
1	206°23.0	174°21.6	34.0	210°49.4	03.1	99°03.9	51.5	200°12.8	20.9						
2	221°25.4	189°21.1	35.1	225°50.1	02.3	114°06.2	51.5	215°15.0	21.0						
3	236°27.9	204°20.6	· · 36.2	240°50.8	· · 01.5	129°08.5	· · 51.5	230°17.2	· · 21.1						
4	251°30.4	219°20.2	37.4	255°51.4	00.7	144°10.8	51.5	245°19.4	21.3						
5	266°32.8	234°19.7	38.5	270°52.1	03°00.0	159°13.0	51.5	260°21.6	21.4						
6	281°35.3	249°19.2	N12°39.6	285°52.8	S02°59.2	174°15.3	N22°51.4	275°23.7	N00°21.5						
7	296°37.8	264°18.8	40.8	300°53.4	58.4	189°17.6	51.4	290°25.9	21.6						
8	311°40.2	279°18.3	41.9	315°54.1	57.6	204°19.8	51.4	305°28.1	21.7						
9	326°42.7	294°17.8	· · 43.0	330°54.8	· · 56.8	219°22.1	· · 51.4	320°30.3	· · 21.9						
10	341°45.2	309°17.4	44.2	345°55.5	56.0	234°24.4	51.4	335°32.4	22.0						
11	356°47.6	324°16.9	45.3	0°56.1	55.3	249°26.7	51.3	350°34.6	22.1						
12	11°50.1	339°16.4	N12°46.4	15°56.8	S02°54.5	264°28.9	N22°51.3	5°36.8	N00°22.2						
13	26°52.5	354°15.9	47.6	30°57.5	53.7	279°31.2	51.3	20°39.0	22.3						
14	41°55.0	9°15.5	48.7	45°58.2	52.9	294°33.5	51.3	35°41.2	22.5						
15	56°57.5	24°15.0	· · 49.8	60°58.8	· · 52.1	309°35.7	· · 51.3	50°43.3	· · 22.6						
16	71°59.9	39°14.5	51.0	75°59.5	51.3	324°38.0	51.2	65°45.5	22.7						
17	87°02.4	54°14.1	52.1	91°00.2	50.6	339°40.3	51.2	80°47.7	22.8						
18	102°04.9	69°13.6	N12°53.2	106°00.8	S02°49.8	354°42.5	N22°51.2	95°49.9	N00°22.9						
19	117°07.3	84°13.1	54.3	121°01.5	49.0	9°44.8	51.2	110°52.1	23.1						
20	132°09.8	99°12.6	55.5	136°02.2	48.2	24°47.1	51.2	125°54.2	23.2						
21	147°12.3	114°12.2	· · 56.6	151°02.9	· · 47.4	39°49.3	· · 51.1	140°56.4	· · 23.3						
22	162°14.7	129°11.7	57.7	166°03.5	46.6	54°51.6	51.1	155°58.6	23.4						
23	177°17.2	144°11.2	58.8	181°04.2	45.9	69°53.9	51.1	171°00.8	23.6						
Mer.pass.	11:13	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.3' d -0.0' m -2.19		ν 2.2' d 0.1' m 0.92							

	SHA		Dec
Alpheratz	357°34.1	29°14.0	
Ankaa	353°06.6	-42°09.8	
Schedar	349°30.5	56°40.8	
Diphda	348°46.6	-17°50.6	
Achernar	335°20.0	-57°06.3	
Hamal	327°50.4	23°35.2	
Polaris	313°55.6	89°22.7	
Acamar	315°11.3	-40°12.1	
Menkar	314°05.4	4°11.5	
Mirfak	308°27.2	49°57.3	
Aldebaran	290°38.6	16°33.7	
Rigel	281°03.0	-8°10.4	
Capella	280°20.6	46°01.6	
Bellatrix	278°21.9	6°22.3	
Elnath	278°00.7	28°37.8	
Alnilam	275°36.8	-1°11.2	
Betelgeuse	270°51.1	7°24.6	
Canopus	263°52.0	-52°42.8	
Sirius	258°25.4	-16°45.3	
Adhara	255°05.1	-29°00.7	
Procyon	244°49.7	5°09.4	
Pollux	243°16.0	27°57.8	
Avior	234°11.1	-59°35.9	
Suhail	222°45.3	-43°32.6	
Miaplacidus	221°37.6	-69°49.7	
Alphard	217°46.6	-8°46.5	
Regulus	207°33.1	11°50.2	
Dubhe	193°39.2	61°36.6	
Denebola	182°23.6	14°25.4	
Gienah	175°42.2	-17°41.4	
Acrux	172°58.3	-63°14.8	
Gacrux	171°50.0	-57°15.7	
Alioth	166°11.5	55°48.9	
Spica	158°20.9	-11°18.1	
Alkaid	152°50.7	49°10.7	
Hadar	148°34.0	-60°30.0	
Menkent	147°56.1	-36°30.0	
Arcturus	145°46.7	19°02.5	
Rigel Kent.	139°38.3	-60°56.6	
Kochab	137°18.8	74°02.6	
Zuben'ubi	136°54.6	-16°09.2	
Alphecca	1		

h	Sun			Moon			
Wed	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°00.2	N04°27.6	11°27.8	15.2'	S01°00.5	15.2'	56.2'
1	194°00.4	28.6	26°01.9	15.2'	01°15.8	15.2'	56.2'
2	209°00.6	29.6	40°36.1	15.2'	01°31.0	15.2'	56.1'
3	224°00.8	· · 30.5	55°10.3	15.2'	01°46.2	15.2'	56.1'
4	239°01.0	31.5	69°44.5	15.2'	02°01.4	15.2'	56.1'
5	254°01.2	32.5	84°18.8	15.2'	02°16.6	15.2'	56.1'
6	269°01.4	N04°33.4	98°53.0	15.2'	S02°31.7	15.1'	56.0'
7	284°01.6	34.4	113°27.2	15.3'	02°46.8	15.1'	56.0'
8	299°01.7	35.4	128°01.5	15.3'	03°01.9	15.1'	56.0'
9	314°01.9	· · 36.3	142°35.8	15.3'	03°17.0	15.1'	56.0'
10	329°02.1	37.3	157°10.0	15.3'	03°32.1	15.0'	56.0'
11	344°02.3	38.2	171°44.3	15.3'	03°47.1	15.0'	55.9'
12	359°02.5	N04°39.2	186°18.6	15.3'	S04°02.1	15.0'	55.9'
13	14°02.7	40.2	200°52.8	15.3'	04°17.1	15.0'	55.9'
14	29°02.9	41.1	215°27.1	15.3'	04°32.1	14.9'	55.9'
15	44°03.0	· · 42.1	230°01.4	15.3'	04°47.0	14.9'	55.9'
16	59°03.2	43.1	244°35.7	15.3'	05°01.9	14.9'	55.8'
17	74°03.4	44.0	259°09.9	15.3'	05°16.8	14.8'	55.8'
18	89°03.6	N04°45.0	273°44.2	15.3'	S05°31.6	14.8'	55.8'
19	104°03.8	46.0	288°18.5	15.3'	05°46.4	14.8'	55.8'
20	119°04.0	46.9	302°52.7	15.3'	06°01.2	14.7'	55.8'
21	134°04.2	· · 47.9	317°27.0	15.3'	06°15.9	14.7'	55.7'
22	149°04.3	48.8	332°01.3	15.2'	06°30.6	14.7'	55.7'
23	164°04.5	49.8	346°35.5	15.2'	06°45.2	14.6'	55.7'
SD = 16.0'			d = 1.0'		SD = 15.3'		

Thu	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°04.7	N04°50.8	1°09.7	15.2'	S06°59.9	14.6'	55.7'
1	194°04.9	51.7	15°44.0	15.2'	07°14.4	14.5'	55.7'
2	209°05.1	52.7	30°18.2	15.2'	07°29.0	14.5'	55.6'
3	224°05.3	· · 53.6	44°52.4	15.2'	07°43.5	14.5'	55.6'
4	239°05.5	54.6	59°26.6	15.2'	07°57.9	14.4'	55.6'
5	254°05.6	55.6	74°00.8	15.2'	08°12.4	14.4'	55.6'
6	269°05.8	N04°56.5	88°34.9	15.2'	S08°26.7	14.3'	55.6'
7	284°06.0	57.5	103°09.1	15.1'	08°41.1	14.3'	55.5'
8	299°06.2	58.5	117°43.2	15.1'	08°55.3	14.2'	55.5'
9	314°06.4	04°59.4	132°17.3	15.1'	09°09.6	14.2'	55.5'
10	329°06.6	05°00.4	146°51.4	15.1'	09°23.8	14.1'	55.5'
11	344°06.7	01.3	161°25.5	15.1'	09°37.9	14.1'	55.5'
12	359°06.9	N05°02.3	175°59.6	15.0'	S09°52.0	14.0'	55.4'
13	14°07.1	03.3	190°33.6	15.0'	10°06.0	14.0'	55.4'
14	29°07.3	04.2	205°07.7	15.0'	10°20.0	13.9'	55.4'
15	44°07.5	· · 05.2	219°41.7	15.0'	10°34.0	13.9'	55.4'
16	59°07.7	06.1	234°15.6	15.0'	10°47.9	13.8'	55.4'
17	74°07.9	07.1	248°49.6	14.9'	11°01.7	13.8'	55.4'
18	89°08.0	N05°08.1	263°23.5	14.9'	S11°15.5	13.7'	55.3'
19	104°08.2	09.0	277°57.4	14.9'	11°29.2	13.7'	55.3'
20	119°08.4	10.0	292°31.3	14.9'	11°42.9	13.6'	55.3'
21	134°08.6	· · 10.9	307°05.1	14.8'	11°56.5	13.6'	55.3'
22	149°08.8	11.9	321°39.0	14.8'	12°10.0	13.5'	55.3'
23	164°09.0	12.8	336°12.8	14.8'	12°23.5	13.4'	55.2'
SD = 16.0'			d = 1.0'		SD = 15.2'		

Fri	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°09.1	N05°13.8	350°46.5	14.7'	S12°37.0	13.4'	55.2'
1	194°09.3	14.8	5°20.3	14.7'	12°50.3	13.3'	55.2'
2	209°09.5	15.7	19°54.0	14.7'	13°03.7	13.2'	55.2'
3	224°09.7	· · 16.7	34°27.6	14.6'	13°16.9	13.2'	55.2'
4	239°09.9	17.6	49°01.3	14.6'	13°30.1	13.1'	55.1'
5	254°10.1	18.6	63°34.9	14.6'	13°43.2	13.1'	55.1'
6	269°10.3	N05°19.5	78°08.5	14.5'	S13°56.3	13.0'	55.1'
7	284°10.4	20.5	92°42.0	14.5'	14°09.3	12.9'	55.1'
8	299°10.6	21.5	107°15.5	14.5'	14°22.2	12.9'	55.1'
9	314°10.8	· · 22.4	121°49.0	14.4'	14°35.0	12.8'	55.1'
10	329°11.0	23.4	136°22.4	14.4'	14°47.8	12.7'	55.0'
11	344°11.2	24.3	150°55.8	14.4'	15°00.5	12.6'	55.0'
12	359°11.4	N05°25.3	165°29.2	14.3'	S15°13.2	12.6'	55.0'
13	14°11.5	26.2	180°02.5	14.3'	15°25.8	12.5'	55.0'
14	29°11.7	27.2	194°35.8	14.2'	15°38.3	12.4'	55.0'
15	44°11.9	· · 28.2	209°09.0	14.2'	15°50.7	12.4'	55.0'
16	59°12.1	29.1	223°42.2	14.2'	16°03.1	12.3'	54.9'
17	74°12.3	30.1	238°15.4	14.1'	16°15.3	12.2'	54.9'
18	89°12.5	N05°31.0	252°48.5	14.1'	S16°27.5	12.1'	54.9'
19	104°12.6	32.0	267°21.5	14.0'	16°39.7	12.1'	54.9'
20	119°12.8	32.9	281°54.6	14.0'	16°51.7	12.0'	54.9'
21	134°13.0	· · 33.9	296°27.6	13.9'	17°03.7	11.9'	54.9'
22	149°13.2	34.8	311°00.5	13.9'	17°15.6	11.8'	54.8'
23	164°13.4	35.8	325°33.4	13.9'	17°27.4	11.7'	54.8'
SD = 16.0'			d = 1.0'		SD = 15.1'		

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

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

Day	Sun		Mer. Pass	Moon		Age 13-15 99-99%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
01	03:59	03:50	12:04	23:55	11:34	
02	03:41	03:32	12:04	--	12:17	
03	03:23	03:15	12:03	00:38	13:00	

April 04, 05, 06 UT (Sat., Sun., Mon.)

	Aries			Venus			Mars			Jupiter			Saturn		
Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	192°19.7	159°10.8	N13°00.0	196°04.9	S02°45.1	84°56.1	N22°51.1	186°02.9	N00°23.7						
1	207°22.1	174°10.3	01.1	211°05.6	44.3	99°58.4	51.1	201°05.1	23.8						
2	222°24.6	189°09.8	02.2	226°06.2	43.5	115°00.7	51.0	216°07.3	23.9						
3	237°27.0	204°09.3	· · 03.3	241°06.9	· · 42.7	130°02.9	· · 51.0	231°09.5	· · 24.0						
4	252°29.5	219°08.9	04.5	256°07.6	41.9	145°05.2	51.0	246°11.7	24.2						
5	267°32.0	234°08.4	05.6	271°08.3	41.1	160°07.5	51.0	261°13.8	24.3						
6	282°34.4	249°07.9	N13°06.7	286°08.9	S02°40.4	175°09.7	N22°51.0	276°16.0	N00°24.4						
7	297°36.9	264°07.4	07.8	301°09.6	39.6	190°12.0	50.9	291°18.2	24.5						
8	312°39.4	279°07.0	08.9	316°10.3	38.8	205°14.2	50.9	306°20.4	24.6						
9	327°41.8	294°06.5	· · 10.1	331°11.0	· · 38.0	220°16.5	· · 50.9	321°22.6	· · 24.8						
10	342°44.3	309°06.0	11.2	346°11.6	37.2	235°18.8	50.9	336°24.7	24.9						
11	357°46.8	324°05.5	12.3	1°12.3	36.4	250°21.0	50.9	351°26.9	25.0						
12	12°49.2	339°05.0	N13°13.4	16°13.0	S02°35.7	265°23.3	N22°50.8	6°29.1	N00°25.1						
13	27°51.7	354°04.6	14.5	31°13.6	34.9	280°25.6	50.8	21°31.3	25.2						
14	42°54.1	9°04.1	15.6	46°14.3	34.1	295°27.8	50.8	36°33.4	25.4						
15	57°56.6	24°03.6	· · 16.8	61°15.0	· · 33.3	310°30.1	· · 50.8	51°35.6	· · 25.5						
16	72°59.1	39°03.1	17.9	76°15.7	32.5	325°32.3	50.8	66°37.8	25.6						
17	88°01.5	54°02.6	19.0	91°16.3	31.7	340°34.6	50.7	81°40.0	25.7						
18	103°04.0	69°02.2	N13°20.1	106°17.0	S02°31.0	355°36.9	N22°50.7	96°42.2	N00°25.8						
19	118°06.5	84°01.7	21.2	121°17.7	30.2	10°39.1	50.7	111°44.3	26.0						
20	133°08.9	99°01.2	22.3	136°18.4	29.4	25°41.4	50.7	126°46.5	26.1						
21	148°11.4	114°00.7	· · 23.4	151°19.0	· · 28.6	40°43.6	· · 50.7	141°48.7	· · 26.2						
22	163°13.9	129°00.2	24.6	166°19.7	27.8	55°45.9	50.6	156°50.9	26.3						
23	178°16.3	143°59.8	25.7	181°20.4	27.0	70°48.2	50.6	171°53.1	26.4						
Mer.pass.	11:09	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.3' d -0.0' m -2.18		ν 2.2' d 0.1' m 0.93							

	SHA		Dec
Alpheratz	357°34.1	29°14.0	
Ankaa	353°06.5	-42°09.8	
Schedar	349°30.5	56°40.8	
Diphda	348°46.6	-17°50.6	
Achernar	335°20.0	-57°06.3	
Hamal	327°50.4	23°35.1	
Polaris	313°56.3	89°22.6	
Acamar	315°11.4	-40°12.1	
Menkar	314°05.4	4°11.5	
Mirfak	308°27.2	49°57.3	
Aldebaran	290°38.7	16°33.7	
Rigel	281°03.0	-8°10.4	
Capella	280°20.6	46°01.6	
Bellatrix	278°21.9	6°22.3	
Elnath	278°00.7	28°37.8	
Anilam	275°36.8	-1°11.2	
Betelgeuse	270°51.1	7°24.6	
Canopus	263°52.0	-52°42.8	
Sirius	258°25.4	-16°45.3	
Adhara	255°05.1	-29°00.7	
Procyon	244°49.7	5°09.4	
Pollux	243°16.0	27°57.8	
Avior	234°14.1	-59°35.9	
Suhail	222°45.4	-43°32.6	
Miaplacidus	221°37.6	-69°49.8	
Alphard	217°46.6	-8°46.5	
Regulus	207°33.1	11°50.2	
Dubhe	193°39.2	61°36.6	
Denebola	182°23.6	14°25.4	
Gienah	175°42.2	-17°41.4	
Acrux	172°58.3	-63°14.8	
Gacrux	171°50.0	-57°15.8	
Alioth	166°11.5	55°48.9	
Spica	158°20.9	-11°18.1	
Alkaid	152°50.7	49°10.7	
Hadar	148°34.0	-60°30.0	
Menkent	147°56.1	-36°30.0	
Arcturus	145°46.7	19°02.5	
Rigel Kent.	139°38.3	-60°56.6	
Kochab	137°18.8	74°02.6	
Zuben'ubi	136°54.6	-16°09.2	
Alphecca	126°02.6	26°37.3	
Antares	112°14.4	-26°29.4	
Atria	107°07.4	-69°04.3	
Sabik	102°01.5	-15°45.5	
Shaula	96°08.8	-37°07.3	
Rasalhague	95°57.5	12°32.2	
Eltanin	90°41.6	51°28.7	
Kaus Aust.	83°31.1	-34°22.3	
Vega	80°32.5	38°48.1	
Nunki	75°46.5	-26°15.8	
Altair	61°59.0	8°56.1	
Peacock	53°04.3	-56°38.8	
Deneb	49°25.3	45°22.1	
Enif	33°38.0	9°59.6	
Al Na'ir	27°32.0	-46°49.9	
Fomalhaut	15°13.7	-29°29.0	
Scheat	13°44.5	28°13.4	
Markab	13°29.2	15°20.7	

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	193°18.8	158°59.3	N13°26.8	196°21.1	S02°26.2	85°50.4	N22°50.6	186°55.2	N00°26.6
1	208°21.3	173°58.8	27.9	211°21.8	25.5	100°52.7	50.6	201°57.4	26.7
2	223°23.7	188°58.3	29.0	226°22.4	24.7	115°54.9	50.5	216°59.6	26.8
3	238°26.2	203°57.8	· · 30.1	241°23.1	· · 23.9	130°57.2	· · 50.5	232°01.8	· · 26.9
4	253°28.6	218°57.3	31.2	256°23.8	23.1	145°59.4	50.5	247°04.0	27.0
5	268°31.1	233°56.9	32.3	271°24.5	22.3	161°01.7	50.5	262°06.1	27.2
6	283°33.6	248°56.4	N13°33.4	286°25.1	S02°21.5	176°04.0	N22°50.5	277°08.3	N00°27.3
7	298°36.0	263°55.9	34.5	301°25.8	20.8	191°06.2	50.4	292°10.5	27.4
8	313°38.5	278°55.4	35.6	316°26.5	20.0	206°08.5	50.4	307°12.7	27.5
9	328°41.0	293°54.9	· · 36.7	331°27.2	· · 19.2	221°10.7	· · 50.4	322°14.9	· · 27.6
10	343°43.4	308°54.4	37.8	346°27.8	18.4	236°13.0	50.4	337°17.0	27.8
11	358°45.9	323°53.9	39.0	1°28.5	17.6	251°15.2	50.4	352°19.2	27.9
12	13°48.4	338°53.5	N13°40.1	16°29.2	S02°16.8	266°17.5	N22°50.3	7°21.4	N00°28.0
13	28°50.8	353°53.0	41.2	31°29.9	16.0	281°19.7	50.3	22°23.6	28.1
14	43°53.3	8°52.5	42.3	46°30.5	15.3	296°22.0	50.3	37°25.7	28.2
15	58°55.8	23°52.0	· · 43.4	61°31.2	· · 14.5	311°24.2	· · 50.3	52°27.9	· · 28.4
16	73°58.2	38°51.5	44.5	76°31.9	13.7	326°26.5	50.2	67°30.1	28.5
17	89°00.7	53°51.0	45.6	91°32.6	12.9	341°28.8	50.2	82°32.3	28.6
18	104°03.1	68°50.5	N13°46.7	106°33.2	S02°12.1	356°31.0	N22°50.2	97°34.5	N00°28.7
19	119°05.6	83°50.0	47.8	121°33.9	11.3	11°33.3	50.2	112°36.6	28.8
20	134°08.1	98°49.5	48.9	136°34.6	10.6	26°35.5	50.2	127°38.8	29.0
21	149°10.5	113°49.1	· · 50.0	151°35.3	· · 09.8	41°37.8	· · 50.1	142°41.0	· · 29.1
22	164°13.0	128°48.6	51.1	166°36.0	09.0	56°40.0	50.1	157°43.2	29.2
23	179°15.5	143°48.1	52.2	181°36.6	08.2	71°42.3	50.1	172°45.4	29.3
Mer.pass.	11:05	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.3' d -0.0' m -2.17		ν 2.2' d 0.1' m 0.93	

Mon	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	194°17.9	158°47.6	N13°53.3	196°37.3	S02°07.4	86°44.5	N22°50.1	187°47.5	N00°29.4
1	209°20.4	173°47.1	54.4	211°38.0	06.6	101°46.8	50.0	202°49.7	29.6
2	224°22.9	188°46.6	55.5	226°38.7	05.8	116°49.0	50.0	217°51.9	29.7
3	239°25.3	203°46.1	· · 56.5	241°39.3	· · 05.1	131°51.3	· · 50.0	232°54.1	· · 29.8
4	254°27.8	218°45.6	57.6	256°40.0	04.3	146°53.5	50.0	247°56.3	29.9
5	269°30.2	233°45.1	58.7	271°40.7	03.5	161°55.8	50.0	262°58.4	30.0
6	284°32.7	248°44.6	N13°59.8	286°41.4	S02°02.7	176°58.0	N22°49.9	278°00.6	N00°30.2
7	299°35.2	263°44.1	14°00.9	301°42.0	01.9	192°00.3	49.9	293°02.8	30.3
8	314°37.6	278°43.6	02.0	316°42.7	01.1	207°02.5	49.9	308°05.0	30.4
9	329°40.1	293°43.1	· · 03.1	331°43.4	02°00.4	222°04.8	· · 49.9	323°07.2	· · 30.5
10	344°42.6	308°42.6	04.2	346°44.1	01°59.6	237°07.0	49.8	338°09.3	30.6
11	359°45.0	323°42.1	05.3	1°44.8	58.8	252°09.2	49.8	353°11.5	30.8
12	14°47.5	338°41.6	N14°06.4	16°45.4	S01°58.0	267°11.5	N22°49.8	8°13.7	N00°30.9
13	29°50.0	353°41.2	07.5	31°46.1	57.2	282°13.7	49.8	23°15.9	31.0
14	44°52.4	8°40.7	08.6	46°46.8	56.4	297°16.0	49.8	38°18.1	31.1
15	59°54.9	23°40.2	· · 09.6	61°47.5	· · 55.6	312°18.2	· · 49.7	53°20.2	· · 31.2
16	74°57.4	38°39.7	10.7	76°48.1	54.9	327°20.5	49.7	68°22.4	31.4
17	89°59.8	53°39.2	11.8	91°48.8	54.1	342°22.7	49.7	83°24.6	31.5
18	105°02.3	68°38.7	N14°12.9	106°49.5	S01°53.3	357°25.0	N22°49.7	98°26.8	N00°31.6
19	120°04.7	83°38.2	14.0	121°50.2	52.5	12°27.2	49.6	113°29.0	31.7
20	135°07.2	98°37.7	15.1	136°50.9	51.7	27°29.5	49.6	128°31.1	31.8
21	150°09.7	113°37.2	· · 16.2	151°51.5	· · 50.9	42°31.7	· · 49.6	143°33.3	· · 32.0
22	165°12.1	128°36.7	17.2	166°52.2	50.1	57°33.9	49.6	158°35.5	32.1
23	180°14.6	143°36.2	18.3	181°52.9	49.4	72°36.2	49.5	173°37.7	32.2
Mer.pass.	11:01	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.3' d -0.0' m -2.17		ν 2.2' d 0.1' m 0.93	

Apr 04 Sat	SHA	Mer.pass
Venus	326°51.1	13:24
Mars	3°45.2	10:55
Jupiter	252°36.5	18:17
Saturn	353°43.3	11:34

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Sun				Moon			
h	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°13.5	N05°36.7	340°06.3	13.8'	S17°39.1	11.7'	54.8'
1	194°13.7	37.7	354°39.1	13.8'	17°50.8	11.6'	54.8'
2	209°13.9	38.7	9°11.9	13.7'	18°02.4	11.5'	54.8'
3	224°14.1	· · 39.6	23°44.6	13.7'	18°13.8	11.4'	54.8'
4	239°14.3	40.6	38°17.3	13.6'	18°25.2	11.3'	54.7'
5	254°14.5	41.5	52°49.9	13.6'	18°36.6	11.2'	54.7'
6	269°14.6	N05°42.5	67°22.5	13.5'	S18°47.8	11.1'	54.7'
7	284°14.8	43.4	81°55.0	13.5'	18°58.9	11.1'	54.7'
8	299°15.0	44.4	96°27.5	13.4'	19°10.0	11.0'	54.7'
9	314°15.2	· · 45.3	110°59.9	13.4'	19°21.0	10.9'	54.7'
10	329°15.4	46.3	125°32.3	13.3'	19°31.8	10.8'	54.7'
11	344°15.6	47.2	140°04.6	13.3'	19°42.6	10.7'	54.6'
12	359°15.7	N05°48.2	154°36.9	13.2'	S19°53.3	10.6'	54.6'
13	14°15.9	49.1	169°09.2	13.2'	20°03.9	10.5'	54.6'
14	29°16.1	50.1	183°41.4	13.1'	20°14.5	10.4'	54.6'
15	44°16.3	· · 51.0	198°13.5	13.1'	20°24.9	10.3'	54.6'
16	59°16.5	52.0	212°45.6	13.0'	20°35.2	10.2'	54.6'
17	74°16.6	52.9	227°17.6	13.0'	20°45.4	10.1'	54.6'
18	89°16.8	N05°53.9	241°49.6	12.9'	S20°55.6	10.0'	54.5'
19	104°17.0	54.8	256°21.5	12.9'	21°05.6	9.9'	54.5'
20	119°17.2	55.8	270°53.4	12.8'	21°15.6	9.8'	54.5'
21	134°17.4	· · 56.7	285°25.3	12.8'	21°25.4	9.7'	54.5'
22	149°17.5	57.7	299°57.0	12.7'	21°35.2	9.6'	54.5'
23	164°17.7	58.6	314°28.8	12.7'	21°44.8	9.5'	54.5'
SD = 16.0'		d = 1.0'	SD = 14.9'				

Sun	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°17.9	N05°59.6	329°00.5	12.6'	S21°54.4	9.4'	54.5'
1	194°18.1	06°00.5	343°32.1	12.6'	22°03.8	9.3'	54.4'
2	209°18.3	01.5	358°03.7	12.5'	22°13.2	9.2'	54.4'
3	224°18.4	· · 02.4	12°35.2	12.5'	22°22.4	9.1'	54.4'
4	239°18.6	03.4	27°06.7	12.4'	22°31.5	9.0'	54.4'
5	254°18.8	04.3	41°38.1	12.4'	22°40.6	8.9'	54.4'
6	269°19.0	N06°05.3	56°09.4	12.3'	S22°49.5	8.8'	54.4'
7	284°19.2	06.2	70°40.7	12.3'	22°58.3	8.7'	54.4'
8	299°19.3	07.2	85°12.0	12.2'	23°07.1	8.6'	54.4'
9	314°19.5	· · 08.1	99°43.2	12.2'	23°15.7	8.5'	54.4'
10	329°19.7	09.1	114°14.4	12.1'	23°24.2	8.4'	54.3'
11	344°19.9	10.0	128°45.5	12.1'	23°32.6	8.3'	54.3'
12	359°20.1	N06°11.0	143°16.5	12.0'	S23°40.9	8.2'	54.3'
13	14°20.2	11.9	157°47.5	12.0'	23°49.0	8.1'	54.3'
14	29°20.4	12.9	172°18.5	11.9'	23°57.1	8.0'	54.3'
15	44°20.6	· · 13.8	186°49.4	11.9'	24°05.1	7.8'	54.3'
16	59°20.8	14.8	201°20.2	11.8'	24°12.9	7.7'	54.3'
17	74°21.0	15.7	215°51.0	11.7'	24°20.7	7.6'	54.3'
18	89°21.1	N06°16.7	230°21.8	11.7'	S24°28.3	7.5'	54.3'
19	104°21.3	17.6	244°52.5	11.6'	24°35.8	7.4'	54.3'
20	119°21.5	18.6	259°23.1	11.6'	24°43.2	7.3'	54.2'
21	134°21.7	· · 19.5	273°53.7	11.6'	24°50.4	7.2'	54.2'
22	149°21.9	20.5	288°24.3	11.5'	24°57.6	7.0'	54.2'
23	164°22.0	21.4	302°54.8	11.5'	25°04.6	6.9'	54.2'
SD = 16.0'		d = 0.9'	SD = 14.9'				

Mon	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°22.2	N06°22.3	317°25.2	11.4'	S25°11.6	6.8'	54.2'
1	194°22.4	23.3	331°55.7	11.4'	25°18.4	6.7'	54.2'
2	209°22.6	24.2	346°26.0	11.3'	25°25.1	6.6'	54.2'
3	224°22.8	· · 25.2	0°56.3	11.3'	25°31.6	6.5'	54.2'
4	239°22.9	26.1	15°26.6	11.2'	25°38.1	6.3'	54.2'
5	254°23.1	27.1	29°56.8	11.2'	25°44.4	6.2'	54.2'
6	269°23.3	N06°28.0	44°27.0	11.1'	S25°50.6	6.1'	54.2'
7	284°23.5	29.0	58°57.1	11.1'	25°56.7	6.0'	54.2'
8	299°23.6	29.9	73°27.2	11.0'	26°02.7	5.8'	54.2'
9	314°23.8	· · 30.8	87°57.2	11.0'	26°08.5	5.7'	54.2'
10	329°24.0	31.8	102°27.2	10.9'	26°14.3	5.6'	54.1'
11	344°24.2	32.7	116°57.1	10.9'	26°19.9	5.5'	54.1'
12	359°24.4	N06°33.7	131°27.1	10.9'	S26°25.3	5.3'	54.1'
13	14°24.5	34.6	145°56.9	10.8'	26°30.7	5.2'	54.1'
14	29°24.7	35.6	160°26.7	10.8'	26°35.9	5.1'	54.1'
15	44°24.9	· · 36.5	174°56.5	10.7'	26°41.0	5.0'	54.1'
16	59°25.1	37.5	189°26.3	10.7'	26°46.0	4.8'	54.1'
17	74°25.2	38.4	203°56.0	10.7'	26°50.8	4.7'	54.1'
18	89°25.4	N06°39.3	218°25.6	10.6'	S26°55.5	4.6'	54.1'
19	104°25.6	40.3	232°55.3	10.6'	27°00.1	4.5'	54.1'
20	119°25.8	41.2	247°24.8	10.6'	27°04.6	4.3'	54.1'
21	134°25.9	· · 42.2	261°54.4	10.5'	27°08.9	4.2'	54.1'
22	149°26.1	43.1	276°23.9	10.5'	27°13.1	4.1'	54.1'
23	164°26.3	44.0	290°53.4	10.4'	27°17.2	3.9'	54.1'
SD = 16.0'		d = 0.9'	SD = 14.8'				

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

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

Day	Sun		Mer. Pass	Moon		Age 16-18 96-86%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
04	03:06	02:57	12:03	01:22	13:45	
05	02:48	02:40	12:03	02:08	14:32	
06	02:31	02:23	12:02	02:56	15:21	

April 07, 08, 09 UT (Tue., Wed., Thu.)

	Aries			Venus			Mars			Jupiter			Saturn		
Tue	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	195° 17.1	158° 35.7	N14° 19.4	196° 53.6	S01° 48.6	87° 38.4	N22° 49.5	188° 39.9	N00° 32.3						
1	210° 19.5	173° 35.2	20.5	211° 54.3	47.8	102° 40.7	49.5	203° 42.0	32.4						
2	225° 22.0	188° 34.7	21.6	226° 54.9	47.0	117° 42.9	49.5	218° 44.2	32.6						
3	240° 24.5	203° 34.2	· · 22.7	241° 55.6	· · 46.2	132° 45.2	· · 49.5	233° 46.4	· · 32.7						
4	255° 26.9	218° 33.6	23.7	256° 56.3	45.4	147° 47.4	49.4	248° 48.6	32.8						
5	270° 29.4	233° 33.1	24.8	271° 57.0	44.7	162° 49.6	49.4	263° 50.8	32.9						
6	285° 31.9	248° 32.6	N14° 25.9	286° 57.6	S01° 43.9	177° 51.9	N22° 49.4	278° 52.9	N00° 33.0						
7	300° 34.3	263° 32.1	27.0	301° 58.3	43.1	192° 54.1	49.4	293° 55.1	33.2						
8	315° 36.8	278° 31.6	28.1	316° 59.0	42.3	207° 56.4	49.3	308° 57.3	33.3						
9	330° 39.2	293° 31.1	· · 29.1	331° 59.7	· · 41.5	222° 58.6	· · 49.3	323° 59.5	· · 33.4						
10	345° 41.7	308° 30.6	30.2	347° 00.4	40.7	238° 00.8	49.3	339° 01.7	33.5						
11	0° 44.2	323° 30.1	31.3	2° 01.0	39.9	253° 03.1	49.3	354° 03.8	33.6						
12	15° 46.6	338° 29.6	N14° 32.4	17° 01.7	S01° 39.2	268° 05.3	N22° 49.2	9° 06.0	N00° 33.8						
13	30° 49.1	353° 29.1	33.4	32° 02.4	38.4	283° 07.6	49.2	24° 08.2	33.9						
14	45° 51.6	8° 28.6	34.5	47° 03.1	37.6	298° 09.8	49.2	39° 10.4	34.0						
15	60° 54.0	23° 28.1	· · 35.6	62° 03.8	· · 36.8	313° 12.0	· · 49.2	54° 12.6	· · 34.1						
16	75° 56.5	38° 27.6	36.7	77° 04.4	36.0	328° 14.3	49.1	69° 14.7	34.2						
17	90° 59.0	53° 27.1	37.7	92° 05.1	35.2	343° 16.5	49.1	84° 16.9	34.4						
18	106° 01.4	68° 26.6	N14° 38.8	107° 05.8	S01° 34.4	358° 18.8	N22° 49.1	99° 19.1	N00° 34.5						
19	121° 03.9	83° 26.1	39.9	122° 06.5	33.7	13° 21.0	49.1	114° 21.3	34.6						
20	136° 06.4	98° 25.5	40.9	137° 07.2	32.9	28° 23.2	49.1	129° 23.5	34.7						
21	151° 08.8	113° 25.0	· · 42.0	152° 07.8	· · 32.1	43° 25.5	· · 49.0	144° 25.6	· · 34.8						
22	166° 11.3	128° 24.5	43.1	167° 08.5	31.3	58° 27.7	49.0	159° 27.8	34.9						
23	181° 13.7	143° 24.0	44.1	182° 09.2	30.5	73° 29.9	49.0	174° 30.0	35.1						
Mer.pass.	10:57	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.2' d -0.0' m -2.16		ν 2.2' d 0.1' m 0.93							

	SHA			Dec
Alpheratz	357° 34.1	29° 14.0		
Ankaa	353° 06.5	-42° 09.8		
Schedar	349° 30.5	56° 40.8		
Diphda	348° 46.6	-17° 50.6		
Achernar	335° 20.0	-57° 06.2		
Hamal	327° 50.4	23° 35.1		
Polaris	313° 56.7	89° 22.6		
Acamar	315° 11.4	-40° 12.1		
Menkar	314° 05.4	4° 11.5		
Mirfak	308° 27.2	49° 57.3		
Aldebaran	290° 38.7	16° 33.7		
Rigel	281° 03.0	-8° 10.4		
Capella	280° 20.6	46° 01.6		
Bellatrix	278° 21.9	6° 22.3		
Elnath	278° 00.7	28° 37.8		
Anilam	275° 36.8	-1° 11.2		
Betelgeuse	270° 51.1	7° 24.6		
Canopus	263° 52.1	-52° 42.8		
Sirius	258° 25.4	-16° 45.3		
Adhara	255° 05.1	-29° 00.7		
Procyon	244° 49.7	5° 09.4		
Pollux	243° 16.0	27° 57.8		
Avior	234° 14.2	-59° 35.9		
Suhail	222° 45.4	-43° 32.6		
Miaplacidus	221° 37.7	-69° 49.8		
Alphard	217° 46.6	-8° 46.5		
Regulus	207° 33.1	11° 50.2		
Dubhe	193° 39.2	61° 36.6		
Denebola	182° 23.6	14° 25.4		
Gienah	175° 42.2	-17° 41.5		
Acrux	172° 58.3	-63° 14.8		
Gacrux	171° 50.0	-57° 15.8		
Alioth	166° 11.5	55° 48.9		
Spica	158° 20.9	-11° 18.1		
Alkaid	152° 50.7	49° 10.8		
Hadar	148° 33.9	-60° 30.0		
Menkent	147° 56.0	-36° 30.0		
Arcturus	145° 46.7	19° 02.5		
Rigel Kent.	139° 38.3	-60° 56.6		
Kochab	137° 18.7	74° 02.6		
Zuben'ubi	136° 54.6	-16° 09.2		
Alphecca	126° 02.6	26° 37.3		
Antares	112° 14.4	-26° 29.4		
Atria	107° 07.4	-69° 04.3		
Sabik	102° 01.4	-15° 45.5		
Shaula	96° 08.8	-37° 07.3		
Rasalhague	95° 57.5	12° 32.2		
Eltanin	90° 41.5	51° 28.7		
Kaus Aust.	83° 31.1	-34° 22.2		
Vega	80° 32.5	38° 48.1		
Nunki	75° 46.5	-26° 15.8		
Altair	61° 59.0	8° 56.1		
Peacock	53° 04.3	-56° 38.8		
Deneb	49° 25.3	45° 22.1		
Enif	33° 38.0	9° 59.6		
Al Na'ir	27° 31.9	-46° 49.9		
Fomalhaut	15° 13.7	-29° 29.0		
Scheat	13° 44.5	28° 13.4		
Markab	13° 29.2	15° 20.7		

Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	196° 16.2	158° 23.5	N14° 45.2	197° 09.9	S01° 29.7	88° 32.2	N22° 49.0	189° 32.2	N00° 35.2
1	211° 18.7	173° 23.0	46.3	212° 10.6	29.0	103° 34.4	48.9	204° 34.4	35.3
2	226° 21.1	188° 22.5	47.4	227° 11.2	28.2	118° 36.6	48.9	219° 36.5	35.4
3	241° 23.6	203° 22.0	· · 48.4	242° 11.9	· · 27.4	133° 38.9	· · 48.9	234° 38.7	· · 35.5
4	256° 26.1	218° 21.4	49.5	257° 12.6	26.6	148° 41.1	48.9	249° 40.9	35.7
5	271° 28.5	233° 20.9	50.5	272° 13.3	25.8	163° 43.4	48.8	264° 43.1	35.8
6	286° 31.0	248° 20.4	N14° 51.6	287° 14.0	S01° 25.0	178° 45.6	N22° 48.8	279° 45.3	N00° 35.9
7	301° 33.5	263° 19.9	52.7	302° 14.6	24.2	193° 47.8	48.8	294° 47.4	36.0
8	316° 35.9	278° 19.4	53.7	317° 15.3	23.5	208° 50.1	48.8	309° 49.6	36.1
9	331° 38.4	293° 18.9	· · 54.8	332° 16.0	· · 22.7	223° 52.3	· · 48.7	324° 51.8	· · 36.3
10	346° 40.8	308° 18.4	55.9	347° 16.7	21.9	238° 54.5	48.7	339° 54.0	36.4
11	1° 43.3	323° 17.8	56.9	2° 17.4	21.1	253° 56.8	48.7	354° 56.2	36.5
12	16° 45.8	338° 17.3	N14° 58.0	17° 18.0	S01° 20.3	268° 59.0	N22° 48.7	9° 58.3	N00° 36.6
13	31° 48.2	353° 16.8	14° 59.0	32° 18.7	19.5	284° 01.2	48.6	25° 00.5	36.7
14	46° 50.7	8° 16.3	15° 00.1	47° 19.4	18.7	299° 03.4	48.6	40° 02.7	36.9
15	61° 53.2	23° 15.8	· · 01.2	62° 20.1	· · 18.0	314° 05.7	· · 48.6	55° 04.9	· · 37.0
16	76° 55.6	38° 15.3	02.2	77° 20.8	17.2	329° 07.9	48.6	70° 07.1	37.1
17	91° 58.1	53° 14.7	03.3	92° 21.4	16.4	344° 10.1	48.5	85° 09.2	37.2
18	107° 00.6	68° 14.2	N15° 04.3	107° 22.1	S01° 15.6	359° 12.4	N22° 48.5	100° 11.4	N00° 37.3
19	122° 03.0	83° 13.7	05.4	122° 22.8	14.8	14° 14.6	48.5	115° 13.6	37.4
20	137° 05.5	98° 13.2	06.4	137° 23.5	14.0	29° 16.8	48.5	130° 15.8	37.6
21	152° 08.0	113° 12.7	· · 07.5	152° 24.2	· · 13.3	44° 19.1	· · 48.4	145° 18.0	· · 37.7
22	167° 10.4	128° 12.1	08.6	167° 24.9	12.5	59° 21.3	48.4	160° 20.2	37.8
23	182° 12.9	143° 11.6	09.6	182° 25.5	11.7	74° 23.5	48.4	175° 22.3	37.9
Mer.pass.	10:53	ν -0.5' d 1.1' m -3.92		ν 0.7' d -0.8' m 1.19		ν 2.2' d -0.0' m -2.15		ν 2.2' d 0.1' m 0.93	

Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	197° 15.3	158° 11.1	N15° 10.7	197° 26.2	S01° 10.9	89° 25.7	N22° 48.4	190° 24.5	N00° 38.0
1	212° 17.8	173° 10.6	11.7	212° 26.9	10.1	104° 28.0	48.3	205° 26.7	38.2
2	227° 20.3	188° 10.1	12.8	227° 27.6	09.3	119° 30.2	48.3	220° 28.9	38.3
3	242° 22.7	203° 09.5	· · 13.8	242° 28.3	· · 08.5	134° 32.4	· · 48.3	235° 31.1	· · 38.4
4	257° 25.2	218° 09.0	14.9	257° 28.9	07.8	149° 34.7	48.3	250° 33.2	38.5
5	272° 27.7	233° 08.5	15.9	272° 29.6	07.0	164° 36.9	48.2	265° 35.4	38.6
6	287° 30.1	248° 08.0	N15° 17.0	287° 30.3	S01° 06.2	179° 39.1	N22° 48.2	280° 37.6	N00° 38.8
7	302° 32.6	263° 07.4	18.0	302° 31.0	05.4	194° 41.3	48.2	295° 39.8	38.9
8	317° 35.1	278° 06.9	19.1	317° 31.7	04.6	209° 43.6	48.2	310° 42.0	39.0
9	332° 37.5	293° 06.4	· · 20.1	332° 32.4	· · 03.8	224° 45.8	· · 48.1	325° 44.1	· · 39.1
10	347° 40.0	308° 05.9	21.2	347° 33.0	03.0	239° 48.0	48.1	340° 46.3	39.2
11	2° 42.5	323° 05.3	22.2	2° 33.7	02.3	254° 50.2	48.1	355° 48.5	39.4
12	17° 44.9	338° 04.8	N15° 23.2	17° 34.4	S01° 01.5	269° 52.5	N22° 48.1	10° 50.7	N00° 39.5
13	32° 47.4	353° 04.3	24.3	32° 35.1	01° 00.7	284° 54.7	48.0	25° 52.9	39.6
14	47° 49.8	8° 03.8	25.3	47° 35.8	00° 59.9	299° 56.9	48.0	40° 55.1	39.7
15	62° 52.3	23° 03.2	· · 26.4	62° 36.4	· · 59.1	314° 59.1	· · 48.0	55° 57.2	· · 39.8
16	77° 54.8	38° 02.7	27.4	77° 37.1	58.3	330° 01.4	48.0	70° 59.4	39.9
17	92° 57.2	53° 02.2	28.5	92° 37.8	57.6	345° 03.6	47.9	86° 01.6	40.1
18	107° 59.7	68° 01.6	N15° 29.5	107° 38.5	S00° 56.8	0° 05.8	N22° 47.9	101° 03.8	N00° 40.2
19	123° 02.2	83° 01.1	30.5	122° 39.2	56.0	15° 08.0	47.9	116° 06.0	40.3
20	138° 04.6	98° 00.6	31.6	137° 39.9	55.2	30° 10.3	47.9	131° 08.1	40.4

Sun				Moon			
h	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°26.5	N06°45.0	305°22.9	10.4'	S27°21.1	3.8'	54.1'
1	194°26.7	45.9	319°52.3	10.4'	27°25.0	3.7'	54.1'
2	209°26.8	46.9	334°21.6	10.4'	27°28.6	3.6'	54.1'
3	224°27.0	· · 47.8	348°51.0	10.3'	27°32.2	3.4'	54.1'
4	239°27.2	48.7	3°20.3	10.3'	27°35.6	3.3'	54.1'
5	254°27.4	49.7	17°49.6	10.3'	27°38.9	3.2'	54.1'
6	269°27.5	N06°50.6	32°18.9	10.2'	S27°42.1	3.0'	54.1'
7	284°27.7	51.6	46°48.1	10.2'	27°45.1	2.9'	54.1'
8	299°27.9	52.5	61°17.3	10.2'	27°48.0	2.8'	54.1'
9	314°28.1	· · 53.4	75°46.5	10.2'	27°50.7	2.6'	54.1'
10	329°28.2	54.4	90°15.7	10.1'	27°53.4	2.5'	54.1'
11	344°28.4	55.3	104°44.8	10.1'	27°55.8	2.4'	54.1'
12	359°28.6	N06°56.3	119°13.9	10.1'	S27°58.2	2.2'	54.1'
13	14°28.8	57.2	133°43.0	10.1'	28°00.4	2.1'	54.1'
14	29°28.9	58.1	148°12.1	10.0'	28°02.5	2.0'	54.1'
15	44°29.1	06°59.1	162°41.1	10.0'	28°04.5	1.8'	54.1'
16	59°29.3	07°00.0	177°10.1	10.0'	28°06.3	1.7'	54.1'
17	74°29.5	01.0	191°39.1	10.0'	28°08.0	1.5'	54.1'
18	89°29.6	N07°01.9	206°08.1	10.0'	S28°09.5	1.4'	54.1'
19	104°29.8	02.8	220°37.1	10.0'	28°10.9	1.3'	54.1'
20	119°30.0	03.8	235°06.1	9.9'	28°12.2	1.1'	54.1'
21	134°30.2	· · 04.7	249°35.0	9.9'	28°13.3	1.0'	54.1'
22	149°30.3	05.6	264°03.9	9.9'	28°14.3	0.9'	54.1'
23	164°30.5	06.6	278°32.9	9.9'	28°15.2	0.7'	54.1'
SD = 16.0'		d = 0.9'	SD = 14.8'				

Wed	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°30.7	N07°07.5	293°01.8	9.9'	S28°15.9	0.6'	54.1'
1	194°30.9	08.4	307°30.7	9.9'	28°16.5	0.5'	54.1'
2	209°31.0	09.4	321°59.6	9.9'	28°17.0	0.3'	54.1'
3	224°31.2	· · 10.3	336°28.4	9.9'	28°17.3	0.2'	54.1'
4	239°31.4	11.3	350°57.3	9.9'	28°17.5	0.0'	54.1'
5	254°31.5	12.2	5°26.2	9.9'	28°17.5	-0.1'	54.1'
6	269°31.7	N07°13.1	19°55.0	9.9'	S28°17.4	-0.2'	54.1'
7	284°31.9	14.1	34°23.9	9.9'	28°17.2	-0.4'	54.2'
8	299°32.1	15.0	48°52.8	9.9'	28°16.8	-0.5'	54.2'
9	314°32.2	· · 15.9	63°21.6	9.9'	28°16.3	-0.6'	54.2'
10	329°32.4	16.9	77°50.5	9.9'	28°15.7	-0.8'	54.2'
11	344°32.6	17.8	92°19.3	9.9'	28°14.9	-0.9'	54.2'
12	359°32.8	N07°18.7	106°48.2	9.9'	S28°14.0	-1.1'	54.2'
13	14°32.9	19.7	121°17.1	9.9'	28°12.9	-1.2'	54.2'
14	29°33.1	20.6	135°45.9	9.9'	28°11.8	-1.3'	54.2'
15	44°33.3	· · 21.5	150°14.8	9.9'	28°10.4	-1.5'	54.2'
16	59°33.4	22.5	164°43.7	9.9'	28°09.0	-1.6'	54.2'
17	74°33.6	23.4	179°12.6	9.9'	28°07.4	-1.7'	54.2'
18	89°33.8	N07°24.3	193°41.5	9.9'	S28°05.6	-1.9'	54.2'
19	104°34.0	25.3	208°10.4	9.9'	28°03.8	-2.0'	54.2'
20	119°34.1	26.2	222°39.3	9.9'	28°01.7	-2.1'	54.3'
21	134°34.3	· · 27.1	237°08.2	9.9'	27°59.6	-2.3'	54.3'
22	149°34.5	28.1	251°37.1	9.9'	27°57.3	-2.4'	54.3'
23	164°34.6	29.0	266°06.1	10.0'	27°54.9	-2.6'	54.3'
SD = 16.0'		d = 0.9'	SD = 14.8'				

Thu	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°34.8	N07°29.9	280°35.0	10.0'	S27°52.3	-2.7'	54.3'
1	194°35.0	30.8	295°04.0	10.0'	27°49.6	-2.8'	54.3'
2	209°35.2	31.8	309°33.0	10.0'	27°46.8	-3.0'	54.3'
3	224°35.3	· · 32.7	324°02.0	10.0'	27°43.8	-3.1'	54.3'
4	239°35.5	33.6	338°31.0	10.0'	27°40.7	-3.2'	54.3'
5	254°35.7	34.6	353°00.0	10.1'	27°37.5	-3.4'	54.4'
6	269°35.8	N07°35.5	7°29.1	10.1'	S27°34.1	-3.5'	54.4'
7	284°36.0	36.4	21°58.2	10.1'	27°30.6	-3.6'	54.4'
8	299°36.2	37.4	36°27.3	10.1'	27°27.0	-3.8'	54.4'
9	314°36.4	· · 38.3	50°56.4	10.1'	27°23.2	-3.9'	54.4'
10	329°36.5	39.2	65°25.6	10.2'	27°19.3	-4.0'	54.4'
11	344°36.7	40.1	79°54.7	10.2'	27°15.3	-4.2'	54.4'
12	359°36.9	N07°41.1	94°23.9	10.2'	S27°11.1	-4.3'	54.5'
13	14°37.0	42.0	108°53.1	10.2'	27°06.8	-4.4'	54.5'
14	29°37.2	42.9	123°22.4	10.3'	27°02.4	-4.6'	54.5'
15	44°37.4	· · 43.9	137°51.7	10.3'	26°57.8	-4.7'	54.5'
16	59°37.5	44.8	152°20.9	10.3'	26°53.1	-4.8'	54.5'
17	74°37.7	45.7	166°50.3	10.4'	26°48.2	-5.0'	54.5'
18	89°37.9	N07°46.6	181°19.6	10.4'	S26°43.3	-5.1'	54.5'
19	104°38.0	47.6	195°49.0	10.4'	26°38.2	-5.2'	54.6'
20	119°38.2	48.5	210°18.4	10.4'	26°32.9	-5.4'	54.6'
21	134°38.4	· · 49.4	224°47.9	10.5'	26°27.6	-5.5'	54.6'
22	149°38.6	50.3	239°17.3	10.5'	26°22.1	-5.6'	54.6'
23	164°38.7	51.3	253°46.9	10.5'	26°16.5	-5.7'	54.6'
SD = 16.0'		d = 0.9'	SD = 14.8'				

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

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

Day	Sun		Mer. Pass	Moon		Age 19-21 79-62%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Upper	Lower	
07	02:14	02:06	12:02	03:46	16:12	
08	01:57	01:49	12:02	04:37	17:03	
09	01:41	01:33	12:02	05:29	17:55	

April 10, 11, 12 UT (Fri., Sat., Sun.)

	Aries			Venus			Mars			Jupiter			Saturn		
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec		
0	199°14.5	157°58.5	N15°35.7	197°42.6	S00°52.1	90°19.1	N22°47.8	191°16.9	N00°40.9						
1	213°17.0	172°57.9	36.8	212°43.3	51.3	105°21.4	47.7	206°19.0	41.0						
2	228°19.4	187°57.4	37.8	227°44.0	50.5	120°23.6	47.7	221°21.2	41.1						
3	243°21.9	202°56.9	· · 38.8	242°44.6	· · 49.7	135°25.8	· · 47.7	236°23.4	· · 41.2						
4	258°24.3	217°56.3	39.9	257°45.3	48.9	150°28.0	47.7	251°25.6	41.4						
5	273°26.8	232°55.8	40.9	272°46.0	48.1	165°30.3	47.6	266°27.8	41.5						
6	288°29.3	247°55.3	N15°41.9	287°46.7	S00°47.3	180°32.5	N22°47.6	281°30.0	N00°41.6						
7	303°31.7	262°54.7	43.0	302°47.4	46.6	195°34.7	47.6	296°32.1	41.7						
8	318°34.2	277°54.2	44.0	317°48.0	45.8	210°36.9	47.5	311°34.3	41.8						
9	333°36.7	292°53.7	· · 45.0	332°48.7	· · 45.0	225°39.1	· · 47.5	326°36.5	· · 42.0						
10	348°39.1	307°53.1	46.1	347°49.4	44.2	240°41.3	47.5	341°38.7	42.1						
11	3°41.6	322°52.6	47.1	2°50.1	43.4	255°43.6	47.5	356°40.9	42.2						
12	18°44.1	337°52.0	N15°48.1	17°50.8	S00°42.6	270°45.8	N22°47.4	11°43.0	N00°42.3						
13	33°46.5	352°51.5	49.1	32°51.5	41.9	285°48.0	47.4	26°45.2	42.4						
14	48°49.0	7°51.0	50.2	47°52.1	41.1	300°50.2	47.4	41°47.4	42.5						
15	63°51.4	22°50.4	· · 51.2	62°52.8	· · 40.3	315°52.4	· · 47.4	56°49.6	· · 42.7						
16	78°53.9	37°49.9	52.2	77°53.5	39.5	330°54.7	47.3	71°51.8	42.8						
17	93°56.4	52°49.4	53.3	92°54.2	38.7	345°56.9	47.3	86°54.0	42.9						
18	108°58.8	67°48.8	N15°54.3	107°54.9	S00°37.9	0°59.1	N22°47.3	101°56.1	N00°43.0						
19	124°01.3	82°48.3	55.3	122°55.6	37.1	16°01.3	47.3	116°58.3	43.1						
20	139°03.8	97°47.7	56.3	137°56.3	36.4	31°03.5	47.2	132°00.5	43.3						
21	154°06.2	112°47.2	· · 57.3	152°56.9	· · 35.6	46°05.7	· · 47.2	147°02.7	· · 43.4						
22	169°08.7	127°46.6	58.4	167°57.6	34.8	61°07.9	47.2	162°04.9	43.5						
23	184°11.2	142°46.1	59.4	182°58.3	34.0	76°10.2	47.2	177°07.0	43.6						
Mer.pass. 10:45 $\nu$ -0.5' d 1.0' m -3.92 $\nu$ 0.7' d -0.8' m 1.20 $\nu$ 2.2' d -0.0' m -2.14 $\nu$ 2.2' d 0.1' m 0.93															

	SHA		Dec
Alpheratz	357°34.1	29°14.0	
Ankaa	353°06.5	-42°09.8	
Schedar	349°30.4	56°40.8	
Diphda	348°46.6	-17°50.6	
Achernar	335°20.0	-57°06.2	
Hamal	327°50.4	23°35.1	
Polaris	313°57.3	89°22.6	
Acamar	315°11.4	-40°12.1	
Menkar	314°05.4	4°11.5	
Mirfak	308°27.2	49°57.3	
Aldebaran	290°38.7	16°33.7	
Rigel	281°03.1	-8°10.4	
Capella	280°20.6	46°01.6	
Bellatrix	278°21.9	6°22.3	
Elnath	278°00.7	28°37.8	
Alnilam	275°36.8	-1°11.2	
Betelgeuse	270°51.1	7°24.6	
Canopus	263°52.1	-52°42.8	
Sirius	258°25.4	-16°45.3	
Adhara	255°05.1	-29°00.7	
Procyon	244°49.8	5°09.4	
Pollux	243°16.0	27°57.8	
Avior	234°14.2	-59°35.9	
Suhail	222°45.4	-43°32.6	
Miaplacidus	221°37.7	-69°49.8	
Alphard	217°46.6	-8°46.5	
Regulus	207°33.1	11°50.2	
Dubhe	193°39.2	61°36.6	
Denebola	182°23.6	14°25.4	
Gienah	175°42.2	-17°41.5	
Acrux	172°58.3	-63°14.9	
Gacrux	171°50.0	-57°15.8	
Alioth	166°11.5	55°48.9	
Spica	158°20.9	-11°18.1	
Alkaid	152°50.7	49°10.8	
Hadar	148°33.9	-60°30.0	
Menkent	147°56.0	-36°30.1	
Arcturus	145°46.6	19°02.7	
Rigel Kent.	139°38.3	-60°56.6	
Kochab	137°18.7	74°02.6	
Zuben'ubi	136°54.6	-16°09.2	
Alphecca	126°02.6	26°37.3	
Antares	112°14.3	-26°29.4	
Atria	107°07.3	-69°04.3	
Sabik	102°01.4	-15°45.5	
Shaula	96°08.8	-37°07.3	
Rasalhague	95°57.4	12°32.2	
Eltanin	90°41.5	51°28.8	
Kaus Aust.	83°31.0	-34°22.2	
Vega	80°32.4	38°48.1	
Nunki	75°46.4	-26°15.8	
Altair	61°59.0	8°56.1	
Peacock	53°04.2	-56°38.8	
Deneb	49°25.3	45°22.1	
Enif	33°38.0	9°59.6	
Al Na'ir	27°31.9	-46°49.9	
Fomalhaut	15°13.7	-29°29.0	
Scheat	13°44.5	28°13.4	
Markab	13°29.1	15°20.7	

Sat	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	199°13.6	157°45.6	N16°00.4	197°59.0	S00°33.2	91°12.4	N22°47.1	192°09.2	N00°43.7
1	214°16.1	172°45.0	01.4	212°59.7	32.4	106°14.6	47.1	207°11.4	43.8
2	229°18.6	187°44.5	02.5	228°00.4	31.7	121°16.8	47.1	222°13.6	44.0
3	244°21.0	202°43.9	· · 03.5	243°01.0	· · 30.9	136°19.0	· · 47.0	237°15.8	· · 44.1
4	259°23.5	217°43.4	04.5	258°01.7	30.1	151°21.2	47.0	252°18.0	44.2
5	274°25.9	232°42.8	05.5	273°02.4	29.3	166°23.4	47.0	267°20.1	44.3
6	289°28.4	247°42.3	N16°06.5	288°03.1	S00°28.5	181°25.7	N22°47.0	282°22.3	N00°44.4
7	304°30.9	262°41.8	07.5	303°03.8	27.7	196°27.9	46.9	297°24.5	44.6
8	319°33.3	277°41.2	08.6	318°04.5	26.9	211°30.1	46.9	312°26.7	44.7
9	334°35.8	292°40.7	· · 09.6	333°05.1	· · 26.2	226°32.3	· · 46.9	327°28.9	· · 44.8
10	349°38.3	307°40.1	10.6	348°05.8	25.4	241°34.5	46.9	342°31.0	44.9
11	4°40.7	322°39.6	11.6	3°06.5	24.6	256°36.7	46.8	357°33.2	45.0
12	19°43.2	337°39.0	N16°12.6	18°07.2	S00°23.8	271°38.9	N22°46.8	12°35.4	N00°45.1
13	34°45.7	352°38.5	13.6	33°07.9	23.0	286°41.1	46.8	27°37.6	45.3
14	49°48.1	7°37.9	14.6	48°08.6	22.2	301°43.3	46.7	42°39.8	45.4
15	64°50.6	22°37.4	· · 15.6	63°09.2	· · 21.5	316°45.6	· · 46.7	57°42.0	· · 45.5
16	79°53.1	37°36.8	16.6	78°09.9	20.7	331°47.8	46.7	72°44.1	45.6
17	94°55.5	52°36.3	17.7	93°10.6	19.9	346°50.0	46.7	87°46.3	45.7
18	109°58.0	67°35.7	N16°18.7	108°11.3	S00°19.1	1°52.2	N22°46.6	102°48.5	N00°45.9
19	125°00.4	82°35.2	19.7	123°12.0	18.3	16°54.4	46.6	117°50.7	46.0
20	140°02.9	97°34.6	20.7	138°12.7	17.5	31°56.6	46.6	132°52.9	46.1
21	155°05.4	112°34.1	· · 21.7	153°13.4	· · 16.8	46°58.8	· · 46.6	147°55.1	· · 46.2
22	170°07.8	127°33.5	22.7	168°14.0	16.0	62°01.0	46.5	162°57.2	46.3
23	185°10.3	142°33.0	23.7	183°14.7	15.2	77°03.2	46.5	177°59.4	46.4
Mer.pass. 10:41 $\nu$ -0.5' d 1.0' m -3.92 $\nu$ 0.7' d -0.8' m 1.20 $\nu$ 2.2' d -0.0' m -2.13 $\nu$ 2.2' d 0.1' m 0.93									

Sun	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	200°12.8	157°32.4	N16°24.7	198°15.4	S00°14.4	92°05.4	N22°46.5	193°01.6	N00°46.6
1	215°15.2	172°31.9	25.7	213°16.1	13.6	107°07.6	46.4	208°03.8	46.7
2	230°17.7	187°31.3	26.7	228°16.8	12.8	122°09.9	46.4	223°06.0	46.8
3	245°20.2	202°30.8	· · 27.7	243°17.5	· · 12.0	137°12.1	· · 46.4	238°08.2	· · 46.9
4	260°22.6	217°30.2	28.7	258°18.2	11.3	152°14.3	46.4	253°10.3	47.0
5	275°25.1	232°29.6	29.7	273°18.8	10.5	167°16.5	46.3	268°12.5	47.1
6	290°27.6	247°29.1	N16°30.7	288°19.5	S00°09.7	182°18.7	N22°46.3	283°14.7	N00°47.3
7	305°30.0	262°28.5	31.7	303°20.2	08.9	197°20.9	46.3	298°16.9	47.4
8	320°32.5	277°28.0	32.7	318°20.9	08.1	212°23.1	46.2	313°19.1	47.5
9	335°34.9	292°27.4	· · 33.7	333°21.6	· · 07.3	227°25.3	· · 46.2	328°21.2	· · 47.6
10	350°37.4	307°26.9	34.7	348°22.3	06.6	242°27.5	46.2	343°23.4	47.7
11	5°39.9	322°26.3	35.7	3°23.0	05.8	257°29.7	46.2	358°25.6	47.9
12	20°42.3	337°25.7	N16°36.7	18°23.6	S00°05.0	272°31.9	N22°46.1	13°27.8	N00°48.0
13	35°44.8	352°25.2	37.7	33°24.3	04.2	287°34.1	46.1	28°30.0	48.1
14	50°47.3	7°24.6	38.7	48°25.0	03.4	302°36.3	46.1	43°32.2	48.2
15	65°49.7	22°24.1	· · 39.7	63°25.7	· · 02.6	317°38.5	· · 46.0	58°34.3	· · 48.3
16	80°52.2	37°23.5	40.7	78°26.4	01.9	332°40.7	46.0	73°36.5	48.4
17	95°54.7	52°23.0	41.7	93°27.1	01.1	347°42.9	46.0	88°38.7	48.6
18	110°57.1	67°22.4	N16°42.6	108°27.8	S00°00.3	2°45.1	N22°46.0	103°40.9	N00°48.7
19	125°59.6	82°21.8	43.6	123°28.4	N00°00.5	17°47.3	45.9	118°43.1	48.8
20	141°02.0	97°21.3	44.6	138°29.1	01.3	32°49.5	45.9	133°45.3	48.9
21	156°04.5	112°20.7	· · 45.6	153°29.8	· · 02.1	47°51.7	· · 45.9	148°47.4	· · 49.0
22	171°07.0	127°20.1	46.6	168°30.5	02.8	62°53.9	45.8	163°49.6	49.1
23	186°09.4	142°19.6	47.6	183°31.2	03.6	77°56.1	45.8	178°51.8	49.3
Mer.pass. 10:37 $\nu$ -0.6' d 1.0' m -3.92 $\nu$ 0.7' d -0.8' m 1.20 $\nu$ 2.2' d -0.0' m -2.13 $\nu$ 2.2' d 0.1' m 0.93									

Apr 10 Fri	SHA	Mer.pass
Venus	319°44.0	13:29
Mars	359°28.1	10:49
Jupiter	252°04.7	17:56
Saturn	353°02.4	11:13

Apr 11 Sat	SHA	Mer.pass
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h	Sun			Moon				
	GHA	Dec		GHA	$\nu$	Dec	$d$	HP
0	179°38.9	N07°52.2		268°16.4	10.6'	S26°10.7	-5.9'	54.7'
1	194°39.1	53.1		282°46.0	10.6'	26°04.9	-6.0'	54.7'
2	209°39.2	54.1		297°15.6	10.6'	25°58.9	-6.1'	54.7'
3	224°39.4	· · 55.0		311°45.2	10.7'	25°52.7	-6.3'	54.7'
4	239°39.6	55.9		326°14.9	10.7'	25°46.5	-6.4'	54.7'
5	254°39.7	56.8		340°44.6	10.7'	25°40.1	-6.5'	54.7'
6	269°39.9	N07°57.8		355°14.3	10.8'	S25°33.6	-6.6'	54.8'
7	284°40.1	58.7		9°44.1	10.8'	25°26.9	-6.8'	54.8'
8	299°40.2	07°59.6		24°13.9	10.9'	25°20.2	-6.9'	54.8'
9	314°40.4	08°00.5		38°43.8	10.9'	25°13.3	-7.0'	54.8'
10	329°40.6	01.4		53°13.7	10.9'	25°06.3	-7.1'	54.8'
11	344°40.7	02.4		67°43.6	11.0'	24°59.1	-7.3'	54.9'
12	359°40.9	N08°03.3		82°13.6	11.0'	S24°51.9	-7.4'	54.9'
13	14°41.1	04.2		96°43.6	11.0'	24°44.5	-7.5'	54.9'
14	29°41.2	05.1		111°13.6	11.1'	24°37.0	-7.6'	54.9'
15	44°41.4	· · 06.1		125°43.7	11.1'	24°29.4	-7.7'	55.0'
16	59°41.6	07.0		140°13.8	11.2'	24°21.6	-7.9'	55.0'
17	74°41.7	07.9		154°44.0	11.2'	24°13.7	-8.0'	55.0'
18	89°41.9	N08°08.8		169°14.2	11.2'	S24°05.8	-8.1'	55.0'
19	104°42.1	09.7		183°44.4	11.3'	23°57.7	-8.2'	55.0'
20	119°42.2	10.7		198°14.7	11.3'	23°49.4	-8.3'	55.1'
21	134°42.4	· · 11.6		212°45.0	11.4'	23°41.1	-8.5'	55.1'
22	149°42.6	12.5		227°15.4	11.4'	23°32.6	-8.6'	55.1'
23	164°42.7	13.4		241°45.8	11.4'	23°24.0	-8.7'	55.1'
SD = 16.0'			d = 0.9'	SD = 14.9'				

Sat	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°42.9	N08°14.4	256°16.2	11.5'	S23°15.3	-8.8'	55.2'
1	194°43.1	15.3	270°46.7	11.5'	23°06.5	-8.9'	55.2'
2	209°43.2	16.2	285°17.2	11.6'	22°57.6	-9.0'	55.2'
3	224°43.4	· · 17.1	299°47.8	11.6'	22°48.5	-9.2'	55.2'
4	239°43.6	18.0	314°18.4	11.6'	22°39.4	-9.3'	55.3'
5	254°43.7	19.0	328°49.0	11.7'	22°30.1	-9.4'	55.3'
6	269°43.9	N08°19.9	343°19.7	11.7'	S22°20.7	-9.5'	55.3'
7	284°44.0	20.8	357°50.4	11.8'	22°11.2	-9.6'	55.4'
8	299°44.2	21.7	12°21.2	11.8'	22°01.6	-9.7'	55.4'
9	314°44.4	· · 22.6	26°52.0	11.8'	21°51.9	-9.8'	55.4'
10	329°44.5	23.5	41°22.8	11.9'	21°42.1	-9.9'	55.4'
11	344°44.7	24.5	55°53.7	11.9'	21°32.1	-10.1'	55.5'
12	359°44.9	N08°25.4	70°24.6	12.0'	S21°22.1	-10.2'	55.5'
13	14°45.0	26.3	84°55.6	12.0'	21°11.9	-10.3'	55.5'
14	29°45.2	27.2	99°26.6	12.0'	21°01.6	-10.4'	55.5'
15	44°45.4	· · 28.1	113°57.6	12.1'	20°51.3	-10.5'	55.6'
16	59°45.5	29.0	128°28.7	12.1'	20°40.8	-10.6'	55.6'
17	74°45.7	30.0	142°59.8	12.2'	20°30.2	-10.7'	55.6'
18	89°45.8	N08°30.9	157°31.0	12.2'	S20°19.5	-10.8'	55.7'
19	104°46.0	31.8	172°02.2	12.2'	20°08.7	-10.9'	55.7'
20	119°46.2	32.7	186°33.4	12.3'	19°57.8	-11.0'	55.7'
21	134°46.3	· · 33.6	201°04.7	12.3'	19°46.8	-11.1'	55.8'
22	149°46.5	34.5	215°36.0	12.3'	19°35.7	-11.2'	55.8'
23	164°46.7	35.5	230°07.3	12.4'	19°24.5	-11.3'	55.8'
SD = 16.0'			d = 0.9'	SD = 15.0'			

Sun	GHA	Dec	GHA	$\nu$	Dec	$d$	HP
0	179°46.8	N08°36.4	244°38.7	12.4'	S19°13.2	-11.4'	55.8'
1	194°47.0	37.3	259°10.1	12.4'	19°01.8	-11.5'	55.9'
2	209°47.1	38.2	273°41.6	12.5'	18°50.3	-11.6'	55.9'
3	224°47.3	· · 39.1	288°13.0	12.5'	18°38.6	-11.7'	55.9'
4	239°47.5	40.0	302°44.6	12.5'	18°26.9	-11.8'	56.0'
5	254°47.6	40.9	317°16.1	12.6'	18°15.1	-11.9'	56.0'
6	269°47.8	N08°41.9	331°47.7	12.6'	S18°03.2	-12.0'	56.0'
7	284°47.9	42.8	346°19.3	12.6'	17°51.2	-12.1'	56.1'
8	299°48.1	43.7	0°50.9	12.7'	17°39.1	-12.2'	56.1'
9	314°48.3	· · 44.6	15°22.6	12.7'	17°27.0	-12.3'	56.1'
10	329°48.4	45.5	29°54.3	12.7'	17°14.7	-12.4'	56.2'
11	344°48.6	46.4	44°26.1	12.8'	17°02.3	-12.5'	56.2'
12	359°48.8	N08°47.3	58°57.8	12.8'	S16°49.8	-12.6'	56.2'
13	14°48.9	48.2	73°29.6	12.8'	16°37.3	-12.6'	56.3'
14	29°49.1	49.1	88°01.5	12.9'	16°24.6	-12.7'	56.3'
15	44°49.2	· · 50.1	102°33.3	12.9'	16°11.9	-12.8'	56.3'
16	59°49.4	51.0	117°05.2	12.9'	15°59.1	-12.9'	56.4'
17	74°49.6	51.9	131°37.1	12.9'	15°46.2	-13.0'	56.4'
18	89°49.7	N08°52.8	146°09.1	13.0'	S15°33.2	-13.1'	56.4'
19	104°49.9	53.7	160°41.0	13.0'	15°20.1	-13.2'	56.5'
20	119°50.0	54.6	175°13.0	13.0'	15°06.9	-13.3'	56.5'
21	134°50.2	· · 55.5	189°45.0	13.0'	14°53.7	-13.3'	56.5'
22	149°50.3	56.4	204°17.1	13.1'	14°40.3	-13.4'	56.6'
23	164°50.5	57.3	218°49.1	13.1'	14°26.9	-13.5'	56.6'
SD = 16.0'			d = 0.9'	SD = 15.2'			

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

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

Day	Sun		Mer. Pass	Moon		Age 22-24 52-33%
	Eqn. of Time 00 <sup>h</sup> mm:ss	12 <sup>h</sup> mm:ss		Mer. Pass. Upper hh:mm	Lower hh:mm	
10	01:24	01:16	12:01	06:20	18:45	
11	01:08	01:01	12:01	07:09	19:33	
12	00:53	00:45	12:01	07:56	20:20	