

Extract from
The Nautical Almanac 2002

May 4 - June 23

Pages 92-125

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2002 May 9

UT		ARIES	VENUS -3.9		MARS $+1.6$		JUPITER -2.0		SATURN $+0.1$		STARS			
		GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
d	h	°	'	°	'	'	°	'	°	'		'	'	
SATURDAY	4 00	221 42.4	153 27.5 N22	50.4	149 28.5 N23	17.0	119 16.7 N23	09.8	149 02.6 N21	07.2	Acamar	315 25.4	S40 17.9	
	01	236 44.8	168 26.7	50.9	164 29.1	17.2	134 18.7	09.8	164 04.7	07.2	Achernar	335 33.7	S57 13.5	
	02	251 47.3	183 25.9	51.5	179 29.8	17.4	149 20.7	09.7	179 06.9	07.3	Acrux	173 18.8	S63 06.8	
	03	266 49.8	198 25.2	52.0	194 30.4	17.6	164 22.7	09.7	194 09.0	07.3	Adhara	255 19.6	S28 58.7	
	04	281 52.2	213 24.4	52.6	209 31.1	17.9	179 24.7	09.7	209 11.2	07.4	Aldebaran	290 59.8	N16 30.8	
	05	296 54.7	228 23.6	53.1	224 31.8	18.1	194 26.7	09.6	224 13.3	07.4				
	06	311 57.2	243 22.9 N22	53.7	239 32.4 N23	18.3	209 28.8 N23	09.6	239 15.5 N21	07.4	Alioth	166 27.7	N55 57.0	
	07	326 59.6	258 22.1	54.2	254 33.1	18.5	224 30.8	09.6	254 17.6	07.5	Alkaid	153 05.2	N49 18.2	
	08	342 02.1	273 21.3	54.8	269 33.7	18.7	239 32.8	09.5	269 19.8	07.5	Al Na'ir	27 54.7	S46 56.9	
	09	357 04.5	288 20.5	55.3	284 34.4	18.9	254 34.8	09.5	284 21.9	07.6	Alnilam	275 55.5	S 1 12.1	
	10	12 07.0	303 19.8	55.9	299 35.0	19.2	269 36.8	09.5	299 24.1	07.6	Alphard	218 04.7	S 8 40.2	
	11	27 09.5	318 19.0	56.4	314 35.7	19.4	284 38.9	09.4	314 26.2	07.7				
	12	42 11.9	333 18.2 N22	56.9	329 36.3 N23	19.6	299 40.9 N23	09.4	329 28.4 N21	07.7	Alphecca	126 18.0	N26 42.4	
	13	57 14.4	348 17.4	57.5	344 37.0	19.8	314 42.9	09.4	344 30.5	07.7	Alpheratz	357 52.9	N29 05.9	
	14	72 16.9	3 16.7	58.0	359 37.6	20.0	329 44.9	09.3	359 32.7	07.8	Altair	62 16.7	N 8 52.3	
	15	87 19.3	18 15.9	58.6	14 38.3	20.2	344 46.9	09.3	14 34.8	07.8	Ankaa	353 24.6	S42 17.6	
	16	102 21.8	33 15.1	59.1	29 38.9	20.4	359 48.9	09.3	29 37.0	07.9	Antares	112 36.7	S26 26.2	
	17	117 24.3	48 14.3	59.6	44 39.6	20.7	14 50.9	09.2	44 39.1	07.9				
	18	132 26.7	63 13.6 N23	00.2	59 40.2 N23	20.9	29 53.0 N23	09.2	59 41.3 N21	07.9	Arcturus	146 03.4	N19 10.2	
	19	147 29.2	78 12.8	00.7	74 40.9	21.1	44 55.0	09.2	74 43.4	08.0	Atria	107 46.1	S69 01.8	
	20	162 31.6	93 12.0	01.2	89 41.5	21.3	59 57.0	09.1	89 45.6	08.0	Avior	234 21.8	S59 31.3	
	21	177 34.1	108 11.2	01.8	104 42.2	21.5	74 59.0	09.1	104 47.7	08.1	Bellatrix	278 41.7	N 6 21.0	
	22	192 36.6	123 10.5	02.3	119 42.9	21.7	90 01.0	09.1	119 49.9	08.1	Betelgeuse	271 11.0	N 7 24.4	
23	207 39.0	138 09.7	02.8	134 43.5	21.9	105 03.0	09.0	134 52.0	08.1					
SUNDAY	5 00	222 41.5	153 08.9 N23	03.3	149 44.2 N23	22.1	120 05.1 N23	09.0	149 54.2 N21	08.2	Canopus	264 00.4	S52 42.0	
	01	237 44.0	168 08.1	03.9	164 44.8	22.4	135 07.1	09.0	164 56.3	08.2	Capella	280 47.9	N46 00.1	
	02	252 46.4	183 07.3	04.4	179 45.5	22.6	150 09.1	08.9	179 58.5	08.3	Deneb	49 37.5	N45 16.9	
	03	267 48.9	198 06.6	04.9	194 46.1	22.8	165 11.1	08.9	195 00.6	08.3	Denebola	182 42.4	N14 33.6	
	04	282 51.4	213 05.8	05.4	209 46.8	23.0	180 13.1	08.9	210 02.8	08.3	Diphda	349 04.9	S17 58.6	
	05	297 53.8	228 05.0	06.0	224 47.4	23.2	195 15.1	08.8	225 04.9	08.4				
	06	312 56.3	243 04.2 N23	06.5	239 48.1 N23	23.4	210 17.1 N23	08.8	240 07.1 N21	08.4	Dubhe	194 01.9	N61 44.6	
	07	327 58.8	258 03.4	07.0	254 48.7	23.6	225 19.2	08.8	255 09.2	08.5	El Nath	278 24.0	N28 36.6	
	08	343 01.2	273 02.7	07.5	269 49.4	23.8	240 21.2	08.7	270 11.4	08.5	Eltanin	90 49.8	N51 29.1	
	09	358 03.7	288 01.9	08.0	284 50.0	24.0	255 23.2	08.7	285 13.5	08.5	Enif	33 55.8	N 9 52.9	
	10	13 06.1	303 01.1	08.5	299 50.7	24.2	270 25.2	08.7	300 15.7	08.6	Fomalhaut	15 33.7	S29 36.7	
	11	28 08.6	318 00.3	09.1	314 51.3	24.4	285 27.2	08.6	315 17.8	08.6				
	12	43 11.1	332 59.5 N23	09.6	329 52.0 N23	24.7	300 29.2 N23	08.6	330 19.9 N21	08.7	Gacrux	172 10.4	S57 07.7	
	13	58 13.5	347 58.7	10.1	344 52.6	24.9	315 31.2	08.6	345 22.1	08.7	Gienah	176 01.1	S17 33.3	
	14	73 16.0	2 58.0	10.6	359 53.3	25.1	330 33.2	08.5	0 24.2	08.8	Hadar	148 59.9	S60 23.1	
	15	88 18.5	17 57.2	11.1	14 53.9	25.3	345 35.2	08.5	15 26.4	08.8	Hamal	328 11.1	N23 28.2	
	16	103 20.9	32 56.4	11.6	29 54.6	25.5	0 37.3	08.5	30 28.5	08.8	Kaus Aust.	83 55.2	S34 23.0	
	17	118 23.4	47 55.6	12.1	44 55.2	25.7	15 39.3	08.4	45 30.7	08.9				
	18	133 25.9	62 54.8 N23	12.6	59 55.9 N23	25.9	30 41.3 N23	08.4	60 32.8 N21	08.9	Kochab	137 18.2	N74 08.8	
	19	148 28.3	77 54.0	13.1	74 56.6	26.1	45 43.3	08.4	75 35.0	09.0	Markab	13 47.3	N15 12.8	
	20	163 30.8	92 53.2	13.6	89 57.2	26.3	60 45.3	08.3	90 37.1	09.0	Menkar	314 24.6	N 4 05.8	
	21	178 33.3	107 52.5	14.1	104 57.9	26.5	75 47.3	08.3	105 39.3	09.0	Menkent	148 17.6	S36 22.9	
	22	193 35.7	122 51.7	14.7	119 58.5	26.7	90 49.3	08.3	120 41.4	09.1	Miaplacidus	221 41.7	S69 43.8	
23	208 38.2	137 50.9	15.2	134 59.2	26.9	105 51.3	08.2	135 43.6	09.1					
MONDAY	6 00	223 40.6	152 50.1 N23	15.7	149 59.8 N23	27.1	120 53.3 N23	08.2	150 45.7 N21	09.2	Mirfak	308 53.5	N49 52.1	
	01	238 43.1	167 49.3	16.2	165 00.5	27.3	135 55.4	08.2	165 47.9	09.2	Nunki	76 09.0	S26 17.6	
	02	253 45.6	182 48.5	16.6	180 01.1	27.5	150 57.4	08.1	180 50.0	09.2	Peacock	53 32.8	S56 43.5	
	03	268 48.0	197 47.7	17.1	195 01.8	27.7	165 59.4	08.1	195 52.2	09.3	Pollux	243 38.6	N28 01.4	
	04	283 50.5	212 46.9	17.6	210 02.4	27.9	181 01.4	08.1	210 54.3	09.3	Procyon	245 09.0	N 5 13.1	
	05	298 53.0	227 46.2	18.1	225 03.1	28.1	196 03.4	08.0	225 56.4	09.4				
	06	313 55.4	242 45.4 N23	18.6	240 03.7 N23	28.3	211 05.4 N23	08.0	240 58.6 N21	09.4	Rasalhague	96 14.3	N12 33.4	
	07	328 57.9	257 44.6	19.1	255 04.4	28.5	226 07.4	08.0	256 00.7	09.4	Regulus	207 52.7	N11 57.4	
	08	344 00.4	272 43.8	19.6	270 05.0	28.7	241 09.4	07.9	271 02.9	09.5	Rigel	281 20.8	S 8 12.1	
	09	359 02.8	287 43.0	20.1	285 05.7	28.9	256 11.4	07.9	286 05.0	09.5	Rigil Kent.	140 03.3	S60 50.7	
	10	14 05.3	302 42.2	20.6	300 06.3	29.1	271 13.4	07.9	301 07.2	09.6	Sabik	102 22.3	S15 43.7	
	11	29 07.7	317 41.4	21.1	315 07.0	29.3	286 15.4	07.8	316 09.3	09.6				
	12	44 10.2	332 40.6 N23	21.6	330 07.6 N23	29.5	301 17.5 N23	07.8	331 11.5 N21	09.6	Schedar	349 51.2	N56 32.7	
	13	59 12.7	347 39.8	22.0	345 08.3	29.7	316 19.5	07.8	346 13.6	09.7	Shaula	96 33.5	S37 06.3	
	14	74 15.1	2 39.0	22.5	0 08.9	29.9	331 21.5	07.7	1 15.8	09.7	Sirius	258 41.7	S16 43.3	
	15	89 17.6	17 38.3	23.0	15 09.6	30.1	346 23.5	07.7	16 17.9	09.8	Spica	158 40.2	S11 10.4	
	16	104 20.1	32 37.5	23.5	30 10.2	30.3	1 25.5	07.7	31 20.1	09.8	Suhail	222 59.0	S43 26.7	
	17	119 22.5	47 36.7	24.0	45 10.9	30.5	16 27.5	07.6	46 22.2	09.8				
	18	134 25.0	62 35.9 N23	24.5	60 11.5 N23	30.7	31 29.5 N23	07.6	61 24.3 N21	09.9	Vega	80 44.7	N38 46.9	
	19	149 27.5	77 35.1	24.9	75 12.2	30.9	46 31.5	07.6	76 26.5	09.9	Zuben'ubi	137 14.8	S16 03.1	
	20	164 29.9	92 34.3	25.4	90 12.8	31.1	61 33.5	07.5	91 28.6	10.0		SHA	Mer. Pass.	
	21	179 32.4	107 33.5	25.9	105 13.5	31.3	76 35.5	07.5	106 30.8	10.0		h	m	
	22	194 34.9	122 32.7	26.4	120 14.1	31.5	91 37.5	07.4	121 32.9	10.1	Venus	290 27.4	13 48	
23	209 37.3	137 31.9	26.8	135 14.8	31.7	106 39.5	07.4	136 35.1	10.1	Mars	287 02.7	14 00		
										Jupiter	257 23.5	15 58		
										Saturn	287 12.7	13 58		

UT	SUN		MOON				Lat.	Twilight			Moonrise					
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil	Sunrise	4	5	6	7	
d h	° / '	° / '	° / '	'	° / '	'	'	°	h m	h m	h m	h m	h m	h m	h m	h m
4 00	180 48.1	N15 50.9	268 08.4	11.3	S21 40.4	6.8	55.2	N 72	////	////	01 16	████	06 21	05 04	04 30	
01	195 48.1	51.7	282 38.7	11.4	21 33.6	6.8	55.2	N 70	////	////	02 08	████	05 12	04 37	04 16	
02	210 48.2	52.4	297 09.1	11.5	21 26.8	7.0	55.2	68	////	////	02 40	05 11	04 35	04 17	04 04	
03	225 48.2	53.1	311 39.6	11.5	21 19.8	7.1	55.1	66	////	01 30	03 03	04 20	04 09	04 01	03 54	
04	240 48.3	53.9	326 10.1	11.7	21 12.7	7.2	55.1	64	////	02 07	03 21	03 48	03 49	03 48	03 46	
05	255 48.4	54.6	340 40.8	11.7	21 05.5	7.3	55.1	62	////	02 33	03 35	03 24	03 32	03 36	03 39	
06	270 48.4	N15 55.3	355 11.5	11.8	S20 58.2	7.3	55.1	60	01 20	02 52	03 48	03 05	03 18	03 27	03 33	
07	285 48.5	56.0	9 42.3	11.9	20 50.9	7.5	55.0	N 58	01 54	03 09	03 59	02 49	03 06	03 18	03 28	
08	300 48.5	56.8	24 13.2	11.9	20 43.4	7.5	55.0	56	02 18	03 22	04 08	02 35	02 56	03 11	03 23	
09	315 48.6	57.5	38 44.1	12.1	20 35.9	7.7	55.0	54	02 36	03 34	04 16	02 24	02 47	03 04	03 18	
10	330 48.7	58.2	53 15.2	12.1	20 28.2	7.7	55.0	52	02 52	03 44	04 23	02 13	02 38	02 58	03 14	
11	345 48.7	58.9	67 46.3	12.2	20 20.5	7.8	55.0	50	03 05	03 53	04 30	02 04	02 31	02 53	03 11	
12	0 48.8	N15 59.7	82 17.5	12.2	S20 12.7	7.9	54.9	45	03 30	04 11	04 44	01 44	02 15	02 41	03 03	
13	15 48.8	16 00.4	96 48.7	12.4	20 04.8	8.0	54.9	N 40	03 50	04 26	04 56	01 28	02 02	02 31	02 56	
14	30 48.9	01.1	111 20.1	12.4	19 56.8	8.0	54.9	35	04 05	04 38	05 05	01 15	01 51	02 22	02 51	
15	45 48.9	01.8	125 51.5	12.5	19 48.8	8.2	54.9	30	04 18	04 48	05 14	01 03	01 41	02 15	02 46	
16	60 49.0	02.5	140 23.0	12.6	19 40.6	8.2	54.8	20	04 38	05 05	05 29	00 42	01 24	02 02	02 37	
17	75 49.1	03.3	154 54.6	12.6	19 32.4	8.3	54.8	N 10	04 54	05 19	05 41	00 25	01 09	01 51	02 29	
18	90 49.1	N16 04.0	169 26.2	12.8	S19 24.1	8.4	54.8	0	05 07	05 32	05 53	00 08	00 56	01 40	02 22	
19	105 49.2	04.7	183 58.0	12.8	19 15.7	8.4	54.8	S 10	05 18	05 43	06 05	24 42	00 42	01 29	02 15	
20	120 49.2	05.4	198 29.8	12.8	19 07.3	8.6	54.8	20	05 28	05 54	06 17	24 27	00 27	01 18	02 07	
21	135 49.3	06.1	213 01.6	13.0	18 58.7	8.6	54.7	30	05 38	06 06	06 31	24 10	00 10	01 05	01 58	
22	150 49.3	06.9	227 33.6	13.0	18 50.1	8.7	54.7	35	05 43	06 13	06 39	24 00	00 00	00 57	01 53	
23	165 49.4	07.6	242 05.6	13.1	18 41.4	8.8	54.7	40	05 48	06 20	06 49	23 48	24 48	00 48	01 47	
								45	05 53	06 28	06 59	23 35	24 38	00 38	01 41	
5 00	180 49.5	N16 08.3	256 37.7	13.2	S18 32.6	8.8	54.7	S 50	05 59	06 38	07 12	23 18	24 26	00 26	01 33	
01	195 49.5	09.0	271 09.9	13.2	18 23.8	9.0	54.7	52	06 01	06 42	07 18	23 10	24 20	00 20	01 29	
02	210 49.6	09.7	285 42.1	13.3	18 14.8	9.0	54.7	54	06 04	06 46	07 25	23 01	24 13	00 13	01 25	
03	225 49.6	10.5	300 14.4	13.4	18 05.8	9.0	54.6	56	06 07	06 51	07 32	22 52	24 06	00 06	01 20	
04	240 49.7	11.2	314 46.8	13.5	17 56.8	9.2	54.6	58	06 10	06 57	07 40	22 40	23 58	25 15	01 15	
05	255 49.7	11.9	329 19.3	13.5	17 47.6	9.2	54.6	S 60	06 13	07 03	07 50	22 27	23 49	25 09	01 09	
06	270 49.8	N16 12.6	343 51.8	13.6	S17 38.4	9.3	54.6									
07	285 49.8	13.3	358 24.4	13.6	17 29.1	9.3	54.6	Lat.	Sunset	Twilight		Moonset				
08	300 49.9	14.0	12 57.0	13.7	17 19.8	9.4	54.5			Civil	Naut.	4	5	6	7	
09	315 49.9	14.7	27 29.7	13.8	17 10.4	9.5	54.5	°	h m	h m	h m	h m	h m	h m	h m	
10	330 50.0	15.5	42 02.5	13.9	17 00.9	9.6	54.5	N 72	22 48	////	////	████	08 10	10 58	12 59	
11	345 50.0	16.2	56 35.4	13.9	16 51.3	9.6	54.5	N 70	21 51	////	////	████	09 17	11 23	13 11	
12	0 50.1	N16 16.9	71 08.3	14.0	S16 41.7	9.7	54.5	68	21 18	////	////	07 40	09 53	11 41	13 21	
13	15 50.2	17.6	85 41.3	14.1	16 32.0	9.7	54.5	66	20 54	22 30	////	08 31	10 18	11 56	13 29	
14	30 50.2	18.3	100 14.4	14.1	16 22.3	9.8	54.5	64	20 35	21 50	////	09 02	10 38	12 08	13 36	
15	45 50.3	19.0	114 47.5	14.2	16 12.5	9.9	54.4	62	20 20	21 24	////	09 25	10 53	12 19	13 42	
16	60 50.3	19.7	129 20.7	14.2	16 02.6	9.9	54.4	60	20 07	21 03	22 39	09 44	11 06	12 27	13 47	
17	75 50.4	20.4	143 53.9	14.3	15 52.7	10.0	54.4	N 58	19 56	20 47	22 03	09 59	11 18	12 35	13 51	
18	90 50.4	N16 21.1	158 27.2	14.4	S15 42.7	10.1	54.4	56	19 47	20 33	21 38	10 12	11 27	12 42	13 55	
19	105 50.5	21.9	173 00.6	14.4	15 32.6	10.1	54.4	54	19 39	20 21	21 19	10 24	11 36	12 48	13 58	
20	120 50.5	22.6	187 34.0	14.5	15 22.5	10.1	54.4	52	19 31	20 11	21 04	10 34	11 44	12 53	14 02	
21	135 50.6	23.3	202 07.5	14.5	15 12.4	10.3	54.4	50	19 24	20 02	20 50	10 43	11 51	12 58	14 04	
22	150 50.6	24.0	216 41.0	14.6	15 02.1	10.2	54.3	45	19 10	19 43	20 24	11 01	12 05	13 08	14 11	
23	165 50.7	24.7	231 14.6	14.7	14 51.9	10.4	54.3	N 40	18 58	19 28	20 05	11 17	12 17	13 17	14 16	
00	180 50.7	N16 25.4	245 48.3	14.7	S14 41.5	10.4	54.3	35	18 48	19 16	19 49	11 29	12 28	13 24	14 20	
01	195 50.8	26.1	260 22.0	14.8	14 31.1	10.4	54.3	30	18 40	19 05	19 36	11 41	12 36	13 31	14 24	
02	210 50.8	26.8	274 55.8	14.8	14 20.7	10.5	54.3	20	18 25	18 48	19 16	12 00	12 52	13 42	14 31	
03	225 50.9	27.5	289 29.6	14.9	14 10.2	10.6	54.3	N 10	18 12	18 34	19 00	12 16	13 05	13 52	14 37	
04	240 50.9	28.2	304 03.5	14.9	13 59.6	10.6	54.3	0	18 00	18 22	18 47	12 31	13 17	14 01	14 42	
05	255 50.9	28.9	318 37.4	15.0	13 49.0	10.7	54.3	S 10	17 48	18 10	18 35	12 47	13 30	14 10	14 47	
06	270 51.0	N16 29.6	333 11.4	15.0	S13 38.3	10.7	54.3	20	17 36	17 59	18 25	13 03	13 43	14 19	14 53	
07	285 51.0	30.3	347 45.4	15.1	13 27.6	10.7	54.2	30	17 22	17 47	18 15	13 22	13 58	14 30	15 00	
08	300 51.1	31.0	2 19.5	15.2	13 16.9	10.8	54.2	35	17 14	17 40	18 10	13 32	14 06	14 36	15 03	
09	315 51.1	31.7	16 53.7	15.2	13 06.1	10.9	54.2	40	17 04	17 33	18 05	13 45	14 16	14 43	15 07	
10	330 51.2	32.4	31 27.9	15.2	12 55.2	10.9	54.2	45	16 54	17 25	18 00	13 59	14 27	14 51	15 12	
11	345 51.2	33.1	46 02.1	15.3	12 44.3	11.0	54.2	S 50	16 41	17 15	17 54	14 17	14 41	15 01	15 18	
12	0 51.3	N16 33.8	60 36.4	15.3	S12 33.3	11.0	54.2	52	16 35	17 11	17 51	14 25	14 47	15 05	15 21	
13	15 51.3	34.5	75 10.7	15.4	12 22.3	11.0	54.2	54	16 28	17 06	17 49	14 34	14 54	15 10	15 23	
14	30 51.4	35.2	89 45.1	15.4	12 11.3	11.1	54.2	56	16 20	17 01	17 46	14 45	15 02	15 16	15 27	
15	45 51.4	35.9	104 19.5	15.5	12 00.2	11.1	54.2	58	16 12	16 56	17 43	14 56	15 11	15 22	15 30	
16	60 51.5	36.6	118 54.0	15.5	11 49.1	11.2	54.2	S 60	16 03	16 49	17 40	15 10	15 21	15 28	15 34	
17	75 51.5	37.3	133 28.5	15.5	11 37.9	11.2	54.2									
18	90 51.6	N16 38.0	148 03.0	15.6	S11 26.7	11.3	54.2									
19	105 51.6	38.7	162 37.6	15.7	11 15.4	11.3	54.2	Day	SUN		MOON					
20	120 51.6	39.4	177 12.3	15.6	11 04.1	11.3	54.1		Eqn. of Time	Mer.	Mer. Pass.		Age		Phase	
21	135 51.7	40.1	191 46.9	15.8	10 52.8	11.4	54.1		00 ^h	12 ^h	Pass.	Upper	Lower			
22	150 51.7	40.8	206 21.7	15.7	10 41.4	11.5	54.1	d	m s	m s	h m	h m	h m	d	%	
23	165 51.8	41.5	220 56.4	15.8	S10 29.9	11.4	54.1	4	03 12	03 15	11 57	06 20	18 44	22 48		
								5	03 18	03 20	11 57	07 07	19 29	23 39		
								6	03 23	03 25	11 57	07 50	20 12	24 30		

UT	ARIES			VENUS -3.9			MARS +1.7			JUPITER -2.0			SATURN +0.1			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec		
TUESDAY	700	224 39.8	152 31.1 N23 27.3	150 15.4 N23 31.9	121 41.5 N23 07.4	151 37.2 N21 10.1								Acamar	315 25.4 S40 17.8			
	01	239 42.2	167 30.3 27.8	165 16.1 32.1	136 43.5 07.3	166 39.4 10.2								Achernar	335 33.7 S57 13.5			
	02	254 44.7	182 29.5 28.3	180 16.7 32.3	151 45.5 07.3	181 41.5 10.2								Acrux	173 18.8 S63 06.9			
	03	269 47.2	197 28.7 . . 28.7	195 17.4 . . 32.4	166 47.6 . . 07.3	196 43.7 . . 10.3								Adhara	255 19.7 S28 58.7			
	04	284 49.6	212 27.9 29.2	210 18.0 32.6	181 49.6 07.2	211 45.8 10.3								Aldebaran	290 59.8 N16 30.8			
	05	299 52.1	227 27.1 29.7	225 18.7 32.8	196 51.6 07.2	226 47.9 10.3												
	06	314 54.6	242 26.3 N23 30.1	240 19.3 N23 33.0	211 53.6 N23 07.2	241 50.1 N21 10.4								Alioth	166 27.7 N55 57.0			
	07	329 57.0	257 25.5 30.6	255 20.0 33.2	226 55.6 07.1	256 52.2 10.4								Alkaid	153 05.2 N49 18.2			
	08	344 59.5	272 24.8 31.1	270 20.6 33.4	241 57.6 07.1	271 54.4 10.5								Al Na'ir	27 54.7 S46 56.9			
	09	0 02.0	287 24.0 . . 31.5	285 21.3 . . 33.6	256 59.6 . . 07.1	286 56.5 . . 10.5								Alnilam	275 55.5 S 1 12.1			
	10	15 04.4	302 23.2 32.0	300 21.9 33.8	272 01.6 07.0	301 58.7 10.5								Alphard	218 04.7 S 8 40.2			
	11	30 06.9	317 22.4 32.4	315 22.6 34.0	287 03.6 07.0	317 00.8 10.6												
	12	45 09.4	332 21.6 N23 32.9	330 23.2 N23 34.2	302 05.6 N23 07.0	332 03.0 N21 10.6								Alphecca	126 18.0 N26 42.4			
	13	60 11.8	347 20.8 33.4	345 23.9 34.4	317 07.6 06.9	347 05.1 10.7								Alpheratz	357 52.9 N29 05.9			
	14	75 14.3	2 20.0 33.8	0 24.5 34.5	332 09.6 06.9	2 07.2 10.7								Altair	62 16.7 N 8 52.3			
	15	90 16.7	17 19.2 . . 34.3	15 25.2 . . 34.7	347 11.6 . . 06.9	17 09.4 . . 10.7								Ankaa	353 24.6 S42 17.6			
	16	105 19.2	32 18.4 34.7	30 25.8 34.9	2 13.6 06.8	32 11.5 10.8								Antares	112 36.7 S26 26.2			
	17	120 21.7	47 17.6 35.2	45 26.5 35.1	17 15.6 06.8	47 13.7 10.8												
	18	135 24.1	62 16.8 N23 35.6	60 27.1 N23 35.3	32 17.6 N23 06.7	62 15.8 N21 10.9								Arcturus	146 03.4 N19 10.2			
	19	150 26.6	77 16.0 36.1	75 27.8 35.5	47 19.6 06.7	77 18.0 10.9								Atria	107 46.0 S69 01.8			
	20	165 29.1	92 15.2 36.5	90 28.4 35.7	62 21.6 06.7	92 20.1 10.9								Avior	234 21.9 S59 31.3			
	21	180 31.5	107 14.4 . . 37.0	105 29.1 . . 35.9	77 23.6 . . 06.6	107 22.3 . . 11.0								Bellatrix	278 41.7 N 6 21.0			
	22	195 34.0	122 13.6 37.4	120 29.8 36.0	92 25.6 06.6	122 24.4 11.0								Betelgeuse	271 11.1 N 7 24.4			
23	210 36.5	137 12.8 37.9	135 30.4 36.2	107 27.6 06.6	137 26.5 11.1													
WEDNESDAY	800	225 38.9	152 12.0 N23 38.3	150 31.1 N23 36.4	122 29.6 N23 06.5	152 28.7 N21 11.1								Canopus	264 00.4 S52 42.0			
	01	240 41.4	167 11.2 38.8	165 31.7 36.6	137 31.6 06.5	167 30.8 11.1								Capella	280 47.9 N46 00.1			
	02	255 43.8	182 10.4 39.2	180 32.4 36.8	152 33.6 06.5	182 33.0 11.2								Deneb	49 37.4 N45 16.9			
	03	270 46.3	197 09.6 . . 39.6	195 33.0 . . 37.0	167 35.6 . . 06.4	197 35.1 . . 11.2								Denebola	182 42.4 N14 33.6			
	04	285 48.8	212 08.8 40.1	210 33.7 37.2	182 37.6 06.4	212 37.3 11.3								Diphda	349 04.9 S17 58.6			
	05	300 51.2	227 07.9 40.5	225 34.3 37.3	197 39.6 06.4	227 39.4 11.3												
	06	315 53.7	242 07.1 N23 41.0	240 35.0 N23 37.5	212 41.6 N23 06.3	242 41.5 N21 11.3								Dubhe	194 01.9 N61 44.6			
	07	330 56.2	257 06.3 41.4	255 35.6 37.7	227 43.6 06.3	257 43.7 11.4								Elnath	278 24.0 N28 36.6			
	08	345 58.6	272 05.5 41.8	270 36.3 37.9	242 45.6 06.2	272 45.8 11.4								Eltanin	90 49.8 N51 29.1			
	09	1 01.1	287 04.7 . . 42.3	285 36.9 . . 38.1	257 47.6 . . 06.2	287 48.0 . . 11.5								Enif	33 55.8 N 9 52.9			
	10	16 03.6	302 03.9 42.7	300 37.6 38.3	272 49.6 06.2	302 50.1 11.5								Fomalhaut	15 33.7 S29 36.6			
	11	31 06.0	317 03.1 43.1	315 38.2 38.4	287 51.6 06.1	317 52.3 11.5												
	12	46 08.5	332 02.3 N23 43.6	330 38.9 N23 38.6	302 53.6 N23 06.1	332 54.4 N21 11.6								Gacrux	172 10.4 S57 07.7			
	13	61 11.0	347 01.5 44.0	345 39.5 38.8	317 55.6 06.1	347 56.5 11.6								Gienah	176 01.1 S17 33.3			
	14	76 13.4	2 00.7 44.4	0 40.2 39.0	332 57.6 06.0	2 58.7 11.7								Hadar	148 59.9 S60 23.1			
	15	91 15.9	16 59.9 . . 44.9	15 40.8 . . 39.2	347 59.6 . . 06.0	18 00.8 . . 11.7								Hamal	328 11.1 N23 28.2			
	16	106 18.3	31 59.1 45.3	30 41.4 39.3	3 01.6 06.0	33 03.0 11.7								Kaus Aust.	83 55.2 S34 23.0			
	17	121 20.8	46 58.3 45.7	45 42.1 39.5	18 03.6 05.9	48 05.1 11.8												
	18	136 23.3	61 57.5 N23 46.1	60 42.7 N23 39.7	33 05.6 N23 05.9	63 07.3 N21 11.8								Kochab	137 18.2 N74 08.8			
	19	151 25.7	76 56.7 46.6	75 43.4 39.9	48 07.6 05.8	78 09.4 11.9								Markab	13 47.3 N15 12.8			
	20	166 28.2	91 55.9 47.0	90 44.0 40.1	63 09.6 05.8	93 11.5 11.9								Menkar	314 24.6 N 4 05.8			
	21	181 30.7	106 55.1 . . 47.4	105 44.7 . . 40.2	78 11.6 . . 05.8	108 13.7 . . 11.9								Menkent	148 17.6 S36 22.9			
	22	196 33.1	121 54.3 47.8	120 45.3 40.4	93 13.6 05.7	123 15.8 12.0								Miaplacidus	221 41.8 S69 43.8			
23	211 35.6	136 53.4 48.2	135 46.0 40.6	108 15.6 05.7	138 18.0 12.0													
THURSDAY	900	226 38.1	151 52.6 N23 48.7	150 46.6 N23 40.8	123 17.6 N23 05.7	153 20.1 N21 12.1								Mirfak	308 53.5 N49 52.1			
	01	241 40.5	166 51.8 49.1	165 47.3 41.0	138 19.6 05.6	168 22.2 12.1								Nunki	76 09.0 S26 17.6			
	02	256 43.0	181 51.0 49.5	180 47.9 41.1	153 21.6 05.6	183 24.4 12.1								Peacock	53 32.8 S56 43.5			
	03	271 45.4	196 50.2 . . 49.9	195 48.6 . . 41.3	168 23.6 . . 05.6	198 26.5 . . 12.2								Pollux	243 38.6 N28 01.4			
	04	286 47.9	211 49.4 50.3	210 49.2 41.5	183 25.6 05.5	213 28.7 12.2								Procyon	245 09.1 N 5 13.1			
	05	301 50.4	226 48.6 50.7	225 49.9 41.7	198 27.6 05.5	228 30.8 12.3												
	06	316 52.8	241 47.8 N23 51.1	240 50.5 N23 41.8	213 29.6 N23 05.4	243 33.0 N21 12.3								Rasalhague	96 14.3 N12 33.4			
	07	331 55.3	256 47.0 51.6	255 51.2 42.0	228 31.6 05.4	258 35.1 12.3								Regulus	207 52.8 N11 57.4			
	08	346 57.8	271 46.2 52.0	270 51.8 42.2	243 33.6 05.4	273 37.2 12.4								Rigel	281 20.8 S 8 12.1			
	09	2 00.2	286 45.4 . . 52.4	285 52.5 . . 42.4	258 35.6 . . 05.3	288 39.4 . . 12.4								Rigil Kent.	140 03.3 S60 50.7			
	10	17 02.7	301 44.5 52.8	300 53.1 42.5	273 37.6 05.3	303 41.5 12.5								Sabik	102 22.3 S15 43.7			
	11	32 05.2	316 43.7 53.2	315 53.8 42.7	288 39.6 05.3	318 43.7 12.5												
	12	47 07.6	331 42.9 N23 53.6	330 54.4 N23 42.9	303 41.6 N23 05.2	333 45.8 N21 12.5								Schedar	349 51.2 N56 32.7			
	13	62 10.1	346 42.1 54.0	345 55.1 43.0	318 43.6 05.2	348 47.9 12.6								Shaula	96 33.5 S37 06.3			
	14	77 12.6	1 41.3 54.4	0 55.7 43.2	333 45.6 05.1	3 50.1 12.6								Sirius	258 41.7 S16 43.3			
	15	92 15.0	16 40.5 . . 54.8	15 56.4 . . 43.4	348 47.5 . . 05.1	18 52.2 . . 12.7								Spica	158 40.2 S11 10.4			
	16	107 17.5	31 39.7 55.2	30 57.0 43.6	3 49.5 05.1	33 54.4 12.7								Suhail	222 59.0 S43 26.7			
	17	122 19.9	46 38.9 55.6	45 57.7 43.7	18 51.5 05.0	48 56.5 12.7												
	18	137 22.4	61 38.0 N23 56.0	60 58.3 N23 43.9	33 53.5 N23 05.0	63 58.6 N21 12.8								Vega	80 44.6 N38 46.9			
	19	152 24.9	76 37.2 56.4	75 59.0 44.1	48 55.5 05.0	79 00.8 12.8								Zuben'ubi	137 14.8 S16 03.1			
	20	167 27.3	91 36.4 56.8	90 59.6 44.2	63 57.5 04.9	94 02.9 12.9												
	21	182 29.8	106 35.6 . . 57.2	106 00.3 . . 44.4	78 59.5 . . 04.9	109 05.1 . . 12.9												
	22	197 32.3	121 34.8 57.6	121 00.9 44.6	94 01.5 04.8	124 07.2 12.9								Venus	286 33.0 S 13 52			
23	212 34.7	136 34.0 57.9	136 01.6 44.8</															

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.		Civil	7	8	9	10
	° / ' / ''	° / ' / ''	° / ' / ''	° / ' / ''	° / ' / ''	° / ' / ''		° / ' / ''	h m		h m	h m	h m	h m	h m
							°	h m	h m	h m	h m	h m	h m	h m	
							N 72	///	///	00 30	04 30	04 04	03 42	03 19	
							N 70	///	///	01 48	04 16	03 58	03 42	03 26	
7 00	180 51.8	N16 42.2	235 31.2	15.8	S10 18.5	11.5	54.1	///	///	02 25	04 04	03 53	03 42	03 31	
01	195 51.9	42.9	250 06.0	15.9	10 07.0	11.6	54.1	///	///	03 11	03 46	03 44	03 42	03 40	
02	210 51.9	43.6	264 40.9	15.9	9 55.4	11.5	54.1	///	01 05	02 51	03 54	03 48	03 42	03 36	
03	225 51.9	.. 44.3	279 15.8	15.9	9 43.9	11.6	54.1	///	01 52	03 11	03 46	03 44	03 42	03 40	
04	240 52.0	45.0	293 50.7	16.0	9 32.3	11.7	54.1	///	02 21	03 27	03 39	03 41	03 42	03 44	
05	255 52.0	45.7	308 25.7	16.0	9 20.6	11.7	54.1	///	02 50	03 40	03 33	03 38	03 42	03 47	
06	270 52.1	N16 46.4	323 00.7	16.0	S 9 08.9	11.7	54.1	///	03 15	04 01	03 23	03 35	03 42	03 50	
07	285 52.1	47.1	337 35.7	16.1	8 57.2	11.7	54.1	///	03 42	04 18	03 30	03 37	03 42	03 52	
08	300 52.2	47.7	352 10.8	16.1	8 45.5	11.8	54.1	///	04 10	04 48	03 31	03 42	03 42	03 54	
09	315 52.2	.. 48.4	366 45.9	16.1	8 33.7	11.8	54.1	///	04 38	05 26	03 14	03 29	03 43	03 56	
10	330 52.2	49.1	381 21.0	16.1	8 21.9	11.9	54.1	///	05 07	06 05	03 11	03 27	03 43	03 58	
11	345 52.3	49.8	396 56.1	16.2	8 10.0	11.9	54.1	///	05 36	06 44	03 03	03 23	03 43	04 02	
12	0 52.3	N16 50.5	50 31.3	16.2	S 7 58.1	11.9	54.1	///	06 05	07 23	02 56	03 20	03 43	04 06	
13	15 52.4	51.2	65 06.5	16.2	7 46.2	11.9	54.1	///	06 34	08 02	02 51	03 17	03 43	04 09	
14	30 52.4	51.9	79 41.7	16.3	7 34.3	12.0	54.1	///	07 03	09 10	02 46	03 15	03 43	04 11	
15	45 52.4	.. 52.6	94 17.0	16.3	7 22.3	12.0	54.1	///	07 32	09 39	02 37	03 10	03 43	04 16	
16	60 52.5	53.3	108 52.3	16.3	7 10.3	12.0	54.1	///	08 01	10 08	02 29	03 07	03 43	04 20	
17	75 52.5	53.9	123 27.6	16.3	6 58.3	12.0	54.1	///	08 30	11 16	02 22	03 03	03 43	04 24	
18	90 52.6	N16 54.6	138 02.9	16.3	S 6 46.3	12.1	54.1	///	09 00	12 07	02 15	02 59	03 43	04 28	
19	105 52.6	55.3	152 38.2	16.4	6 34.2	12.1	54.1	///	09 30	13 14	02 07	02 56	03 44	04 32	
20	120 52.6	56.0	167 13.6	16.4	6 22.1	12.1	54.1	///	10 00	14 28	02 00	02 51	03 44	04 37	
21	135 52.7	.. 56.7	181 49.0	16.3	6 10.0	12.2	54.1	///	10 30	15 42	01 53	02 49	03 44	04 40	
22	150 52.7	57.4	196 24.3	16.5	5 57.8	12.1	54.1	///	11 00	16 56	01 47	02 46	03 44	04 43	
23	165 52.7	58.1	210 59.8	16.4	5 45.7	12.2	54.1	///	11 30	18 10	01 41	02 42	03 44	04 46	
8 00	180 52.8	N16 58.7	225 35.2	16.4	S 5 33.5	12.2	54.1	///	12 00	19 24	01 33	02 39	03 44	04 51	
01	195 52.8	16 59.4	240 10.6	16.5	5 21.3	12.3	54.1	///	12 30	20 38	01 29	02 37	03 44	04 53	
02	210 52.9	17 00.1	254 46.1	16.5	5 09.0	12.2	54.1	///	13 00	21 52	01 25	02 35	03 45	04 55	
03	225 52.9	.. 00.8	269 21.6	16.4	4 56.8	12.3	54.1	///	13 30	23 06	01 20	02 32	03 45	04 58	
04	240 52.9	01.5	283 57.0	16.5	4 44.5	12.3	54.1	///	14 00	24 20	01 15	02 30	03 45	05 01	
05	255 53.0	02.2	298 32.5	16.5	4 32.2	12.3	54.1	///	14 30	25 34	01 09	02 27	03 45	05 04	
06	270 53.0	N17 02.8	313 08.0	16.6	S 4 19.9	12.4	54.1	///	15 00	26 48	01 00	02 20	03 45	05 07	
07	285 53.0	03.5	327 43.6	16.5	4 07.5	12.3	54.1	///	15 30	28 02	00 50	02 12	03 44	05 10	
08	300 53.1	04.2	342 19.1	16.5	3 55.2	12.4	54.1	///	16 00	29 16	00 41	02 04	03 43	05 13	
09	315 53.1	.. 04.9	356 54.6	16.6	3 42.8	12.4	54.1	///	16 30	30 30	00 32	01 56	03 42	05 16	
10	330 53.1	05.6	371 30.2	16.5	3 30.4	12.4	54.1	///	17 00	31 44	00 24	01 48	03 41	05 19	
11	345 53.2	06.2	386 05.7	16.5	3 18.0	12.4	54.1	///	17 30	32 58	00 16	01 40	03 40	05 22	
12	0 53.2	N17 06.9	40 41.2	16.6	S 3 05.6	12.4	54.1	///	18 00	34 12	00 07	01 32	03 39	05 25	
13	15 53.2	07.6	55 16.8	16.6	2 53.2	12.5	54.1	///	18 30	35 26	00 00	01 24	03 38	05 28	
14	30 53.3	08.3	69 52.4	16.5	2 40.7	12.4	54.1	///	19 00	36 40	00 00	01 16	03 37	05 31	
15	45 53.3	.. 08.9	84 27.9	16.6	2 28.3	12.5	54.1	///	19 30	37 54	00 00	01 08	03 36	05 34	
16	60 53.3	09.6	99 03.5	16.5	2 15.8	12.5	54.1	///	20 00	39 08	00 00	01 00	03 35	05 37	
17	75 53.4	10.3	113 39.0	16.6	2 03.3	12.5	54.1	///	20 30	40 22	00 00	00 52	03 34	05 40	
18	90 53.4	N17 11.0	128 14.6	16.6	S 1 50.8	12.5	54.1	///	21 00	41 36	00 00	00 44	03 33	05 43	
19	105 53.4	11.6	142 50.2	16.5	1 38.3	12.5	54.1	///	21 30	42 50	00 00	00 36	03 32	05 46	
20	120 53.5	12.3	157 25.7	16.6	1 25.8	12.5	54.1	///	22 00	44 04	00 00	00 28	03 31	05 49	
21	135 53.5	.. 13.0	172 01.3	16.5	1 13.3	12.5	54.2	///	22 30	45 18	00 00	00 20	03 30	05 52	
22	150 53.5	13.7	186 36.8	16.6	1 00.8	12.6	54.2	///	23 00	46 32	00 00	00 12	03 29	05 55	
23	165 53.6	14.3	201 12.4	16.5	0 48.2	12.5	54.2	///	23 30	47 46	00 00	00 04	03 28	05 58	
9 00	180 53.6	N17 15.0	215 47.9	16.6	S 0 35.7	12.6	54.2	///	24 00	48 60	00 00	00 00	03 27	06 01	
01	195 53.6	15.7	230 23.5	16.5	0 23.1	12.5	54.2	///	24 30	49 74	00 00	00 00	03 26	06 04	
02	210 53.7	16.3	244 59.0	16.5	S 0 10.6	12.6	54.2	///	25 00	50 88	00 00	00 00	03 25	06 07	
03	225 53.7	.. 17.0	259 34.5	16.5	N 0 02.0	12.6	54.2	///	25 30	52 02	00 00	00 00	03 24	06 10	
04	240 53.7	17.7	274 10.0	16.5	0 14.6	12.5	54.2	///	26 00	53 16	00 00	00 00	03 23	06 13	
05	255 53.7	18.4	288 45.5	16.5	0 27.1	12.6	54.2	///	26 30	54 30	00 00	00 00	03 22	06 16	
06	270 53.8	N17 19.0	303 21.0	16.5	N 0 39.7	12.6	54.2	///	27 00	55 44	00 00	00 00	03 21	06 19	
07	285 53.8	19.7	317 56.5	16.4	0 52.3	12.6	54.2	///	27 30	56 58	00 00	00 00	03 20	06 22	
08	300 53.8	20.4	332 31.9	16.5	1 04.9	12.5	54.2	///	28 00	58 12	00 00	00 00	03 19	06 25	
09	315 53.9	.. 21.0	347 07.4	16.4	1 17.4	12.6	54.2	///	28 30	59 26	00 00	00 00	03 18	06 28	
10	330 53.9	21.7	361 42.8	16.4	1 30.0	12.6	54.3	///	29 00	60 40	00 00	00 00	03 17	06 31	
11	345 53.9	22.4	376 18.2	16.4	1 42.6	12.6	54.3	///	29 30	61 54	00 00	00 00	03 16	06 34	
12	0 53.9	N17 23.0	390 53.6	16.4	N 1 55.2	12.5	54.3	///	30 00	63 08	00 00	00 00	03 15	06 37	
13	15 54.0	23.7	45 29.0	16.4	2 07.7	12.6	54.3	///	30 30	64 22	00 00	00 00	03 14	06 40	
14	30 54.0	24.4	60 04.4	16.3	2 20.3	12.6	54.3	///	31 00	65 36	00 00	00 00	03 13	06 43	
15	45 54.0	.. 25.0	74 39.7	16.4	2 32.9	12.6	54.3	///	31 30	66 50	00 00	00 00	03 12	06 46	
16	60 54.1	25.7	89 15.1	16.3	2 45.5	12.5	54.3	///	32 00	68 04	00 00	00 00	03 11	06 49	
17	75 54.1	26.3	103 50.4	16.2	2 58.0	12.6	54.3	///	32 30	69 18	00 00	00 00	03 10	06 52	
18	90 54.1	N17 27.0	118 25.6	16.3	N 3 10.6	12.5	54.3	///	33 00	70 32	00 00	00 00	03 09	06 55	
19	105 54.1	27.7	133 00.9	16.2	3 23.1	12.6	54.3	///	33 30	71 46	00 00	00 00	03 08	06 58	
20	120 54.2	28.3	147 36.1	16.2	3 35.7	12.5	54.3	///	3						

UT	ARIES	VENUS −3.9		MARS +1.7		JUPITER −2.0		SATURN +0.1		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
10 d h 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	227 37.2	151 33.2	N23 58.3	151 02.2	N23 44.9	124 05.5	N23 04.8	154 11.5	N21 13.0	Acamar	315 25.3	S40 17.8
	242 39.7	166 32.3	58.7	166 02.9	45.1	139 07.5	04.7	169 13.6	13.1	Achernar	335 33.7	S57 13.5
	257 42.1	181 31.5	59.1	181 03.5	45.3	154 09.5	04.7	184 15.8	13.1	Acruz	173 18.8	S63 06.9
	272 44.6	196 30.7	. . 59.5	196 04.2	. . 45.4	169 11.5	. . 04.7	199 17.9	. . 13.1	Adhara	255 19.7	S28 58.7
	287 47.1	211 29.9	23 59.9	211 04.8	45.6	184 13.5	04.6	214 20.1	13.2	Aldebaran	290 59.8	N16 30.8
	302 49.5	226 29.1	24 00.3	226 05.5	45.8	199 15.5	04.6	229 22.2	13.2			
	317 52.0	241 28.3	N24 00.6	241 06.1	N23 45.9	214 17.5	N23 04.5	244 24.3	N21 13.3	Alioth	166 27.8	N55 57.1
	332 54.4	256 27.5	01.0	256 06.8	46.1	229 19.4	04.5	259 26.5	13.3	Alkaid	153 05.2	N49 18.2
	347 56.9	271 26.6	01.4	271 07.4	46.3	244 21.4	04.5	274 28.6	13.3	Al Na'ir	27 54.7	S46 56.9
	2 59.4	286 25.8	. . 01.8	286 08.1	. . 46.4	259 23.4	. . 04.4	289 30.8	. . 13.4	Alnilam	275 55.6	S 1 12.1
	18 01.8	301 25.0	02.2	301 08.7	46.6	274 25.4	04.4	304 32.9	13.4	Alphard	218 04.7	S 8 40.2
	33 04.3	316 24.2	02.5	316 09.4	46.8	289 27.4	04.4	319 35.0	13.5			
	48 06.8	331 23.4	N24 02.9	331 10.0	N23 46.9	304 29.4	N23 04.3	334 37.2	N21 13.5	Alphecca	126 18.0	N26 42.4
	63 09.2	346 22.6	03.3	346 10.7	47.1	319 31.4	04.3	349 39.3	13.5	Alpheratz	357 52.9	N29 05.9
	78 11.7	1 21.7	03.7	1 11.3	47.3	334 33.4	04.2	4 41.4	13.6	Altair	62 16.6	N 8 52.3
	93 14.2	16 20.9	. . 04.0	16 12.0	. . 47.4	349 35.4	. . 04.2	19 43.6	. . 13.6	Ankaa	353 24.6	S42 17.6
	108 16.6	31 20.1	04.4	31 12.6	47.6	4 37.4	04.2	34 45.7	13.7	Antares	112 36.7	S26 26.2
	123 19.1	46 19.3	04.8	46 13.3	47.7	19 39.4	04.1	49 47.9	13.7			
	138 21.5	61 18.5	N24 05.1	61 13.9	N23 47.9	34 41.3	N23 04.1	64 50.0	N21 13.7	Arcturus	146 03.4	N19 10.3
	153 24.0	76 17.6	05.5	76 14.6	48.1	49 43.3	04.1	79 52.1	13.8	Atria	107 46.0	S69 01.8
	168 26.5	91 16.8	05.9	91 15.2	48.2	64 45.3	04.0	94 54.3	13.8	Avior	234 21.9	S59 31.3
	183 28.9	106 16.0	. . 06.2	106 15.9	. . 48.4	79 47.3	. . 04.0	109 56.4	. . 13.9	Bellatrix	278 41.7	N 6 21.0
	198 31.4	121 15.2	06.6	121 16.5	48.6	94 49.3	03.9	124 58.6	13.9	Betelgeuse	271 11.1	N 7 24.4
213 33.9	136 14.4	07.0	136 17.1	48.7	109 51.3	03.9	140 00.7	13.9				
11 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	228 36.3	151 13.5	N24 07.3	151 17.8	N23 48.9	124 53.3	N23 03.9	155 02.8	N21 14.0	Canopus	264 00.4	S52 42.0
	243 38.8	166 12.7	07.7	166 18.4	49.0	139 55.3	03.8	170 05.0	14.0	Capella	280 47.9	N46 00.1
	258 41.3	181 11.9	08.0	181 19.1	49.2	154 57.3	03.8	185 07.1	14.1	Deneb	49 37.4	N45 16.9
	273 43.7	196 11.1	. . 08.4	196 19.7	. . 49.4	169 59.3	. . 03.7	200 09.3	. . 14.1	Denebola	182 42.4	N14 33.6
	288 46.2	211 10.3	08.8	211 20.4	49.5	185 01.2	03.7	215 11.4	14.1	Diphda	349 04.9	S17 58.6
	303 48.7	226 09.4	09.1	226 21.0	49.7	200 03.2	03.7	230 13.5	14.2			
	318 51.1	241 08.6	N24 09.5	241 21.7	N23 49.8	215 05.2	N23 03.6	245 15.7	N21 14.2	Dubhe	194 01.9	N61 44.6
	333 53.6	256 07.8	09.8	256 22.3	50.0	230 07.2	03.6	260 17.8	14.3	Elnath	278 24.1	N28 36.6
	348 56.0	271 07.0	10.2	271 23.0	50.1	245 09.2	03.6	275 19.9	14.3	Eltanin	90 49.8	N51 29.1
	3 58.5	286 06.2	. . 10.5	286 23.6	. . 50.3	260 11.2	. . 03.5	290 22.1	. . 14.3	Enif	33 55.8	N 9 52.9
	19 01.0	301 05.3	10.9	301 24.3	50.5	275 13.2	03.5	305 24.2	14.4	Fomalhaut	15 33.7	S29 36.6
	34 03.4	316 04.5	11.2	316 24.9	50.6	290 15.2	03.4	320 26.4	14.4			
	49 05.9	331 03.7	N24 11.6	331 25.6	N23 50.8	305 17.1	N23 03.4	335 28.5	N21 14.5	Gacrux	172 10.5	S57 07.7
	64 08.4	346 02.9	11.9	346 26.2	50.9	320 19.1	03.4	350 30.6	14.5	Gienah	176 01.1	S17 33.3
	79 10.8	1 02.0	12.3	1 26.9	51.1	335 21.1	03.3	5 32.8	14.5	Hadar	148 59.9	S60 23.1
	94 13.3	16 01.2	. . 12.6	16 27.5	. . 51.2	350 23.1	. . 03.3	20 34.9	. . 14.6	Hamal	328 11.1	N23 28.2
	109 15.8	31 00.4	12.9	31 28.2	51.4	5 25.1	03.2	35 37.1	14.6	Kaus Aust.	83 55.1	S34 23.0
	124 18.2	45 59.6	13.3	46 28.8	51.5	20 27.1	03.2	50 39.2	14.7			
	139 20.7	60 58.8	N24 13.6	61 29.5	N23 51.7	35 29.1	N23 03.2	65 41.3	N21 14.7	Kochab	137 18.2	N74 08.9
	154 23.1	75 57.9	14.0	76 30.1	51.9	50 31.1	03.1	80 43.5	14.7	Markab	13 47.2	N15 12.8
	169 25.6	90 57.1	14.3	91 30.8	52.0	65 33.0	03.1	95 45.6	14.8	Menkar	314 24.6	N 4 05.8
	184 28.1	105 56.3	. . 14.6	106 31.4	. . 52.2	80 35.0	. . 03.0	110 47.7	. . 14.8	Menkent	148 17.6	S36 22.9
	199 30.5	120 55.5	15.0	121 32.1	52.3	95 37.0	03.0	125 49.9	14.9	Miaplacidus	221 41.8	S69 43.8
214 33.0	135 54.6	15.3	136 32.7	52.5	110 39.0	03.0	140 52.0	14.9				
12 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	229 35.5	150 53.8	N24 15.6	151 33.4	N23 52.6	125 41.0	N23 02.9	155 54.2	N21 14.9	Mirfak	308 53.5	N49 52.1
	244 37.9	165 53.0	16.0	166 34.0	52.8	140 43.0	02.9	170 56.3	15.0	Nunki	76 08.9	S26 17.6
	259 40.4	180 52.2	16.3	181 34.7	52.9	155 45.0	02.9	185 58.4	15.0	Peacock	53 32.7	S56 43.5
	274 42.9	195 51.3	. . 16.6	196 35.3	. . 53.1	170 46.9	. . 02.8	201 00.6	. . 15.0	Pollux	243 38.6	N28 01.4
	289 45.3	210 50.5	17.0	211 35.9	53.2	185 48.9	02.8	216 02.7	15.1	Procyon	245 09.1	N 5 13.1
	304 47.8	225 49.7	17.3	226 36.6	53.4	200 50.9	02.7	231 04.8	15.1			
	319 50.3	240 48.9	N24 17.6	241 37.2	N23 53.5	215 52.9	N23 02.7	246 07.0	N21 15.2	Rasalhague	96 14.3	N12 33.4
	334 52.7	255 48.0	17.9	256 37.9	53.7	230 54.9	02.7	261 09.1	15.2	Regulus	207 52.8	N11 57.4
	349 55.2	270 47.2	18.3	271 38.5	53.8	245 56.9	02.6	276 11.2	15.2	Rigel	281 20.8	S 8 12.0
	4 57.6	285 46.4	. . 18.6	286 39.2	. . 54.0	260 58.8	. . 02.6	291 13.4	. . 15.3	Rigel Kent.	140 03.3	S60 50.7
	20 00.1	300 45.5	18.9	301 39.8	54.1	276 00.8	02.5	306 15.5	15.3	Sabik	102 22.3	S15 43.7
	35 02.6	315 44.7	19.2	316 40.5	54.3	291 02.8	02.5	321 17.7	15.4			
	50 05.0	330 43.9	N24 19.5	331 41.1	N23 54.4	306 04.8	N23 02.5	336 19.8	N21 15.4	Schedar	349 51.2	N56 32.7
	65 07.5	345 43.1	19.9	346 41.8	54.6	321 06.8	02.4	351 21.9	15.4	Shaula	96 33.5	S37 06.3
	80 10.0	0 42.2	20.2	1 42.4	54.7	336 08.8	02.4	6 24.1	15.5	Sirius	258 41.7	S16 43.3
	95 12.4	15 41.4	. . 20.5	16 43.1	. . 54.8	351 10.7	. . 02.3	21 26.2	. . 15.5	Spica	158 40.2	S11 10.4
	110 14.9	30 40.6	20.8	31 43.7	55.0	6 12.7	02.3	36 28.3	15.6	Suhail	222 59.0	S43 26.7
	125 17.4	45 39.8	21.1	46 44.4	55.1	21 14.7	02.3	51 30.5	15.6			
	140 19.8	60 38.9	N24 21.4	61 45.0	N23 55.3	36 16.7	N23 02.2	66 32.6	N21 15.6	Vega	80 44.6	N38 46.9
	155 22.3	75 38.1	21.7	76 45.7	55.4	51 18.7	02.2	81 34.7	15.7	Zuben'ubi	137 14.8	S16 03.1
	170 24.8	90 37.3	22.0	91 46.3	55.6	66 20.7	02.1	96 36.9	15.7			
	185 27.2	105 36.4	. . 22.3	106 47.0	. . 55.7	81 22.6	. . 02.1	111 39.0	. . 15.8			
	200 29.7	120 35.6	22.6	121 47.6	55.9	96 24.6	02.1	126 41.2	15.8	Venus	282 37.2	h m 13 56
215 32.1	135 34.8	23.0	136 48.3	56.0	111 26.6	02.0	141 43.3	15.8	Mars	282 41.5	13 54	
									Jupiter	256 17.0	15 38	
									Saturn	286 26.5	13 38	
Mer. Pass.	8 44.1	v −0.8	d 0.3	v 0.6	d 0.2	v 2.0	d 0.0	v 2.1	d 0.0			

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise											
	GHA	Dec	GHA	ν	Dec	d		HP	Naut.		Civil	10	11	12	13							
	$^{\circ}$ / $'$	$^{\circ}$ / $'$	$^{\circ}$ / $'$	$'$ / $''$	$^{\circ}$ / $'$	$'$ / $''$		$'$ / $''$	$^{\circ}$		h m	h m	h m	h m	h m	h m	h m	h m				
10 F R I D A Y	180	54.3	N17	31.0	205	56.8	16.1	N	4	25.8	12.5	54.4	N 72	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	03 19	02 53	02 17	<input type="checkbox"/>		
	01	195	54.3		31.6	220	31.9	16.1		4	38.3	12.4	54.4	N 70	////	////	01 25	03 26	03 08	02 45	02 06	
	02	210	54.3		32.3	235	07.0	16.0		4	50.7	12.5	54.4	68	////	////	02 10	03 31	03 20	03 06	02 47	
	03	225	54.3		32.9	249	42.0	16.0		5	03.2	12.5	54.4	66	////	00 28	02 39	03 36	03 30	03 23	03 15	
	04	240	54.4		33.6	264	17.0	16.0		5	15.7	12.4	54.4	64	////	01 35	03 01	03 40	03 38	03 37	03 37	
	05	255	54.4		34.3	278	52.0	16.0		5	28.1	12.5	54.4	62	////	02 09	03 18	03 44	03 46	03 49	03 55	
	06	270	54.4	N17	34.9	293	27.0	15.9	N	5	40.6	12.4	54.5	60	00 25	02 33	03 33	03 47	03 52	03 59	04 09	
	07	285	54.4		35.6	308	01.9	15.9		5	53.0	12.4	54.5	N 58	01 25	02 52	03 45	03 50	03 58	04 08	04 22	
	08	300	54.5		36.2	322	36.8	15.8		6	05.4	12.4	54.5	56	01 56	03 07	03 55	03 52	04 03	04 16	04 32	
	09	315	54.5		36.9	337	11.6	15.8		6	17.8	12.3	54.5	54	02 19	03 20	04 05	03 54	04 07	04 23	04 42	
	10	330	54.5		37.5	351	46.4	15.8		6	30.1	12.4	54.5	52	02 36	03 32	04 13	03 56	04 11	04 29	04 51	
	11	345	54.5		38.2	366	21.2	15.7		6	42.5	12.3	54.5	50	02 51	03 42	04 20	03 58	04 15	04 35	04 58	
	12	0	54.5	N17	38.8	381	55.9	15.7	N	6	54.8	12.3	54.5	45	03 20	04 02	04 36	04 02	04 23	04 47	05 15	
	13	15	54.6		39.5	396	30.6	15.7		7	07.1	12.3	54.5	N 40	03 42	04 19	04 49	04 06	04 30	04 57	05 28	
	14	30	54.6		40.2	411	05.3	15.6		7	19.4	12.3	54.6	35	03 59	04 32	05 00	04 09	04 36	05 06	05 40	
	15	45	54.6		40.8	426	39.9	15.5		7	31.7	12.2	54.6	30	04 12	04 44	05 09	04 11	04 41	05 14	05 50	
	16	60	54.6		41.5	441	14.4	15.6		7	43.9	12.3	54.6	20	04 35	05 02	05 26	04 16	04 50	05 27	06 07	
	17	75	54.7		42.1	456	14.4	15.6		7	56.2	12.2	54.6	N 10	04 52	05 18	05 40	04 20	04 58	05 39	06 23	
	18	90	54.7	N17	42.8	471	23.4	15.5	N	8	08.4	12.1	54.6	0	05 06	05 31	05 53	04 24	05 06	05 50	06 37	
	19	105	54.7		43.4	486	57.9	15.4		8	20.5	12.2	54.6	S 10	05 18	05 44	06 06	04 28	05 14	06 01	06 52	
	20	120	54.7		44.1	501	32.3	15.3		8	32.7	12.1	54.6	20	05 30	05 56	06 20	04 32	05 22	06 13	07 07	
	21	135	54.7		44.7	516	66.6	15.3		8	44.8	12.1	54.7	30	05 41	06 10	06 35	04 37	05 31	06 27	07 25	
	22	150	54.8		45.4	531	40.9	15.3		8	56.9	12.1	54.7	35	05 47	06 17	06 44	04 40	05 37	06 35	07 36	
23	165	54.8		46.0	546	15.2	15.2		9	09.0	12.0	54.7	40	05 53	06 25	06 54	04 43	05 43	06 45	07 48		
													45	05 59	06 35	07 06	04 46	05 50	06 56	08 02		
11 S A T U R D A Y	180	54.8	N17	46.6	195	49.4	15.2	N	9	21.0	12.0	54.7	S 50	06 06	06 46	07 21	04 51	05 59	07 09	08 20		
	01	195	54.8		47.3	210	23.6	15.1		9	33.0	12.0	54.7	52	06 09	06 50	07 28	04 53	06 03	07 15	08 28	
	02	210	54.8		47.9	224	57.7	15.0		9	45.0	11.9	54.7	54	06 13	06 56	07 35	04 55	06 08	07 22	08 38	
	03	225	54.9		48.6	239	31.7	15.0		9	56.9	11.9	54.7	56	06 16	07 02	07 43	04 58	06 13	07 30	08 48	
	04	240	54.9		49.2	254	05.7	15.0		10	08.8	11.9	54.8	58	06 20	07 08	07 53	05 01	06 18	07 38	09 00	
	05	255	54.9		49.9	268	39.7	14.9		10	20.7	11.8	54.8	S 60	06 24	07 15	08 04	05 04	06 24	07 48	09 15	
	06	270	54.9	N17	50.5	283	13.6	14.9	N10	10	32.5	11.8	54.8									
	07	285	54.9		51.2	297	47.5	14.8		10	44.3	11.8	54.8	Lat.	Sunset	Twilight		Moonset				
	08	300	54.9		51.8	312	21.3	14.7		10	56.1	11.7	54.8			Civil	Naut.	10	11	12	13	
	09	315	55.0		52.5	326	55.0	14.7		11	07.8	11.7	54.8									
	10	330	55.0		53.1	341	28.7	14.6		11	19.5	11.7	54.9									
	11	345	55.0		53.7	356	02.3	14.6		11	31.2	11.6	54.9	N 72	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18 32	20 39	<input type="checkbox"/>	<input type="checkbox"/>	
	12	0	55.0	N17	54.4	10	35.9	14.5	N11	11	42.8	11.6	54.9	N 70	22 35	////	////	18 19	20 12	22 27	<input type="checkbox"/>	
	13	15	55.0		55.0	25	09.4	14.4		11	54.4	11.5	54.9	68	21 47	////	////	18 09	19 52	21 47	24 15	
	14	30	55.0		55.7	39	42.8	14.4		12	05.9	11.5	54.9	66	21 17	////	////	18 00	19 37	21 20	23 14	
	15	45	55.0		56.3	54	16.2	14.4		12	17.4	11.5	54.9	64	20 54	22 23	////	17 53	19 24	20 59	22 40	
	16	60	55.1		56.9	68	49.6	14.2		12	28.9	11.4	54.9	62	20 37	21 47	////	17 47	19 13	20 43	22 15	
	17	75	55.1		57.6	83	22.8	14.3		12	40.3	11.3	55.0	60	20 22	21 22	////	17 42	19 04	20 29	21 55	
	18	90	55.1	N17	58.2	97	56.1	14.1	N12	12	51.6	11.3	55.0	N 58	20 09	21 03	22 32	17 37	18 56	20 17	21 39	
	19	105	55.1		58.8	112	29.2	14.1		13	02.9	11.3	55.0	56	19 59	20 47	22 00	17 33	18 49	20 07	21 25	
	20	120	55.1		59.5	127	02.3	14.0		13	14.2	11.2	55.0	54	19 49	20 34	21 36	17 30	18 43	19 58	21 14	
	21	135	55.1		60.1	141	35.3	14.0		13	25.4	11.1	55.0	52	19 41	20 22	21 18	17 26	18 37	19 50	21 03	
	22	150	55.1		60.8	156	08.3	13.9		13	36.5	11.2	55.0	50	19 33	20 12	21 03	17 23	18 32	19 43	20 54	
23	165	55.2		61.4	170	41.2	13.8		13	47.7	11.0	55.1	45	19 17	19 51	20 34	17 17	18 21	19 27	20 35		
12 S U N D A Y	180	55.2	N18	02.0	185	14.0	13.7	N13	13	58.7	11.0	55.1	N 40	19 04	19 35	20 12	17 12	18 12	19 15	20 19		
	01	195	55.2		02.7	199	46.7	13.7		14	09.7	11.0	55.1	35	18 53	19 21	19 55	17 07	18 05	19 04	20 05	
	02	210	55.2		03.3	214	19.4	13.7		14	20.7	10.9	55.1	30	18 44	19 10	19 41	17 03	17 58	18 55	19 54	
	03	225	55.2		03.9	228	52.1	13.5		14	31.6	10.8	55.1	20	18 27	18 51	19 18	16 56	17 46	18 39	19 34	
	04	240	55.2		04.6	243	24.6	13.5		14	42.4	10.8	55.2	N 10	18 13	18 35	19 01	16 50	17 36	18 25	19 17	
	05	255	55.2		05.2	257	57.1	13.4		14	53.2	10.7	55.2	0	18 00	18 22	18 47	16 44	17 27	18 12	19 01	
	06	270	55.2	N18	05.8	272	29.5	13.4	N15	15	03.9	10.7	55.2	S 10	17 47	18 09	18 34	16 38	17 17	18 00	18 45	
	07	285	55.3		06.5	287	01.9	13.3		15	14.6	10.6	55.2	20	17 33	17 56	18 23	16 32	17 07	17 46	18 28	
	08	300	55.3		07.1	301	34.2	13.2		15	25.2	10.5	55.2	30	17 17	17 42	18 11	16 25	16 56	17 30	18 09	
	09	315	55.3		07.7	316	06.4	13.1		15	35.7	10.5	55.2	35	17 08	17 35	18 05	16 21	16 50	17 21	17 57	
	10	330	55.3		08.3	330	38.5	13.1		15	46.2	10.5	55.3	40	16 58	17 27	17 59	16 17	16 42	17 11	17 45	
	11	345	55.3		09.0	345	10.6	13.0		15	56.7	10.3	55.3	45	16 46	17 17	17 53	16 11	16 33	16 59	17 29	
	12	0	55.3	N18	09.6	359	42.6	12.9	N16	16	07.0	10.3	55.3	S 50	16 31	17 07	17 46	16 05	16 23	16 44	17 11	
	13	15	55.3		10.2	14	14.5	12.8		16	17.3	10.2	55.3	52	16 25	17 02	17 43	16 02	16 18	16 38	17 02	
	14	30	55.3		10.9	28	46.3	12.8		16	27.5	10.2	55.3	54	16 17	16 56	17 39	15 59	16 13	16 30	16 52	
	15	45	55.3		11.5	43	18.1	12.7		16	37.7	10.1	55.3	56	16 09	16 50	17 36	15 56	16 07</			

2002 MAY 13, 14, 15 (MON., TUES., WED.)

UT	ARIES		VENUS -3.9		MARS +1.7		JUPITER -1.9		SATURN +0.1		STARS			
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec	
13 MONDAY	00	230 34.6	150 34.0 N24	23.3	151 48.9 N23	56.2	126 28.6 N23	02.0	156 45.4 N21	15.9	Acamar	315 25.3 S40	17.8	
	01	245 37.1	165 33.1	23.6	166 49.6	56.3	141 30.6	01.9	171 47.6	15.9	Achernar	335 33.7 S57	13.5	
	02	260 39.5	180 32.3	23.9	181 50.2	56.4	156 32.5	01.9	186 49.7	16.0	Acruz	173 18.9 S63	06.9	
	03	275 42.0	195 31.5	24.2	196 50.9	56.6	171 34.5	01.9	201 51.8	16.0	Adhara	255 19.7 S28	58.7	
	04	290 44.5	210 30.6	24.5	211 51.5	56.7	186 36.5	01.8	216 54.0	16.0	Aldebaran	290 59.8 N16	30.8	
	05	305 46.9	225 29.8	24.8	226 52.1	56.9	201 38.5	01.8	231 56.1	16.1				
	06	320 49.4	240 29.0 N24	25.1	241 52.8 N23	57.0	216 40.5 N23	01.7	246 58.2 N21	16.1	Alioth	166 27.8 N55	57.1	
	07	335 51.9	255 28.1	25.4	256 53.4	57.1	231 42.5	01.7	262 00.4	16.1	Alkaid	153 05.2 N49	18.3	
	08	350 54.3	270 27.3	25.6	271 54.1	57.3	246 44.4	01.7	277 02.5	16.2	Al Na'ir	27 54.6 S46	56.9	
	09	5 56.8	285 26.5	25.9	286 54.7	57.4	261 46.4	01.6	292 04.6	16.2	Alnilam	275 55.6 S 1	12.1	
	10	20 59.3	300 25.6	26.2	301 55.4	57.6	276 48.4	01.6	307 06.8	16.3	Alphard	218 04.7 S 8	40.2	
	11	36 01.7	315 24.8	26.5	316 56.0	57.7	291 50.4	01.5	322 08.9	16.3				
	12	51 04.2	330 24.0 N24	26.8	331 56.7 N23	57.8	306 52.4 N23	01.5	337 11.1 N21	16.3	Alphecca	126 18.0 N26	42.4	
	13	66 06.6	345 23.2	27.1	346 57.3	58.0	321 54.3	01.4	352 13.2	16.4	Alpheratz	357 52.9 N29	05.9	
	14	81 09.1	0 22.3	27.4	1 58.0	58.1	336 56.3	01.4	7 15.3	16.4	Altair	62 16.6 N 8	52.3	
	15	96 11.6	15 21.5	27.7	16 58.6	58.3	351 58.3	01.4	22 17.5	16.5	Ankaa	353 24.5 S42	17.6	
	16	111 14.0	30 20.7	28.0	31 59.3	58.4	7 00.3	01.3	37 19.6	16.5	Antares	112 36.7 S26	26.2	
	17	126 16.5	45 19.8	28.2	46 59.9	58.5	22 02.2	01.3	52 21.7	16.5				
	18	141 19.0	60 19.0 N24	28.5	62 00.6 N23	58.7	37 04.2 N23	01.2	67 23.9 N21	16.6	Arcturus	146 03.4 N19	10.3	
	19	156 21.4	75 18.2	28.8	77 01.2	58.8	52 06.2	01.2	82 26.0	16.6	Atria	107 46.0 S69	01.8	
	20	171 23.9	90 17.3	29.1	92 01.9	58.9	67 08.2	01.2	97 28.1	16.7	Avior	234 21.9 S59	31.3	
	21	186 26.4	105 16.5	29.4	107 02.5	59.1	82 10.2	01.1	112 30.3	16.7	Bellatrix	278 41.7 N 6	21.0	
	22	201 28.8	120 15.7	29.6	122 03.2	59.2	97 12.1	01.1	127 32.4	16.7	Betelgeuse	271 11.1 N 7	24.4	
23	216 31.3	135 14.8	29.9	137 03.8	59.4	112 14.1	01.0	142 34.5	16.8					
14 TUESDAY	00	231 33.7	150 14.0 N24	30.2	152 04.5 N23	59.5	127 16.1 N23	01.0	157 36.7 N21	16.8	Canopus	264 00.5 S52	42.0	
	01	246 36.2	165 13.2	30.5	167 05.1	59.6	142 18.1	01.0	172 38.8	16.9	Capella	280 47.9 N46	00.1	
	02	261 38.7	180 12.3	30.7	182 05.7	59.8	157 20.1	00.9	187 40.9	16.9	Deneb	49 37.4 N45	17.0	
	03	276 41.1	195 11.5	31.0	197 06.4	59.9	172 22.0	00.9	202 43.1	16.9	Denebola	182 42.4 N14	33.6	
	04	291 43.6	210 10.7	31.3	212 07.0	60.0	187 24.0	00.8	217 45.2	17.0	Diphda	349 04.9 S17	58.5	
	05	306 46.1	225 09.8	31.5	227 07.7	60.2	202 26.0	00.8	232 47.3	17.0				
	06	321 48.5	240 09.0 N24	31.8	242 08.3 N24	60.3	217 28.0 N23	00.7	247 49.5 N21	17.0	Dubhe	194 02.0 N61	44.6	
	07	336 51.0	255 08.2	32.1	257 09.0	60.4	232 29.9	00.7	262 51.6	17.1	Elnath	278 24.1 N28	36.6	
	08	351 53.5	270 07.3	32.3	272 09.6	60.6	247 31.9	00.7	277 53.7	17.1	Eltanin	90 49.8 N51	29.1	
	09	6 55.9	285 06.5	32.6	287 10.3	60.7	262 33.9	00.6	292 55.9	17.2	Enif	33 55.7 N 9	52.9	
	10	21 58.4	300 05.7	32.9	302 10.9	60.8	277 35.9	00.6	307 58.0	17.2	Fomalhaut	15 33.7 S29	36.6	
	11	37 00.9	315 04.8	33.1	317 11.6	60.9	292 37.8	00.5	323 00.1	17.2				
	12	52 03.3	330 04.0 N24	33.4	332 12.2 N24	61.1	307 39.8 N23	00.5	338 02.3 N21	17.3	Gacrux	172 10.5 S57	07.7	
	13	67 05.8	345 03.2	33.6	347 12.9	61.2	322 41.8	00.5	353 04.4	17.3	Gienah	176 01.2 S17	33.3	
	14	82 08.2	0 02.3	33.9	2 13.5	61.3	337 43.8	00.4	8 06.5	17.4	Hadar	148 59.9 S60	23.1	
	15	97 10.7	15 01.5	34.2	17 14.2	61.5	352 45.7	00.4	23 08.7	17.4	Hamal	328 11.0 N23	28.2	
	16	112 13.2	30 00.6	34.4	32 14.8	01.6	7 47.7	00.3	38 10.8	17.4	Kaus Aust.	83 55.1 S34	23.0	
	17	127 15.6	44 59.8	34.7	47 15.5	01.7	22 49.7	00.3	53 12.9	17.5				
	18	142 18.1	59 59.0 N24	34.9	62 16.1 N24	01.9	37 51.7 N23	00.2	68 15.1 N21	17.5	Kochab	137 18.2 N74	08.9	
	19	157 20.6	74 58.1	35.2	77 16.8	02.0	52 53.6	00.2	83 17.2	17.6	Markab	13 47.2 N15	12.8	
	20	172 23.0	89 57.3	35.4	92 17.4	02.1	67 55.6	00.2	98 19.4	17.6	Menkar	314 24.6 N 4	05.8	
	21	187 25.5	104 56.5	35.7	107 18.1	02.2	82 57.6	00.1	113 21.5	17.6	Menkent	148 17.6 S36	22.9	
	22	202 28.0	119 55.6	35.9	122 18.7	02.4	97 59.6	00.1	128 23.6	17.7	Miaplacidus	221 41.9 S69	43.8	
23	217 30.4	134 54.8	36.2	137 19.4	02.5	113 01.5	00.0	143 25.8	17.7					
15 WEDNESDAY	00	232 32.9	149 54.0 N24	36.4	152 20.0 N24	02.6	128 03.5 N23	00.0	158 27.9 N21	17.8	Mirfak	308 53.5 N49	52.0	
	01	247 35.4	164 53.1	36.7	167 20.6	02.7	143 05.5	23 00.0	173 30.0	17.8	Nunki	76 08.9 S26	17.6	
	02	262 37.8	179 52.3	36.9	182 21.3	02.9	158 07.5	22 59.9	188 32.1	17.8	Peacock	53 32.7 S56	43.5	
	03	277 40.3	194 51.5	37.1	197 21.9	03.0	173 09.4	59.9	203 34.3	17.9	Pollux	243 38.6 N28	01.4	
	04	292 42.7	209 50.6	37.4	212 22.6	03.1	188 11.4	59.8	218 36.4	17.9	Procyon	245 09.1 N 5	13.1	
	05	307 45.2	224 49.8	37.6	227 23.2	03.2	203 13.4	59.8	233 38.5	17.9				
	06	322 47.7	239 48.9 N24	37.9	242 23.9 N24	03.4	218 15.4 N22	59.7	248 40.7 N21	18.0	Rasalhague	96 14.3 N12	33.4	
	07	337 50.1	254 48.1	38.1	257 24.5	03.5	233 17.3	59.7	263 42.8	18.0	Regulus	207 52.8 N11	57.4	
	08	352 52.6	269 47.3	38.3	272 25.2	03.6	248 19.3	59.7	278 44.9	18.1	Rigel	281 20.8 S 8	12.0	
	09	7 55.1	284 46.4	38.6	287 25.8	03.7	263 21.3	59.6	293 47.1	18.1	Rigil Kent.	140 03.3 S60	50.7	
	10	22 57.5	299 45.6	38.8	302 26.5	03.9	278 23.3	59.6	308 49.2	18.1	Sabik	102 22.3 S15	43.7	
	11	38 00.0	314 44.8	39.0	317 27.1	04.0	293 25.2	59.5	323 51.3	18.2				
	12	53 02.5	329 43.9 N24	39.3	332 27.8 N24	04.1	308 27.2 N22	59.5	338 53.5 N21	18.2	Schedar	349 51.1 N56	32.7	
	13	68 04.9	344 43.1	39.5	347 28.4	04.2	323 29.2	59.4	353 55.6	18.3	Shaula	96 33.5 S37	06.3	
	14	83 07.4	359 42.2	39.7	2 29.1	04.3	338 31.1	59.4	8 57.7	18.3	Sirius	258 41.7 S16	43.2	
	15	98 09.9	14 41.4	40.0	17 29.7	04.5	353 33.1	59.4	23 59.9	18.3	Spica	158 40.2 S11	10.4	
	16	113 12.3	29 40.6	40.2	32 30.4	04.6	8 35.1	59.3	39 02.0	18.4	Suhail	222 59.0 S43	26.7	
	17	128 14.8	44 39.7	40.4	47 31.0	04.7	23 37.1	59.3	54 04.1	18.4				
	18	143 17.2	59 38.9 N24	40.6	62 31.7 N24	04.8	38 39.0 N22	59.2	69 06.3 N21	18.4	Vega	80 44.6 N38	46.9	
	19	158 19.7	74 38.0	40.9	77 32.3	04.9	53 41.0	59.2	84 08.4	18.5	Zuben'ubi	137 14.8 S16	03.1	
	20	173 22.2	89 37.2	41.1	92 32.9	05.1	68 43.0	59.1	99 10.5	18.5				
	21	188 24.6	104 36.4	41.3	107 33.6	05.2	83 44.9	59.1	114 12.7	18.6				
	22	203 27.1	119 35.5	41.5	122 34.2	05.3	98 46.9	59.1	129 14.8	18.6	Venus	278 40.2 S14	00.0	
23	218 29.6	134 34.7	41.7	137 34.9	05.4	113 48.9	59.0	144 16.9	18.6	Mars	280 30.7 S13	51		
										Jupiter	255 42.3 S15	29		
										Saturn	286 02.9 S13	28		

Mer. Pass. 8 32.3

v -0.8 d 0.3

v 0.6 d 0.1

v 2.0 d 0.0

v 2.1 d 0.0

	SHA	Mer. Pass.
	h m	h m
	137 14.8	14 00
		14 00
		14 00
		14 00

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise				
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	13	14	15	16
									h m		h m	h m	h m	h m	h m
MONDAY															
13 00	180 55.4	N18 17.1	174 00.7	12.0	N18 05.9	9.4	55.5	00 56	02 06	02 06	03 04	03 39	03 48	04 17	
01	195 55.4	17.7	188 31.7	11.9	18 15.3	9.4	55.5	01 54	02 47	02 02	03 04	03 39	03 48	04 17	
02	210 55.4	18.3	203 02.6	11.9	18 24.7	9.2	55.6	02 27	03 15	03 04	03 39	03 48	04 17	04 46	
03	225 55.4	19.0	217 33.5	11.7	18 33.9	9.2	55.6	01 17	02 51	03 37	03 39	03 48	04 17	04 46	
04	240 55.4	19.6	232 04.2	11.7	18 43.1	9.1	55.6	01 56	03 10	03 55	04 05	04 24	05 04	05 34	
05	255 55.4	20.2	246 34.9	11.7	18 52.2	9.0	55.6	02 23	03 25	04 09	04 25	04 51	05 34	06 04	
06	270 55.5	N18 20.8	261 05.6	11.5	N19 01.2	9.0	55.6	01 09	02 44	03 38	04 22	04 41	05 11	05 57	
07	285 55.5	21.4	275 36.1	11.5	19 10.2	8.8	55.7	01 45	03 00	03 49	04 32	04 56	05 29	06 16	
08	300 55.5	22.1	290 06.6	11.4	19 19.0	8.8	55.7	02 10	03 14	03 59	04 42	05 08	05 43	06 32	
09	315 55.5	22.7	304 37.0	11.3	19 27.8	8.7	55.7	02 29	03 26	04 08	04 51	05 19	05 56	06 45	
10	330 55.5	23.3	319 07.3	11.2	19 36.5	8.5	55.7	02 45	03 37	04 16	04 58	05 28	06 07	06 57	
11	345 55.5	23.9	333 37.5	11.1	19 45.0	8.5	55.7	03 15	03 58	04 32	05 15	05 49	06 30	07 22	
12	0 55.5	N18 24.5	348 07.6	11.1	N19 53.5	8.4	55.8	03 38	04 15	04 46	05 28	06 05	06 49	07 42	
13	15 55.5	25.1	2 37.7	11.0	20 01.9	8.3	55.8	03 56	04 29	04 57	05 40	06 19	07 05	07 58	
14	30 55.5	25.8	17 07.7	10.9	20 10.2	8.3	55.8	04 10	04 41	05 07	05 50	06 31	07 19	08 12	
15	45 55.5	26.4	31 37.6	10.8	20 18.5	8.1	55.8	04 33	05 01	05 24	06 07	06 52	07 42	08 37	
16	60 55.5	27.0	46 07.4	10.8	20 26.6	8.0	55.8	04 51	05 17	05 39	06 23	07 11	08 02	08 58	
17	75 55.5	27.6	60 37.2	10.7	20 34.6	7.9	55.8	05 06	05 31	05 53	06 37	07 28	08 21	09 17	
18	90 55.5	N18 28.2	75 06.9	10.6	N20 42.5	7.8	55.9	05 19	05 44	06 06	06 52	07 45	08 40	09 37	
19	105 55.5	28.8	89 36.5	10.5	20 50.3	7.8	55.9	05 31	05 57	06 21	07 07	08 04	09 01	09 58	
20	120 55.5	29.4	104 06.0	10.4	20 58.1	7.6	55.9	05 43	06 12	06 37	07 25	08 25	09 25	10 22	
21	135 55.5	30.0	118 35.4	10.4	21 05.7	7.5	55.9	05 49	06 19	06 46	07 36	08 38	09 39	10 37	
22	150 55.5	30.7	133 04.8	10.2	21 13.2	7.5	55.9	05 55	06 28	06 57	07 48	08 52	09 55	10 53	
23	165 55.5	31.3	147 34.0	10.2	21 20.7	7.3	56.0	06 02	06 38	07 10	08 02	09 09	10 14	11 13	
TUESDAY															
14 00	180 55.5	N18 31.9	162 03.2	10.2	N21 28.0	7.2	56.0	06 10	06 49	07 25	08 20	09 31	10 38	11 38	
01	195 55.5	32.5	176 32.4	10.0	21 35.2	7.1	56.0	06 13	06 55	07 32	08 28	09 41	10 50	11 50	
02	210 55.5	33.1	191 01.4	10.0	21 42.3	7.0	56.0	06 17	07 00	07 40	08 38	09 53	11 04	12 04	
03	225 55.5	33.7	205 30.4	9.9	21 49.3	6.9	56.1	06 21	07 07	07 49	08 48	10 06	11 19	12 20	
04	240 55.5	34.3	219 59.3	9.8	21 56.2	6.8	56.1	06 25	07 14	07 59	09 00	10 22	11 37	12 39	
05	255 55.5	34.9	234 28.1	9.7	22 03.0	6.7	56.1	06 29	07 21	08 11	09 15	10 41	12 00	13 03	
06	270 55.5	N18 35.5	248 56.8	9.7	N22 09.7	6.5	56.1								
07	285 55.5	36.1	263 25.5	9.6	22 16.2	6.5	56.1								
08	300 55.5	36.7	277 54.1	9.5	22 22.7	6.3	56.2								
09	315 55.5	37.3	292 22.6	9.4	22 29.0	6.2	56.2								
10	330 55.5	37.9	306 51.0	9.4	22 35.2	6.1	56.2								
11	345 55.5	38.5	321 19.4	9.3	22 41.3	6.0	56.2								
12	0 55.5	N18 39.1	335 47.7	9.2	N22 47.3	5.9	56.2								
13	15 55.5	39.7	350 15.9	9.1	22 53.2	5.8	56.3								
14	30 55.5	40.3	4 44.0	9.1	22 59.0	5.6	56.3								
15	45 55.5	40.9	19 12.1	9.0	23 04.6	5.5	56.3								
16	60 55.5	41.5	33 40.1	9.0	23 10.1	5.4	56.3								
17	75 55.5	42.1	48 08.1	8.8	23 15.5	5.3	56.3								
18	90 55.5	N18 42.7	62 35.9	8.8	N23 20.8	5.1	56.4								
19	105 55.5	43.3	77 03.7	8.7	23 25.9	5.1	56.4								
20	120 55.5	43.9	91 31.4	8.7	23 31.0	4.9	56.4								
21	135 55.5	44.5	105 59.1	8.6	23 35.9	4.7	56.4								
22	150 55.5	45.1	120 26.7	8.5	23 40.6	4.7	56.4								
23	165 55.5	45.7	134 54.2	8.5	23 45.3	4.5	56.5								
WEDNESDAY															
15 00	180 55.5	N18 46.3	149 21.7	8.4	N23 49.8	4.4	56.5								
01	195 55.5	46.9	163 49.1	8.3	23 54.2	4.3	56.5								
02	210 55.5	47.5	178 16.4	8.3	23 58.5	4.1	56.5								
03	225 55.4	48.1	192 43.7	8.2	24 02.6	4.0	56.5								
04	240 55.4	48.7	207 10.9	8.2	24 06.6	3.9	56.6								
05	255 55.4	49.3	221 38.1	8.1	24 10.5	3.7	56.6								
06	270 55.4	N18 49.9	236 05.2	8.0	N24 14.2	3.6	56.6								
07	285 55.4	50.5	250 32.2	8.0	24 17.8	3.5	56.6								
08	300 55.4	51.1	264 59.2	7.9	24 21.3	3.3	56.7								
09	315 55.4	51.7	279 26.1	7.9	24 24.6	3.2	56.7								
10	330 55.4	52.3	293 53.0	7.8	24 27.8	3.0	56.7								
11	345 55.4	52.9	308 19.8	7.8	24 30.8	3.0	56.7								
12	0 55.4	N18 53.4	322 46.6	7.7	N24 33.8	2.7	56.7								
13	15 55.4	54.0	337 13.3	7.6	24 36.5	2.7	56.8								
14	30 55.4	54.6	351 39.9	7.7	24 39.2	2.5	56.8								
15	45 55.4	55.2	6 06.6	7.5	24 41.7	2.4	56.8								
16	60 55.4	55.8	20 33.1	7.5	24 44.1	2.2	56.8								
17	75 55.3	56.4	34 59.6	7.5	24 46.3	2.1	56.8								
18	90 55.3	N18 57.0	49 26.1	7.4	N24 48.4	1.9	56.9								
19	105 55.3	57.6	63 52.5	7.4	24 50.3	1.8	56.9								
20	120 55.3	58.1	78 18.9	7.4	24 52.1	1.6	56.9								
21	135 55.3	58.7	92 45.3	7.3	24 53.7	1.6	56.9								
22	150 55.3	59.3	107 11.6	7.3	24 55.3	1.3	57.0								
23	165 55.3	59.9	121 37.9	7.2	N24 56.6	1.2	57.0								
	SD 15.8	d 0.6	SD	15.2	15.3	15.5									

UT	ARIES			VENUS -3.9			MARS +1.7			JUPITER -1.9			SATURN +0.1			STARS		
	GHA	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		Name	SHA	Dec
16 T H U R S D A Y	233	32.0	149 33.9 N24 41.9	152	35.5 N24 05.5		128	50.9 N22 59.0		159	19.1 N21 18.7		Acamar	315 25.3	S40 17.8			
	248	34.5	164 33.0	167	36.2	05.7	143	52.8	58.9	174	21.2	18.7	Achernar	335 33.6	S57 13.5			
	263	37.0	179 32.2	182	36.8	05.8	158	54.8	58.9	189	23.3	18.8	Acrux	173 18.9	S63 06.9			
	278	39.4	194 31.3	197	37.5	05.9	173	56.8	58.8	204	25.5	18.8	Adhara	255 19.7	S28 58.7			
	293	41.9	209 30.5	212	38.1	06.0	188	58.7	58.8	219	27.6	18.8	Aldebaran	290 59.8	N16 30.8			
	308	44.4	224 29.7	227	38.8	06.1	204	00.7	58.8	234	29.7	18.9						
	323	46.8	239 28.8 N24 43.2	242	39.4 N24 06.2		219	02.7 N22 58.7		249	31.9 N21 18.9		Alioth	166 27.8	N55 57.1			
	338	49.3	254 28.0	257	40.1	06.4	234	04.6	58.7	264	34.0	19.0	Alkaid	153 05.2	N49 18.3			
	353	51.7	269 27.1	272	40.7	06.5	249	06.6	58.6	279	36.1	19.0	Al Na'ir	27 54.6	S46 56.9			
	8	54.2	284 26.3	287	41.4	06.6	264	08.6	58.6	294	38.2	19.0	Anilam	275 55.6	S 1 12.1			
	23	56.7	299 25.5	302	42.0	06.7	279	10.6	58.5	309	40.4	19.1	Alphard	218 04.7	S 8 40.2			
	38	59.1	314 24.6	317	42.7	06.8	294	12.5	58.5	324	42.5	19.1						
	54	01.6	329 23.8 N24 44.5	332	43.3 N24 06.2		309	14.5 N22 58.5		339	44.6 N21 19.1		Alphecca	126 18.0	N26 42.4			
	69	04.1	344 22.9	347	44.0	07.0	324	16.5	58.4	354	46.8	19.2	Alpheratz	357 52.8	N29 05.9			
	84	06.5	359 22.1	2 44.6	07.2		339	18.4	58.4	9 48.9	19.2	Altair	62 16.6	N 8 52.3				
	99	09.0	14 21.3	17 45.3	07.3		354	20.4	58.3	24 51.0	19.3	Ankaa	353 24.5	S42 17.6				
	114	11.5	29 20.4	32 45.9	07.4		9 22.4	58.3		39 53.2	19.3	Antares	112 36.7	S26 26.2				
	129	13.9	44 19.6	47 46.6	07.5		24 24.3	58.2		54 55.3	19.3							
	144	16.4	59 18.7 N24 45.6	62 47.2 N24 07.6			39 26.3 N22 58.2			69 57.4 N21 19.4		Arcturus	146 03.4	N19 10.3				
	159	18.8	74 17.9	77 47.8	07.7		54 28.3	58.1		84 59.6	19.4	Atria	107 45.9	S69 01.8				
	174	21.3	89 17.1	92 48.5	07.8		69 30.2	58.1		100 01.7	19.5	Avior	234 21.9	S59 31.2				
	189	23.8	104 16.2	107 49.1	07.9		84 32.2	58.1		115 03.8	19.5	Bellatrix	278 41.7	N 6 21.0				
	204	26.2	119 15.4	122 49.8	08.0		99 34.2	58.0		130 06.0	19.5	Betelgeuse	271 11.1	N 7 24.4				
219	28.7	134 14.5	137 50.4	08.2		114 36.1	58.0		145 08.1	19.6								
17 F R I D A Y	234	31.2	149 13.7 N24 46.8	152	51.1 N24 08.3		129	38.1 N22 57.9		160	10.2 N21 19.6		Canopus	264 00.5	S52 42.0			
	249	33.6	164 12.9	167	51.7	08.4	144	40.1	57.9	175	12.3	19.6	Capella	280 47.9	N46 00.0			
	264	36.1	179 12.0	182	52.4	08.5	159	42.0	57.8	190	14.5	19.7	Deneb	49 37.4	N45 17.0			
	279	38.6	194 11.2	197 53.0	08.6		174	44.0	57.8	205 16.6	19.7	Denebola	182 42.4	N14 33.6				
	294	41.0	209 10.3	212 53.7	08.7		189	46.0	57.8	220 18.7	19.8	Diphda	349 04.9	S17 58.5				
	309	43.5	224 09.5	227 54.3	08.8		204	47.9	57.7	235 20.9	19.8							
	324	46.0	239 08.7 N24 47.9	242 55.0 N24 08.9			219	49.9 N22 57.7		250 23.0 N21 19.8		Dubhe	194 02.0	N61 44.6				
	339	48.4	254 07.8	257 55.6	09.0		234	51.9	57.6	265 25.1	19.9	Elnath	278 24.0	N28 36.6				
	354	50.9	269 07.0	272 56.3	09.1		249	53.8	57.6	280 27.3	19.9	Eltanin	90 49.8	N51 29.1				
	9	53.3	284 06.1	287 56.9	09.2		264	55.8	57.5	295 29.4	20.0	Enif	33 55.7	N 9 52.9				
	24	55.8	299 05.3	302 57.6	09.3		279	57.8	57.5	310 31.5	20.0	Fomalhaut	15 33.7	S29 36.6				
	39	58.3	314 04.4	317 58.2	09.4		294	59.7	57.4	325 33.7	20.0							
	55	00.7	329 03.6 N24 48.9	332 58.9 N24 09.5			310	01.7 N22 57.4		340	35.8 N21 20.1		Gacrux	172 10.5	S57 07.7			
	70	03.2	344 02.8	347 59.5	09.6		325	03.7	57.4	355 37.9	20.1	Gienah	176 01.2	S17 33.3				
	85	05.7	359 01.9	3 00.2	09.8		340	05.6	57.3	10 40.0	20.1	Hadar	148 59.9	S60 23.1				
	100	08.1	14 01.1	18 00.8	09.9		355	07.6	57.3	25 42.2	20.2	Hamal	328 11.0	N23 28.2				
	115	10.6	29 00.2	33 01.5	10.0		10 09.6	57.2		40 44.3	20.2	Kaus Aust.	83 55.1	S34 23.0				
	130	13.1	43 59.4	48 02.1	10.1		25 11.5	57.2		55 46.4	20.3							
	145	15.5	58 58.6 N24 49.9	63 02.7 N24 10.2			40 13.5 N22 57.1			70 48.6 N21 20.3		Kochab	137 18.2	N74 08.9				
	160	18.0	73 57.7	78 03.4	10.3		55 15.5	57.1		85 50.7	20.3	Markab	13 47.2	N15 12.8				
	175	20.5	88 56.9	93 04.0	10.4		70 17.4	57.0		100 52.8	20.4	Menkar	314 24.5	N 4 05.8				
	190	22.9	103 56.0	108 04.7	10.5		85 19.4	57.0		115 55.0	20.4	Menkent	148 17.6	S36 23.0				
	205	25.4	118 55.2	123 05.3	10.6		100 21.3	56.9		130 57.1	20.4	Miaplacidus	221 41.9	S69 43.8				
220	27.8	133 54.3	138 06.0	10.7		115 23.3	56.9		145 59.2	20.5								
18 S A T U R D A Y	235	30.3	148 53.5 N24 50.9	153	06.6 N24 10.8		130	25.3 N22 56.9		161	01.3 N21 20.5		Mirfak	308 53.5	N49 52.0			
	250	32.8	163 52.7	168	07.3	10.9	145	27.2	56.8	176	03.5	20.6	Nunki	76 08.9	S26 17.6			
	265	35.2	178 51.8	183	07.9	11.0	160	29.2	56.8	191	05.6	20.6	Peacock	53 32.7	S56 43.5			
	280	37.7	193 51.0	198 08.6	11.1		175	31.2	56.7	206 07.7	20.6	Pollux	243 38.6	N28 01.4				
	295	40.2	208 50.1	213 09.2	11.2		190	33.1	56.7	221 09.9	20.7	Procyon	245 09.1	N 5 13.2				
	310	42.6	223 49.3	228 09.9	11.3		205	35.1	56.6	236 12.0	20.7							
	325	45.1	238 48.5 N24 51.8	243 10.5 N24 11.4			220	37.1 N22 56.6		251 14.1 N21 20.8		Rasalhague	96 14.3	N12 33.4				
	340	47.6	253 47.6	258 11.2	11.5		235	39.0	56.5	266 16.2	20.8	Regulus	207 52.8	N11 57.4				
	355	50.0	268 46.8	273 11.8	11.6		250	41.0	56.5	281 18.4	20.8	Rigel	281 20.8	S 8 12.0				
	10	52.5	283 45.9	288 12.5	11.7		265	42.9	56.5	296 20.5	20.9	Rigel Kent.	140 03.3	S60 50.7				
	25	55.0	298 45.1	303 13.1	11.8		280	44.9	56.4	311 22.6	20.9	Sabik	102 22.3	S15 43.7				
	40	57.4	313 44.2	318 13.8	11.9		295	46.9	56.4	326 24.8	20.9							
	55	59.9	328 43.4 N24 52.7	333 14.4 N24 12.0			310	48.8 N22 56.3		341 26.9 N21 21.0		Schedar	349 51.1	N56 32.7				
	71	02.3	343 42.6	348 15.1	12.1		325	50.8	56.3	356 29.0	21.0	Shaula	96 33.4	S37 06.3				
	86	04.8	358 41.7	3 15.7	12.1		340	52.7	56.2	11 31.1	21.1	Sirius	258 41.7	S16 43.2				
	101	07.3	13 40.9	18 16.4	12.2		355	54.7	56.2	26 33.3	21.1	Spica	158 40.2	S11 10.4				
	116	09.7	28 40.0	33 17.0	12.3		10 56.7	56.1		41 35.4	21.1	Suhail	222 59.0	S43 26.7				
	131	12.2	43 39.2	48 17.7	12.4		25 58.6	56.1		56 37.5	21.2							
	146	14.7	58 38.3 N24 53.5	63 18.3 N24 12.5			41 00.6 N22 56.0			71 39.7 N21 21.2		Vega	80 44.6	N38 46.9				
	161	17.1	73 37.5	78 18.9	12.6		56 02.6	56.0		86 41.8	21.2	Zuben'ubi	137 14.8	S16 03.1				
	176	19.6	88 36.7	93 19.6	12.7		71 04.5	56.0		101 43.9	21.3							
	191	22.1	103 35.8	108 20.2	12.8		86 06.5	55.9		116 46.1	21.3							
	206	24.5	118 35.0	123 20.9	12.9		101 08.4	55.9		13								

UT	SUN		MOON				Lat.	Twilight			Moonrise					
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil	Sunrise	16	17	18	19	
									h m	h m	h m	h m	h m	h m	h m	h m
16	180 55.3	N19 00.5	136 04.1	7.2	N24 57.8	1.1	57.0	□	□	□	□	□	□	□	07 22	
01	195 55.3	01.1	150 30.3	7.1	24 58.9	0.9	57.0	□	□	01 37	□	□	□	□	08 13	
02	210 55.3	01.6	164 56.4	7.2	24 59.8	0.8	57.0	□	□	02 15	□	□	06 34	□	08 44	
03	225 55.2	02.2	179 22.6	7.1	25 00.6	0.7	57.1	□	00 54	02 41	04 17	05 31	07 16	□	09 07	
04	240 55.2	02.8	193 48.7	7.0	25 01.3	0.4	57.1	□	01 43	03 02	05 04	06 12	07 44	□	09 25	
05	255 55.2	03.4	208 14.7	7.1	25 01.7	0.4	57.1	□	02 13	03 18	05 34	06 40	08 05	□	09 40	
06	270 55.2	N19 04.0	222 40.8	7.0	N25 02.1	0.2	57.1	N 58	00 48	02 36	03 32	05 57	07 02	08 23	09 53	
07	285 55.2	04.5	237 06.8	7.0	25 02.3	0.0	57.1	56	01 33	02 53	03 44	06 16	07 20	08 38	10 04	
08	300 55.2	05.1	251 32.8	6.9	25 02.3	0.1	57.2	54	02 01	03 08	03 54	06 32	07 35	08 50	10 14	
09	315 55.2	05.7	265 58.7	7.0	25 02.2	0.2	57.2	52	02 22	03 21	04 04	06 45	07 48	09 02	10 22	
10	330 55.2	06.3	280 24.7	6.9	25 02.0	0.4	57.2	50	02 39	03 32	04 12	06 57	07 59	09 11	10 30	
11	345 55.1	06.8	294 50.6	6.9	25 01.6	0.6	57.2	45	03 11	03 55	04 29	07 22	08 23	09 32	10 46	
12	0 55.1	N19 07.4	309 16.5	6.9	N25 01.0	0.7	57.3	N 40	03 34	04 12	04 43	07 42	08 42	09 49	10 59	
13	15 55.1	08.0	323 42.4	6.8	25 00.3	0.8	57.3	35	03 53	04 27	04 55	07 58	08 58	10 03	11 11	
14	30 55.1	08.6	338 08.2	6.9	24 59.5	1.0	57.3	30	04 08	04 39	05 06	08 12	09 12	10 15	11 20	
15	45 55.1	09.1	352 34.1	6.8	24 58.5	1.2	57.3	20	04 32	05 00	05 23	08 37	09 35	10 36	11 37	
16	60 55.1	09.7	6 59.9	6.8	24 57.3	1.3	57.3	N 10	04 50	05 16	05 39	08 58	09 55	10 54	11 52	
17	75 55.1	10.3	21 25.7	6.8	24 56.0	1.4	57.4	0	05 05	05 31	05 53	09 17	10 14	11 11	12 05	
18	90 55.0	N19 10.9	35 51.5	6.8	N24 54.6	1.6	57.4	S 10	05 19	05 45	06 07	09 37	10 33	11 27	12 19	
19	105 55.0	11.4	50 17.3	6.8	24 53.0	1.8	57.4	20	05 32	05 59	06 22	09 58	10 53	11 45	12 33	
20	120 55.0	12.0	64 43.1	6.8	24 51.2	1.9	57.4	30	05 44	06 13	06 39	10 22	11 17	12 06	12 50	
21	135 55.0	12.6	79 08.9	6.7	24 49.3	2.0	57.5	35	05 51	06 22	06 49	10 37	11 30	12 18	13 00	
22	150 55.0	13.1	93 34.6	6.8	24 47.3	2.2	57.5	40	05 58	06 31	07 00	10 53	11 46	12 31	13 10	
23	165 55.0	13.7	108 00.4	6.8	24 45.1	2.4	57.5	45	06 05	06 41	07 13	11 13	12 05	12 48	13 23	
17	180 55.0	N19 14.3	122 26.2	6.7	N24 42.7	2.5	57.5	S 50	06 13	06 53	07 29	11 38	12 28	13 08	13 39	
01	195 54.9	14.9	136 51.9	6.8	24 40.2	2.6	57.5	52	06 17	06 59	07 37	11 50	12 39	13 17	13 46	
02	210 54.9	15.4	151 17.7	6.8	24 37.6	2.8	57.6	54	06 21	07 05	07 45	12 04	12 52	13 27	13 54	
03	225 54.9	16.0	165 43.5	6.7	24 34.8	3.0	57.6	56	06 25	07 11	07 54	12 20	13 06	13 39	14 03	
04	240 54.9	16.6	180 09.2	6.8	24 31.8	3.1	57.6	58	06 30	07 19	08 05	12 39	13 24	13 53	14 13	
05	255 54.9	17.1	194 35.0	6.8	24 28.7	3.3	57.6	S 60	06 35	07 27	08 17	13 03	13 44	14 09	14 24	
06	270 54.9	N19 17.7	209 00.8	6.8	N24 25.4	3.4	57.7	Lat.	Sunset	Twilight			Moonset			
07	285 54.8	18.3	223 26.6	6.8	24 22.0	3.5	57.7			Civil	Naut.	16	17	18	19	
08	300 54.8	18.8	237 52.4	6.8	24 18.5	3.7	57.7			h m	h m	h m	h m	h m	h m	
09	315 54.8	19.4	252 18.2	6.8	24 14.8	3.9	57.7	N 72	□	□	□	□	□	□	□	
10	330 54.8	19.9	266 44.0	6.8	24 10.9	4.0	57.7	N 70	□	□	□	□	□	□	04 37	
11	345 54.8	20.5	281 09.8	6.8	24 06.9	4.1	57.8	68	22 21	□	□	□	□	□	03 46	
12	0 54.7	N19 21.1	295 35.6	6.9	N24 02.8	4.3	57.8	66	21 41	□	□	□	□	03 27	03 13	
13	15 54.7	21.6	310 01.5	6.9	23 58.5	4.4	57.8	64	21 14	23 07	□	□	01 47	02 32	02 45	
14	30 54.7	22.2	324 27.4	6.8	23 54.1	4.6	57.8	62	20 53	22 13	□	□	01 00	01 50	02 17	
15	45 54.7	22.8	338 53.2	7.0	23 49.5	4.8	57.8	60	20 36	21 42	□	□	00 30	01 22	01 55	
16	60 54.7	23.3	353 19.2	6.9	23 44.7	4.8	57.9	N 58	20 22	21 19	23 12	00 07	01 00	01 37	02 01	
17	75 54.6	23.9	7 45.1	6.9	23 39.9	5.1	57.9	56	20 10	21 01	22 23	24 42	00 42	01 22	01 49	
18	90 54.6	N19 24.4	22 11.0	7.0	N23 34.8	5.2	57.9	54	19 59	20 46	21 54	24 27	00 27	01 08	01 39	
19	105 54.6	25.0	36 37.0	7.0	23 29.6	5.3	57.9	52	19 50	20 33	21 33	24 14	00 14	00 57	01 30	
20	120 54.6	25.6	51 03.0	7.0	23 24.3	5.4	58.0	50	19 42	20 22	21 15	24 02	00 02	00 47	01 22	
21	135 54.6	26.1	65 29.0	7.0	23 18.9	5.6	58.0	45	19 24	19 59	20 43	23 38	24 25	00 25	01 04	
22	150 54.5	26.7	79 55.0	7.1	23 13.3	5.8	58.0	N 40	19 10	19 41	20 19	23 19	24 08	00 08	00 50	
23	165 54.5	27.2	94 21.1	7.1	23 07.5	5.9	58.0	35	18 58	19 26	20 01	23 03	23 53	24 38	00 38	
18	180 54.5	N19 27.8	108 47.2	7.1	N23 01.6	6.0	58.0	30	18 47	19 14	19 45	22 49	23 40	24 27	00 27	
01	195 54.5	28.3	123 13.3	7.2	22 55.6	6.2	58.1	20	18 30	18 53	19 21	22 25	23 18	24 08	00 08	
02	210 54.4	28.9	137 39.5	7.2	22 49.4	6.3	58.1	N 10	18 14	18 37	19 03	22 04	22 59	23 52	24 42	
03	225 54.4	29.4	152 05.7	7.2	22 43.1	6.5	58.1	0	18 00	18 22	18 47	21 45	22 41	23 37	24 31	
04	240 54.4	30.0	166 31.9	7.2	22 36.6	6.6	58.1	S 10	17 46	18 08	18 34	21 25	22 23	23 22	24 19	
05	255 54.4	30.5	180 58.1	7.3	22 30.0	6.7	58.2	20	17 31	17 54	18 21	21 04	22 04	23 05	24 06	
06	270 54.4	N19 31.1	195 24.4	7.3	N22 23.3	6.9	58.2	30	17 14	17 39	18 08	20 40	21 41	22 46	23 52	
07	285 54.3	31.6	209 50.7	7.4	22 16.4	7.0	58.2	35	17 04	17 31	18 01	20 26	21 28	22 35	23 43	
08	300 54.3	32.2	224 17.1	7.3	22 09.4	7.2	58.2	40	16 52	17 22	17 55	20 09	21 13	22 22	23 33	
09	315 54.3	32.8	238 43.4	7.5	22 02.2	7.3	58.2	45	16 39	17 11	17 47	19 49	20 55	22 07	23 22	
10	330 54.3	33.3	253 09.9	7.4	21 54.9	7.4	58.3	S 50	16 23	16 59	17 39	19 25	20 32	21 48	23 08	
11	345 54.2	33.8	267 36.3	7.5	21 47.5	7.6	58.3	52	16 16	16 54	17 35	19 13	20 21	21 39	23 01	
12	0 54.2	N19 34.4	282 02.8	7.5	N21 39.9	7.7	58.3	54	16 07	16 47	17 31	18 59	20 09	21 29	22 54	
13	15 54.2	34.9	296 29.3	7.6	21 32.2	7.8	58.3	56	15 58	16 41	17 27	18 43	19 54	21 17	22 46	
14	30 54.2	35.5	310 55.9	7.6	21 24.4	8.0	58.3	58	15 47	16 33	17 22	18 24	19 38	21 04	22 37	
15	45 54.1	36.0	325 22.5	7.7	21 16.4	8.1	58.4	S 60	15 35	16 25	17 17	18 00	19 17	20 49	22 26	
16	60 54.1	36.6	339 49.2	7.7	21 08.3	8.2	58.4	Day	SUN			MOON				
17	75 54.1	37.1	354 15.9	7.7	21 00.1	8.3	58.4		Eqn. of Time	Mer.	Mer. Pass.		Age		Phase	
18	90 54.1	N19 37.7	8 42.6	7.8	N20 51.8	8.5	58.4		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
19	105 54.0	38.2	23 09.4	7.8	20 43.3	8.6	58.5	16	03 41	03 41	h m	h m	h m	h m	04 17	
20	120 54.0	38.8	37 36.2	7.8	20 34.7	8.8	58.5	17	03 40	03 39	h m	h m	h m	h m	05 25	
21	1															

UT	ARIES	VENUS -4.0		MARS +1.7		JUPITER -1.9		SATURN +0.1		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
1900 S U N D A Y	236 29.5	148 33.3	N24 54.3	153 22.2	N24 13.1	131 12.4	N22 55.8	161 52.4	N21 21.4	Acamar	315 25.3	S40 17.8
	01 251 31.9	163 32.4	54.4	168 22.8	13.2	146 14.3	55.7	176 54.6	21.5	Achernar	335 33.6	S57 13.4
	02 266 34.4	178 31.6	54.5	183 23.5	13.3	161 16.3	55.7	191 56.7	21.5	Acrux	173 18.9	S63 06.9
	03 281 36.8	193 30.8	54.7	198 24.1	13.4	176 18.2	55.6	206 58.8	21.6	Adhara	255 19.7	S28 58.6
	04 296 39.3	208 29.9	54.8	213 24.8	13.5	191 20.2	55.6	222 00.9	21.6	Aldebaran	290 59.8	N16 30.8
	05 311 41.8	223 29.1	54.9	228 25.4	13.5	206 22.2	55.5	237 03.1	21.6			
	06 326 44.2	238 28.2	N24 55.0	243 26.1	N24 13.6	221 24.1	N22 55.5	252 05.2	N21 21.7	Alioth	166 27.8	N55 57.1
	07 341 46.7	253 27.4	55.2	258 26.7	13.7	236 26.1	55.4	267 07.3	21.7	Alkaid	153 05.2	N49 18.3
	08 356 49.2	268 26.6	55.3	273 27.4	13.8	251 28.0	55.4	282 09.5	21.7	Al Na'ir	27 54.6	S46 56.9
	09 11 51.6	283 25.7	55.4	288 28.0	13.9	266 30.0	55.4	297 11.6	21.8	Alnilam	275 55.6	S 1 12.1
	10 26 54.1	298 24.9	55.5	303 28.7	14.0	281 32.0	55.3	312 13.7	21.8	Alphard	218 04.7	S 8 40.2
	11 41 56.6	313 24.0	55.6	318 29.3	14.1	296 33.9	55.3	327 15.8	21.9			
	12 56 59.0	328 23.2	N24 55.7	333 30.0	N24 14.2	311 35.9	N22 55.2	342 18.0	N21 21.9	Alphecca	126 18.0	N26 42.4
	13 72 01.5	343 22.3	55.8	348 30.6	14.3	326 37.8	55.2	357 20.1	21.9	Alpheratz	357 52.8	N29 05.9
	14 87 03.9	358 21.5	56.0	3 31.3	14.3	341 39.8	55.1	12 22.2	22.0	Altair	62 16.6	N 8 52.3
	15 102 06.4	13 20.7	56.1	18 31.9	14.4	356 41.7	55.1	27 24.4	22.0	Ankaa	353 24.5	S42 17.6
	16 117 08.9	28 19.8	56.2	33 32.6	14.5	11 43.7	55.0	42 26.5	22.0	Antares	112 36.7	S26 26.3
	17 132 11.3	43 19.0	56.3	48 33.2	14.6	26 45.7	55.0	57 28.6	22.1			
	18 147 13.8	58 18.1	N24 56.4	63 33.9	N24 14.7	41 47.6	N22 54.9	72 30.7	N21 22.1	Arcturus	146 03.4	N19 10.3
	19 162 16.3	73 17.3	56.5	78 34.5	14.8	56 49.6	54.9	87 32.9	22.2	Atria	107 45.9	S69 01.9
	20 177 18.7	88 16.4	56.6	93 35.2	14.9	71 51.5	54.8	102 35.0	22.2	Avior	234 22.0	S59 31.2
	21 192 21.2	103 15.6	56.7	108 35.8	14.9	86 53.5	54.8	117 37.1	22.2	Bellatrix	278 41.7	N 6 21.1
	22 207 23.7	118 14.8	56.8	123 36.5	15.0	101 55.5	54.7	132 39.3	22.3	Betelgeuse	271 11.1	N 7 24.4
23 222 26.1	133 13.9	56.9	138 37.1	15.1	116 57.4	54.7	147 41.4	22.3				
2000 M O N D A Y	237 28.6	148 13.1	N24 57.0	153 37.8	N24 15.2	131 59.4	N22 54.7	162 43.5	N21 22.3	Canopus	264 00.5	S52 42.0
	01 252 31.1	163 12.2	57.1	168 38.4	15.3	147 01.3	54.6	177 45.6	22.4	Capella	280 47.9	N46 00.0
	02 267 33.5	178 11.4	57.2	183 39.1	15.4	162 03.3	54.6	192 47.8	22.4	Deneb	49 37.3	N45 17.0
	03 282 36.0	193 10.5	57.3	198 39.7	15.5	177 05.2	54.5	207 49.9	22.5	Denebola	182 42.4	N14 33.6
	04 297 38.4	208 09.7	57.4	213 40.4	15.5	192 07.2	54.5	222 52.0	22.5	Diphda	349 04.8	S17 58.5
	05 312 40.9	223 08.9	57.5	228 41.0	15.6	207 09.1	54.4	237 54.1	22.5			
	06 327 43.4	238 08.0	N24 57.6	243 41.7	N24 15.7	222 11.1	N22 54.4	252 56.3	N21 22.6	Dubhe	194 02.0	N61 44.6
	07 342 45.8	253 07.2	57.6	258 42.3	15.8	237 13.1	54.3	267 58.4	22.6	Elnath	278 24.0	N28 36.6
	08 357 48.3	268 06.3	57.7	273 42.9	15.8	252 15.0	54.3	283 00.5	22.6	Eltanin	90 49.7	N51 29.1
	09 12 50.8	283 05.5	57.8	288 43.6	15.9	267 17.0	54.2	298 02.7	22.7	Enif	33 55.7	N 9 52.9
	10 27 53.2	298 04.7	57.9	303 44.2	16.0	282 18.9	54.2	313 04.8	22.7	Fomalhaut	15 33.6	S29 36.6
	11 42 55.7	313 03.8	58.0	318 44.9	16.1	297 20.9	54.1	328 06.9	22.8			
	12 57 58.2	328 03.0	N24 58.1	333 45.5	N24 16.2	312 22.8	N22 54.1	343 09.0	N21 22.8	Gacrux	172 10.5	S57 07.7
	13 73 00.6	343 02.1	58.2	348 46.2	16.2	327 24.8	54.0	358 11.2	22.8	Gienah	176 01.2	S17 33.3
	14 88 03.1	358 01.3	58.2	3 46.8	16.3	342 26.8	54.0	13 13.3	22.9	Hadar	148 59.9	S60 23.2
	15 103 05.6	13 00.4	58.3	18 47.5	16.4	357 28.7	53.9	28 15.4	22.9	Hamal	328 11.0	N23 28.2
	16 118 08.0	27 59.6	58.4	33 48.1	16.5	12 30.7	53.9	43 17.5	22.9	Kaus Aust.	83 55.1	S34 23.0
	17 133 10.5	42 58.8	58.5	48 48.8	16.6	27 32.6	53.9	58 19.7	23.0			
	18 148 12.9	57 57.9	N24 58.5	63 49.4	N24 16.6	42 34.6	N22 53.8	73 21.8	N21 23.0	Kochab	137 17.8	N74 08.9
	19 163 15.4	72 57.1	58.6	78 50.1	16.7	57 36.5	53.8	88 23.9	23.1	Markab	13 47.2	N15 12.8
	20 178 17.9	87 56.2	58.7	93 50.7	16.8	72 38.5	53.7	103 26.0	23.1	Menkar	314 24.5	N 4 05.8
	21 193 20.3	102 55.4	58.8	108 51.4	16.9	87 40.4	53.7	118 28.2	23.1	Menkent	148 17.6	S36 23.0
	22 208 22.8	117 54.6	58.8	123 52.0	16.9	102 42.4	53.6	133 30.3	23.2	Miaplacidus	221 42.0	S69 43.8
23 223 25.3	132 53.7	58.9	138 52.7	17.0	117 44.3	53.6	148 32.4	23.2				
2100 T U E S D A Y	238 27.7	147 52.9	N24 59.0	153 53.3	N24 17.1	132 46.3	N22 53.5	163 34.6	N21 23.2	Mirfak	308 53.5	N49 52.0
	01 253 30.2	162 52.0	59.0	168 54.0	17.2	147 48.3	53.5	178 36.7	23.3	Nunki	76 08.9	S26 17.6
	02 268 32.7	177 51.2	59.1	183 54.6	17.2	162 50.2	53.4	193 38.8	23.3	Peacock	53 32.6	S56 43.5
	03 283 35.1	192 50.3	59.2	198 55.3	17.3	177 52.2	53.4	208 40.9	23.4	Pollux	243 38.6	N28 01.4
	04 298 37.6	207 49.5	59.2	213 55.9	17.4	192 54.1	53.3	223 43.1	23.4	Procyon	245 09.1	N 5 13.2
	05 313 40.0	222 48.7	59.3	228 56.6	17.5	207 56.1	53.3	238 45.2	23.4			
	06 328 42.5	237 47.8	N24 59.4	243 57.2	N24 17.5	222 58.0	N22 53.2	253 47.3	N21 23.5	Rasalhague	96 14.3	N12 33.4
	07 343 45.0	252 47.0	59.4	258 57.9	17.6	238 00.0	53.2	268 49.4	23.5	Regulus	207 52.8	N11 57.4
	08 358 47.4	267 46.1	59.5	273 58.5	17.7	253 01.9	53.1	283 51.6	23.5	Rigel	281 20.8	S 8 12.0
	09 13 49.9	282 45.3	59.5	288 59.2	17.8	268 03.9	53.1	298 53.7	23.6	Rigil Kent.	140 03.3	S60 50.7
	10 28 52.4	297 44.5	59.6	303 59.8	17.8	283 05.8	53.0	313 55.8	23.6	Sabik	102 22.3	S15 43.7
	11 43 54.8	312 43.6	59.6	319 00.5	17.9	298 07.8	53.0	328 57.9	23.7			
	12 58 57.3	327 42.8	N24 59.7	334 01.1	N24 18.0	313 09.7	N22 52.9	344 00.1	N21 23.7	Schedar	349 51.1	N56 32.7
	13 73 59.8	342 41.9	59.7	349 01.8	18.0	328 11.7	52.9	359 02.2	23.7	Shaula	96 33.4	S37 06.3
	14 89 02.2	357 41.1	59.8	4 02.4	18.1	343 13.6	52.8	14 04.3	23.8	Sirius	258 41.7	S16 43.2
	15 104 04.7	12 40.3	59.8	19 03.1	18.2	358 15.6	52.8	29 06.4	23.8	Spica	158 40.2	S11 10.4
	16 119 07.2	27 39.4	59.9	34 03.7	18.2	13 17.5	52.7	44 08.6	23.8	Suhail	222 59.1	S43 26.7
	17 134 09.6	42 38.6	24 59.9	49 04.4	18.3	28 19.5	52.7	59 10.7	23.9			
	18 149 12.1	57 37.7	N25 00.0	64 05.0	N24 18.4	43 21.4	N22 52.7	74 12.8	N21 23.9	Vega	80 44.6	N38 46.9
	19 164 14.5	72 36.9	00.0	79 05.7	18.4	58 23.4	52.6	89 14.9	24.0	Zuben'ubi	137 14.8	S16 03.1
	20 179 17.0	87 36.1	00.1	94 06.3	18.5	73 25.3	52.6	104 17.1	24.0			
	21 194 19.5	102 35.2	00.1	109 07.0	18.6	88 27.3	52.5	119 19.2	24.0			
	22 209 21.9	117 34.4	00.2	124 07.6	18.7	103 29.3	52.5	134 21.3	24.1	Venus	270 44.5	h 08 m 14
23 224 24.4	132 33.5	00.2	139 08.3	18.7	118 31.2	52.4	149 23.5	24.1	Mars	276 09.2	13 45	
									Jupiter	254 30.8	15 10	
									Saturn	285 14.9	13 07	
	h m											
Mer. Pass.	8 08.8	v -0.8	d 0.1	v 0.6	d 0.1	v 2.0	d 0.0	v 2.1	d 0.0			

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.		Civil	19	20	21	22	
	° / °	' / '	° / °	' / '	° / °	' / '		' / '	°	h m	h m	h m	h m	h m	h m	h m
19 SUNDAY	00	180 53.9	N19 40.9	95 23.9	8.0	N19 58.9	9.2	58.6	N 72	□	□	□	□	09 38	12 09	14 27
	01	195 53.9	41.5	109 50.9	8.1	19 49.7	9.4	58.6	N 70	□	□	□	□	07 22	10 06	12 21
	02	210 53.8	42.0	124 18.0	8.1	19 40.3	9.4	58.6	68	////	////	01 18	08 13	10 27	12 31	14 30
	03	225 53.8	42.6	138 45.1	8.2	19 30.9	9.7	58.6	66	////	////	02 03	08 44	10 44	12 38	14 31
	04	240 53.8	43.1	153 12.3	8.2	19 21.2	9.7	58.6	64	////	00 18	02 32	09 07	10 57	12 45	14 32
	05	255 53.8	43.6	167 39.5	8.2	19 11.5	9.8	58.7	62	////	01 30	02 54	09 25	11 08	12 51	14 32
	06	270 53.7	N19 44.2	182 06.7	8.3	N19 01.7	10.0	58.7	60	////	02 04	03 12	09 40	11 18	12 56	14 33
	07	285 53.7	44.7	196 34.0	8.4	18 51.7	10.1	58.7	N 58	00 16	02 28	03 26	09 53	11 26	13 00	14 33
	08	300 53.7	45.2	211 01.4	8.4	18 41.6	10.2	58.7	56	01 21	02 47	03 39	10 04	11 33	13 04	14 34
	09	315 53.6	45.8	225 28.8	8.4	18 31.4	10.3	58.8	54	01 52	03 03	03 50	10 14	11 40	13 07	14 34
	10	330 53.6	46.3	239 56.2	8.5	18 21.1	10.4	58.8	52	02 15	03 16	03 59	10 22	11 46	13 10	14 35
	11	345 53.6	46.9	254 23.7	8.5	18 10.7	10.5	58.8	50	02 33	03 28	04 08	10 30	11 51	13 13	14 35
	12	0 53.6	N19 47.4	268 51.2	8.6	N18 00.2	10.7	58.8	45	03 07	03 51	04 26	10 46	12 02	13 19	14 36
	13	15 53.5	47.9	283 18.8	8.6	17 49.5	10.8	58.8	N 40	03 31	04 10	04 41	10 59	12 11	13 24	14 37
	14	30 53.5	48.5	297 46.4	8.7	17 38.7	10.8	58.9	35	03 50	04 25	04 53	11 11	12 19	13 28	14 37
	15	45 53.5	49.0	312 14.1	8.7	17 27.9	11.0	58.9	30	04 06	04 37	05 04	11 20	12 26	13 32	14 38
	16	60 53.4	49.5	326 41.8	8.8	17 16.9	11.1	58.9	20	04 30	04 58	05 22	11 37	12 38	13 39	14 39
	17	75 53.4	50.1	341 09.6	8.8	17 05.8	11.2	58.9	N 10	04 49	05 16	05 38	11 52	12 49	13 44	14 39
	18	90 53.4	N19 50.6	355 37.4	8.8	N16 54.6	11.3	58.9	0	05 05	05 31	05 53	12 05	12 58	13 50	14 40
	19	105 53.3	51.1	10 05.2	8.9	16 43.3	11.4	59.0	S 10	05 19	05 45	06 08	12 19	13 08	13 55	14 41
	20	120 53.3	51.6	24 33.1	9.0	16 31.9	11.5	59.0	20	05 33	06 00	06 23	12 33	13 18	14 01	14 42
	21	135 53.3	52.2	39 01.1	8.9	16 20.4	11.6	59.0	30	05 46	06 15	06 41	12 50	13 30	14 07	14 43
	22	150 53.2	52.7	53 29.0	9.1	16 08.8	11.7	59.0	35	05 53	06 24	06 51	13 00	13 37	14 11	14 43
23	165 53.2	53.2	67 57.1	9.0	15 57.1	11.8	59.0	40	06 00	06 33	07 03	13 10	13 44	14 15	14 44	
20 MONDAY	00	180 53.2	N19 53.8	82 25.1	9.2	N15 45.3	11.9	59.1	S 50	06 17	06 57	07 33	13 39	14 04	14 26	14 46
	01	195 53.1	54.3	96 53.3	9.1	15 33.4	12.0	59.1	52	06 21	07 03	07 41	13 46	14 09	14 28	14 46
	02	210 53.1	54.8	111 21.4	9.2	15 21.4	12.1	59.1	54	06 25	07 09	07 50	13 54	14 14	14 31	14 47
	03	225 53.1	55.3	125 49.6	9.3	15 09.3	12.1	59.1	56	06 29	07 16	07 59	14 03	14 20	14 34	14 47
	04	240 53.0	55.9	140 17.9	9.3	14 57.2	12.3	59.1	58	06 34	07 24	08 11	14 13	14 27	14 38	14 48
	05	255 53.0	56.4	154 46.2	9.3	14 44.9	12.4	59.2	S 60	06 39	07 32	08 23	14 24	14 34	14 42	14 48
	06	270 53.0	N19 56.9	169 14.5	9.4	N14 32.5	12.5	59.2	Lat.	Sunset	Twilight		Moonset			
	07	285 52.9	57.4	183 42.9	9.4	14 20.0	12.5	59.2			Civil	Naut.	19	20	21	22
	08	300 52.9	58.0	198 11.3	9.4	14 07.5	12.6	59.2	°	h m	h m	h m	h m	h m	h m	h m
	09	315 52.9	58.5	212 39.7	9.5	13 54.9	12.8	59.2	N 72	□	□	□	□	04 16	03 33	03 04
	10	330 52.8	59.0	227 08.2	9.6	13 42.1	12.8	59.2	N 70	□	□	□	□	04 37	03 45	03 19
	11	345 52.8	19 59.5	241 36.8	9.5	13 29.3	12.9	59.3	68	22 41	////	////	03 46	03 23	03 07	02 54
	12	0 52.8	N20 00.0	256 05.3	9.7	N13 16.4	12.9	59.3	66	21 53	////	////	03 13	03 05	02 57	02 51
	13	15 52.7	00.6	270 34.0	9.6	13 03.5	13.1	59.3	64	21 23	////	////	02 49	02 50	02 49	02 48
	14	30 52.7	01.1	285 02.6	9.7	12 50.4	13.1	59.3	62	21 01	22 27	////	02 30	02 38	02 42	02 45
	15	45 52.7	01.6	299 31.3	9.7	12 37.3	13.2	59.3	60	20 43	21 52	////	02 14	02 27	02 36	02 43
	16	60 52.6	02.1	314 00.0	9.8	12 24.1	13.3	59.4	N 58	20 28	21 27	////	02 01	02 18	02 30	02 40
	17	75 52.6	02.6	328 28.8	9.8	12 10.8	13.4	59.4	56	20 15	21 08	22 36	01 49	02 10	02 25	02 38
	18	90 52.5	N20 03.1	342 57.6	9.8	N11 57.4	13.5	59.4	54	20 04	20 52	22 03	01 39	02 02	02 21	02 37
	19	105 52.5	03.7	357 26.4	9.9	11 43.9	13.5	59.4	52	19 55	20 38	21 40	01 30	01 56	02 17	02 35
	20	120 52.5	04.2	11 55.3	9.9	11 30.4	13.6	59.4	50	19 46	20 26	21 22	01 22	01 50	02 13	02 34
	21	135 52.4	04.7	26 24.2	9.9	11 16.8	13.6	59.4	45	19 28	20 03	20 47	01 04	01 37	02 05	02 31
	22	150 52.4	05.2	40 53.1	10.0	11 03.2	13.8	59.5	N 40	19 13	19 44	20 23	00 50	01 26	01 58	02 28
23	165 52.4	05.7	55 22.1	10.0	10 49.4	13.8	59.5	35	19 00	19 29	20 03	00 38	01 17	01 53	02 26	
21 TUESDAY	00	180 52.3	N20 06.2	69 51.1	10.0	N10 35.6	13.8	59.5	30	18 49	19 16	19 48	00 27	01 09	01 47	02 24
	01	195 52.3	06.7	84 20.1	10.0	10 21.8	14.0	59.5	20	18 31	18 55	19 23	00 08	00 55	01 38	02 20
	02	210 52.2	07.3	98 49.1	10.1	10 07.8	14.0	59.5	N 10	18 15	18 37	19 04	24 42	00 42	01 30	02 17
	03	225 52.2	07.8	113 18.2	10.1	9 53.8	14.0	59.5	0	18 00	18 22	18 48	24 31	00 31	01 23	02 14
	04	240 52.2	08.3	127 47.3	10.2	9 39.8	14.2	59.6	S 10	17 45	18 08	18 33	24 19	00 19	01 15	02 10
	05	255 52.1	08.8	142 16.5	10.1	9 25.6	14.1	59.6	20	17 30	17 53	18 20	24 06	00 06	01 07	02 07
	06	270 52.1	N20 09.3	156 45.6	10.2	N 9 11.5	14.3	59.6	30	17 12	17 38	18 07	23 52	24 58	00 58	02 03
	07	285 52.0	09.8	171 14.8	10.3	8 57.2	14.3	59.6	35	17 02	17 29	18 00	23 43	24 52	00 52	02 01
	08	300 52.0	10.3	185 44.1	10.2	8 42.9	14.3	59.6	40	16 50	17 19	17 53	23 33	24 46	00 46	01 58
	09	315 52.0	10.8	200 13.3	10.3	8 28.6	14.4	59.6	45	16 36	17 09	17 45	23 22	24 39	00 39	01 55
	10	330 51.9	11.3	214 42.6	10.3	8 14.2	14.5	59.6	S 50	16 20	16 56	17 36	23 08	24 30	00 30	01 52
	11	345 51.9	11.8	229 11.9	10.3	7 59.7	14.5	59.7	52	16 12	16 50	17 32	23 01	24 26	00 26	01 50
	12	0 51.8	N20 12.3	243 41.2	10.3	N 7 45.2	14.6	59.7	54	16 03	16 44	17 28	22 54	24 21	00 21	01 48
	13	15 51.8	12.9	258 10.5	10.3	7 30.6	14.6	59.7	56	15 53	16 37	17 23	22 46	24 16	00 16	01 46
	14	30 51.8	13.4	272 39.8	10.4	7 16.0	14.7	59.7	58	15 42	16 29	17 18	22 37	24 10	00 10	01 44
	15	45 51.7	13.9	287 09.2	10.4	7 01.3	14.7	59.7	S 60	15 29	16 20	17 13	22 26	24 04	00 04	01 41
	16	60 51.7	14.4	301 38.6	10.4	6 46.6	14.7	59.7	Day	SUN		MOON				
	17	75 51.6	14.9	316 08.0	10.4	6 31.9	14.8	59.7		Eqn. of Time	Mer.	Mer. Pass.		Age		Phase
	18	90 51.6	N20 15.4	330 37.4	10.4	N 6 17.1	14.9	59.8		00 ^h	12 ^h	Pass.	Upper	Lower	d	%
	19	105 51.5	15.9	345 06.8	10.5	6 02.2	14.8	59.8	19	m s	m s	h m	h m	h m	h m	
	20	120 51.5	16.4	359 36.3	10.5	5 47.4	15.0	59.8	20	03 36	03 34	11 56	18 18	05 51	07 46	
	21	135 51.5	16.9	14 05.8	10.4	5 32.4	14.9	59.8	21	03 33	03 31	11 56	19 11	06 45	08 58	
	22	150 51.4	17.4	28 35.2	10.5	5 17.5	15.0	59.8		03 29	03 27	11 57	20 02	07 36	09 69	
23	165 51.4	17.9	43 04.7	10.5	N 5 02.5	15.0	59.8									

UT	SUN		MOON				Lat.	Twilight			Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.	Civil	Sunrise	22	23	24	25	
									h m	h m	h m	h m	h m	h m	h m	h m
d h	° /	° /	° /		° /	° /	° /	°	h m	h m	h m	h m	h m	h m	h m	
22	00	180 51.3	N20 18.4	57 34.2	10.5	N 4	47.5 15.1	59.8	N 72	□	□	□	14 27	16 45	19 15	■
01	195 51.3	18.9	72 03.7	10.5	4	32.4 15.1	59.8	N 70	□	□	□	14 29	16 37	18 52	21 30	
02	210 51.2	19.4	86 33.2	10.5	4	17.3 15.1	59.9	68	////	////	00 55	14 30	16 30	18 34	20 50	
03	225 51.2	19.9	101 02.7	10.6	4	02.2 15.2	59.9	66	////	////	01 51	14 31	16 24	18 20	20 23	
04	240 51.2	20.4	115 32.3	10.5	3	47.0 15.1	59.9	64	////	////	02 23	14 32	16 19	18 09	20 02	
05	255 51.1	20.9	130 01.8	10.5	3	31.9 15.2	59.9	62	////	01 16	02 47	14 32	16 15	17 59	19 46	
06	270 51.1	N20 21.3	144 31.3	10.6	N 3	16.7 15.3	59.9	60	////	01 54	03 05	14 33	16 11	17 51	19 32	
07	285 51.0	21.8	159 00.9	10.5	3	01.4 15.2	59.9	N 58	01 08	02 20	03 21	14 33	16 08	17 44	19 20	
08	300 51.0	22.3	173 30.4	10.6	2	46.2 15.3	59.9	56	01 44	02 57	03 45	14 34	16 02	17 32	19 10	
09	315 50.9	22.8	188 00.0	10.5	2	30.9 15.3	59.9	54	02 08	03 11	03 55	14 35	16 00	17 27	18 53	
10	330 50.9	23.3	202 29.5	10.5	2	15.6 15.3	59.9	52	02 27	03 23	04 04	14 35	15 58	17 22	18 46	
11	345 50.8	23.8	216 59.0	10.6	2	00.3 15.3	59.9	50	03 03	03 48	04 23	14 36	15 54	17 12	18 31	
12	0 50.8	N20 24.3	231 28.6	10.5	N 1	45.0 15.4	60.0	45	03 03	03 48	04 23	14 36	15 54	17 12	18 31	
13	15 50.7	24.8	245 58.1	10.6	1	29.6 15.3	60.0	N 40	03 28	04 07	04 38	14 37	15 50	17 04	18 18	
14	30 50.7	25.3	260 27.7	10.5	1	14.3 15.4	60.0	35	03 48	04 23	04 51	14 37	15 47	16 57	18 08	
15	45 50.6	25.8	274 57.2	10.5	0	58.9 15.4	60.0	30	04 04	04 36	05 02	14 38	15 44	16 51	17 59	
16	60 50.6	26.3	289 26.7	10.5	0	43.5 15.3	60.0	20	04 29	04 58	05 21	14 39	15 39	16 40	17 43	
17	75 50.6	26.8	303 56.2	10.5	0	28.2 15.4	60.0	N 10	04 49	05 15	05 38	14 39	15 35	16 31	17 30	
18	90 50.5	N20 27.2	318 25.7	10.5	N 0	12.8 15.4	60.0	0	05 05	05 31	05 53	14 40	15 31	16 23	17 17	
19	105 50.5	27.7	332 55.2	10.5	S 0	02.6 15.4	60.0	S 10	05 20	05 46	06 08	14 41	15 27	16 15	17 04	
20	120 50.4	28.2	347 24.7	10.5	0	18.0 15.4	60.0	20	05 34	06 01	06 24	14 42	15 23	16 06	16 51	
21	135 50.4	28.7	1 54.2	10.5	0	33.4 15.5	60.0	30	05 48	06 17	06 42	14 43	15 18	15 56	16 36	
22	150 50.3	29.2	16 23.7	10.4	0	48.9 15.4	60.0	35	05 55	06 26	06 53	14 43	15 16	15 50	16 27	
23	165 50.3	29.7	30 53.1	10.5	1	04.3 15.4	60.0	40	06 02	06 36	07 05	14 44	15 13	15 43	16 17	
23	00	180 50.2	N20 30.2	45 22.6	10.4	S 1	19.7 15.4	60.0	45	06 11	06 47	07 19	14 45	15 10	15 36	16 06
01	195 50.2	30.6	59 52.0	10.4	1	35.1 15.4	60.0	S 50	06 20	07 00	07 37	14 46	15 06	15 27	15 52	
02	210 50.1	31.1	74 21.4	10.4	1	50.5 15.4	60.0	52	06 24	07 06	07 45	14 46	15 04	15 23	15 45	
03	225 50.1	31.6	88 50.8	10.4	2	05.9 15.3	60.1	54	06 28	07 13	07 54	14 47	15 02	15 18	15 38	
04	240 50.0	32.1	103 20.2	10.4	2	21.2 15.4	60.1	56	06 33	07 20	08 04	14 47	15 00	15 14	15 30	
05	255 50.0	32.6	117 49.6	10.3	2	36.6 15.4	60.1	58	06 38	07 28	08 16	14 48	14 57	15 08	15 22	
06	270 49.9	N20 33.0	132 18.9	10.3	S 2	52.0 15.3	60.1	S 60	06 44	07 38	08 30	14 48	14 55	15 02	15 11	
07	285 49.9	33.5	146 48.2	10.3	3	07.3 15.4	60.1	Lat.	Sunset	Twilight			Moonset			
08	300 49.8	34.0	161 17.5	10.3	3	22.7 15.3	60.1			Civil	Naut.	22	23	24	25	
09	315 49.8	34.5	175 46.8	10.2	3	38.0 15.3	60.1	°	h m	h m	h m	h m	h m	h m	h m	
10	330 49.7	35.0	190 16.0	10.3	3	53.3 15.2	60.1	N 72	□	□	□	03 04	02 37	02 08	01 30	
11	345 49.7	35.4	204 45.3	10.2	4	08.5 15.3	60.1	N 70	□	□	□	02 59	02 40	02 20	01 55	
12	0 49.6	N20 35.9	219 14.5	10.1	S 4	23.8 15.2	60.1	68	23 06	////	////	02 54	02 42	02 29	02 14	
13	15 49.6	36.4	233 43.6	10.2	4	39.0 15.2	60.1	66	22 06	////	////	02 51	02 44	02 37	02 30	
14	30 49.5	36.9	248 12.8	10.1	4	54.2 15.2	60.1	64	21 33	////	////	02 48	02 46	02 44	02 43	
15	45 49.5	37.3	262 41.9	10.1	5	09.4 15.2	60.1	62	21 09	22 43	////	02 45	02 47	02 50	02 54	
16	60 49.4	37.8	277 11.0	10.1	5	24.6 15.1	60.1	60	20 50	22 02	////	02 43	02 49	02 55	03 03	
17	75 49.4	38.3	291 40.1	10.0	5	39.7 15.1	60.1	N 58	20 34	21 35	////	02 40	02 50	03 00	03 12	
18	90 49.3	N20 38.8	306 09.1	10.0	S 5	54.8 15.1	60.1	56	20 20	21 14	22 49	02 38	02 51	03 04	03 19	
19	105 49.2	39.2	320 38.1	10.0	6	09.9 15.0	60.1	54	20 09	20 57	22 12	02 37	02 52	03 08	03 25	
20	120 49.2	39.7	335 07.1	9.9	6	24.9 15.0	60.1	52	19 59	20 43	21 47	02 35	02 53	03 11	03 31	
21	135 49.1	40.2	349 36.0	9.9	6	39.9 14.9	60.1	50	19 50	20 31	21 27	02 34	02 53	03 14	03 37	
22	150 49.1	40.6	4 04.9	9.8	6	54.8 15.0	60.1	45	19 31	20 06	20 52	02 31	02 55	03 21	03 48	
23	165 49.0	41.1	18 33.7	9.9	7	09.8 14.8	60.1	N 40	19 15	19 47	20 26	02 28	02 57	03 26	03 58	
00	180 49.0	N20 41.6	33 02.6	9.8	S 7	24.6 14.9	60.1	35	19 02	19 31	20 06	02 26	02 58	03 31	04 06	
01	195 48.9	42.1	47 31.4	9.7	7	39.5 14.7	60.1	30	18 51	19 18	19 50	02 24	02 59	03 35	04 14	
02	210 48.9	42.5	62 00.1	9.7	7	54.2 14.8	60.1	20	18 32	18 56	19 24	02 20	03 01	03 43	04 27	
03	225 48.8	43.0	76 28.8	9.7	8	09.0 14.7	60.1	N 10	18 16	18 38	19 05	02 17	03 03	03 49	04 38	
04	240 48.8	43.5	90 57.5	9.6	8	23.7 14.6	60.1	0	18 00	18 22	18 48	02 14	03 04	03 55	04 48	
05	255 48.7	43.9	105 26.1	9.6	8	38.3 14.6	60.0	S 10	17 45	18 07	18 33	02 10	03 06	04 02	04 59	
06	270 48.6	N20 44.4	119 54.7	9.6	S 8	52.9 14.6	60.0	20	17 29	17 53	18 20	02 07	03 07	04 08	05 10	
07	285 48.6	44.9	134 23.3	9.5	9	07.5 14.5	60.0	30	17 11	17 36	18 06	02 03	03 09	04 16	05 23	
08	300 48.5	45.3	148 51.8	9.5	9	22.0 14.4	60.0	35	17 00	17 27	17 58	02 01	03 10	04 20	05 31	
09	315 48.5	45.8	163 20.3	9.4	9	36.4 14.4	60.0	40	16 48	17 17	17 51	01 58	03 11	04 25	05 39	
10	330 48.4	46.2	177 48.7	9.4	9	50.8 14.3	60.0	45	16 34	17 06	17 42	01 55	03 13	04 31	05 50	
11	345 48.4	46.7	192 17.1	9.3	10	05.1 14.2	60.0	S 50	16 16	16 53	17 33	01 52	03 14	04 38	06 02	
12	0 48.3	N20 47.2	206 45.4	9.3	S10	19.3 14.2	60.0	52	16 08	16 47	17 29	01 50	03 15	04 41	06 08	
13	15 48.3	47.6	221 13.7	9.3	10	33.5 14.1	60.0	54	15 59	16 40	17 24	01 48	03 16	04 45	06 14	
14	30 48.2	48.1	235 42.0	9.2	10	47.6 14.1	60.0	56	15 49	16 33	17 20	01 46	03 17	04 48	06 21	
15	45 48.1	48.5	250 10.2	9.1	11	01.7 14.0	60.0	58	15 37	16 24	17 14	01 44	03 18	04 53	06 29	
16	60 48.1	49.0	264 38.3	9.1	11	15.7 13.9	60.0	S 60	15 23	16 15	17 09	01 41	03 19	04 58	06 38	
17	75 48.0	49.5	279 06.4	9.1	11	29.6 13.9	60.0	Day	SUN			MOON				
18	90 48.0	N20 49.9	293 34.5	9.0	S11	43.5 13.8	60.0		Eqn. of Time	Mer.	Mer. Pass.		Age Phase			
19	105 47.9	50.4	308 02.5	9.0	11											

UT	ARIES			VENUS -4.0			MARS +1.7			JUPITER -1.9			SATURN +0.1			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
S A T U R D A Y	25 00	242 24.3	146 32.5 N24	154 55.8 N24	22.6	135 53.3 N22	48.7	166 58.5 N21	26.8	Acamar	315 25.3	S40 17.7						
	01	257 26.7	161 31.7	59.7	169 56.5	22.7	150 55.2	48.7	182 00.6	26.8	Achernar	335 33.6	S57 13.4					
	02	272 29.2	176 30.9	59.6	184 57.1	22.7	165 57.2	48.6	197 02.8	26.8	Acruz	173 18.9	S63 06.9					
	03	287 31.7	191 30.0	59.6	199 57.8	22.8	180 59.1	48.6	212 04.9	26.9	Adhara	255 19.7	S28 58.6					
	04	302 34.1	206 29.2	59.5	214 58.4	22.8	196 01.1	48.5	227 07.0	26.9	Aldebaran	290 59.8	N16 30.8					
	05	317 36.6	221 28.4	59.5	229 59.1	22.8	211 03.0	48.5	242 09.1	27.0								
	06	332 39.1	236 27.5 N24	59.4	244 59.7 N24	22.9	226 04.9 N22	48.4	257 11.3 N21	27.0	Alioth	166 27.8	N55 57.1					
	07	347 41.5	251 26.7	59.3	260 00.4	22.9	241 06.9	48.4	272 13.4	27.0	Alkaid	153 05.3	N49 18.3					
	08	2 44.0	266 25.9	59.3	275 01.0	23.0	256 08.8	48.3	287 15.5	27.1	Al Na'ir	27 54.5	S46 56.9					
	09	17 46.5	281 25.1	59.2	290 01.7	23.0	271 10.8	48.3	302 17.6	27.1	Alnilam	275 55.6	S 1 12.1					
	10	32 48.9	296 24.2	59.2	305 02.3	23.0	286 12.7	48.2	317 19.7	27.1	Alphard	218 04.8	S 8 40.1					
	11	47 51.4	311 23.4	59.1	320 03.0	23.1	301 14.6	48.2	332 21.9	27.2								
	12	62 53.8	326 22.6 N24	59.0	335 03.6 N24	23.1	316 16.6 N22	48.1	347 24.0 N21	27.2	Alphecca	126 18.0	N26 42.4					
	13	77 56.3	341 21.7	59.0	350 04.3	23.1	331 18.5	48.1	2 26.1	27.2	Alpheratz	357 52.8	N29 05.9					
	14	92 58.8	356 20.9	58.9	5 04.9	23.2	346 20.5	48.0	17 28.2	27.3	Altair	62 16.5	N 8 52.3					
	15	108 01.2	11 20.1	58.8	20 05.6	23.2	1 22.4	48.0	32 30.4	27.3	Ankaa	353 24.4	S42 17.5					
	16	123 03.7	26 19.3	58.8	35 06.3	23.2	16 24.3	47.9	47 32.5	27.3	Antares	112 36.6	S26 26.3					
	17	138 06.2	41 18.4	58.7	50 06.9	23.3	31 26.3	47.8	62 34.6	27.4								
	18	153 08.6	56 17.6 N24	58.6	65 07.6 N24	23.3	46 28.2 N22	47.8	77 36.7 N21	27.4	Arcturus	146 03.4	N19 10.3					
	19	168 11.1	71 16.8	58.5	80 08.2	23.3	61 30.2	47.7	92 38.8	27.5	Atria	107 45.9	S69 01.9					
	20	183 13.6	86 15.9	58.5	95 08.9	23.4	76 32.1	47.7	107 41.0	27.5	Avior	234 22.0	S59 31.2					
	21	198 16.0	101 15.1	58.4	110 09.5	23.4	91 34.0	47.6	122 43.1	27.5	Bellatrix	278 41.7	N 6 21.1					
	22	213 18.5	116 14.3	58.3	125 10.2	23.4	106 36.0	47.6	137 45.2	27.6	Betelgeuse	271 11.1	N 7 24.4					
23	228 21.0	131 13.5	58.2	140 10.8	23.5	121 37.9	47.5	152 47.3	27.6									
S U N D A Y	26 00	243 23.4	146 12.6 N24	155 11.5 N24	23.5	136 39.9 N22	47.5	167 49.5 N21	27.6	Canopus	264 00.5	S52 42.0						
	01	258 25.9	161 11.8	58.1	170 12.1	23.5	151 41.8	47.4	182 51.6	27.7	Capella	280 47.9	N46 00.0					
	02	273 28.3	176 11.0	58.0	185 12.8	23.6	166 43.7	47.4	197 53.7	27.7	Deneb	49 37.3	N45 17.0					
	03	288 30.8	191 10.2	57.9	200 13.4	23.6	181 45.7	47.3	212 55.8	27.7	Denebola	182 42.4	N14 33.7					
	04	303 33.3	206 09.3	57.8	215 14.1	23.6	196 47.6	47.3	227 57.9	27.8	Diphda	349 04.8	S17 58.5					
	05	318 35.7	221 08.5	57.7	230 14.7	23.7	211 49.6	47.2	243 00.1	27.8								
	06	333 38.2	236 07.7 N24	57.6	245 15.4 N24	23.7	226 51.5 N22	47.2	258 02.2 N21	27.8	Dubhe	194 02.1	N61 44.7					
	07	348 40.7	251 06.9	57.5	260 16.0	23.7	241 53.4	47.1	273 04.3	27.9	Elnath	278 24.0	N28 36.6					
	08	3 43.1	266 06.0	57.5	275 16.7	23.8	256 55.4	47.1	288 06.4	27.9	Eltanin	90 49.7	N51 29.2					
	09	18 45.6	281 05.2	57.4	290 17.4	23.8	271 57.3	47.0	303 08.6	28.0	Enif	33 55.6	N 9 52.9					
	10	33 48.1	296 04.4	57.3	305 18.0	23.8	286 59.2	46.9	318 10.7	28.0	Fomalhaut	15 33.6	S29 36.6					
	11	48 50.5	311 03.6	57.2	320 18.7	23.8	302 01.2	46.9	333 12.8	28.0								
	12	63 53.0	326 02.7 N24	57.1	335 19.3 N24	23.9	317 03.1 N22	46.8	348 14.9 N21	28.1	Gacrux	172 10.5	S57 07.8					
	13	78 55.5	341 01.9	57.0	350 20.0	23.9	332 05.1	46.8	3 17.0	28.1	Gienah	176 01.2	S17 33.3					
	14	93 57.9	356 01.1	56.9	5 20.6	23.9	347 07.0	46.7	18 19.2	28.1	Hadar	149 00.0	S60 23.2					
	15	109 00.4	11 00.3	56.8	20 21.3	24.0	2 08.9	46.7	33 21.3	28.2	Hamal	328 11.0	N23 28.2					
	16	124 02.8	25 59.4	56.7	35 21.9	24.0	17 10.9	46.6	48 23.4	28.2	Kaus Aust.	83 55.0	S34 23.0					
	17	139 05.3	40 58.6	56.6	50 22.6	24.0	32 12.8	46.6	63 25.5	28.2								
	18	154 07.8	55 57.8 N24	56.5	65 23.2 N24	24.0	47 14.7 N22	46.5	78 27.7 N21	28.3	Kochab	137 18.3	N74 08.9					
	19	169 10.2	70 57.0	56.4	80 23.9	24.1	62 16.7	46.5	93 29.8	28.3	Markab	13 47.1	N15 12.8					
	20	184 12.7	85 56.1	56.3	95 24.5	24.1	77 18.6	46.4	108 31.9	28.3	Menkar	314 24.5	N 4 05.8					
	21	199 15.2	100 55.3	56.2	110 25.2	24.1	92 20.6	46.4	123 34.0	28.4	Menkent	148 17.6	S36 23.0					
	22	214 17.6	115 54.5	56.1	125 25.9	24.1	107 22.5	46.3	138 36.1	28.4	Miaplacidus	221 42.0	S69 43.8					
23	229 20.1	130 53.7	56.0	140 26.5	24.2	122 24.4	46.3	153 38.3	28.5									
M O N D A Y	27 00	244 22.6	145 52.9 N24	155 27.2 N24	24.2	137 26.4 N22	46.2	168 40.4 N21	28.5	Mirfak	308 53.5	N49 52.0						
	01	259 25.0	160 52.0	55.7	170 27.8	24.2	152 28.3	46.1	183 42.5	28.5	Nunki	76 08.8	S26 17.6					
	02	274 27.5	175 51.2	55.6	185 28.5	24.2	167 30.2	46.1	198 44.6	28.6	Peacock	53 32.6	S56 43.5					
	03	289 30.0	190 50.4	55.5	200 29.1	24.3	182 32.2	46.0	213 46.7	28.6	Pollux	243 38.6	N28 01.4					
	04	304 32.4	205 49.6	55.4	215 29.8	24.3	197 34.1	46.0	228 48.9	28.6	Procyon	245 09.1	N 5 13.2					
	05	319 34.9	220 48.7	55.3	230 30.4	24.3	212 36.0	45.9	243 51.0	28.7								
	06	334 37.3	235 47.9 N24	55.2	245 31.1 N24	24.3	227 38.0 N22	45.9	258 53.1 N21	28.7	Rasalhague	96 14.2	N12 33.4					
	07	349 39.8	250 47.1	55.0	260 31.7	24.3	242 39.9	45.8	273 55.2	28.7	Regulus	207 52.8	N11 57.5					
	08	4 42.3	265 46.3	54.9	275 32.4	24.4	257 41.9	45.8	288 57.4	28.8	Rigel	281 20.8	S 8 12.0					
	09	19 44.7	280 45.5	54.8	290 33.1	24.4	272 43.8	45.7	303 59.5	28.8	Rigil Kent.	140 03.3	S60 50.8					
	10	34 47.2	295 44.6	54.7	305 33.7	24.4	287 45.7	45.7	319 01.6	28.8	Sabik	102 22.2	S15 43.7					
	11	49 49.7	310 43.8	54.6	320 34.4	24.4	302 47.7	45.6	334 03.7	28.9								
	12	64 52.1	325 43.0 N24	54.4	335 35.0 N24	24.4	317 49.6 N22	45.5	349 05.8 N21	28.9	Schedar	349 51.0	N56 32.7					
	13	79 54.6	340 42.2	54.3	350 35.7	24.5	332 51.5	45.5	4 08.0	29.0	Shaula	96 33.4	S37 06.3					
	14	94 57.1	355 41.4	54.2	5 36.3	24.5	347 53.5	45.4	19 10.1	29.0	Sirius	258 41.7	S16 43.2					
	15	109 59.5	10 40.6	54.0	20 37.0	24.5	2 55.4	45.4	34 12.2	29.0	Spica	158 40.3	S11 10.4					
	16	125 02.0	25 39.7	53.9	35 37.6	24.5	17 57.3	45.3	49 14.3	29.1	Suhail	222 59.1	S43 26.7					
	17	140 04.5	40 38.9	53.8	50 38.3	24.5	32 59.3	45.3	64 16.4	29.1								
	18	155 06.9	55 38.1 N24	53.7	65 39.0 N24	24.6	48 01.2 N22	45.2	79 18.6 N21	29.1	Vega	80 44.5	N38 47.0					
	19	170 09.4	70 37.3	53.5	80 39.6	24.6	63 03.1	45.2	94 20.7	29.2	Zuben'ubi	137 14.8	S16 03.1					
	20	185 11.8	85 36.5	53.4	95 40.3	24.6	78 05.1	45.1	109 22.8	29.2								
	21	200 14.3	100 35.6	53.2	110 40.9	24.6	93 07.0	45.1	124 24.9	29.2								
	22	215 16.8	115 34.8	53.1	125 41.6	24.6	108 08.9	45.0	139 27.0	29.3	Venus	262 49.2	14 16					
23	230 19.2	130 34.0	53.0	140 42.2	24.6	123 10.9	44.9	154 29.2	29.3	Mars	271 48.1	13 39						
										Jupiter	253 16.4	14 51						
										Saturn	284 26.0	12 47						

UT	SUN		MOON				Lat.	Twilight			Moonrise				
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil	Sunrise	25	26	27	28
									h m	h m	h m	h m	h m	h m	h m
25 00	180 47.6	N20 52.7	20 21.8	8.8	S13 05.1	13.3	59.9								
01	195 47.6	53.1	34 49.6	8.6	13 18.4	13.2	59.9	00 21	00 21	20 50	24 02	24 02	00 02		
02	210 47.5	53.6	49 17.2	8.6	13 31.6	13.1	59.9	01 38	01 38	20 23	22 36	22 36			
03	225 47.4	54.0	63 44.8	8.6	13 44.7	13.1	59.9	02 14	02 14	20 02	21 59	21 59	23 51	25 18	
04	240 47.4	54.5	78 12.4	8.5	13 57.8	13.0	59.8	01 00	01 00	02 40	19 46	21 32	23 11	24 27	
05	255 47.3	54.9	92 39.9	8.5	14 10.8	12.9	59.8	01 45	01 45	03 00	19 32	21 12	22 43	23 55	
06	270 47.3	N20 55.4	107 07.4	8.4	S14 23.7	12.8	59.8	02 13	02 13	03 16	19 20	20 55	22 21	23 31	
07	285 47.2	55.8	121 34.8	8.3	14 36.5	12.7	59.8	00 54	02 35	03 30	19 10	20 41	22 04	23 12	
08	300 47.1	56.3	136 02.1	8.3	14 49.2	12.6	59.8	01 35	02 52	03 42	19 01	20 28	21 49	22 56	
09	315 47.1	56.7	150 29.4	8.3	15 01.8	12.5	59.8	02 02	03 07	03 52	18 53	20 18	21 36	22 42	
10	330 47.0	57.2	164 56.7	8.2	15 14.3	12.4	59.8	02 22	03 20	04 01	18 46	20 08	21 24	22 30	
11	345 46.9	57.6	179 23.9	8.1	15 26.7	12.3	59.7	02 59	03 45	04 21	18 31	19 48	21 01	22 05	
12	0 46.9	N20 58.1	193 51.0	8.1	S15 39.0	12.2	59.7	03 25	04 05	04 36	18 18	19 32	20 42	21 45	
13	15 46.8	58.5	208 18.1	8.0	15 51.2	12.1	59.7	03 46	04 21	04 50	18 08	19 18	20 26	21 28	
14	30 46.8	59.0	222 45.1	8.0	16 03.3	12.0	59.7	04 02	04 34	05 01	17 59	19 07	20 12	21 14	
15	45 46.7	59.4	237 12.1	8.0	16 15.3	11.9	59.7	04 28	04 57	05 21	17 43	18 47	19 49	20 49	
16	60 46.6	20 59.8	251 39.1	7.8	16 27.2	11.8	59.7	04 48	05 15	05 38	17 30	18 29	19 29	20 28	
17	75 46.6	21 00.3	266 05.9	7.9	16 39.0	11.7	59.6	05 05	05 31	05 53	17 17	18 13	19 11	20 09	
18	90 46.5	N21 00.7	280 32.8	7.7	S16 50.7	11.6	59.6	05 21	05 46	06 09	17 04	17 57	18 52	19 49	
19	105 46.4	01.2	294 59.5	7.8	17 02.3	11.5	59.6	05 35	06 02	06 25	16 51	17 40	18 32	19 28	
20	120 46.4	01.6	309 26.3	7.6	17 13.8	11.3	59.6	05 49	06 18	06 44	16 36	17 20	18 10	19 04	
21	135 46.3	02.1	323 52.9	7.6	17 25.1	11.2	59.6	05 57	06 28	06 55	16 27	17 09	17 57	18 50	
22	150 46.3	02.5	338 19.5	7.6	17 36.3	11.2	59.5	06 04	06 38	07 08	16 17	16 56	17 41	18 33	
23	165 46.2	02.9	352 46.1	7.5	17 47.5	11.0	59.5	06 13	06 50	07 22	16 06	16 41	17 23	18 14	
26 00	180 46.1	N21 03.4	7 12.6	7.5	S17 58.5	10.9	59.5	06 23	07 03	07 40	15 52	16 22	17 01	17 49	
01	195 46.1	03.8	21 39.1	7.4	18 09.4	10.8	59.5	06 27	07 10	07 49	15 45	16 14	16 50	17 37	
02	210 46.0	04.3	36 05.5	7.4	18 20.2	10.6	59.5	06 32	07 17	07 58	15 38	16 04	16 38	17 24	
03	225 45.9	04.7	50 31.9	7.3	18 30.8	10.5	59.4	06 37	07 24	08 09	15 30	15 53	16 24	17 08	
04	240 45.9	05.1	64 58.2	7.3	18 41.3	10.4	59.4	06 42	07 33	08 21	15 22	15 40	16 08	16 50	
05	255 45.8	05.6	79 24.5	7.2	18 51.7	10.3	59.4	06 48	07 43	08 35	15 11	15 26	15 49	16 27	
06	270 45.7	N21 06.0	93 50.7	7.1	S19 02.0	10.2	59.4	Lat.	Sunset	Twilight		Moonset			
07	285 45.7	06.4	108 16.8	7.2	19 12.2	10.0	59.4	Civil	Naut.	25	26	27	28		
08	300 45.6	06.9	122 43.0	7.0	19 22.2	9.9	59.4	h m	h m	h m	h m	h m	h m	h m	
09	315 45.5	07.3	137 09.0	7.1	19 32.1	9.8	59.3	N 72							
10	330 45.5	07.7	151 35.1	7.0	19 41.9	9.7	59.3	N 70				01 55	01 11		
11	345 45.4	08.2	166 01.1	6.9	19 51.6	9.5	59.3	68				02 14	01 52	00 39	
12	0 45.3	N21 08.6	180 27.0	6.9	S20 01.1	9.4	59.2	66	22 19	02 30	02 21	02 06			
13	15 45.3	09.0	194 52.9	6.9	20 10.5	9.2	59.2	64	21 42	02 43	02 42	02 44	02 52		
14	30 45.2	09.5	209 18.8	6.8	20 19.7	9.1	59.2	62	21 16	23 00	02 54	03 00	03 11	03 33	
15	45 45.1	09.9	223 44.6	6.7	20 28.8	9.0	59.2	60	20 56	22 12	03 03	03 15	03 32	04 02	
16	60 45.1	10.3	238 10.3	6.8	20 37.8	8.8	59.1	N 58	20 39	21 43	03 12	03 27	03 50	04 24	
17	75 45.0	10.7	252 36.1	6.7	20 46.6	8.7	59.1	56	20 25	21 21	03 19	03 38	04 04	04 41	
18	90 44.9	N21 11.2	267 01.8	6.6	S20 55.3	8.6	59.1	54	20 13	21 03	03 25	03 48	04 17	04 57	
19	105 44.9	11.6	281 27.4	6.6	21 03.9	8.4	59.1	52	20 03	20 48	03 31	03 56	04 28	05 10	
20	120 44.8	12.0	295 53.0	6.6	21 12.3	8.3	59.0	50	19 53	20 35	03 37	04 04	04 38	05 21	
21	135 44.7	12.5	310 18.6	6.5	21 20.6	8.2	59.0	45	19 34	20 10	03 48	04 21	04 59	05 45	
22	150 44.7	12.9	324 44.1	6.5	21 28.8	8.0	59.0	N 40	19 18	19 50	03 58	04 34	05 16	06 05	
23	165 44.6	13.3	339 09.6	6.5	21 36.8	7.8	59.0	35	19 05	19 33	04 06	04 46	05 30	06 21	
27 00	180 44.5	N21 13.7	353 35.1	6.5	S21 44.6	7.7	58.9	30	18 53	19 20	04 14	04 56	05 43	06 35	
01	195 44.4	14.2	8 00.6	6.4	21 52.3	7.6	58.9	20	18 33	18 57	04 27	05 14	06 04	06 59	
02	210 44.4	14.6	22 26.0	6.3	21 59.9	7.4	58.9	N 10	18 16	18 39	04 38	05 29	06 23	07 19	
03	225 44.3	15.0	36 51.3	6.4	22 07.3	7.3	58.9	0	18 01	18 23	04 48	05 43	06 40	07 39	
04	240 44.2	15.4	51 16.7	6.3	22 14.6	7.1	58.8	S 10	17 45	18 07	04 59	05 58	06 58	07 58	
05	255 44.2	15.8	65 42.0	6.3	22 21.7	7.0	58.8	20	17 28	17 52	05 10	06 13	07 17	08 18	
06	270 44.1	N21 16.3	80 07.3	6.3	S22 28.7	6.8	58.8	30	17 10	17 35	05 23	06 31	07 38	08 42	
07	285 44.0	16.7	94 32.6	6.2	22 35.5	6.7	58.7	35	16 59	17 26	05 31	06 42	07 51	08 56	
08	300 44.0	17.1	108 57.8	6.3	22 42.2	6.6	58.7	40	16 46	17 16	05 39	06 54	08 06	09 13	
09	315 43.9	17.5	123 23.1	6.2	22 48.8	6.3	58.7	45	16 31	17 04	05 50	07 08	08 23	09 32	
10	330 43.8	17.9	137 48.3	6.2	22 55.1	6.3	58.7	S 50	16 13	16 50	06 02	07 25	08 45	09 56	
11	345 43.7	18.4	152 13.5	6.1	23 01.4	6.0	58.6	52	16 05	16 44	06 08	07 33	08 55	10 08	
12	0 43.7	N21 18.8	166 38.6	6.2	S23 07.4	6.0	58.6	54	15 55	16 37	06 14	07 43	09 07	10 21	
13	15 43.6	19.2	181 03.8	6.1	23 13.4	5.7	58.6	56	15 45	16 29	06 21	07 53	09 20	10 37	
14	30 43.5	19.6	195 28.9	6.1	23 19.1	5.7	58.5	58	15 32	16 21	06 29	08 05	09 36	10 55	
15	45 43.5	20.0	209 54.0	6.1	23 24.8	5.4	58.5	S 60	15 18	16 11	06 38	08 19	09 55	11 18	
16	60 43.4	20.4	224 19.1	6.1	23 30.2	5.3	58.5	Day	SUN		MOON				
17	75 43.3	20.8	238 44.2	6.1	23 35.5	5.2	58.4	Eqn. of Time	Mer.	Mer. Pass.		Age Phase			
18	90 43.2	N21 21.3	253 09.3	6.1	S23 40.7	5.0	58.4	00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
19	105 43.2	21.7	267 34.4	6.1	23 45.7	4.8	58.4	03 11	03 08	11 57	23 30	11 03	13	99	
20	120 43.1	22.1	281 59.5	6.0	23 50.5	4.7	58.4	03 05	03 01	11 57	24 27	11 58	14	100	
21	135 43.0	22.5	296 24.5	6.1	23 55.2	4.6	58.3	02 58	02 55	11 57	00 27	12 56	15	99	
22	150 42.9	22.9	310 49.6	6.1	23 59.8	4.4	58.3								
23	165 42.9	23.													

UT	ARIES	VENUS -4.0		MARS +1.7		JUPITER -1.9		SATURN +0.0		STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
28 TUESDAY	245 21.7	145 33.2	N24 52.8	155 42.9	N24 24.7	138 12.8	N22 44.9	169 31.3	N21 29.3	Acamar	315 25.3	S40 17.7
	260 24.2	160 32.4	52.7	170 43.5	24.7	153 14.7	44.8	184 33.4	29.4	Achernar	335 33.5	S57 13.4
	275 26.6	175 31.6	52.5	185 44.2	24.7	168 16.7	44.8	199 35.5	29.4	Acruz	173 18.9	S63 06.9
	290 29.1	190 30.8	52.4	200 44.8	24.7	183 18.6	44.7	214 37.7	29.4	Adhara	255 19.7	S28 58.6
	305 31.6	205 29.9	52.3	215 45.5	24.7	198 20.5	44.7	229 39.8	29.5	Aldebaran	290 59.8	N16 30.8
	320 34.0	220 29.1	52.1	230 46.2	24.7	213 22.5	44.6	244 41.9	29.5			
	335 36.5	235 28.3	N24 52.0	245 46.8	N24 24.7	228 24.4	N22 44.6	259 44.0	N21 29.6	Alioth	166 27.8	N55 57.1
	350 39.0	250 27.5	51.8	260 47.5	24.8	243 26.3	44.5	274 46.1	29.6	Alkaid	153 05.3	N49 18.3
	5 41.4	265 26.7	51.7	275 48.1	24.8	258 28.3	44.5	289 48.3	29.6	Al Na'ir	27 54.5	S46 56.9
	20 43.9	280 25.9	51.5	290 48.8	24.8	273 30.2	44.4	304 50.4	29.7	Alnilam	275 55.6	S 1 12.1
	35 46.3	295 25.0	51.4	305 49.4	24.8	288 32.1	44.3	319 52.5	29.7	Alphard	218 04.8	S 8 40.1
	50 48.8	310 24.2	51.2	320 50.1	24.8	303 34.1	44.3	334 54.6	29.7			
	65 51.3	325 23.4	N24 51.1	335 50.7	N24 24.8	318 36.0	N22 44.2	349 56.7	N21 29.8	Alphecca	126 18.0	N26 42.4
	80 53.7	340 22.6	50.9	350 51.4	24.8	333 37.9	44.2	4 58.9	29.8	Alpheratz	357 52.7	N29 05.9
	95 56.2	355 21.8	50.8	5 52.1	24.8	348 39.9	44.1	20 01.0	29.8	Altair	62 16.5	N 8 52.3
	110 58.7	10 21.0	50.6	20 52.7	24.8	3 41.8	44.1	35 03.1	29.9	Ankaa	353 24.4	S42 17.5
	126 01.1	25 20.2	50.4	35 53.4	24.9	18 43.7	44.0	50 05.2	29.9	Antares	112 36.6	S26 26.3
	141 03.6	40 19.4	50.3	50 54.0	24.9	33 45.7	44.0	65 07.3	29.9			
	156 06.1	55 18.5	N24 50.1	65 54.7	N24 24.9	48 47.6	N22 43.9	80 09.5	N21 30.0	Arcturus	146 03.4	N19 10.3
	171 08.5	70 17.7	49.9	80 55.3	24.9	63 49.5	43.8	95 11.6	30.0	Atria	107 45.8	S69 01.9
	186 11.0	85 16.9	49.8	95 56.0	24.9	78 51.5	43.8	110 13.7	30.0	Avior	234 22.0	S59 31.2
	201 13.4	100 16.1	49.6	110 56.7	24.9	93 53.4	43.7	125 15.8	30.1	Bellatrix	278 41.7	N 6 21.1
	216 15.9	115 15.3	49.5	125 57.3	24.9	108 55.3	43.7	140 17.9	30.1	Betelgeuse	271 11.1	N 7 24.4
231 18.4	130 14.5	49.3	140 58.0	24.9	123 57.3	43.6	155 20.1	30.1				
29 WEDNESDAY	246 20.8	145 13.7	N24 49.1	155 58.6	N24 24.9	138 59.2	N22 43.6	170 22.2	N21 30.2	Canopus	264 00.5	S52 41.9
	261 23.3	160 12.9	48.9	170 59.3	24.9	154 01.1	43.5	185 24.3	30.2	Capella	280 47.9	N46 00.0
	276 25.8	175 12.1	48.8	185 59.9	24.9	169 03.0	43.5	200 26.4	30.3	Deneb	49 37.3	N45 17.0
	291 28.2	190 11.3	48.6	201 00.6	24.9	184 05.0	43.4	215 28.5	30.3	Denebola	182 42.4	N14 33.7
	306 30.7	205 10.4	48.4	216 01.2	24.9	199 06.9	43.3	230 30.7	30.3	Diphda	349 04.8	S17 58.5
	321 33.2	220 09.6	48.3	231 01.9	25.0	214 08.8	43.3	245 32.8	30.4			
	336 35.6	235 08.8	N24 48.1	246 02.6	N24 25.0	229 10.8	N22 43.2	260 34.9	N21 30.4	Dubhe	194 02.1	N61 44.7
	351 38.1	250 08.0	47.9	261 03.2	25.0	244 12.7	43.2	275 37.0	30.4	El Nath	278 24.0	N28 36.6
	6 40.6	265 07.2	47.7	276 03.9	25.0	259 14.6	43.1	290 39.1	30.5	Eltanin	90 49.7	N51 29.2
	21 43.0	280 06.4	47.5	291 04.5	25.0	274 16.6	43.1	305 41.3	30.5	Enif	33 55.6	N 9 53.0
	36 45.5	295 05.6	47.4	306 05.2	25.0	289 18.5	43.0	320 43.4	30.5	Fomalhaut	15 33.6	S29 36.6
	51 47.9	310 04.8	47.2	321 05.8	25.0	304 20.4	43.0	335 45.5	30.6			
	66 50.4	325 04.0	N24 47.0	336 06.5	N24 25.0	319 22.3	N22 42.9	350 47.6	N21 30.6	Gacrux	172 10.5	S57 07.8
	81 52.9	340 03.2	46.8	351 07.2	25.0	334 24.3	42.8	5 49.7	30.6	Gienah	176 01.2	S17 33.3
	96 55.3	355 02.4	46.6	6 07.8	25.0	349 26.2	42.8	20 51.9	30.7	Hadar	148 59.9	S60 23.2
	111 57.8	10 01.6	46.4	21 08.5	25.0	4 28.1	42.7	35 54.0	30.7	Hamal	328 10.9	N23 28.2
	127 00.3	25 00.8	46.3	36 09.1	25.0	19 30.1	42.7	50 56.1	30.7	Kaus Aust.	83 50.5	S34 23.0
	142 02.7	40 00.0	46.1	51 09.8	25.0	34 32.0	42.6	65 58.2	30.8			
	157 05.2	54 59.1	N24 45.9	66 10.4	N24 25.0	49 33.9	N22 42.6	81 00.3	N21 30.8	Kochab	137 18.3	N74 08.9
	172 07.7	69 58.3	45.7	81 11.1	25.0	64 35.9	42.5	96 02.5	30.8	Markab	13 47.1	N15 12.8
	187 10.1	84 57.5	45.5	96 11.8	25.0	79 37.8	42.4	111 04.6	30.9	Menkar	314 24.5	N 4 05.8
	202 12.6	99 56.7	45.3	111 12.4	25.0	94 39.7	42.4	126 06.7	30.9	Menkent	148 17.6	S36 23.0
	217 15.1	114 55.9	45.1	126 13.1	25.0	109 41.6	42.3	141 08.8	30.9	Miaplacidus	221 42.1	S69 43.8
232 17.5	129 55.1	44.9	141 13.7	25.0	124 43.6	42.3	156 10.9	31.0				
30 THURSDAY	247 20.0	144 54.3	N24 44.7	156 14.4	N24 25.0	139 45.5	N22 42.2	171 13.1	N21 31.0	Miraf	308 53.4	N49 52.0
	262 22.4	159 53.5	44.5	171 15.0	25.0	154 47.4	42.2	186 15.2	31.0	Nunki	76 08.8	S26 17.6
	277 24.9	174 52.7	44.3	186 15.7	25.0	169 49.4	42.1	201 17.3	31.1	Peacock	53 32.5	S56 43.5
	292 27.4	189 51.9	44.1	201 16.4	25.0	184 51.3	42.0	216 19.4	31.1	Pollux	243 38.6	N28 01.4
	307 29.8	204 51.1	43.9	216 17.0	25.0	199 53.2	42.0	231 21.5	31.2	Procyon	245 09.1	N 5 13.2
	322 32.3	219 50.3	43.7	231 17.7	25.0	214 55.1	41.9	246 23.7	31.2			
	337 34.8	234 49.5	N24 43.5	246 18.3	N24 25.0	229 57.1	N22 41.9	261 25.8	N21 31.2	Rasalhague	96 14.2	N12 33.4
	352 37.2	249 48.7	43.3	261 19.0	25.0	244 59.0	41.8	276 27.9	31.3	Regulus	207 52.8	N11 57.5
	7 39.7	264 47.9	43.1	276 19.7	25.0	260 00.9	41.8	291 30.0	31.3	Rigel	281 20.8	S 8 12.0
	22 42.2	279 47.1	42.9	291 20.3	25.0	275 02.9	41.7	306 32.1	31.3	Rigil Kent.	140 03.3	S60 50.8
	37 44.6	294 46.3	42.7	306 21.0	25.0	290 04.8	41.6	321 34.2	31.4	Sabik	102 22.2	S15 43.7
	52 47.1	309 45.5	42.4	321 21.6	25.0	305 06.7	41.6	336 36.4	31.4			
	67 49.6	324 44.7	N24 42.2	336 22.3	N24 24.9	320 08.6	N22 41.5	351 38.5	N21 31.4	Schedar	349 51.0	N56 32.7
	82 52.0	339 43.9	42.0	351 22.9	24.9	335 10.6	41.5	6 40.6	31.5	Shaula	96 33.4	S37 06.3
	97 54.5	354 43.1	41.8	6 23.6	24.9	350 12.5	41.4	21 42.7	31.5	Sirius	258 41.7	S16 43.2
	112 56.9	9 42.3	41.6	21 24.3	24.9	5 14.4	41.4	36 44.8	31.5	Spica	158 40.2	S11 10.4
	127 59.4	24 41.5	41.4	36 24.9	24.9	20 16.3	41.3	51 47.0	31.6	Suhail	222 59.1	S43 26.7
	143 01.9	39 40.7	41.2	51 25.6	24.9	35 18.3	41.2	66 49.1	31.6			
	158 04.3	54 39.9	N24 40.9	66 26.2	N24 24.9	50 20.2	N22 41.2	81 51.2	N21 31.6	Vega	80 44.5	N38 47.0
	173 06.8	69 39.1	40.7	81 26.9	24.9	65 22.1	41.1	96 53.3	31.7	Zuben'ubi	137 14.8	S16 03.1
	188 09.3	84 38.3	40.5	96 27.6	24.9	80 24.0	41.1	111 55.4	31.7		SHA	Mer. Pass.
	203 11.7	99 37.5	40.3	111 28.2	24.9	95 26.0	41.0	126 57.6	31.7		h	m
	218 14.2	114 36.7	40.0	126 28.9	24.9	110 27.9	41.0	141 59.7	31.8	Venus	258 52.8	14 20
233 16.7	129 35.9	39.8	141 29.5	24.9	125 29.8	40.9	157 01.8	31.8	Mars	269 37.8	13 35	
									Jupiter	252 38.3	14 42	
Mer. Pass. 7 33.4	v -0.8 d 0.2		v 0.7 d 0.0		v 1.9 d 0.1		v 2.1 d 0.0		Saturn	284 01.3	12 37	

UT	SUN		MOON				Lat.	Twilight		Sunrise	Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.		Civil	28	29	30	31	
	° / ' / ''	° / ' / ''	° / ' / ''	° / ' / ''	° / ' / ''	' / ''		' / ''	h m		h m	h m	h m	h m	h m	h m
TUESDAY	00	180 42.8	N21 23.7	339 39.7	6.1	S24 08.4	4.0	58.2	N 72	□	□	□	■	■	■	■
	01	195 42.7	24.1	354 04.8	6.1	24 12.4	4.0	58.2	N 70	□	□	□	■	■	■	■
	02	210 42.6	24.5	8 29.9	6.1	24 16.4	3.7	58.2	68	□	□	□	■	■	■	■
	03	225 42.6	24.9	22 55.0	6.0	24 20.1	3.6	58.1	66	////	////	01 26	■	■	■	02 42
	04	240 42.5	25.3	37 20.0	6.1	24 23.7	3.4	58.1	64	////	////	02 06	25 18	01 18	01 52	02 01
	05	255 42.4	25.7	51 45.1	6.1	24 27.1	3.3	58.1	62	////	00 40	02 33	24 27	00 27	01 11	01 32
	06	270 42.3	N21 26.2	66 10.2	6.1	S24 30.4	3.2	58.0	60	////	01 36	02 54	23 55	24 42	00 42	01 10
	07	285 42.3	26.6	80 35.3	6.2	24 33.6	2.9	58.0	N 58	////	02 07	03 11	23 31	24 20	00 20	00 52
	08	300 42.2	27.0	95 00.5	6.1	24 36.5	2.8	58.0	56	00 36	02 30	03 26	23 12	24 02	00 02	00 37
	09	315 42.1	27.4	109 25.6	6.2	24 39.3	2.7	57.9	54	01 27	02 48	03 38	22 56	23 47	24 24	00 24
	10	330 42.0	27.8	123 50.8	6.1	24 42.0	2.5	57.9	52	01 56	03 03	03 49	22 42	23 34	24 13	00 13
	11	345 42.0	28.2	138 15.9	6.2	24 44.5	2.3	57.9	50	02 17	03 16	03 58	22 30	23 22	24 03	00 03
	12	0 41.9	N21 28.6	152 41.1	6.3	S24 46.8	2.2	57.8	45	02 56	03 43	04 19	22 05	22 58	23 41	24 16
	13	15 41.8	29.0	167 06.4	6.2	24 49.0	2.0	57.8	N 40	03 23	04 03	04 35	21 45	22 39	23 24	24 01
	14	30 41.7	29.4	181 31.6	6.3	24 51.0	1.9	57.8	35	03 44	04 19	04 48	21 28	22 23	23 10	23 49
	15	45 41.7	29.8	195 56.9	6.3	24 52.9	1.7	57.7	30	04 01	04 33	05 00	21 14	22 09	22 57	23 38
	16	60 41.6	30.2	210 22.2	6.3	24 54.6	1.6	57.7	20	04 27	04 56	05 20	20 49	21 45	22 35	23 20
	17	75 41.5	30.6	224 47.5	6.3	24 56.2	1.4	57.7	N 10	04 48	05 15	05 38	20 28	21 24	22 16	23 04
	18	90 41.4	N21 31.0	239 12.8	6.4	S24 57.6	1.3	57.6	0	05 06	05 31	05 54	20 09	21 05	21 59	22 49
	19	105 41.3	31.4	253 38.2	6.4	24 58.9	1.1	57.6	S 10	05 21	05 47	06 10	19 49	20 46	21 41	22 33
	20	120 41.3	31.8	268 03.6	6.5	25 00.0	0.9	57.6	20	05 36	06 03	06 27	19 28	20 25	21 22	22 17
	21	135 41.2	32.2	282 29.1	6.5	25 00.9	0.8	57.5	30	05 50	06 20	06 46	19 04	20 01	21 00	21 58
	22	150 41.1	32.5	296 54.6	6.5	25 01.7	0.6	57.5	35	05 58	06 29	06 57	18 50	19 47	20 47	21 47
23	165 41.0	32.9	311 20.1	6.5	25 02.3	0.5	57.5	40	06 07	06 40	07 10	18 33	19 31	20 32	21 35	
								45	06 16	06 52	07 25	18 14	19 12	20 15	21 20	
WEDNESDAY	00	180 40.9	N21 33.3	325 45.6	6.7	S25 02.8	0.4	57.4	S 50	06 26	07 06	07 44	17 49	18 47	19 53	21 01
	01	195 40.9	33.7	340 11.3	6.6	25 03.2	0.1	57.4	52	06 30	07 13	07 52	17 37	18 35	19 42	20 53
	02	210 40.8	34.1	354 36.9	6.7	25 03.3	0.1	57.4	54	06 35	07 20	08 02	17 24	18 22	19 30	20 43
	03	225 40.7	34.5	9 02.6	6.7	25 03.4	0.1	57.3	56	06 40	07 28	08 13	17 08	18 07	19 16	20 32
	04	240 40.6	34.9	23 28.3	6.8	25 03.3	0.3	57.3	58	06 46	07 37	08 26	16 50	17 48	19 00	20 19
	05	255 40.5	35.3	37 54.1	6.9	25 03.0	0.4	57.3	S 60	06 53	07 47	08 41	16 27	17 26	18 41	20 04
	06	270 40.5	N21 35.7	52 20.0	6.8	S25 02.6	0.6	57.2	Lat.	Sunset	Twilight		Moonset			
	07	285 40.4	36.1	66 45.8	7.0	25 02.0	0.7	57.2			Civil	Naut.	28	29	30	31
	08	300 40.3	36.5	81 11.8	7.0	25 01.3	0.9	57.2			h m	h m	h m	h m	h m	h m
	09	315 40.2	36.8	95 37.8	7.0	25 00.4	1.0	57.1	N 72	□	□	□	■	■	■	■
	10	330 40.1	37.2	110 03.8	7.1	24 59.4	1.1	57.1	N 70	□	□	□	■	■	■	■
	11	345 40.1	37.6	124 29.9	7.2	24 58.3	1.3	57.1	68	□	□	□	■	■	■	■
	12	0 40.0	N21 38.0	138 56.1	7.2	S24 57.0	1.5	57.0	66	22 33	////	////	■	■	■	05 49
	13	15 39.9	38.4	153 22.3	7.3	24 55.5	1.6	57.0	64	21 51	////	////	02 52	03 26	04 49	06 30
	14	30 39.8	38.8	167 48.6	7.3	24 53.9	1.7	57.0	62	21 23	23 22	////	03 33	04 18	05 30	06 58
	15	45 39.7	39.2	182 14.9	7.4	24 52.2	1.9	56.9	60	21 02	22 22	////	04 02	04 50	05 59	07 20
	16	60 39.7	39.5	196 41.3	7.4	24 50.3	2.0	56.9	N 58	20 44	21 50	////	04 24	05 14	06 20	07 37
	17	75 39.6	39.9	211 07.7	7.6	24 48.3	2.2	56.9	56	20 30	21 26	23 26	04 41	05 33	06 38	07 52
	18	90 39.5	N21 40.3	225 34.3	7.6	S24 46.1	2.3	56.9	54	20 17	21 08	22 30	04 57	05 49	06 53	08 04
	19	105 39.4	40.7	240 00.9	7.6	24 43.8	2.4	56.8	52	20 07	20 52	22 00	05 10	06 03	07 06	08 15
	20	120 39.3	41.1	254 27.5	7.8	24 41.4	2.6	56.8	50	19 57	20 39	21 39	05 21	06 15	07 17	08 25
	21	135 39.2	41.4	268 54.3	7.7	24 38.8	2.7	56.8	45	19 37	20 13	21 00	05 45	06 40	07 41	08 46
	22	150 39.2	41.8	283 21.0	7.9	24 36.1	2.8	56.7	N 40	19 20	19 52	20 32	06 05	07 00	08 00	09 02
23	165 39.1	42.2	297 47.9	8.0	24 33.3	3.0	56.7	35	19 07	19 36	20 11	06 21	07 17	08 16	09 16	
00	180 39.0	N21 42.6	312 14.9	8.0	S24 30.3	3.1	56.7	30	18 55	19 22	19 54	06 35	07 31	08 29	09 28	
01	195 38.9	43.0	326 41.9	8.0	24 27.2	3.3	56.6	20	18 35	18 59	19 27	06 59	07 55	08 53	09 49	
02	210 38.8	43.3	341 08.9	8.2	24 23.9	3.4	56.6	N 10	18 17	18 40	19 07	07 19	08 16	09 13	10 07	
03	225 38.7	43.7	355 36.1	8.2	24 20.5	3.5	56.6	0	18 01	18 23	18 49	07 39	08 36	09 31	10 23	
04	240 38.6	44.1	10 03.3	8.3	24 17.0	3.6	56.5	S 10	17 45	18 07	18 34	07 58	08 56	09 50	10 40	
05	255 38.6	44.5	24 30.6	8.4	24 13.4	3.8	56.5	20	17 28	17 52	18 19	08 18	09 17	10 10	10 57	
06	270 38.5	N21 44.8	38 58.0	8.5	S24 09.6	3.9	56.5	30	17 09	17 35	18 04	08 42	09 41	10 32	11 17	
07	285 38.4	45.2	53 25.5	8.5	24 05.7	4.0	56.4	35	16 57	17 25	17 56	08 56	09 55	10 46	11 29	
08	300 38.3	45.6	67 53.0	8.6	24 01.7	4.2	56.4	40	16 44	17 14	17 48	09 13	10 11	11 01	11 42	
09	315 38.2	45.9	82 20.6	8.7	23 57.5	4.3	56.4	45	16 29	17 02	17 39	09 32	10 31	11 19	11 58	
10	330 38.1	46.3	96 48.3	8.8	23 53.2	4.4	56.3	S 50	16 11	16 48	17 29	09 56	10 56	11 42	12 17	
11	345 38.1	46.7	111 16.1	8.9	23 48.8	4.5	56.3	52	16 02	16 41	17 24	10 08	11 08	11 53	12 27	
12	0 38.0	N21 47.1	125 44.0	8.9	S23 44.3	4.7	56.3	54	15 52	16 34	17 19	10 21	11 21	12 05	12 37	
13	15 37.9	47.4	140 11.9	9.0	23 39.6	4.8	56.2	56	15 41	16 26	17 14	10 37	11 37	12 19	12 48	
14	30 37.8	47.8	154 39.9	9.1	23 34.8	4.9	56.2	58	15 28	16 17	17 08	10 55	11 55	12 35	13 01	
15	45 37.7	48.2	169 08.0	9.2	23 29.9	5.0	56.2	S 60	15 13	16 07	17 02	11 18	12 18	12 55	13 17	
16	60 37.6	48.5	183 36.2	9.3	23 24.9	5.1	56.1	Day	SUN		MOON					
17	75 37.5	48.9	198 04.5	9.4	23 19.8	5.3	56.1		Eqn. of Time	Mer.	Mer. Pass.		Age	Phase		
18	90 37.4	N21 49.3	212 32.9	9.4	S23 14.5	5.3	56.1		00 ^h	12 ^h	Pass.	Upper	Lower	d	%	
19	105 37.4	49.6	227 01.3	9.5	23 09.2	5.5	56.1	d	m s	m s	h m	h m	h m	d	%	
20	120 37.3	50.0	241 29.8	9.6	23											

UT	ARIES			VENUS -4.0			MARS +1.7			JUPITER -1.9			SATURN +0.0			STARS		
	GHA	GHA	Dec	GHA	Dec		GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec			
31 F R I D A Y	00	248 19.1	144 35.1 N24	39.6	156 30.2 N24	24.9	140 31.8 N22	40.8	172 03.9 N21	31.8	Acamar	315 25.3 S40	17.7					
	01	263 21.6	159 34.3	39.4	171 30.8	24.8	155 33.7	40.8	187 06.0	31.9	Achernar	335 33.5 S57	13.4					
	02	278 24.1	174 33.5	39.1	186 31.5	24.8	170 35.6	40.7	202 08.2	31.9	Acrux	173 19.0 S63	06.9					
	03	293 26.5	189 32.7	38.9	201 32.2	24.8	185 37.5	40.7	217 10.3	31.9	Adhara	255 19.7 S28	58.6					
	04	308 29.0	204 32.0	38.7	216 32.8	24.8	200 39.5	40.6	232 12.4	32.0	Aldebaran	290 59.8 N16	30.8					
	05	323 31.4	219 31.2	38.4	231 33.5	24.8	215 41.4	40.6	247 14.5	32.0								
	06	338 33.9	234 30.4 N24	38.2	246 34.1 N24	24.8	230 43.3 N22	40.5	262 16.6 N21	32.0	Alioth	166 27.9 N55	57.1					
	07	353 36.4	249 29.6	38.0	261 34.8	24.8	245 45.2	40.4	277 18.7	32.1	Alkaid	153 05.3 N49	18.3					
	08	8 38.8	264 28.8	37.7	276 35.5	24.8	260 47.2	40.4	292 20.9	32.1	Al Na'ir	27 54.4 S46	56.9					
	09	23 41.3	279 28.0	37.5	291 36.1	24.8	275 49.1	40.3	307 23.0	32.1	Alnilam	275 55.5 S 1	12.1					
	10	38 43.8	294 27.2	37.3	306 36.8	24.7	290 51.0	40.3	322 25.1	32.2	Alphard	218 04.8 S 8	40.1					
	11	53 46.2	309 26.4	37.0	321 37.4	24.7	305 52.9	40.2	337 27.2	32.2								
	12	68 48.7	324 25.6 N24	36.8	336 38.1 N24	24.7	320 54.9 N22	40.1	352 29.3 N21	32.3	Alphecca	126 18.0 N26	42.5					
	13	83 51.2	339 24.8	36.5	351 38.8	24.7	335 56.8	40.1	7 31.5	32.3	Alpheratz	357 52.7 N29	05.9					
	14	98 53.6	354 24.0	36.3	6 39.4	24.7	350 58.7	40.0	22 33.6	32.3	Altair	62 16.5 N 8	52.3					
	15	113 56.1	9 23.2	36.0	21 40.1	24.7	6 00.6	40.0	37 35.7	32.4	Ankaa	353 24.4 S42	17.5					
	16	128 58.6	24 22.4	35.8	36 40.7	24.7	21 02.6	39.9	52 37.8	32.4	Antares	112 36.6 S26	26.3					
	17	144 01.0	39 21.6	35.5	51 41.4	24.6	36 04.5	39.9	67 39.9	32.4								
	18	159 03.5	54 20.9 N24	35.3	66 42.1 N24	24.6	51 06.4 N22	39.8	82 42.1 N21	32.5	Arcturus	146 03.4 N19	10.3					
	19	174 05.9	69 20.1	35.0	81 42.7	24.6	66 08.3	39.7	97 44.2	32.5	Atria	107 45.8 S69	01.9					
	20	189 08.4	84 19.3	34.8	96 43.4	24.6	81 10.2	39.7	112 46.3	32.5	Avior	234 22.1 S59	31.2					
	21	204 10.9	99 18.5	34.5	111 44.0	24.6	96 12.2	39.6	127 48.4	32.6	Bellatrix	278 41.7 N 6	21.1					
	22	219 13.3	114 17.7	34.3	126 44.7	24.6	111 14.1	39.6	142 50.5	32.6	Betelgeuse	271 11.1 N 7	24.4					
23	234 15.8	129 16.9	34.0	141 45.4	24.5	126 16.0	39.5	157 52.6	32.6									
1 S A T U R D A Y	00	249 18.3	144 16.1 N24	33.8	156 46.0 N24	24.5	141 17.9 N22	39.4	172 54.8 N21	32.7	Canopus	264 00.5 S52	41.9					
	01	264 20.7	159 15.3	33.5	171 46.7	24.5	156 19.9	39.4	187 56.9	32.7	Capella	280 47.8 N46	00.0					
	02	279 23.2	174 14.5	33.3	186 47.3	24.5	171 21.8	39.3	202 59.0	32.7	Deneb	49 37.2 N45	17.0					
	03	294 25.7	189 13.8	33.0	201 48.0	24.5	186 23.7	39.3	218 01.1	32.8	Denebola	182 42.4 N14	33.7					
	04	309 28.1	204 13.0	32.7	216 48.7	24.4	201 25.6	39.2	233 03.2	32.8	Diphda	349 04.8 S17	58.5					
	05	324 30.6	219 12.2	32.5	231 49.3	24.4	216 27.6	39.2	248 05.4	32.8								
	06	339 33.0	234 11.4 N24	32.2	246 50.0 N24	24.4	231 29.5 N22	39.1	263 07.5 N21	32.9	Dubhe	194 02.1 N61	44.7					
	07	354 35.5	249 10.6	32.0	261 50.6	24.4	246 31.4	39.0	278 09.6	32.9	Einath	278 24.0 N28	36.6					
	08	9 38.0	264 09.8	31.7	276 51.3	24.4	261 33.3	39.0	293 11.7	32.9	Eltanin	90 49.7 N51	29.2					
	09	24 40.4	279 09.0	31.4	291 52.0	24.3	276 35.3	38.9	308 13.8	33.0	Enif	33 55.6 N 9	53.0					
	10	39 42.9	294 08.3	31.2	306 52.6	24.3	291 37.2	38.9	323 15.9	33.0	Fomalhaut	15 33.5 S29	36.6					
	11	54 45.4	309 07.5	30.9	321 53.3	24.3	306 39.1	38.8	338 18.1	33.0								
	12	69 47.8	324 06.7 N24	30.6	336 53.9 N24	24.3	321 41.0 N22	38.7	353 20.2 N21	33.1	Gacrux	172 10.5 S57	07.8					
	13	84 50.3	339 05.9	30.3	351 54.6	24.2	336 42.9	38.7	8 22.3	33.1	Gienah	176 01.2 S17	33.3					
	14	99 52.8	354 05.1	30.1	6 55.3	24.2	351 44.9	38.6	23 24.4	33.1	Hadar	149 00.0 S60	23.2					
	15	114 55.2	9 04.3	29.8	21 55.9	24.2	6 46.8	38.6	38 26.5	33.2	Hamal	328 10.9 N23	28.2					
	16	129 57.7	24 03.6	29.5	36 56.6	24.2	21 48.7	38.5	53 28.7	33.2	Kaus Aust.	83 55.0 S34	23.0					
	17	145 00.2	39 02.8	29.3	51 57.2	24.2	36 50.6	38.4	68 30.8	33.2								
	18	160 02.6	54 02.0 N24	29.0	66 57.9 N24	24.1	51 52.6 N22	38.4	83 32.9 N21	33.3	Kochab	137 18.3 N74	08.9					
	19	175 05.1	69 01.2	28.7	81 58.6	24.1	66 54.5	38.3	98 35.0	33.3	Markab	13 47.1 N15	12.8					
	20	190 07.5	84 00.4	28.4	96 59.2	24.1	81 56.4	38.3	113 37.1	33.3	Menkar	314 24.5 N 4	05.8					
	21	205 10.0	98 59.7	28.1	111 59.9	24.1	96 58.3	38.2	128 39.2	33.4	Menkent	148 17.6 S36	23.0					
	22	220 12.5	113 58.9	27.9	127 00.6	24.0	112 00.2	38.1	143 41.4	33.4	Miaplacidus	221 42.1 S69	43.8					
23	235 14.9	128 58.1	27.6	142 01.2	24.0	127 02.2	38.1	158 43.5	33.4									
2 S U N D A Y	00	250 17.4	143 57.3 N24	27.3	157 01.9 N24	24.0	142 04.1 N22	38.0	173 45.6 N21	33.5	Mirfak	308 53.4 N49	52.0					
	01	265 19.9	158 56.5	27.0	172 02.5	24.0	157 06.0	38.0	188 47.7	33.5	Nunki	76 08.8 S26	17.6					
	02	280 22.3	173 55.8	26.7	187 03.2	23.9	172 07.9	37.9	203 49.8	33.5	Peacock	53 32.5 S56	43.5					
	03	295 24.8	188 55.0	26.4	202 03.9	23.9	187 09.8	37.8	218 52.0	33.6	Pollux	243 38.6 N28	01.4					
	04	310 27.3	203 54.2	26.1	217 04.5	23.9	202 11.8	37.8	233 54.1	33.6	Procyon	245 09.1 N 5	13.2					
	05	325 29.7	218 53.4	25.8	232 05.2	23.8	217 13.7	37.7	248 56.2	33.6								
	06	340 32.2	233 52.6 N24	25.6	247 05.8 N24	23.8	232 15.6 N22	37.7	263 58.3 N21	33.7	Rasalhague	96 14.2 N12	33.4					
	07	355 34.7	248 51.9	25.3	262 06.5	23.8	247 17.5	37.6	279 00.4	33.7	Regulus	207 52.8 N11	57.5					
	08	10 37.1	263 51.1	25.0	277 07.2	23.8	262 19.4	37.5	294 02.5	33.7	Rigel	281 20.8 S 8	12.0					
	09	25 39.6	278 50.3	24.7	292 07.8	23.7	277 21.4	37.5	309 04.7	33.8	Rigil Kent.	140 03.3 S60	50.8					
	10	40 42.0	293 49.5	24.4	307 08.5	23.7	292 23.3	37.4	324 06.8	33.8	Sabik	102 22.2 S15	43.7					
	11	55 44.5	308 48.8	24.1	322 09.2	23.7	307 25.2	37.4	339 08.9	33.8								
	12	70 47.0	323 48.0 N24	23.8	337 09.8 N24	23.6	322 27.1 N22	37.3	354 11.0 N21	33.9	Schedar	349 50.9 N56	32.7					
	13	85 49.4	338 47.2	23.5	352 10.5	23.6	337 29.0	37.2	9 13.1	33.9	Shaula	96 33.3 S37	06.3					
	14	100 51.9	353 46.4	23.2	7 11.1	23.6	352 31.0	37.2	24 15.3	33.9	Sirius	258 41.7 S16	43.2					
	15	115 54.4	8 45.7	22.9	22 11.8	23.5	7 32.9	37.1	39 17.4	34.0	Spica	158 40.3 S11	10.4					
	16	130 56.8	23 44.9	22.6	37 12.5	23.5	22 34.8	37.1	54 19.5	34.0	Suhail	222 59.1 S43	26.7					
	17	145 59.3	38 44.1	22.3	52 13.1	23.5	37 36.7	37.0	69 21.6	34.0								
	18	161 01.8	53 43.3 N24	22.0	67 13.8 N24	23.4	52 38.6 N22	36.9	84 23.7 N21	34.1	Vega	80 44.5 N38	47.0					
	19	176 04.2	68 42.6	21.7	82 14.5	23.4	67 40.6	36.9	99 25.8	34.1	Zuben'ubi	137 14.8 S16	03.1					
	20	191 06.7	83 41.8	21.4	97 15.1	23.4	82 42.5	36.8	114 28.0	34.1		SHA	Mer. Pass.					
	21	206 09.1	98 41.0	21.0	112 15.8	23.3	97 44.4	36.8	129 30.1	34.2								
	22	221 11.6	113 40.3	20.7	127 16.4	23.3	112 46.3	36.7	144 32.2	34.2	Venus	254 57.9 h m	14 24					
23	236 14.1	128 39.5	20.4	142 17.1	23.3	127 48.2	36.6	159 34.3	34.2	Mars	267 27.8	13 32						
										Jupiter	251 59.7	14 33						
										Saturn	283 36.5	12 27						
	Mer. Pass.	7 21.6	v -0.8 d 0.3	v 0.7 d 0.0	v 1.9 d 0.1	v 2.1 d 0.0												

UT	SUN		MOON				Lat.	Twilight			Moonrise				
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil	Sunrise	31	1	2	3
d h	° /	° /	° /	'	° /	'	°	h m	h m	h m	h m	h m	h m	h m	h m
31	00	180 36.9 N21 51.4	299 24.8 9.9	S22 40.6	6.0	55.9	N 72	□	□	□	■	■	03 38	02 55	
01	195 36.8 51.8	313 53.7 10.1	22 34.6	6.2	55.9	N 70	□	□	□	■	03 57	03 03	02 37	02 22	
02	210 36.7 52.2	328 22.8 10.1	22 28.4	6.2	55.9	66	////	////	01 13	02 42	02 27	02 18	02 10		
03	225 36.6 . . 52.5	342 51.9 10.2	22 22.2	6.4	55.8	64	////	////	01 58	02 01	02 02	02 02	02 00		
04	240 36.6 52.9	357 21.1 10.3	22 15.8	6.5	55.8	62	////	////	02 28	01 32	01 43	01 48	01 51		
05	255 36.5 53.2	11 50.4 10.4	22 09.3	6.6	55.8	60	////	01 27	02 50	01 10	01 27	01 37	01 44		
06	270 36.4 N21 53.6	26 19.8 10.5	S22 02.7	6.6	55.7	N 58	////	02 01	03 07	00 52	01 13	01 27	01 37		
07	285 36.3 54.0	40 49.3 10.6	21 56.1	6.8	55.7	56	////	02 25	03 22	00 37	01 01	01 18	01 31		
08	300 36.2 54.3	55 18.9 10.6	21 49.3	6.9	55.7	54	01 19	02 44	03 35	00 24	00 51	01 11	01 26		
09	315 36.1 . . 54.7	69 48.5 10.7	21 42.4	7.0	55.7	52	01 50	03 00	03 46	00 13	00 42	01 04	01 21		
10	330 36.0 55.0	84 18.2 10.9	21 35.4	7.1	55.6	50	02 13	03 13	03 56	00 03	00 33	00 57	01 17		
11	345 35.9 55.4	98 48.1 10.9	21 28.3	7.1	55.6	45	02 53	03 40	04 17	24 16	00 16	00 44	01 07		
12	0 35.8 N21 55.7	113 18.0 11.0	S21 21.2	7.3	55.6	N 40	03 21	04 01	04 33	24 01	00 01	00 33	01 00		
13	15 35.7 56.1	127 48.0 11.1	21 13.9	7.4	55.5	35	03 42	04 18	04 47	23 49	24 23	00 23	00 53		
14	30 35.7 56.4	142 18.1 11.2	21 06.5	7.5	55.5	30	04 00	04 32	04 59	23 38	24 14	00 14	00 47		
15	45 35.6 . . 56.8	156 48.3 11.2	20 59.0	7.5	55.5	20	04 27	04 56	05 20	23 20	24 00	00 00	00 36		
16	60 35.5 57.1	171 18.5 11.4	20 51.5	7.7	55.5	N 10	04 48	05 15	05 38	23 04	23 47	24 27	00 27		
17	75 35.4 57.5	185 48.9 11.4	20 43.8	7.7	55.4	0	05 06	05 32	05 54	22 49	23 35	24 18	00 18		
18	90 35.3 N21 57.8	200 19.3 11.5	S20 36.1	7.8	55.4	S 10	05 22	05 48	06 10	22 33	23 23	24 10	00 10		
19	105 35.2 58.2	214 49.8 11.6	20 28.3	8.0	55.4	20	05 37	06 04	06 28	22 17	23 10	24 00	00 00		
20	120 35.1 58.5	229 20.4 11.7	20 20.3	8.0	55.4	30	05 52	06 21	06 48	21 58	22 55	23 50	24 43		
21	135 35.0 . . 58.9	243 51.1 11.8	20 12.3	8.1	55.3	35	06 00	06 31	06 59	21 47	22 46	23 44	24 40		
22	150 34.9 59.2	258 21.9 11.9	20 04.2	8.2	55.3	40	06 08	06 42	07 12	21 35	22 36	23 37	24 35		
23	165 34.8 59.6	272 52.8 11.9	19 56.0	8.2	55.3	45	06 18	06 55	07 28	21 20	22 25	23 28	24 31		
1	00	180 34.7 N21 59.9	287 23.7 12.0	S19 47.8	8.4	55.3	S 50	06 28	07 09	07 47	21 01	22 10	23 18	24 25	
01	195 34.6 22 00.3	301 54.7 12.1	19 39.4	8.4	55.2	52	06 33	07 16	07 56	20 53	22 04	23 14	24 22		
02	210 34.5 00.6	316 25.8 12.2	19 31.0	8.5	55.2	54	06 38	07 23	08 06	20 43	21 56	23 09	24 20		
03	225 34.5 . . 01.0	330 57.0 12.3	19 22.5	8.6	55.2	56	06 44	07 32	08 17	20 32	21 48	23 03	24 16		
04	240 34.4 01.3	345 28.3 12.4	19 13.9	8.7	55.2	58	06 50	07 41	08 31	20 19	21 39	22 57	24 13		
05	255 34.3 01.7	359 59.7 12.4	19 05.2	8.8	55.1	S 60	06 56	07 51	08 46	20 04	21 28	22 50	24 09		
06	270 34.2 N22 02.0	14 31.1 12.6	S18 56.4	8.8	55.1										
07	285 34.1 02.3	29 02.7 12.6	18 47.6	8.9	55.1	Lat.	Sunset	Twilight			Moonset				
08	300 34.0 02.7	43 34.3 12.7	18 38.7	9.0	55.1			Civil	Naut.	31	1	2	3		
09	315 33.9 . . 03.0	58 06.0 12.7	18 29.7	9.1	55.1										
10	330 33.8 03.4	72 37.7 12.9	18 20.6	9.1	55.0										
11	345 33.7 03.7	87 09.6 12.9	18 11.5	9.2	55.0										
12	0 33.6 N22 04.0	101 41.5 13.0	S18 02.3	9.3	55.0	N 72	□	□	□	■	■	08 12	10 25		
13	15 33.5 04.4	116 13.5 13.1	17 53.0	9.4	55.0	N 70	□	□	□	■	06 18	08 47	10 41		
14	30 33.4 04.7	130 45.6 13.1	17 43.6	9.4	54.9	68	□	□	□	■	07 13	09 11	10 54		
15	45 33.3 . . 05.0	145 17.7 13.3	17 34.2	9.5	54.9	66	22 46	////	////	05 49	07 46	09 29	11 05		
16	60 33.2 05.4	159 50.0 13.3	17 24.7	9.6	54.9	64	21 59	////	////	06 30	08 10	09 44	11 14		
17	75 33.1 05.7	174 22.3 13.4	17 15.1	9.6	54.9	62	21 30	////	////	06 58	08 29	09 57	11 21		
18	90 33.0 N22 06.1	188 54.7 13.4	S17 05.5	9.7	54.9	60	21 07	22 32	////	07 20	08 44	10 07	11 28		
19	105 32.9 06.1	203 27.1 13.6	16 55.8	9.7	54.8	N 58	20 49	21 57	////	07 37	08 57	10 16	11 33		
20	120 32.8 06.7	217 59.7 13.6	16 46.1	9.9	54.8	56	20 34	21 32	////	07 52	09 08	10 24	11 38		
21	135 32.7 . . 07.1	232 32.3 13.7	16 36.2	9.9	54.8	54	20 21	21 13	22 39	08 04	09 18	10 31	11 43		
22	150 32.6 07.4	247 05.0 13.7	16 26.3	9.9	54.8	52	20 10	20 57	22 07	08 15	09 27	10 38	11 47		
23	165 32.5 07.7	261 37.7 13.9	16 16.4	10.0	54.8	50	20 00	20 43	21 44	08 25	09 34	10 43	11 51		
2	00	180 32.4 N22 08.0	276 10.6 13.9	S16 06.4	10.1	54.8	45	19 39	20 16	21 03	08 46	09 51	10 56	11 59	
01	195 32.4 08.4	290 43.5 13.9	15 56.3	10.1	54.7	N 40	19 23	19 55	20 35	09 02	10 04	11 06	12 05		
02	210 32.3 08.7	305 16.4 14.0	15 46.2	10.2	54.7	35	19 08	19 38	20 14	09 16	10 16	11 14	12 11		
03	225 32.2 . . 09.0	319 49.4 14.2	15 36.0	10.3	54.7	30	18 56	19 23	19 56	09 28	10 26	11 22	12 16		
04	240 32.1 09.4	334 22.6 14.1	15 25.7	10.3	54.7	20	18 36	19 00	19 29	09 49	10 43	11 35	12 24		
05	255 32.0 09.7	348 55.7 14.3	15 15.4	10.4	54.7	N 10	18 18	18 41	19 08	10 07	10 58	11 46	12 32		
06	270 31.9 N22 10.0	3 29.0 14.3	S15 05.0	10.4	54.7	0	18 01	18 24	18 50	10 23	11 11	11 56	12 39		
07	285 31.8 10.3	18 02.3 14.3	14 54.6	10.5	54.6	S 10	17 45	18 08	18 34	10 40	11 25	12 07	12 45		
08	300 31.7 10.7	32 35.6 14.5	14 44.1	10.5	54.6	20	17 28	17 51	18 19	10 57	11 39	12 18	12 53		
09	315 31.6 . . 11.0	47 09.1 14.4	14 33.6	10.6	54.6	30	17 08	17 34	18 03	11 17	11 56	12 30	13 01		
10	330 31.5 11.3	61 42.5 14.6	14 23.0	10.6	54.6	35	16 56	17 24	17 55	11 29	12 06	12 37	13 06		
11	345 31.4 11.6	76 16.1 14.6	14 12.4	10.7	54.6	40	16 43	17 13	17 47	11 42	12 16	12 45	13 11		
12	0 31.3 N22 12.0	90 49.7 14.7	S14 01.7	10.8	54.6	45	16 28	17 01	17 37	11 58	12 29	12 55	13 17		
13	15 31.2 12.3	105 23.4 14.7	13 50.9	10.7	54.5	S 50	16 08	16 46	17 27	12 17	12 45	13 06	13 24		
14	30 31.1 12.6	119 57.1 14.8	13 40.2	10.9	54.5	52	15 59	16 39	17 22	12 27	12 52	13 11	13 28		
15	45 31.0 . . 12.9	134 30.9 14.9	13 29.3	10.9	54.5	54	15 49	16 32	17 17	12 37	13 00	13 17	13 31		
16	60 30.9 13.2	149 04.8 14.9	13 18.4	10.9	54.5	56	15 38	16 23	17 11	12 48	13 09	13 24	13 35		
17	75 30.8 13.6	163 38.7 15.0	13 07.5	11.0	54.5	58	15 25	16 14	17 05	13 01	13 19	13 31	13 40		
18	90 30.7 N22 13.9	178 12.7 15.0	S12 56.5	11.0	54.5	S 60	15 09	16 04	16 59	13 17					

UT	SUN		MOON				Lat.	Twilight			Sunrise	Moonrise				
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil		3	4	5	6	
									h m	h m						h m
MONDAY	^d / _h	[°] / _'	[°] / _'	[°] / _'	[°] / _'	[°] / _'	[°] / _'	N 72	□	□	□	02 55	02 27	02 04	01 41	
	3 00	180 30.1	N22 15.8	265 37.6	15.4	S11 49.7	11.3	54.4	□	□	□	02 37	02 18	02 01	01 45	
	01	195 30.0	16.1	280 12.0	15.3	11 38.4	11.4	54.4	68	□	□	02 22	02 10	01 59	01 48	
	02	210 29.9	16.4	294 46.3	15.5	11 27.0	11.3	54.4	66	////	////	01 00	02 10	02 04	01 57	
	03	225 29.8	16.7	309 20.8	15.5	11 15.7	11.5	54.4	64	////	////	01 51	02 00	01 58	01 56	
	04	240 29.7	17.0	323 55.3	15.5	11 04.2	11.4	54.4	62	////	////	02 22	01 51	01 53	01 55	
	05	255 29.6	17.3	338 29.8	15.6	10 52.8	11.5	54.4	60	////	01 18	02 45	01 44	01 49	01 53	
	06	270 29.4	N22 17.6	353 04.4	15.6	S10 41.3	11.5	54.3	N 58	////	01 55	03 04	01 37	01 45	01 52	
	07	285 29.3	17.9	7 39.0	15.6	10 29.8	11.6	54.3	56	////	02 21	03 19	01 31	01 42	01 52	
	08	300 29.2	18.3	22 13.6	15.7	10 18.2	11.6	54.3	54	01 11	02 40	03 32	01 26	01 39	01 51	
	09	315 29.1	18.6	36 48.3	15.8	10 06.6	11.6	54.3	52	01 45	02 57	03 44	01 21	01 36	01 50	
	10	330 29.0	18.9	51 23.1	15.8	9 55.0	11.7	54.3	50	02 09	03 11	03 54	01 17	01 34	01 49	
	11	345 28.9	19.2	65 57.9	15.8	9 43.3	11.7	54.3	45	02 51	03 39	04 15	01 07	01 28	01 48	
	12	0 28.8	N22 19.5	80 32.7	15.9	S 9 31.6	11.7	54.3	N 40	03 19	04 00	04 32	01 00	01 24	01 47	
	13	15 28.7	19.8	95 07.6	15.9	9 19.9	11.8	54.3	35	03 41	04 17	04 46	00 53	01 20	01 46	
	14	30 28.6	20.1	109 42.5	15.9	9 08.1	11.8	54.3	30	03 59	04 32	04 59	00 47	01 16	01 45	
	15	45 28.5	20.4	124 17.4	16.0	8 56.3	11.8	54.3	20	04 27	04 55	05 20	00 36	01 10	01 43	
	16	60 28.4	20.7	138 52.4	16.0	8 44.5	11.9	54.3	N 10	04 48	05 15	05 38	00 27	01 05	01 41	
	17	75 28.3	21.0	153 27.4	16.0	8 32.6	11.9	54.3	0	05 06	05 32	05 55	00 18	01 00	01 40	
	18	90 28.2	N22 21.3	168 02.4	16.1	S 8 20.7	11.9	54.3	S 10	05 22	05 49	06 11	00 10	00 55	01 39	
	19	105 28.1	21.6	182 37.5	16.1	8 08.8	12.0	54.3	20	05 38	06 05	06 29	00 00	00 49	01 37	
	20	120 28.0	21.9	197 12.6	16.2	7 56.8	11.9	54.2	30	05 53	06 23	06 49	24 43	00 43	01 36	
	21	135 27.9	22.2	211 47.8	16.1	7 44.9	12.0	54.2	35	06 01	06 33	07 01	24 40	00 40	01 35	
22	150 27.8	22.5	226 22.9	16.2	7 32.9	12.1	54.2	40	06 10	06 44	07 14	24 35	00 35	01 34		
23	165 27.7	22.8	240 58.1	16.3	7 20.8	12.0	54.2	45	06 20	06 57	07 30	24 31	00 31	01 32		
TUESDAY	4 00	180 27.6	N22 23.1	255 33.4	16.2	S 7 08.8	12.1	54.2	S 50	06 31	07 12	07 50	24 25	00 25	01 31	
	01	195 27.5	23.4	270 08.6	16.3	6 56.7	12.1	54.2	52	06 36	07 19	07 59	24 22	00 22	01 30	
	02	210 27.4	23.7	284 43.9	16.3	6 44.6	12.1	54.2	54	06 41	07 26	08 09	24 20	00 20	01 30	
	03	225 27.3	24.0	299 19.2	16.3	6 32.5	12.2	54.2	56	06 47	07 35	08 21	24 16	00 16	01 29	
	04	240 27.2	24.3	313 54.5	16.4	6 20.3	12.2	54.2	58	06 53	07 44	08 35	24 13	00 13	01 28	
	05	255 27.0	24.6	328 29.9	16.4	6 08.1	12.2	54.2	S 60	07 00	07 55	08 51	24 09	00 09	01 27	
	06	270 26.9	N22 24.9	343 05.3	16.4	S 5 55.9	12.2	54.2	Lat.	Sunset	Twilight		Moonset			
	07	285 26.8	25.2	357 40.7	16.4	5 43.7	12.2	54.2			Civil	Naut.	3	4	5	6
	08	300 26.7	25.5	12 16.1	16.4	5 31.5	12.3	54.2			h m	h m	h m	h m	h m	h m
	09	315 26.6	25.7	26 51.5	16.5	5 19.2	12.3	54.2	N 72	□	□	□	10 25	12 19	14 08	15 58
	10	330 26.5	26.0	41 27.0	16.4	5 06.9	12.3	54.2	N 70	□	□	□	10 41	12 26	14 07	15 49
	11	345 26.4	26.3	56 02.4	16.5	4 54.6	12.3	54.2	68	□	□	□	10 54	12 31	14 06	15 42
	12	0 26.3	N22 26.6	70 37.9	16.5	4 42.3	12.3	54.2	66	23 01	////	////	11 05	12 36	14 06	15 36
	13	15 26.2	26.9	85 13.4	16.5	4 30.0	12.4	54.2	64	22 07	////	////	11 14	12 40	14 05	15 31
	14	30 26.1	27.2	99 48.9	16.5	4 17.6	12.4	54.2	62	21 36	////	////	11 21	12 43	14 05	15 27
	15	45 26.0	27.5	114 24.4	16.6	4 05.2	12.4	54.2	60	21 12	22 41	////	11 28	12 46	14 04	15 23
	16	60 25.9	27.8	129 00.0	16.5	3 52.8	12.4	54.2	N 58	20 54	22 03	////	11 33	12 49	14 04	15 20
	17	75 25.8	28.1	143 35.5	16.6	3 40.4	12.4	54.2	56	20 38	21 37	////	11 38	12 51	14 04	15 17
	18	90 25.7	N22 28.3	158 11.1	16.6	S 3 28.0	12.4	54.2	54	20 25	21 17	22 48	11 43	12 53	14 03	15 14
	19	105 25.6	28.6	172 46.7	16.5	3 15.6	12.4	54.2	52	20 13	21 00	22 13	11 47	12 55	14 03	15 11
	20	120 25.4	28.9	187 22.2	16.6	3 03.2	12.5	54.2	50	20 03	20 46	21 48	11 51	12 57	14 03	15 09
	21	135 25.3	29.2	201 57.8	16.6	2 50.7	12.5	54.2	45	19 42	20 18	21 07	11 59	13 01	14 02	15 04
	22	150 25.2	29.5	216 33.4	16.6	2 38.2	12.4	54.2	N 40	19 25	19 57	20 38	12 05	13 04	14 02	15 01
23	165 25.1	29.8	231 09.0	16.6	2 25.8	12.5	54.2	35	19 10	19 40	20 16	12 11	13 06	14 01	14 57	
WEDNESDAY	5 00	180 25.0	N22 30.0	245 44.6	16.6	S 2 13.3	12.5	54.2	30	18 58	19 25	19 58	12 16	13 09	14 01	
	01	195 24.9	30.3	260 20.2	16.6	2 00.8	12.6	54.2	20	18 37	19 01	19 30	12 24	13 13	14 00	
	02	210 24.8	30.6	274 55.8	16.6	1 48.2	12.5	54.2	N 10	18 19	18 42	19 08	12 32	13 16	14 00	
	03	225 24.7	30.9	289 31.4	16.6	1 35.7	12.5	54.2	0	18 02	18 24	18 50	12 39	13 19	13 59	
	04	240 24.6	31.2	304 07.0	16.6	1 23.2	12.5	54.2	S 10	17 45	18 08	18 34	12 45	13 22	13 59	
	05	255 24.5	31.4	318 42.6	16.6	1 10.7	12.6	54.2	20	17 28	17 51	18 19	12 53	13 26	13 58	
	06	270 24.3	N22 31.7	333 18.2	16.6	S 0 58.1	12.5	54.2	30	17 07	17 33	18 03	13 01	13 30	13 58	
	07	285 24.2	32.0	347 53.8	16.6	0 45.6	12.6	54.3	35	16 56	17 23	17 55	13 06	13 32	13 57	
	08	300 24.1	32.3	2 29.4	16.6	0 33.0	12.6	54.3	40	16 42	17 12	17 46	13 11	13 34	13 57	
	09	315 24.0	32.5	17 05.0	16.6	0 20.4	12.5	54.3	45	16 26	17 00	17 36	13 17	13 37	13 56	
	10	330 23.9	32.8	31 40.6	16.5	S 0 07.9	12.6	54.3	S 50	16 07	16 44	17 25	13 24	13 40	13 56	
	11	345 23.8	33.1	46 16.1	16.6	N 0 04.7	12.6	54.3	52	15 57	16 37	17 21	13 28	13 42	13 56	
	12	0 23.7	N22 33.4	60 51.7	16.6	N 0 17.3	12.5	54.3	54	15 47	16 30	17 15	13 31	13 44	13 55	
	13	15 23.6	33.6	75 27.3	16.5	0 29.8	12.6	54.3	56	15 35	16 21	17 10	13 35	13 46	13 55	
	14	30 23.5	33.9	90 02.8	16.5	0 42.4	12.6	54.3	58	15 22	16 12	17 03	13 40	13 48	13 55	
	15	45 23.3	34.2	104 38.3	16.6	0 55.0	12.6	54.3	S 60	15 05	16 01	16 57	13 45	13 50	13 54	
	16	60 23.2	34.5	119 13.9	16.5	1 07.6	12.6	54.3	Day	SUN			MOON			
	17	75 23.1	34.7	133 49.4	16.5	1 20.2	12.5	54.3		Eqn. of Time	Mer.	Mer. Pass.		Age Phase		
	18	90 23.0	N22 35.0	148 24.9	16.4	N 1 32.7	12.6	54.3		00 ^h	12 ^h	Pass.	Upper	Lower	d %	
	19	105 22.9	35.3	163 00.3	16.5	1 45.3	12.6	54.3	3	02 00	01 56	11 58	06 29	18 49	22 45	
	20	120 22.8	35.5	177 35.8	16.5	1 57.9	12.6	54.3	4	01 51	01 45	11 58	07 10	19 30	23 36	
	21	135 22.7	35.8	192 11.3	16.4	2 10.5	12.6	54.3	5	01 40	01 35	11 58	07 50	20 1		

UT	ARIES		VENUS -4.0		MARS +1.7		JUPITER -1.9		SATURN +0.0		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
THURSDAY	6 00	254 14.0	142 44.3 N23 54.5	158 05.7 N24 19.8	145 08.1 N22 32.1	177 08.9 N21 36.6	Acamar	315 25.2 S40 17.7					
	01	269 16.4	157 43.6 54.1	173 06.4 19.8	160 10.0 32.0	192 11.0 36.7	Achernar	335 33.5 S57 13.4					
	02	284 18.9	172 42.8 53.7	188 07.0 19.7	175 11.9 32.0	207 13.1 36.7	Acrux	173 19.0 S63 06.9					
	03	299 21.3	187 42.1 . . 53.3	203 07.7 . . 19.6	190 13.8 . . 31.9	222 15.2 . . 36.7	Adhara	255 19.7 S28 58.6					
	04	314 23.8	202 41.4 52.9	218 08.4 19.6	205 15.7 31.8	237 17.3 36.8	Aldebaran	290 59.7 N16 30.8					
	05	329 26.3	217 40.6 52.5	233 09.0 19.5	220 17.6 31.8	252 19.4 36.8							
	06	344 28.7	232 39.9 N23 52.1	248 09.7 N24 19.5	235 19.5 N22 31.7	267 21.6 N21 36.8	Alioth	166 27.9 N55 57.1					
	07	359 31.2	247 39.2 51.7	263 10.4 19.4	250 21.4 31.6	282 23.7 36.8	Alkaid	153 05.3 N49 18.3					
	08	14 33.7	262 38.4 51.3	278 11.0 19.3	265 23.4 31.6	297 25.8 36.9	Al Na'ir	27 54.4 S46 56.8					
	09	29 36.1	277 37.7 . . 50.9	293 11.7 . . 19.3	280 25.3 . . 31.5	312 27.9 . . 36.9	Alnilam	275 55.5 S 1 12.1					
	10	44 38.6	292 37.0 50.5	308 12.4 19.2	295 27.2 31.4	327 30.0 36.9	Alphard	218 04.8 S 8 40.1					
	11	59 41.1	307 36.2 50.1	323 13.0 19.1	310 29.1 31.4	342 32.1 37.0							
	12	74 43.5	322 35.5 N23 49.7	338 13.7 N24 19.1	325 31.0 N22 31.3	357 34.3 N21 37.0	Alphecca	126 18.0 N26 42.5					
	13	89 46.0	337 34.8 49.3	353 14.4 19.0	340 32.9 31.3	12 36.4 37.0	Alpheratz	357 52.7 N29 05.9					
	14	104 48.5	352 34.0 48.9	8 15.0 19.0	355 34.8 31.2	27 38.5 37.1	Altair	62 16.5 N 8 52.4					
	15	119 50.9	7 33.3 . . 48.5	23 15.7 . . 18.9	10 36.7 . . 31.1	42 40.6 . . 37.1	Ankaa	353 24.3 S42 17.5					
	16	134 53.4	22 32.6 48.0	38 16.4 18.8	25 38.6 31.1	57 42.7 37.1	Antares	112 36.6 S26 26.3					
	17	149 55.8	37 31.8 47.6	53 17.0 18.8	40 40.6 31.0	72 44.8 37.2							
	18	164 58.3	52 31.1 N23 47.2	68 17.7 N24 18.7	55 42.5 N22 30.9	87 47.0 N21 37.2	Arcturus	146 03.4 N19 10.3					
	19	180 00.8	67 30.4 46.8	83 18.4 18.6	70 44.4 30.9	102 49.1 37.2	Atria	107 45.8 S69 01.9					
	20	195 03.2	82 29.6 46.4	98 19.1 18.6	85 46.3 30.8	117 51.2 37.3	Avior	234 22.1 S59 31.2					
	21	210 05.7	97 28.9 . . 46.0	113 19.7 . . 18.5	100 48.2 . . 30.7	132 53.3 . . 37.3	Bellatrix	278 41.7 N 6 21.1					
	22	225 08.2	112 28.2 45.5	128 20.4 18.4	115 50.1 30.7	147 55.4 37.3	Betelgeuse	271 11.1 N 7 24.4					
23	240 10.6	127 27.4 45.1	143 21.1 18.4	130 52.0 30.6	162 57.5 37.4								
FRIDAY	7 00	255 13.1	142 26.7 N23 44.7	158 21.7 N24 18.3	145 53.9 N22 30.5	177 59.6 N21 37.4	Canopus	264 00.6 S52 41.9					
	01	270 15.6	157 26.0 44.3	173 22.4 18.2	160 55.8 30.5	193 01.8 37.4	Capella	280 47.8 N46 00.0					
	02	285 18.0	172 25.3 43.8	188 23.1 18.2	175 57.7 30.4	208 03.9 37.5	Deneb	49 37.2 N45 17.0					
	03	300 20.5	187 24.5 . . 43.4	203 23.7 . . 18.1	190 59.7 . . 30.4	223 06.0 . . 37.5	Denebola	182 42.4 N14 33.7					
	04	315 22.9	202 23.8 43.0	218 24.4 18.0	206 01.6 30.3	238 08.1 37.5	Diphda	349 04.7 S17 58.4					
	05	330 25.4	217 23.1 42.6	233 25.1 17.9	221 03.5 30.2	253 10.2 37.5							
	06	345 27.9	232 22.3 N23 42.1	248 25.8 N24 17.9	236 05.4 N22 30.2	268 12.3 N21 37.6	Dubhe	194 02.1 N61 44.7					
	07	0 30.3	247 21.6 41.7	263 26.4 17.8	251 07.3 30.1	283 14.5 37.6	Elnath	278 24.0 N28 36.5					
	08	15 32.8	262 20.9 41.3	278 27.1 17.7	266 09.2 30.0	298 16.6 37.6	Eltanin	90 49.7 N51 29.2					
	09	30 35.3	277 20.2 . . 40.8	293 27.8 . . 17.7	281 11.1 . . 30.0	313 18.7 . . 37.7	Enif	33 55.6 N 9 53.0					
	10	45 37.7	292 19.4 40.4	308 28.4 17.6	296 13.0 29.9	328 20.8 37.7	Fomalhaut	15 33.5 S29 36.5					
	11	60 40.2	307 18.7 40.0	323 29.1 17.5	311 14.9 29.8	343 22.9 37.7							
	12	75 42.7	322 18.0 N23 39.5	338 29.8 N24 17.5	326 16.8 N22 29.8	358 25.0 N21 37.8	Gacrux	172 10.6 S57 07.8					
	13	90 45.1	337 17.3 39.1	353 30.4 17.4	341 18.8 29.7	13 27.2 37.8	Gienah	176 01.2 S17 33.3					
	14	105 47.6	352 16.6 38.6	8 31.1 17.3	356 20.7 29.6	28 29.3 37.8	Hadar	149 00.0 S60 23.2					
	15	120 50.1	7 15.8 . . 38.2	23 31.8 . . 17.2	11 22.6 . . 29.6	43 31.4 . . 37.9	Hamal	328 10.9 N23 28.2					
	16	135 52.5	22 15.1 37.8	38 32.5 17.2	26 24.5 29.5	58 33.5 37.9	Kaus Aust.	83 55.0 S34 23.0					
	17	150 55.0	37 14.4 37.3	53 33.1 17.1	41 26.4 29.4	73 35.6 37.9							
	18	165 57.4	52 13.7 N23 36.9	68 33.8 N24 17.0	56 28.3 N22 29.4	88 37.7 N21 38.0	Kochab	137 18.4 N74 09.0					
	19	180 59.9	67 13.0 36.4	83 34.5 16.9	71 30.2 29.3	103 39.9 38.0	Markab	13 47.0 N15 12.9					
	20	196 02.4	82 12.2 36.0	98 35.1 16.9	86 32.1 29.2	118 42.0 38.0	Menkar	314 24.5 N 4 05.8					
	21	211 04.8	97 11.5 . . 35.5	113 35.8 . . 16.8	101 34.0 . . 29.2	133 44.1 . . 38.1	Menkent	148 17.6 S36 23.0					
	22	226 07.3	112 10.8 35.1	128 36.5 16.7	116 35.9 29.1	148 46.2 38.1	Miaplacidus	221 42.2 S69 43.8					
23	241 09.8	127 10.1 34.6	143 37.2 16.6	131 37.8 29.0	163 48.3 38.1								
SATURDAY	8 00	256 12.2	142 09.4 N23 34.2	158 37.8 N24 16.6	146 39.7 N22 29.0	178 50.4 N21 38.1	Mirfak	308 53.4 N49 52.0					
	01	271 14.7	157 08.6 33.7	173 38.5 16.5	161 41.7 28.9	193 52.6 38.2	Nunki	76 08.7 S26 17.6					
	02	286 17.2	172 07.9 33.3	188 39.2 16.4	176 43.6 28.8	208 54.7 38.2	Peacock	53 32.4 S56 43.5					
	03	301 19.6	187 07.2 . . 32.8	203 39.8 . . 16.3	191 45.5 . . 28.8	223 56.8 . . 38.2	Pollux	243 38.6 N28 01.4					
	04	316 22.1	202 06.5 32.4	218 40.5 16.3	206 47.4 28.7	238 58.9 38.3	Procyon	245 09.1 N 5 13.2					
	05	331 24.6	217 05.8 31.9	233 41.2 16.2	221 49.3 28.6	254 01.0 38.3							
	06	346 27.0	232 05.1 N23 31.5	248 41.9 N24 16.1	236 51.2 N22 28.6	269 03.1 N21 38.3	Rasalhague	96 14.2 N12 33.5					
	07	1 29.5	247 04.4 31.0	263 42.5 16.0	251 53.1 28.5	284 05.3 38.4	Regulus	207 52.8 N11 57.5					
	08	16 31.9	262 03.6 30.6	278 43.2 15.9	266 55.0 28.4	299 07.4 38.4	Rigel	281 20.8 S 8 12.0					
	09	31 34.4	277 02.9 . . 30.1	293 43.9 . . 15.9	281 56.9 . . 28.4	314 09.5 . . 38.4	Rigil Kent.	140 03.4 S60 50.8					
	10	46 36.9	292 02.2 29.6	308 44.5 15.8	296 58.8 28.3	329 11.6 38.5	Sabik	102 22.2 S15 43.7					
	11	61 39.3	307 01.5 29.2	323 45.2 15.7	312 00.7 28.2	344 13.7 38.5							
	12	76 41.8	322 00.8 N23 28.7	338 45.9 N24 15.6	327 02.6 N22 28.2	359 15.8 N21 38.5	Schedar	349 50.9 N56 32.7					
	13	91 44.3	337 00.1 28.2	353 46.6 15.5	342 04.5 28.1	14 17.9 38.6	Shaula	96 33.3 S37 06.3					
	14	106 46.7	351 59.4 27.8	8 47.2 15.5	357 06.4 28.0	29 20.1 38.6	Sirius	258 41.8 S16 43.2					
	15	121 49.2	6 58.7 . . 27.3	23 47.9 . . 15.4	12 08.4 . . 28.0	44 22.2 . . 38.6	Spica	158 40.3 S11 10.4					
	16	136 51.7	21 58.0 26.8	38 48.6 15.3	27 10.3 27.9	59 24.3 38.6	Suhail	222 59.2 S43 26.7					
	17	151 54.1	36 57.3 26.4	53 49.3 15.2	42 12.2 27.8	74 26.4 38.7							
	18	166 56.6	51 56.5 N23 25.9	68 49.9 N24 15.1	57 14.1 N22 27.8	89 28.5 N21 38.7	Vega	80 44.5 N38 47.0					
	19	181 59.0	66 55.8 25.4	83 50.6 15.1	72 16.0 27.7	104 30.6 38.7	Zuben'ubi	137 14.8 S16 03.1					
	20	197 01.5	81 55.1 25.0	98 51.3 15.0	87 17.9 27.6	119 32.8 38.8							
	21	212 04.0	96 54.4 . . 24.5	113 51.9 . . 14.9	102 19.8 . . 27.6	134 34.9 . . 38.8							
	22	227 06.4	111 53.7 24.0	128 52.6 14.8	117 21.7 27.5	149 37.0 38.8	Venus	247 13.6 14 31					
23	242 08.9	126 53.0 23.5	143 53.3 14.7	132 23.6 27.4	164 39.1 38.9	Mars	263 08.6 13 26						
						Jupiter	250 40.8 14 15						
						Saturn	282 46.6 12 06						

UT	SUN		MOON				Lat.	Twilight			Moonrise					
	GHA	Dec	GHA	v	Dec	d		HP	Naut.	Civil	Sunrise	6	7	8	9	
									h m	h m	h m	h m	h m	h m	h m	h m
d h	° /	° /	° /	'	° /	'	° /	°	h m	h m	h m	h m	h m	h m	h m	h m
6 00	180 22.3	N22 36.6	235 57.5	16.3	N 2	48.2	12.6	54.4	☐	☐	☐	01 41	01 17	01 08	00 38	
01	195 22.2	36.9	250 32.8	16.4	3	00.8	12.5	54.4	☐	☐	☐	01 45	01 28	01 08	00 38	
02	210 22.1	37.1	265 08.2	16.3	3	13.3	12.6	54.4	☐	☐	☐	01 48	01 37	01 25	01 08	
03	225 22.0	37.4	279 43.5	16.3	3	25.9	12.5	54.4	////	////	00 46	01 51	01 45	01 39	01 31	
04	240 21.9	37.6	294 18.8	16.3	3	38.4	12.5	54.4	////	////	01 45	01 54	01 52	01 50	01 50	
05	255 21.8	37.9	308 54.1	16.2	3	50.9	12.6	54.4	////	////	02 18	01 56	01 58	02 00	02 05	
06	270 21.7	N22 38.2	323 29.3	16.2	N 4	03.5	12.5	54.4	////	01 10	02 42	01 58	02 03	02 09	02 17	
07	285 21.5	38.4	338 04.5	16.2	4	16.0	12.5	54.5	N 58	////	01 50	03 01	01 59	02 07	02 16	02 28
08	300 21.4	38.7	352 39.7	16.2	4	28.5	12.5	54.5	56	////	02 17	03 17	02 01	02 11	02 23	02 38
09	315 21.3	38.9	367 14.9	16.1	4	41.0	12.5	54.5	54	01 04	02 38	03 30	02 02	02 15	02 29	02 46
10	330 21.2	39.2	7 50.0	16.1	4	53.5	12.4	54.5	52	01 41	02 54	03 42	02 04	02 18	02 34	02 54
11	345 21.1	39.5	21 25.0	16.1	4	53.5	12.4	54.5	50	02 06	03 09	03 52	02 05	02 21	02 39	03 01
12	0 21.0	N22 39.7	36 25.1	16.1	5	05.9	12.5	54.5	45	02 49	03 37	04 14	02 07	02 27	02 50	03 16
13	15 20.9	40.0	51 00.2	16.0	N 5	18.4	12.4	54.5	N 40	03 18	03 59	04 31	02 09	02 33	02 59	03 28
14	30 20.7	40.2	65 35.2	16.0	5	30.8	12.5	54.5	35	03 40	04 16	04 46	02 11	02 38	03 06	03 39
15	45 20.6	40.5	80 10.2	16.0	5	43.3	12.4	54.5	30	03 58	04 31	04 58	02 13	02 42	03 13	03 48
16	60 20.5	40.7	94 45.2	15.9	5	55.7	12.4	54.5	20	04 26	04 55	05 20	02 15	02 49	03 25	04 04
17	75 20.4	41.0	109 20.1	15.9	6	08.1	12.4	54.6	N 10	04 48	05 15	05 38	02 18	02 56	03 35	04 18
18	90 20.3	N22 41.2	123 55.0	15.9	6	20.5	12.3	54.6	0	05 07	05 33	05 55	02 20	03 02	03 45	04 31
19	105 20.2	41.5	138 29.9	15.8	N 6	32.8	12.4	54.6	S 10	05 23	05 49	06 12	02 23	03 08	03 55	04 44
20	120 20.0	41.8	153 04.7	15.7	6	45.2	12.3	54.6	20	05 39	06 06	06 30	02 25	03 14	04 05	04 59
21	135 19.9	42.0	167 39.4	15.8	6	57.5	12.3	54.6	30	05 55	06 24	06 50	02 28	03 22	04 17	05 15
22	150 19.8	42.3	182 14.2	15.7	7	09.8	12.3	54.6	35	06 03	06 34	07 02	02 30	03 26	04 25	05 25
23	165 19.7	42.5	196 48.9	15.6	7	22.1	12.3	54.6	40	06 12	06 46	07 16	02 32	03 31	04 33	05 36
			211 23.5	15.6	7	34.4	12.2	54.7	45	06 22	06 59	07 32	02 34	03 37	04 42	05 49
7 00	180 19.6	N22 42.7	225 58.1	15.6	N 7	46.6	12.3	54.7	S 50	06 33	07 14	07 52	02 37	03 44	04 54	06 05
01	195 19.5	43.0	240 32.7	15.5	7	58.9	12.2	54.7	52	06 38	07 21	08 02	02 38	03 48	04 59	06 12
02	210 19.4	43.2	255 07.2	15.5	8	11.1	12.1	54.7	54	06 43	07 29	08 12	02 40	03 51	05 05	06 21
03	225 19.2	43.5	269 41.7	15.4	8	23.2	12.2	54.7	56	06 49	07 38	08 24	02 41	03 55	05 11	06 30
04	240 19.1	43.7	284 16.1	15.3	8	35.4	12.1	54.7	58	06 56	07 48	08 38	02 43	04 00	05 19	06 41
05	255 19.0	44.0	298 50.4	15.4	8	47.5	12.1	54.8	S 60	07 03	07 59	08 55	02 45	04 05	05 27	06 53
06	270 18.9	N22 44.2	313 24.8	15.2	N 8	59.6	12.1	54.8	Lat.	Sunset	Twilight		Moonset			
07	285 18.8	44.5	327 59.0	15.3	9	11.7	12.1	54.8			Civil	Naut.	6	7	8	9
08	300 18.7	44.7	342 33.3	15.1	9	23.8	12.0	54.8	°	h m	h m	h m	h m	h m	h m	h m
09	315 18.5	45.0	357 07.4	15.1	9	35.8	12.0	54.8	N 72	☐	☐	☐	15 58	17 58	20 27	☐
10	330 18.4	45.2	11 41.5	15.1	9	47.8	11.9	54.8	N 70	☐	☐	☐	15 49	17 38	19 42	☐
11	345 18.3	45.4	26 15.6	15.0	9	59.7	11.9	54.9	68	☐	☐	☐	15 42	17 23	19 13	21 22
12	0 18.2	N22 45.7	40 49.6	14.9	N10	11.6	11.9	54.9	66	23 17	////	////	15 36	17 10	18 51	20 41
13	15 18.1	45.9	55 23.5	14.9	10	23.5	11.9	54.9	64	22 14	////	////	15 31	17 00	18 34	20 13
14	30 17.9	46.2	69 57.4	14.9	10	35.4	11.8	54.9	62	21 41	////	////	15 27	16 51	18 20	19 52
15	45 17.8	46.4	84 31.3	14.8	10	47.2	11.8	54.9	60	21 17	22 50	////	15 23	16 44	18 08	19 35
16	60 17.7	46.6	99 05.1	14.7	10	59.0	11.8	54.9	N 58	20 57	22 09	////	15 20	16 37	17 58	19 20
17	75 17.6	46.9	113 38.8	14.6	11	10.8	11.7	55.0	56	20 41	21 42	////	15 17	16 31	17 49	19 08
18	90 17.5	N22 47.1	128 12.4	14.6	N11	22.5	11.6	55.0	54	20 28	21 21	22 56	15 14	16 26	17 41	18 57
19	105 17.4	47.3	142 46.0	14.6	11	34.1	11.7	55.0	52	20 16	21 04	22 18	15 11	16 22	17 34	18 48
20	120 17.2	47.6	157 19.6	14.4	11	45.8	11.6	55.0	50	20 06	20 49	21 53	15 09	16 17	17 27	18 39
21	135 17.1	47.8	171 53.0	14.4	11	57.4	11.5	55.0	45	19 44	20 21	21 10	15 04	16 08	17 14	18 21
22	150 17.0	48.0	186 26.4	14.4	12	08.9	11.6	55.1	N 40	19 26	19 59	20 40	15 01	16 01	17 03	18 07
23	165 16.9	48.3	200 59.8	14.3	12	20.5	11.4	55.1	35	19 12	19 41	20 18	14 57	15 54	16 53	17 54
8 00	180 16.8	N22 48.5	215 33.1	14.2	N12	31.9	11.5	55.1	30	18 59	19 27	20 00	14 54	15 49	16 45	17 44
01	195 16.6	48.7	230 06.3	14.1	12	43.4	11.3	55.1	20	18 38	19 02	19 31	14 49	15 39	16 31	17 25
02	210 16.5	49.0	244 39.4	14.1	12	54.7	11.4	55.1	N 10	18 20	18 42	19 09	14 44	15 30	16 18	17 09
03	225 16.4	49.2	259 12.5	14.0	13	06.1	11.3	55.1	0	18 02	18 25	18 51	14 40	15 22	16 07	16 54
04	240 16.3	49.4	273 45.5	13.9	13	17.4	11.2	55.2	S 10	17 46	18 08	18 34	14 36	15 14	15 55	16 40
05	255 16.2	49.7	288 18.4	13.9	13	28.6	11.2	55.2	20	17 28	17 51	18 19	14 31	15 06	15 43	16 24
06	270 16.0	N22 49.9	302 51.3	13.8	N13	39.8	11.2	55.2	30	17 07	17 33	18 03	14 26	14 56	15 29	16 06
07	285 15.9	50.1	317 24.1	13.7	13	51.0	11.1	55.2	35	16 55	17 23	17 55	14 23	14 51	15 21	15 55
08	300 15.8	50.3	331 56.8	13.7	14	02.1	11.0	55.2	40	16 41	17 12	17 46	14 20	14 44	15 12	15 43
09	315 15.7	50.6	346 29.5	13.6	14	13.1	11.0	55.3	45	16 25	16 59	17 36	14 16	14 37	15 01	15 29
10	330 15.6	50.8	1 02.1	13.5	14	24.1	10.9	55.3	S 50	16 05	16 43	17 24	14 11	14 28	14 48	15 12
11	345 15.4	51.0	15 34.6	13.4	14	35.0	10.9	55.3	52	15 56	16 36	17 19	14 09	14 24	14 42	15 04
12	0 15.3	N22 51.2	30 07.0	13.4	N14	45.9	10.8	55.3	54	15 45	16 28	17 14	14 07	14 20	14 35	14 55
13	15 15.2	51.5	44 39.4	13.3	14	56.7	10.8	55.4	56	15 33	16 20	17 08	14 04	14 15	14 28	14 45
14	30 15.1	51.7	59 11.7	13.2	15	07.5	10.7	55.4	58	15 19	16 10	17 02	14 02	14 10	14 20	14 34
15	45 15.0	51.9	73 43.9	13.1	15	18.2	10.7	55.4	S 60	15 03	15 59	16 55	13 59	14 04	14 11	14 21
16	60 14.8	52.1														

UT	SUN		MOON						Lat.	Twilight			Sunrise	Moonrise			
	GHA	Dec	GHA	v	Dec	d	HP	Naut.		Civil	h m	9		10	11	12	
								h m		h m	h m	h m		h m	h m	h m	h m
								°									
9 00	180 13.9	N22 53.9	204 30.2	12.4	N16 51.9	10.0	55.6	N 72	□	□	□	□	□	□	□	□	□
01	195 13.7	54.1	219 01.6	12.3	17 01.9	10.0	55.6	N 70	□	□	□	00 38	□	□	□	□	□
02	210 13.6	54.3	233 32.9	12.3	17 11.9	10.0	55.6	68	□	□	□	01 08	00 40	□	□	□	□
03	225 13.5	54.5	248 04.2	12.2	17 21.9	9.8	55.7	66	////	////	00 29	01 31	01 22	01 04	□	□	□
04	240 13.4	54.7	262 35.4	12.0	17 31.7	9.8	55.7	64	////	////	01 40	01 50	01 51	01 56	02 15	□	□
05	255 13.3	54.9	277 06.4	12.0	17 41.5	9.7	55.7	62	////	////	02 14	02 05	02 13	02 28	03 00	□	□
06	270 13.1	N22 55.1	291 37.4	11.9	N17 51.2	9.6	55.7	60	////	01 03	02 39	02 17	02 30	02 52	03 29	□	□
07	285 13.0	55.3	306 08.3	11.9	18 00.8	9.6	55.7	N 58	////	01 46	02 59	02 28	02 45	03 11	03 52	□	□
08	300 12.9	55.6	320 39.2	11.7	18 10.4	9.5	55.8	56	////	02 14	03 15	02 38	02 58	03 28	04 10	□	□
09	315 12.8	55.8	335 09.9	11.7	18 19.9	9.4	55.8	54	00 57	02 35	03 29	02 46	03 10	03 41	04 26	□	□
10	330 12.6	56.0	349 40.6	11.5	18 29.3	9.3	55.8	52	01 37	02 53	03 41	02 54	03 19	03 53	04 39	□	□
11	345 12.5	56.2	4 11.1	11.5	18 38.6	9.2	55.8	50	02 03	03 07	03 51	03 01	03 28	04 04	04 51	□	□
12	0 12.4	N22 56.4	18 41.6	11.4	N18 47.8	9.2	55.9	45	02 47	03 36	04 13	03 16	03 47	04 27	05 15	□	□
13	15 12.3	56.6	33 12.0	11.3	18 57.0	9.1	55.9	N 40	03 17	03 58	04 31	03 28	04 03	04 45	05 35	□	□
14	30 12.1	56.8	47 42.3	11.3	19 06.1	9.0	55.9	35	03 40	04 16	04 46	03 39	04 16	05 00	05 51	□	□
15	45 12.0	57.0	62 12.6	11.1	19 15.1	8.9	55.9	30	03 58	04 31	04 58	03 48	04 27	05 13	06 06	□	□
16	60 11.9	57.2	76 42.7	11.1	19 24.0	8.8	56.0	20	04 26	04 55	05 20	04 04	04 47	05 36	06 30	□	□
17	75 11.8	57.4	91 12.8	10.9	19 32.8	8.7	56.0	N 10	04 48	05 15	05 38	04 18	05 05	05 56	06 51	□	□
18	90 11.6	N22 57.6	105 42.7	10.9	N19 41.5	8.6	56.0	0	05 07	05 33	05 56	04 31	05 21	06 14	07 10	□	□
19	105 11.5	57.8	120 12.6	10.8	19 50.1	8.6	56.0	S 10	05 24	05 50	06 13	04 44	05 37	06 33	07 30	□	□
20	120 11.4	58.0	134 42.4	10.7	19 58.7	8.4	56.1	20	05 40	06 07	06 31	04 59	05 55	06 53	07 51	□	□
21	135 11.3	58.2	149 12.1	10.6	20 07.1	8.4	56.1	30	05 56	06 25	06 52	05 15	06 15	07 16	08 15	□	□
22	150 11.2	58.4	163 41.7	10.5	20 15.5	8.2	56.1	35	06 04	06 36	07 04	05 25	06 27	07 29	08 30	□	□
23	165 11.0	58.6	178 11.2	10.5	20 23.7	8.2	56.1	40	06 13	06 47	07 18	05 36	06 41	07 45	08 47	□	□
								45	06 23	07 01	07 34	05 49	06 57	08 04	09 06	□	□
10 00	180 10.9	N22 58.8	192 40.7	10.3	N20 31.9	8.1	56.1	S 50	06 35	07 16	07 54	06 05	07 17	08 27	09 32	□	□
01	195 10.8	59.0	207 10.0	10.3	20 40.0	7.9	56.2	52	06 40	07 23	08 04	06 12	07 27	08 39	09 44	□	□
02	210 10.7	59.2	221 39.3	10.2	20 47.9	7.9	56.2	54	06 45	07 31	08 15	06 21	07 37	08 52	09 57	□	□
03	225 10.5	59.4	236 08.5	10.0	20 55.8	7.8	56.2	56	06 51	07 40	08 27	06 30	07 50	09 06	10 14	□	□
04	240 10.4	59.6	250 37.5	10.1	21 03.6	7.6	56.2	58	06 58	07 50	08 41	06 41	08 04	09 24	10 33	□	□
05	255 10.3	59.8	265 06.6	9.9	21 11.2	7.6	56.3	S 60	07 05	08 02	08 58	06 53	08 21	09 46	10 57	□	□
06	270 10.2	N23 00.0	279 35.5	9.8	N21 18.8	7.4	56.3										
07	285 10.0	00.2	294 04.3	9.7	21 26.2	7.4	56.3	Lat.	Sunset	Twilight		Moonset					
08	300 09.9	00.4	308 33.0	9.7	21 33.6	7.2	56.3			Civil	Naut.	9	10	11	12		
09	315 09.8	00.6	323 01.7	9.6	21 40.8	7.2	56.4	°	h m	h m	h m	h m	h m	h m	h m	h m	
10	330 09.6	00.8	337 30.3	9.5	21 48.0	7.0	56.4	N 72	□	□	□	□	□	□	□	□	
11	345 09.5	00.9	351 58.8	9.4	21 55.0	6.9	56.4	N 70	□	□	□	□	□	□	□	□	
12	0 09.4	N23 01.1	6 27.2	9.3	N22 01.9	6.8	56.4	68	□	□	□	21 22	□	□	□	□	
13	15 09.3	01.3	20 55.5	9.2	22 08.7	6.7	56.5	66	23 36	////	////	20 41	22 48	□	□	□	
14	30 09.1	01.5	35 23.7	9.2	22 15.4	6.6	56.5	64	22 21	////	////	20 13	21 56	23 33	24 35	□	
15	45 09.0	01.7	49 51.9	9.0	22 22.0	6.4	56.5	62	21 45	////	////	19 52	21 25	22 49	23 50	□	
16	60 08.9	01.9	64 19.9	9.0	22 28.4	6.4	56.5	60	21 20	22 58	////	19 35	21 01	22 19	23 20	□	
17	75 08.8	02.1	78 47.9	8.9	22 34.8	6.2	56.5	N 58	21 01	22 14	////	19 20	20 42	21 57	22 57	□	
18	90 08.6	N23 02.3	93 15.8	8.8	N22 41.0	6.1	56.6	56	20 44	21 45	////	19 08	20 26	21 39	22 39	□	
19	105 08.5	02.4	107 43.6	8.8	22 47.1	6.0	56.6	54	20 30	21 24	23 03	18 57	20 13	21 23	22 23	□	
20	120 08.4	02.6	122 11.4	8.7	22 53.1	5.9	56.6	52	20 18	21 07	22 22	18 48	20 01	21 10	22 10	□	
21	135 08.3	02.8	136 39.1	8.5	22 59.0	5.7	56.6	50	20 08	20 52	21 56	18 39	19 51	20 58	21 58	□	
22	150 08.1	03.0	151 06.6	8.5	23 04.7	5.6	56.7	45	19 46	20 23	21 12	18 21	19 29	20 34	21 33	□	
23	165 08.0	03.2	165 34.1	8.5	N23 10.3	5.5	56.7	N 40	19 28	20 01	20 42	18 07	19 11	20 15	21 14	□	
11 00	180 07.9	N23 03.4	An annular eclipse of the Sun occurs on this date. See page 5.						35	19 13	19 43	20 19	17 54	18 57	19 58	20 57	□
01	195 07.8	03.5							30	19 01	19 28	20 01	17 44	18 44	19 44	20 43	□
02	210 07.6	03.7							20	18 39	19 03	19 33	17 25	18 22	19 21	20 19	□
03	225 07.5	03.9							N 10	18 20	18 43	19 10	17 09	18 03	19 00	19 58	□
04	240 07.4	04.1							0	18 03	18 26	18 52	16 54	17 46	18 41	19 38	□
05	255 07.2	04.3							S 10	17 46	18 09	18 35	16 40	17 28	18 22	19 18	□
06	270 07.1	N23 04.4	266 44.5	7.9	N23 46.2	4.6	56.9	20	17 28	17 52	18 19	16 24	17 10	18 01	18 57	□	
07	285 07.0	04.6	281 11.4	7.9	23 50.8	4.4	56.9	30	17 07	17 33	18 03	16 06	16 48	17 37	18 33	□	
08	300 06.9	04.8	295 38.3	7.8	23 55.2	4.4	56.9	35	16 55	17 23	17 54	15 55	16 36	17 23	18 18	□	
09	315 06.7	05.0	310 05.1	7.7	23 59.6	4.2	56.9	40	16 41	17 11	17 45	15 43	16 21	17 07	18 02	□	
10	330 06.6	05.1	324 31.8	7.6	24 03.8	4.0	56.9	45	16 24	16 58	17 35	15 29	16 04	16 48	17 42	□	
11	345 06.5	05.3	338 58.4	7.6	24 07.8	4.0	57.0	S 50	16 04	16 42	17 24	15 12	15 43	16 24	17 17	□	
12	0 06.3	N23 05.5	353 25.0	7.5	N24 11.8	3.7	57.0	52	15 54	16 35	17 19	15 04	15 33	16 12	17 05	□	
13	15 06.2	05.7	7 51.5	7.4	24 15.5	3.7	57.0	54	15 44	16 27	17 13	14 55	15 22	15 59	16 51	□	
14	30 06.1	05.8	22 17.9	7.4	24 19.2	3.5	57.0	56	15 31	16 18	17 07	14 45	15 09	15 44	16 35	□	
15	45 06.0	06.0	36 44.3	7.3	24 22.7	3.4	57.1	58	15 17	16 08	17 01	14 34	14 54	15 26	16 15	□	
16	60 05.8	06.2	51 10.6	7.2	24 26.1	3.2	57.1	S 60	15 00	15 57	16 53	14 21	14 37	15 05	15 52	□	
17	75 05																

UT	ARIES			VENUS -4.0			MARS +1.7			JUPITER -1.8			SATURN +0.0			STARS		
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec				
12 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	260 08.8	141 03.0	N22 45.9	159 42.7	N24 07.7	149 42.5	N22 22.5	182 13.6	N21 41.1	Acamar	315 25.2	S40 17.6						
	275 11.3	156 02.3	45.3	174 43.4	07.6	164 44.4	22.4	197 15.7	41.1	Achernar	335 33.4	S57 13.3						
	290 13.7	171 01.6	44.7	189 44.0	07.5	179 46.3	22.3	212 17.8	41.1	Acrux	173 19.1	S63 07.0						
	305 16.2	186 01.0	44.2	204 44.7	07.4	194 48.2	22.2	227 19.9	41.2	Adhara	255 19.7	S28 58.6						
	320 18.6	201 00.3	43.6	219 45.4	07.2	209 50.1	22.2	242 22.0	41.2	Aldebaran	290 59.7	N16 30.8						
	335 21.1	215 59.6	43.1	234 46.1	07.1	224 52.0	22.1	257 24.2	41.2									
	350 23.6	230 59.0	N22 42.5	249 46.8	N24 07.0	239 53.9	N22 22.0	272 26.3	N21 41.3	Alioth	166 27.9	N55 57.1						
	5 26.0	245 58.3	41.9	264 47.4	06.9	254 55.8	22.0	287 28.4	41.3	Alkaid	153 05.3	N49 18.4						
	20 28.5	260 57.7	41.4	279 48.1	06.8	269 57.7	21.9	302 30.5	41.3	Al Na'ir	27 54.3	S46 56.8						
	35 31.0	275 57.0	40.8	294 48.8	06.7	284 59.6	21.8	317 32.6	41.4	Anilam	275 55.5	S 1 12.0						
	50 33.4	290 56.3	40.3	309 49.5	06.6	300 01.5	21.8	332 34.7	41.4	Alphard	218 04.8	S 8 40.1						
	65 35.9	305 55.7	39.7	324 50.2	06.5	315 03.4	21.7	347 36.9	41.4									
	80 38.4	320 55.0	N22 39.1	339 50.8	N24 06.4	330 05.3	N22 21.6	2 39.0	N21 41.4	Alphecca	126 18.0	N26 42.5						
	95 40.8	335 54.4	38.6	354 51.5	06.2	345 07.2	21.5	17 41.1	41.5	Alpheratz	357 52.6	N29 05.9						
	110 43.3	350 53.7	38.0	9 52.2	06.1	0 09.1	21.5	32 43.2	41.5	Altair	62 16.4	N 8 52.4						
	125 45.8	5 53.1	37.4	24 52.9	06.0	15 11.0	21.4	47 45.3	41.5	Ankaa	353 24.3	S42 17.5						
	140 48.2	20 52.4	36.8	39 53.6	05.9	30 12.9	21.3	62 47.4	41.6	Antares	112 36.6	S26 26.3						
	155 50.7	35 51.7	36.3	54 54.3	05.8	45 14.8	21.3	77 49.6	41.6									
	170 53.1	50 51.1	N22 35.7	69 54.9	N24 05.7	60 16.7	N22 21.2	92 51.7	N21 41.6	Arcturus	146 03.4	N19 10.3						
	185 55.6	65 50.4	35.1	84 55.6	05.6	75 18.6	21.1	107 53.8	41.7	Atria	107 45.8	S69 02.0						
	200 58.1	80 49.8	34.5	99 56.3	05.4	90 20.5	21.0	122 55.9	41.7	Avior	234 22.2	S59 31.2						
	216 00.5	95 49.1	34.0	114 57.0	05.3	105 22.4	21.0	137 58.0	41.7	Bellatrix	278 41.7	N 6 21.1						
	231 03.0	110 48.5	33.4	129 57.7	05.2	120 24.3	20.9	153 00.1	41.7	Betelgeuse	271 11.0	N 7 24.4						
246 05.5	125 47.8	32.8	144 58.3	05.1	135 26.2	20.8	168 02.2	41.8										
13 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	261 07.9	140 47.2	N22 32.2	159 59.0	N24 05.0	150 28.1	N22 20.8	183 04.4	N21 41.8	Canopus	264 00.6	S52 41.9						
	276 10.4	155 46.5	31.7	174 59.7	04.9	165 30.0	20.7	198 06.5	41.8	Capella	280 47.8	N46 00.0						
	291 12.9	170 45.9	31.1	190 00.4	04.7	180 31.9	20.6	213 08.6	41.9	Deneb	49 37.1	N45 17.1						
	306 15.3	185 45.2	30.5	205 01.1	04.6	195 33.8	20.5	228 10.7	41.9	Denebola	182 42.5	N14 33.7						
	321 17.8	200 44.6	29.9	220 01.8	04.5	210 35.7	20.5	243 12.8	41.9	Diphda	349 04.7	S17 58.4						
	336 20.3	215 43.9	29.3	235 02.4	04.4	225 37.6	20.4	258 14.9	41.9									
	351 22.7	230 43.3	N22 28.7	250 03.1	N24 04.3	240 39.5	N22 20.3	273 17.1	N21 42.0	Dubhe	194 02.2	N61 44.7						
	6 25.2	245 42.6	28.1	265 03.8	04.2	255 41.4	20.3	288 19.2	42.0	Einath	278 24.0	N28 36.5						
	21 27.6	260 42.0	27.6	280 04.5	04.0	270 43.3	20.2	303 21.3	42.0	Eltanin	90 49.6	N51 29.3						
	36 30.1	275 41.3	27.0	295 05.2	03.9	285 45.2	20.1	318 23.4	42.1	Enif	33 55.5	N 9 53.0						
	51 32.6	290 40.7	26.4	310 05.9	03.8	300 47.1	20.1	333 25.5	42.1	Fomalhaut	15 33.4	S29 36.5						
	66 35.0	305 40.0	25.8	325 06.5	03.7	315 49.0	20.0	348 27.6	42.1									
	81 37.5	320 39.4	N22 25.2	340 07.2	N24 03.6	330 50.9	N22 19.9	3 29.8	N21 42.2	Gacrux	172 10.6	S57 07.8						
	96 40.0	335 38.7	24.6	355 07.9	03.4	345 52.8	19.8	18 31.9	42.2	Gienah	176 01.2	S17 33.3						
	111 42.4	350 38.1	24.0	10 08.6	03.3	0 54.7	19.8	33 34.0	42.2	Hadar	149 00.0	S60 23.2						
	126 44.9	5 37.5	23.4	25 09.3	03.2	15 56.6	19.7	48 36.1	42.2	Hamal	328 10.8	N23 28.2						
	141 47.4	20 36.8	22.8	40 10.0	03.1	30 58.5	19.6	63 38.2	42.3	Kaus Aust.	83 54.9	S34 23.0						
	156 49.8	35 36.2	22.2	55 10.6	02.9	46 00.4	19.5	78 40.3	42.3									
	171 52.3	50 35.5	N22 21.6	70 11.3	N24 02.8	61 02.3	N22 19.5	93 42.5	N21 42.3	Kochab	137 18.5	N74 09.0						
	186 54.8	65 34.9	21.0	85 12.0	02.7	76 04.2	19.4	108 44.6	42.4	Markab	13 47.0	N15 12.9						
	201 57.2	80 34.3	20.4	100 12.7	02.6	91 06.1	19.3	123 46.7	42.4	Menkar	314 24.4	N 4 05.9						
	216 59.7	95 33.6	19.8	115 13.4	02.5	106 08.0	19.3	138 48.8	42.4	Menkent	148 17.6	S36 23.0						
	232 02.1	110 33.0	19.2	130 14.1	02.3	121 09.9	19.2	153 50.9	42.4	Miaplacidus	221 42.3	S69 43.8						
247 04.6	125 32.3	18.6	145 14.7	02.2	136 11.8	19.1	168 53.0	42.5										
14 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23	262 07.1	140 31.7	N22 18.0	160 15.4	N24 02.1	151 13.7	N22 19.0	183 55.1	N21 42.5	Mirfak	308 53.3	N49 52.0						
	277 09.5	155 31.1	17.4	175 16.1	02.0	166 15.6	19.0	198 57.3	42.5	Nunki	76 08.7	S26 17.6						
	292 12.0	170 30.4	16.8	190 16.8	01.8	181 17.5	18.9	213 59.4	42.6	Peacock	53 32.3	S56 43.5						
	307 14.5	185 29.8	16.2	205 17.5	01.7	196 19.4	18.8	229 01.5	42.6	Pollux	243 38.6	N28 01.3						
	322 16.9	200 29.2	15.6	220 18.2	01.6	211 21.3	18.8	244 03.6	42.6	Procyon	245 09.1	N 5 13.2						
	337 19.4	215 28.5	15.0	235 18.8	01.5	226 23.2	18.7	259 05.7	42.6									
	352 21.9	230 27.9	N22 14.4	250 19.5	N24 01.3	241 25.1	N22 18.6	274 07.8	N21 42.7	Rasalhague	96 14.2	N12 33.5						
	7 24.3	245 27.3	13.8	265 20.2	01.2	256 27.0	18.5	289 10.0	42.7	Regulus	207 52.9	N11 57.5						
	22 26.8	260 26.6	13.1	280 20.9	01.1	271 28.9	18.5	304 12.1	42.7	Rigel	281 20.7	S 8 12.0						
	37 29.3	275 26.0	12.5	295 21.6	00.9	286 30.8	18.4	319 14.2	42.8	Rigil Kent.	140 03.4	S60 50.8						
	52 31.7	290 25.4	11.9	310 22.3	00.8	301 32.7	18.3	334 16.3	42.8	Sabik	102 22.2	S15 43.7						
	67 34.2	305 24.7	11.3	325 23.0	00.7	316 34.6	18.3	349 18.4	42.8									
	82 36.6	320 24.1	N22 10.7	340 23.6	N24 00.6	331 36.5	N22 18.2	4 20.5	N21 42.9	Schedar	349 50.8	N56 32.7						
	97 39.1	335 23.5	10.1	355 24.3	00.4	346 38.3	18.1	19 22.7	42.9	Shaula	96 33.3	S37 06.3						
	112 41.6	350 22.8	09.4	10 25.0	00.3	1 40.2	18.0	34 24.8	42.9	Sirius	258 41.7	S16 43.2						
	127 44.0	5 22.2	08.8	25 25.7	00.2	16 42.1	18.0	49 26.9	42.9	Spica	158 40.3	S11 10.4						
	142 46.5	20 21.6	08.2	40 26.4	00.0	31 44.0	17.9	64 29.0	43.0	Suhail	222 59.2	S43 26.7						
	157 49.0	35 21.0	07.6	55 27.1	23 59.9	46 45.9	17.8	79 31.1	43.0									
	172 51.4	50 20.3	N22 07.0	70 27.8	N23 59.8	61 47.8	N22 17.7	94 33.2	N21 43.0	Vega	80 44.4	N38 47.0						
	187 53.9	65 19.7	06.3	85 28.4	59.7	76 49.7	17.7	109 35.4	43.1	Zuben'ubi	137 14.8	S16 03.1						
	202 56.4	80 19.1	05.7	100 29.1	59.5	91 51.6	17.6	124 37.5	43.1									
	217 58.8	95 18.5	05.1	115 29.8	59.4	106 53.5	17.5	139 39.6	43.1									
	233 01.3	110 17.8	04.5	130 30.5	59.3	121 55.4	17.5	154 41.7	43.1									
248 03.8	125 17.2	03.8	145 31.2	59.1	136 57.3	17.4	169 43.8	43.2										
h m										SHA	Mer. Pass.							
Mer. Pass. 6 34.4	v -0.6	d 0.6	v 0.7	d 0.1	v 1.9	d 0.1	v 2.1	d 0.0		Venus	239 39.2	14 37						
										Mars	258 51.1	13 19						
										Jupiter	249 20.2	13 56						
										Saturn	281 56.4	11 46						

UT	SUN		MOON					Lat.	Twilight			Moonrise						
	GHA	Dec	GHA	v	Dec	d	HP		Naut.	Civil	Sunrise	12	13	14	15			
								h	m	h	m	h	m	h	m	h	m	h
	° /	° /	° /	' /	° /	' /	' /	°	h	m	h	m	h	m	h	m	h	m
12 00	180 04.8	N23 07.5	166 39.1	6.8	N24 47.9	2.1	57.3	N 72										
01	195 04.7	07.7	181 04.9	6.8	24 50.0	1.9	57.3	N 70										
02	210 04.5	07.8	195 30.7	6.7	24 51.9	1.8	57.3	68										05 39
03	225 04.4	08.0	209 56.4	6.7	24 53.7	1.6	57.3	66									04 01	06 18
04	240 04.3	08.2	224 22.1	6.6	24 55.3	1.5	57.4	64	////	////	01 35	02 15	03 14	04 54	04 54	04 54	06 46	06 46
05	255 04.2	08.3	238 47.7	6.6	24 56.8	1.3	57.4	62	////	////	02 12	03 00	03 59	05 26	07 07	07 07	07 07	07 07
06	270 04.0	N23 08.5	253 13.3	6.6	N24 58.1	1.2	57.4	60	////	00 57	02 37	03 29	04 29	05 50	07 24	07 24	07 24	07 24
07	285 03.9	08.6	267 38.9	6.5	24 59.3	1.0	57.4	N 58	////	01 43	02 57	03 52	04 51	06 09	07 38	07 38	07 38	07 38
08	300 03.8	08.8	282 04.4	6.5	25 00.3	0.9	57.4	56	////	02 12	03 14	04 10	05 10	06 25	07 50	07 50	07 50	07 50
09	315 03.6	09.0	296 29.9	6.5	25 01.2	0.8	57.5	54	00 52	02 34	03 28	04 26	05 25	06 38	08 01	08 01	08 01	08 01
10	330 03.5	09.1	310 55.4	6.4	25 02.0	0.5	57.5	52	01 35	02 51	03 40	04 39	05 38	06 50	08 10	08 10	08 10	08 10
11	345 03.4	09.3	325 20.8	6.4	25 02.5	0.4	57.5	50	02 02	03 06	03 50	04 51	05 50	07 01	08 18	08 18	08 18	08 18
12	0 03.2	N23 09.4	339 46.2	6.4	N25 02.9	0.3	57.5	45	02 46	03 35	04 13	05 15	06 15	07 22	08 36	08 36	08 36	08 36
13	15 03.1	09.6	354 11.6	6.3	25 03.2	0.1	57.6	N 40	03 16	03 58	04 31	05 35	06 34	07 40	08 50	08 50	08 50	08 50
14	30 03.0	09.7	8 36.9	6.3	25 03.3	0.0	57.6	35	03 39	04 16	04 45	05 51	06 50	07 55	09 03	09 03	09 03	09 03
15	45 02.9	09.9	23 02.2	6.3	25 03.3	0.2	57.6	30	03 58	04 31	04 58	06 06	07 04	08 08	09 13	09 13	09 13	09 13
16	60 02.7	10.0	37 27.5	6.3	25 03.1	0.3	57.6	20	04 26	04 56	05 20	06 30	07 28	08 29	09 31	09 31	09 31	09 31
17	75 02.6	10.2	51 52.8	6.2	25 02.8	0.6	57.6	N 10	04 49	05 16	05 39	06 51	07 49	08 48	09 47	09 47	09 47	09 47
18	90 02.5	N23 10.3	66 18.0	6.3	N25 02.2	0.6	57.7	0	05 08	05 34	05 56	07 10	08 08	09 06	10 02	10 02	10 02	10 02
19	105 02.3	10.5	80 43.3	6.2	25 01.6	0.8	57.7	S 10	05 24	05 51	06 14	07 30	08 28	09 23	10 16	10 16	10 16	10 16
20	120 02.2	10.6	95 08.5	6.2	25 00.8	1.0	57.7	20	05 40	06 08	06 32	07 51	08 48	09 42	10 32	10 32	10 32	10 32
21	135 02.1	10.8	109 33.7	6.2	24 59.8	1.1	57.7	30	05 57	06 27	06 53	08 15	09 12	10 04	10 50	10 50	10 50	10 50
22	150 01.9	10.9	123 58.9	6.1	24 58.7	1.3	57.7	35	06 05	06 37	07 05	08 30	09 26	10 16	11 00	11 00	11 00	11 00
23	165 01.8	11.1	138 24.0	6.2	24 57.4	1.4	57.8	40	06 15	06 49	07 19	08 47	09 42	10 31	11 12	11 12	11 12	11 12
								45	06 25	07 02	07 36	09 06	10 02	10 48	11 26	11 26	11 26	11 26
13 00	180 01.7	N23 11.2	152 49.2	6.1	N24 56.0	1.6	57.8	S 50	06 37	07 18	07 56	09 32	10 26	11 09	11 43	11 43	11 43	11 43
01	195 01.6	11.4	167 14.3	6.2	24 54.4	1.8	57.8	52	06 42	07 25	08 06	09 44	10 37	11 19	11 51	11 51	11 51	11 51
02	210 01.4	11.5	181 39.5	6.1	24 52.6	1.9	57.8	54	06 47	07 33	08 17	09 57	10 51	11 30	12 00	12 00	12 00	12 00
03	225 01.3	11.7	196 04.6	6.2	24 50.7	2.0	57.8	56	06 53	07 42	08 30	10 14	11 06	11 43	12 09	12 09	12 09	12 09
04	240 01.2	11.8	210 29.8	6.1	24 48.7	2.2	57.9	58	07 00	07 52	08 44	10 33	11 24	11 58	12 21	12 21	12 21	12 21
05	255 01.0	12.0	224 54.9	6.1	24 46.5	2.4	57.9	S 60	07 07	08 04	09 01	10 57	11 46	12 16	12 33	12 33	12 33	12 33
06	270 00.9	N23 12.1	239 20.0	6.2	N24 44.1	2.5	57.9	Lat.										
07	285 00.8	12.3	253 45.2	6.1	24 41.6	2.7	57.9	Sunset										
08	300 00.6	12.4	268 10.3	6.1	24 38.9	2.9	57.9	Civil										
09	315 00.5	12.5	282 35.4	6.2	24 36.0	2.9	58.0	Naut.										
10	330 00.4	12.7	297 00.6	6.1	24 33.1	3.2	58.0	12										
11	345 00.2	12.8	311 25.7	6.2	24 29.9	3.3	58.0	13										
12	0 00.1	N23 13.0	325 50.9	6.2	N24 26.6	3.4	58.0	14										
13	15 00.0	13.1	340 16.1	6.2	24 23.2	3.7	58.0	66							01 49	01 30	01 30	01 30
14	29 59.8	13.2	354 41.3	6.2	24 19.5	3.7	58.0	64	22 26	////	////	24 35	00 35	00 56	01 02	01 02	01 02	01 02
15	44 59.7	13.4	9 06.5	6.2	24 15.8	3.9	58.1	62	21 49	////	////	23 50	24 23	00 23	00 40	00 40	00 40	00 40
16	59 59.6	13.5	23 31.7	6.3	24 11.9	4.1	58.1	60	21 23	23 05	////	23 20	23 59	24 22	00 22	00 22	00 22	00 22
17	74 59.4	13.6	37 57.0	6.2	24 07.8	4.2	58.1	N 58	21 03	22 18	////	22 57	23 40	24 08	00 08	00 08	00 08	00 08
18	89 59.3	N23 13.8	52 22.2	6.3	N24 03.6	4.4	58.1	56	20 47	21 49	////	22 39	23 23	23 55	24 17	24 17	24 17	24 17
19	104 59.2	13.9	66 47.5	6.3	23 59.2	4.5	58.1	54	20 33	21 27	23 10	22 23	23 09	23 44	24 09	24 09	24 09	24 09
20	119 59.1	14.0	81 12.8	6.3	23 54.7	4.7	58.2	52	20 21	21 09	22 26	22 10	22 57	23 34	24 02	24 02	24 02	24 02
21	134 58.9	14.2	95 38.1	6.4	23 50.0	4.8	58.2	50	20 10	20 54	21 59	21 58	22 47	23 25	23 55	23 55	23 55	23 55
22	149 58.8	14.3	110 03.5	6.4	23 45.2	5.0	58.2	45	19 47	20 25	21 14	21 33	22 24	23 06	23 41	23 41	23 41	23 41
23	164 58.7	14.4	124 28.9	6.4	23 40.2	5.1	58.2	N 40	19 30	20 02	20 44	21 14	22 06	22 51	23 29	23 29	23 29	23 29
14 00	179 58.5	N23 14.6	138 54.3	6.4	N23 35.1	5.3	58.2	35	19 15	19 44	20 21	20 57	21 50	22 37	23 19	23 19	23 19	23 19
01	194 58.4	14.7	153 19.7	6.5	23 29.8	5.4	58.2	30	19 02	19 29	20 02	20 43	21 37	22 26	23 10	23 10	23 10	23 10
02	209 58.3	14.8	167 45.2	6.5	23 24.4	5.6	58.3	20	18 40	19 04	19 34	20 19	21 14	22 06	22 54	22 54	22 54	22 54
03	224 58.1	15.0	182 10.7	6.5	23 18.8	5.7	58.3	N 10	18 21	18 44	19 11	19 58	20 54	21 49	22 40	22 40	22 40	22 40
04	239 58.0	15.1	196 36.2	6.6	23 13.1	5.9	58.3	0	18 04	18 26	18 52	19 38	20 36	21 33	22 28	22 28	22 28	22 28
05	254 57.9	15.2	211 01.8	6.6	23 07.2	6.0	58.3	S 10	17 46	18 09	18 35	19 18	20 17	21 17	22 15	22 15	22 15	22 15
06	269 57.7	N23 15.3	225 27.4	6.7	N23 01.2	6.2	58.3	20	17 28	17 52	18 19	18 57	19 57	20 59	22 01	22 01	22 01	22 01
07	284 57.6	15.5	239 53.1	6.7	22 55.0	6.3	58.3	30	17 07	17 33	18 03	18 33	19 34	20 39	21 45	21 45	21 45	21 45
08	299 57.5	15.6	254 18.8	6.7	22 48.7	6.4	58.4	35	16 55	17 23	17 54	18 18	19 20	20 27	21 35	21 35	21 35	21 35
09	314 57.3	15.7	268 44.5	6.7	22 42.3	6.6	58.4	40	16 41	17 11	17 45	18 02	19 04	20 13	21 25	21 25	21 25	21 25
10	329 57.2	15.8	283 10.2	6.8	22 35.7													

UT	ARIES			VENUS -4.0			MARS +1.7			JUPITER -1.8			SATURN +0.0			STARS		
	GHA	GHA	Dec	GHA	Dec		GHA	Dec		GHA	Dec		GHA	Dec		Name	SHA	Dec
S A T U R D A Y	15 00	263 06.2	140 16.6	N22 03.2	160 31.9	N23 59.0	151 59.2	N22 17.3		184 45.9	N21 43.2		Acamar	315 25.2	S40 17.6			
	01	278 08.7	155 16.0	02.6	175 32.6	58.9	167 01.1	17.2		199 48.1	43.2		Achernar	335 33.4	S57 13.3			
	02	293 11.1	170 15.3	01.9	190 33.3	58.7	182 03.0	17.2		214 50.2	43.3		Acrux	173 19.1	S63 07.0			
	03	308 13.6	185 14.7	01.3	205 33.9	58.6	197 04.9	17.1		229 52.3	43.3		Adhara	255 19.7	S28 58.5			
	04	323 16.1	200 14.1	00.7	220 34.6	58.5	212 06.8	17.0		244 54.4	43.3		Aldebaran	290 59.7	N16 30.8			
	05	338 18.5	215 13.5	22 00.0	235 35.3	58.3	227 08.7	16.9		259 56.5	43.3							
	06	353 21.0	230 12.9	N21 59.4	250 36.0	N23 58.2	242 10.6	N22 16.9		274 58.6	N21 43.4		Alioth	166 27.9	N55 57.2			
	07	8 23.5	245 12.2	58.8	265 36.7	58.1	257 12.5	16.8		290 00.8	43.4		Alkaid	153 05.3	N49 18.4			
	08	23 25.9	260 11.6	58.1	280 37.4	57.9	272 14.4	16.7		305 02.9	43.4		Al Na'ir	27 54.3	S46 56.8			
	09	38 28.4	275 11.0	57.5	295 38.1	57.8	287 16.3	16.7		320 05.0	43.5		Alnilam	275 55.5	S 1 12.0			
	10	53 30.9	290 10.4	56.9	310 38.8	57.7	302 18.2	16.6		335 07.1	43.5		Alphard	218 04.8	S 8 40.1			
	11	68 33.3	305 09.8	56.2	325 39.4	57.5	317 20.1	16.5		350 09.2	43.5							
	12	83 35.8	320 09.2	N21 55.6	340 40.1	N23 57.4	332 21.9	N22 16.4		5 11.3	N21 43.5		Alphecca	126 18.0	N26 42.5			
	13	98 38.2	335 08.5	54.9	355 40.8	57.2	347 23.8	16.4		20 13.5	43.6		Alpheratz	357 52.6	N29 06.0			
	14	113 40.7	350 07.9	54.3	10 41.5	57.1	2 25.7	16.3		35 15.6	43.6		Altair	62 16.4	N 8 52.4			
	15	128 43.2	5 07.3	53.6	25 42.2	57.0	17 27.6	16.2		50 17.7	43.6		Ankaa	353 24.2	S42 17.5			
	16	143 45.6	20 06.7	53.0	40 42.9	56.8	32 29.5	16.1		65 19.8	43.7		Antares	112 36.6	S26 26.3			
	17	158 48.1	35 06.1	52.4	55 43.6	56.7	47 31.4	16.1		80 21.9	43.7							
	18	173 50.6	50 05.5	N21 51.7	70 44.3	N23 56.6	62 33.3	N22 16.0		95 24.0	N21 43.7		Arcturus	146 03.4	N19 10.3			
	19	188 53.0	65 04.9	51.1	85 45.0	56.4	77 35.2	15.9		110 26.2	43.7		Atria	107 45.7	S69 02.0			
	20	203 55.5	80 04.3	50.4	100 45.6	56.3	92 37.1	15.8		125 28.3	43.8		Avior	234 22.2	S59 31.2			
	21	218 58.0	95 03.7	49.8	115 46.3	56.1	107 39.0	15.8		140 30.4	43.8		Bellatrix	278 41.7	N 6 21.1			
	22	234 00.4	110 03.0	49.1	130 47.0	56.0	122 40.9	15.7		155 32.5	43.8		Betelgeuse	271 11.0	N 7 24.5			
23	249 02.9	125 02.4	48.5	145 47.7	55.9	137 42.8	15.6		170 34.6	43.9								
S U N D A Y	16 00	264 05.4	140 01.8	N21 47.8	160 48.4	N23 55.7	152 44.7	N22 15.5		185 36.7	N21 43.9		Canopus	264 00.6	S52 41.8			
	01	279 07.8	155 01.2	47.2	175 49.1	55.6	167 46.6	15.5		200 38.9	43.9		Capella	280 47.8	N46 00.0			
	02	294 10.3	170 00.6	46.5	190 49.8	55.4	182 48.5	15.4		215 41.0	43.9		Deneb	49 37.1	N45 17.1			
	03	309 12.7	185 00.0	45.8	205 50.5	55.3	197 50.4	15.3		230 43.1	44.0		Denebola	182 42.5	N14 33.7			
	04	324 15.2	199 59.4	45.2	220 51.2	55.2	212 52.3	15.2		245 45.2	44.0		Diphda	349 04.6	S17 58.4			
	05	339 17.7	214 58.8	44.5	235 51.9	55.0	227 54.2	15.2		260 47.3	44.0							
	06	354 20.1	229 58.2	N21 43.9	250 52.5	N23 54.9	242 56.0	N22 15.1		275 49.4	N21 44.1		Dubhe	194 02.2	N61 44.7			
	07	9 22.6	244 57.6	43.2	265 53.2	54.7	257 57.9	15.0		290 51.6	44.1		El Nath	278 24.0	N28 36.5			
	08	24 25.1	259 57.0	42.6	280 53.9	54.6	272 59.8	15.0		305 53.7	44.1		Eltanin	90 49.6	N51 29.3			
	09	39 27.5	274 56.4	41.9	295 54.6	54.4	288 01.7	14.9		320 55.8	44.1		Enif	33 55.5	N 9 53.0			
	10	54 30.0	289 55.8	41.2	310 55.3	54.3	303 03.6	14.8		335 57.9	44.2		Fomalhaut	15 33.4	S29 36.5			
	11	69 32.5	304 55.2	40.6	325 56.0	54.2	318 05.5	14.7		351 00.0	44.2							
	12	84 34.9	319 54.6	N21 39.9	340 56.7	N23 54.0	333 07.4	N22 14.7		6 02.1	N21 44.2		Gacrux	172 10.6	S57 07.8			
	13	99 37.4	334 54.0	39.2	355 57.4	53.9	348 09.3	14.6		21 04.3	44.2		Gienah	176 01.2	S17 33.3			
	14	114 39.9	349 53.4	38.6	10 58.1	53.7	3 11.2	14.5		36 06.4	44.3		Hadar	149 00.0	S60 23.2			
	15	129 42.3	4 52.8	37.9	25 58.8	53.6	18 13.1	14.4		51 08.5	44.3		Hamal	328 10.8	N23 28.2			
	16	144 44.8	19 52.2	37.2	40 59.4	53.4	33 15.0	14.4		66 10.6	44.3		Kaus Aust.	83 54.9	S34 23.0			
	17	159 47.2	34 51.6	36.6	56 00.1	53.3	48 16.9	14.3		81 12.7	44.4							
	18	174 49.7	49 51.0	N21 35.9	71 00.8	N23 53.1	63 18.8	N22 14.2		96 14.8	N21 44.4		Kochab	137 18.5	N74 09.0			
	19	189 52.2	64 50.4	35.2	86 01.5	53.0	78 20.7	14.1		111 17.0	44.4		Markab	13 46.9	N15 12.9			
	20	204 54.6	79 49.8	34.6	101 02.2	52.8	93 22.6	14.1		126 19.1	44.4		Menkar	314 24.4	N 4 05.9			
	21	219 57.1	94 49.2	33.9	116 02.9	52.7	108 24.4	14.0		141 21.2	44.5		Menkent	148 17.7	S36 23.0			
	22	234 59.6	109 48.6	33.2	131 03.6	52.5	123 26.3	13.9		156 23.3	44.5		Miaplacidus	221 42.3	S69 43.8			
23	250 02.0	124 48.0	32.5	146 04.3	52.4	138 28.2	13.8		171 25.4	44.5								
M O N D A Y	17 00	265 04.5	139 47.4	N21 31.9	161 05.0	N23 52.3	153 30.1	N22 13.8		186 27.5	N21 44.6		Mirfak	308 53.3	N49 52.0			
	01	280 07.0	154 46.8	31.2	176 05.7	52.1	168 32.0	13.7		201 29.7	44.6		Nunki	76 08.7	S26 17.6			
	02	295 09.4	169 46.2	30.5	191 06.4	52.0	183 33.9	13.6		216 31.8	44.6		Peacock	53 32.3	S56 43.5			
	03	310 11.9	184 45.7	29.8	206 07.1	51.8	198 35.8	13.5		231 33.9	44.6		Pollux	243 38.6	N28 01.3			
	04	325 14.3	199 45.1	29.1	221 07.8	51.7	213 37.7	13.5		246 36.0	44.7		Procyon	245 09.1	N 5 13.2			
	05	340 16.8	214 44.5	28.5	236 08.4	51.5	228 39.6	13.4		261 38.1	44.7							
	06	355 19.3	229 43.9	N21 27.8	251 09.1	N23 51.4	243 41.5	N22 13.3		276 40.2	N21 44.7		Rasalhague	96 14.2	N12 33.5			
	07	10 21.7	244 43.3	27.1	266 09.8	51.2	258 43.4	13.2		291 42.4	44.8		Regulus	207 52.9	N11 57.5			
	08	25 24.2	259 42.7	26.4	281 10.5	51.1	273 45.3	13.2		306 44.5	44.8		Rigel	281 20.7	S 8 11.9			
	09	40 26.7	274 42.1	25.7	296 11.2	50.9	288 47.2	13.1		321 46.6	44.8		Rigil Kent.	140 03.4	S60 50.8			
	10	55 29.1	289 41.5	25.0	311 11.9	50.8	303 49.1	13.0		336 48.7	44.8		Sabik	102 22.2	S15 43.7			
	11	70 31.6	304 41.0	24.4	326 12.6	50.6	318 50.9	12.9		351 50.8	44.9							
	12	85 34.1	319 40.4	N21 23.7	341 13.3	N23 50.5	333 52.8	N22 12.9		6 52.9	N21 44.9		Schedar	349 50.8	N56 32.7			
	13	100 36.5	334 39.8	23.0	356 14.0	50.3	348 54.7	12.8		21 55.1	44.9		Shaula	96 33.3	S37 06.4			
	14	115 39.0	349 39.2	22.3	11 14.7	50.1	3 56.6	12.7		36 57.2	44.9		Sirius	258 41.7	S16 43.1			
	15	130 41.5	4 38.6	21.6	26 15.4	50.0	18 58.5	12.6		51 59.3	45.0		Spica	158 40.3	S11 10.4			
	16	145 43.9	19 38.0	20.9	41 16.1	49.8	34 00.4	12.6		67 01.4	45.0		Suhail	222 59.2	S43 26.6			
	17	160 46.4	34 37.5	20.2	56													

UT	SUN		MOON				Lat.	Twilight			Moonrise																						
								Sunrise	15	16	17	18																					
	GHA	Dec	GHA	v	Dec	d			HP	h m	h m	h m	h m																				
	d	h	°	'	°	'	°	'	°	'	°	'	°	'	°	'	°	'	°	'													
	N	72																															
SATURDAY	15	00	179	55.3	N23	17.5	125	15.7	7.5	N20	48.9	8.6	58.6	N	70																		
	01	194	55.2		17.6	139	42.2	7.6	20	40.3	8.7	58.6		68				05	39	08	01	10	06	12	04								
	02	209	55.1		17.7	154	08.8	7.5	20	31.6	8.9	58.6		66				06	18	08	21	10	16	12	07								
	03	224	54.9		17.8	168	35.3	7.7	20	22.7	9.0	58.6		64	////	////	01	32	06	46	08	37	10	25	12	10							
	04	239	54.8		17.9	183	02.0	7.7	20	13.7	9.1	58.7		62	////	////	02	10	07	07	08	50	10	32	12	12							
	05	254	54.7		18.0	197	28.7	7.8	20	04.6	9.3	58.7		60	////	00	52	02	36	07	24	09	01	10	38	12	14						
	06	269	54.5	N23	18.1	211	55.5	7.8	N19	55.3	9.4	58.7		N	58	////	01	41	02	56	07	38	09	11	10	44	12	16					
	07	284	54.4		18.3	226	22.3	7.8	19	45.9	9.5	58.7		56	////	02	11	03	13	07	50	09	19	10	48	12	17						
	08	299	54.3		18.4	240	49.1	8.0	19	36.4	9.6	58.7		54	00	48	02	33	03	27	08	01	09	26	10	53	12	18					
	09	314	54.1		18.5	255	16.1	7.9	19	26.8	9.7	58.7		52	01	33	02	51	03	39	08	10	09	33	10	57	12	20					
	10	329	54.0		18.6	269	43.0	8.1	19	17.1	9.9	58.7		50	02	00	03	06	03	50	08	18	09	39	11	00	12	21					
	11	344	53.9		18.7	284	10.1	8.1	19	07.2	9.9	58.8		45	02	46	03	35	04	13	08	36	09	52	11	08	12	23					
	12	359	53.7	N23	18.8	298	37.2	8.1	N18	57.3	10.1	58.8		N	40	03	16	03	58	04	31	08	50	10	02	11	14	12	25				
	13	14	53.6		18.9	313	04.3	8.3	18	47.2	10.2	58.8		35	03	39	04	16	04	46	09	03	10	11	11	20	12	27					
	14	29	53.5		19.0	327	31.6	8.2	18	37.0	10.3	58.8		30	03	58	04	31	04	59	09	13	10	19	11	24	12	29					
	15	44	53.3		19.1	341	58.8	8.4	18	26.7	10.4	58.8		N	20	04	27	04	56	05	21	09	31	10	33	11	33	12	32				
	16	59	53.2		19.2	356	26.2	8.4	18	16.3	10.6	58.8		N	10	04	49	05	16	05	39	09	47	10	44	11	40	12	34				
	17	74	53.0		19.3	10	53.6	8.4	18	05.7	10.6	58.8		0	05	08	05	34	05	57	10	02	10	55	11	47	12	36					
	18	89	52.9	N23	19.4	25	21.0	8.5	N17	55.1	10.8	58.8		S	10	05	25	05	52	06	14	10	16	11	06	11	53	12	39				
	19	104	52.8		19.5	39	48.5	8.6	17	44.3	10.8	58.9		20	05	41	06	09	06	33	10	32	11	18	12	01	12	41					
	20	119	52.6		19.6	54	16.1	8.6	17	33.5	11.0	58.9		30	05	58	06	28	06	54	10	50	11	31	12	09	12	44					
	21	134	52.5		19.7	68	43.7	8.7	17	22.5	11.1	58.9		35	06	06	06	38	07	06	11	00	11	39	12	13	12	45					
	22	149	52.4		19.8	83	11.4	8.7	17	11.4	11.1	58.9		40	06	16	06	50	07	20	11	12	11	47	12	19	12	47					
23	164	52.2		19.9	97	39.1	8.8	17	00.3	11.3	58.9		45	06	26	07	03	07	37	11	26	11	58	12	25	12	49						
SUNDAY	16	00	179	52.1	N23	20.0	112	06.9	8.9	N16	49.0	11.4	58.9	S	50	06	38	07	19	07	58	11	43	12	10	12	32	12	52				
	01	194	52.0		20.1	126	34.8	8.9	16	37.6	11.4	58.9		52	06	43	07	27	08	08	11	51	12	15	12	35	12	53					
	02	209	51.8		20.2	141	02.7	9.0	16	26.2	11.6	58.9		54	06	49	07	35	08	19	12	00	12	21	12	39	12	54					
	03	224	51.7		20.3	155	30.7	9.0	16	14.6	11.7	58.9		56	06	55	07	44	08	31	12	09	12	28	12	43	12	56					
	04	239	51.6		20.4	169	58.7	9.1	16	02.9	11.7	59.0		58	07	02	07	54	08	46	12	21	12	36	12	48	12	57					
	05	254	51.4		20.5	184	26.8	9.1	15	51.2	11.9	59.0		S	60	07	09	08	06	09	03	12	33	12	45	12	53	12	59				
	06	269	51.3	N23	20.5	198	54.9	9.2	N15	39.3	11.9	59.0																					
	07	284	51.2		20.6	213	23.1	9.3	15	27.4	12.1	59.0		Lat.	Sunset	Twilight			Moonset														
	08	299	51.0		20.7	227	51.4	9.3	15	15.3	12.1	59.0				Civil	Naut.	15	16	17	18												
	09	314	50.9		20.8	242	19.7	9.3	15	03.2	12.2	59.0																					
	10	329	50.8		20.9	256	48.0	9.4	14	51.0	12.3	59.0																					
	11	344	50.6		21.0	271	16.4	9.5	14	38.7	12.4	59.0																					
	12	359	50.5	N23	21.1	285	44.9	9.5	N14	26.3	12.5	59.0		N	70																		
	13	14	50.4		21.2	300	13.4	9.6	14	13.8	12.5	59.0		68						02	10	01	41	01	24	01	11						
	14	29	50.2		21.3	314	42.0	9.7	14	01.3	12.7	59.1		66						01	30	01	20	01	12	01	06						
	15	44	50.1		21.3	329	10.7	9.6	13	48.6	12.7	59.1		64	22	30	////	////	////	01	02	01	03	01	02	01	01						
	16	59	49.9		21.4	343	39.3	9.8	13	35.9	12.8	59.1		62	21	52	////	////	////	00	40	00	49	00	54	00	57						
	17	74	49.8		21.5	358	08.1	9.8	13	23.1	12.8	59.1		60	21	26	23	10	////	00	22	00	37	00	46	00	53						
	18	89	49.7	N23	21.6	12	36.9	9.8	N13	10.3	13.0	59.1		N	58	21	05	22	21	////	00	08	00	26	00	40	00	50					
	19	104	49.5		21.7	27	05.7	9.9	12	57.3	13.0	59.1		56	20	49	21	51	////	24	17	00	17	00	34	00	47						
	20	119	49.4		21.8	41	34.6	9.9	12	44.3	13.1	59.1		54	20	34	21	29	23	15	24	09	00	09	00	28	00	45					
	21	134	49.3		21.8	56	03.5	10.0	12	31.2	13.2	59.1		52	20	22	21	11	22	29	24	02	00	02	00	24	00	42					
	22	149	49.1		21.9	70	32.5	10.1	12	18.0	13.2	59.1		50	20	11	20	56	22	01	23	55	24	19	00	19	00	40					
23	164	49.0		22.0	85	01.6	10.0	12	04.8	13.4	59.1		45	19	49	20	26	21	16	23	41	24	10	00	10	00	35						
MONDAY	17	00	179	48.9	N23	22.1	99	30.6	10.2	N11	51.4	13.3	59.1	N	40	19	31	20	04	20	45	23	29	24	02	00	32						
	01	194	48.7		22.2	113	59.8	10.1	11	38.1	13.5	59.1		35	19	16	19	45	20	22	23	19	23	55	24	28	00	28					
	02	209	48.6		22.2	128	28.9	10.3																									

UT	ARIES		VENUS -4.0		MARS +1.7		JUPITER -1.8		SATURN +0.0		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
1800 TUESDAY	266 03.6	139 33.4 N21 15.3	161 21.6 N23 48.6	154 15.5 N22 11.9	187 18.3 N21 45.2	Acamar	315 25.2	S40 17.6					
	281 06.1	154 32.8 14.6	176 22.3 48.4	169 17.4 11.9	202 20.5 45.2	Achernar	335 33.3	S57 13.3					
	296 08.6	169 32.3 13.9	191 23.0 48.3	184 19.3 11.8	217 22.6 45.3	Acrux	173 19.1	S63 07.0					
	311 11.0	184 31.7 . . 13.2	206 23.7 . . 48.1	199 21.2 . . 11.7	232 24.7 . . 45.3	Adhara	255 19.7	S28 58.5					
	326 13.5	199 31.1 12.5	221 24.4 48.0	214 23.1 11.6	247 26.8 45.3	Aldebaran	290 59.7	N16 30.8					
	341 16.0	214 30.5 11.8	236 25.1 47.8	229 25.0 11.6	262 28.9 45.4								
	356 18.4	229 30.0 N21 11.1	251 25.8 N23 47.7	244 26.9 N22 11.5	277 31.1 N21 45.4	Alioth	166 28.0	N55 57.2					
	11 20.9	244 29.4 10.4	266 26.5 47.5	259 28.8 11.4	292 33.2 45.4	Alkaid	153 05.4	N49 18.4					
	26 23.3	259 28.8 09.7	281 27.2 47.3	274 30.7 11.3	307 35.3 45.4	Al Na'ir	27 54.3	S46 56.8					
	41 25.8	274 28.2 . . 09.0	296 27.9 . . 47.2	289 32.6 . . 11.3	322 37.4 . . 45.5	Alnilam	275 55.5	S 1 12.0					
	56 28.3	289 27.7 08.3	311 28.6 47.0	304 34.4 11.2	337 39.5 45.5	Alphard	218 04.8	S 8 40.1					
	71 30.7	304 27.1 07.6	326 29.3 46.9	319 36.3 11.1	352 41.6 45.5								
	86 33.2	319 26.5 N21 06.9	341 30.0 N23 46.7	334 38.2 N22 11.0	7 43.8 N21 45.6	Alphecca	126 18.0	N26 42.5					
	101 35.7	334 26.0 06.2	356 30.7 46.5	349 40.1 11.0	22 45.9 45.6	Alpheratz	357 52.6	N29 06.0					
	116 38.1	349 25.4 05.5	11 31.4 46.4	4 42.0 10.9	37 48.0 45.6	Altair	62 16.4	N 8 52.4					
	131 40.6	4 24.8 . . 04.7	26 32.1 . . 46.2	19 43.9 . . 10.8	52 50.1 . . 45.6	Ankaa	353 24.2	S42 17.4					
	146 43.1	19 24.3 04.0	41 32.8 46.1	34 45.8 10.7	67 52.2 45.7	Antares	112 36.6	S26 26.3					
	161 45.5	34 23.7 03.3	56 33.5 45.9	49 47.7 10.6	82 54.3 45.7								
	176 48.0	49 23.1 N21 02.6	71 34.2 N23 45.7	64 49.6 N22 10.6	97 56.5 N21 45.7	Arcturus	146 03.4	N19 10.3					
	191 50.4	64 22.6 01.9	86 34.9 45.6	79 51.5 10.5	112 58.6 45.7	Atria	107 45.7	S69 02.0					
	206 52.9	79 22.0 01.2	101 35.6 45.4	94 53.4 10.4	128 00.7 45.8	Avior	234 22.2	S59 31.1					
	221 55.4	94 21.4 21 00.4	116 36.3 . . 45.2	109 55.2 . . 10.3	143 02.8 . . 45.8	Bellatrix	278 41.7	N 6 21.1					
	236 57.8	109 20.9 20 59.7	131 36.9 45.1	124 57.1 10.3	158 04.9 45.8	Betelgeuse	271 11.0	N 7 24.5					
252 00.3	124 20.3 59.0	146 37.6 44.9	139 59.0 10.2	173 07.0 45.8									
1900 WEDNESDAY	267 02.8	139 19.8 N20 58.3	161 38.3 N23 44.8	155 00.9 N22 10.1	188 09.2 N21 45.9	Canopus	264 00.6	S52 41.8					
	282 05.2	154 19.2 57.6	176 39.0 44.6	170 02.8 10.0	203 11.3 45.9	Capella	280 47.8	N46 00.0					
	297 07.7	169 18.6 56.8	191 39.7 44.4	185 04.7 10.0	218 13.4 45.9	Deneb	49 37.1	N45 17.1					
	312 10.2	184 18.1 . . 56.1	206 40.4 . . 44.3	200 06.6 . . 09.9	233 15.5 . . 46.0	Denebola	182 42.5	N14 33.7					
	327 12.6	199 17.5 55.4	221 41.1 44.1	215 08.5 09.8	248 17.6 46.0	Diphda	349 04.6	S17 58.4					
	342 15.1	214 17.0 54.7	236 41.8 43.9	230 10.4 09.7	263 19.8 46.0								
	357 17.6	229 16.4 N20 53.9	251 42.5 N23 43.8	245 12.3 N22 09.6	278 21.9 N21 46.0	Dubhe	194 02.2	N61 44.7					
	12 20.0	244 15.9 53.2	266 43.2 43.6	260 14.1 09.6	293 24.0 46.1	Einath	278 24.0	N28 36.5					
	27 22.5	259 15.3 52.5	281 43.9 43.4	275 16.0 09.5	308 26.1 46.1	Eltanin	90 49.6	N51 29.3					
	42 24.9	274 14.7 . . 51.7	296 44.6 . . 43.3	290 17.9 . . 09.4	323 28.2 . . 46.1	Enif	33 55.5	N 9 53.0					
	57 27.4	289 14.2 51.0	311 45.3 43.1	305 19.8 09.3	338 30.3 46.1	Fomalhaut	15 33.4	S29 36.5					
	72 29.9	304 13.6 50.3	326 46.0 42.9	320 21.7 09.3	353 32.5 46.2								
	87 32.3	319 13.1 N20 49.5	341 46.7 N23 42.8	335 23.6 N22 09.2	8 34.6 N21 46.2	Gacrux	172 10.7	S57 07.8					
	102 34.8	334 12.5 48.8	356 47.4 42.6	350 25.5 09.1	23 36.7 46.2	Gienah	176 01.2	S17 33.3					
	117 37.3	349 12.0 48.1	11 48.1 42.4	5 27.4 09.0	38 38.8 46.3	Hadar	149 00.0	S60 23.3					
	132 39.7	4 11.4 . . 47.3	26 48.8 . . 42.3	20 29.3 . . 09.0	53 40.9 . . 46.3	Hamal	328 10.8	N23 28.2					
	147 42.2	19 10.9 46.6	41 49.5 42.1	35 31.2 08.9	68 43.1 46.3	Kaus Aust.	83 54.9	S34 23.0					
	162 44.7	34 10.3 45.9	56 50.2 41.9	50 33.0 08.8	83 45.2 46.3								
	177 47.1	49 09.8 N20 45.1	71 50.9 N23 41.8	65 34.9 N22 08.7	98 47.3 N21 46.4	Kochab	137 18.5	N74 09.0					
	192 49.6	64 09.2 44.4	86 51.6 41.6	80 36.8 08.6	113 49.4 46.4	Markab	13 46.9	N15 12.9					
	207 52.1	79 08.7 43.7	101 52.3 41.4	95 38.7 08.6	128 51.5 46.4	Menkar	314 24.4	N 4 05.9					
	222 54.5	94 08.1 . . 42.9	116 53.0 . . 41.2	110 40.6 . . 08.5	143 53.6 . . 46.4	Menkent	148 17.7	S36 23.0					
	237 57.0	109 07.6 42.2	131 53.7 41.1	125 42.5 08.4	158 55.8 46.5	Miaplacidus	221 42.3	S69 43.8					
252 59.4	124 07.0 41.4	146 54.4 40.9	140 44.4 08.3	173 57.9 46.5									
2000 THURSDAY	268 01.9	139 06.5 N20 40.7	161 55.1 N23 40.7	155 46.3 N22 08.3	189 00.0 N21 46.5	Mirfak	308 53.3	N49 52.0					
	283 04.4	154 06.0 39.9	176 55.8 40.6	170 48.2 08.2	204 02.1 46.5	Nunki	76 08.7	S26 17.6					
	298 06.8	169 05.4 39.2	191 56.5 40.4	185 50.0 08.1	219 04.2 46.6	Peacock	53 32.3	S56 43.5					
	313 09.3	184 04.9 . . 38.4	206 57.2 . . 40.2	200 51.9 . . 08.0	234 06.3 . . 46.6	Pollux	243 38.6	N28 01.3					
	328 11.8	199 04.3 37.7	221 57.9 40.0	215 53.8 07.9	249 08.5 46.6	Procyon	245 09.1	N 5 13.2					
	343 14.2	214 03.8 37.0	236 58.6 39.9	230 55.7 07.9	264 10.6 46.7								
	358 16.7	229 03.2 N20 36.2	251 59.3 N23 39.7	245 57.6 N22 07.8	279 12.7 N21 46.7	Rasalhague	96 14.2	N12 33.5					
	13 19.2	244 02.7 35.5	267 00.0 39.5	260 59.5 07.7	294 14.8 46.7	Regulus	207 52.9	N11 57.5					
	28 21.6	259 02.2 34.7	282 00.7 39.3	276 01.4 07.6	309 16.9 46.7	Rigel	281 20.7	S 8 11.9					
	43 24.1	274 01.6 . . 34.0	297 01.4 . . 39.2	291 03.3 . . 07.5	324 19.1 . . 46.8	Rigil Kent.	140 03.4	S60 50.9					
	58 26.5	289 01.1 33.2	312 02.1 39.0	306 05.2 07.5	339 21.2 46.8	Sabik	102 22.2	S15 43.7					
	73 29.0	304 00.5 32.4	327 02.8 38.8	321 07.0 07.4	354 23.3 46.8								
	88 31.5	319 00.0 N20 31.7	342 03.5 N23 38.6	336 08.9 N22 07.3	9 25.4 N21 46.8	Schedar	349 50.7	N56 32.7					
	103 33.9	333 59.5 30.9	357 04.2 38.5	351 10.8 07.2	24 27.5 46.9	Shaula	96 33.3	S37 06.4					
	118 36.4	348 58.9 30.2	12 04.9 38.3	6 12.7 07.2	39 29.7 46.9	Sirius	258 41.7	S16 43.1					
	133 38.9	3 58.4 . . 29.4	27 05.6 . . 38.1	21 14.6 . . 07.1	54 31.8 . . 46.9	Spica	158 40.3	S11 10.4					
	148 41.3	18 57.9 28.7	42 06.4 37.9	36 16.5 07.0	69 33.9 46.9	Suhail	222 59.2	S43 26.6					
	163 43.8	33 57.3 27.9	57 07.1 37.8	51 18.4 06.9	84 36.0 47.0								
	178 46.3	48 56.8 N20 27.1	72 07.8 N23 37.6	66 20.3 N22 06.8	99 38.1 N21 47.0	Vega	80 44.4	N38 47.1					
	193 48.7	63 56.3 26.4	87 08.5 37.4	81 22.1 06.8	114 40.2 47.0	Zuben'ubi	137 14.8	S16 03.1					
	208 51.2	78 55.7 25.6	102 09.2 37.2	96 24.0 06.7	129 42.4 47.0								
	223 53.7	93 55.2 . . 24.9	117 09.9 . . 37.1	111 25.9 . . 06.6	144 44.5 . . 47.1								
	238 56.1	108 54.7 24.1	132 10.6 36.9	126 27.8 06.5	159 46.6 47.1	Venus	232 17.0	14 43					
253 58.6	123 54.1 23.3	147 11.3 36.7	141 29.7 06.4	174 48.7 47.1	Mars	254 35.6	13 13						
					Jupiter	247 58.1	13 38						
					Saturn	281 06.4	11 26						

UT	SUN		MOON				Lat.	Twilight			Sunrise	Moonrise						
	GHA	Dec	GHA	v	Dec	d		HP	Naut.	Civil		18	19	20	21			
18 TUESDAY	d							h	m	h	m	h	m	h	m	h	m	
	h																	
	00	179 45.6	N23 23.8	87 20.6	11.0	N 6 14.6	14.6	59.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11 55	14 09	16 28	19 13			
	01	194 45.5	23.8	101 50.6	11.0	N 0 00.0	14.7	59.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12 00	14 04	16 11	18 32			
	02	209 45.3	23.9	116 20.6	11.0	5 45.3	14.7	59.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12 04	14 00	15 58	18 05			
	03	224 45.2	23.9	130 50.6	11.1	5 30.6	14.7	59.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12 07	13 56	15 48	17 44			
	04	239 45.1	24.0	145 20.7	11.1	5 15.9	14.7	59.3	////	////	01 31	12 10	13 54	15 39	17 28			
	05	254 44.9	24.1	159 50.8	11.1	5 01.2	14.8	59.3	////	////	02 09	12 12	13 51	15 32	17 14			
	06	269 44.8	N23 24.1	174 20.9	11.1	N 4 46.4	14.8	59.3	////	00 49	02 35	12 14	13 49	15 25	17 03			
	07	284 44.7	24.2	188 51.0	11.1	4 31.6	14.8	59.3	////	01 40	02 56	12 16	13 47	15 20	16 53			
	08	299 44.5	24.2	203 21.1	11.1	4 16.8	14.9	59.3	////	02 10	03 13	12 17	13 46	15 15	16 45			
	09	314 44.4	24.3	217 51.2	11.2	4 01.9	14.8	59.3	00 45	02 32	03 27	12 18	13 44	15 10	16 37			
	10	329 44.3	24.3	232 21.4	11.2	3 47.1	14.9	59.3	01 32	02 50	03 39	12 20	13 43	15 06	16 30			
	11	344 44.1	24.4	246 51.6	11.2	3 32.2	14.9	59.3	02 00	03 06	03 50	12 21	13 41	15 03	16 24			
	12	359 44.0	N23 24.4	261 21.8	11.2	N 3 17.3	15.0	59.3	02 46	03 35	04 13	12 23	13 39	14 55	16 11			
	13	14 43.8	24.5	275 52.0	11.2	3 02.3	14.9	59.3	03 16	03 58	04 31	12 25	13 37	14 48	16 01			
	14	29 43.7	24.5	290 22.2	11.2	2 47.4	15.0	59.3	03 39	04 16	04 46	12 27	13 35	14 43	15 51			
	15	44 43.6	24.6	304 52.4	11.3	2 32.4	15.0	59.4	03 58	04 31	04 59	12 29	13 33	14 38	15 44			
	16	59 43.4	24.6	319 22.7	11.2	2 17.4	14.9	59.4	04 27	04 56	05 21	12 32	13 30	14 30	15 30			
	17	74 43.3	24.7	333 52.9	11.2	2 02.5	15.1	59.4	04 50	05 17	05 40	12 34	13 28	14 22	15 18			
	18	89 43.2	N23 24.7	348 23.1	11.3	N 1 47.4	15.0	59.4	0 05 09	05 35	05 58	12 36	13 26	14 16	15 07			
	19	104 43.0	24.8	2 53.4	11.3	1 32.4	15.0	59.4	S 10	05 26	05 52	06 15	12 39	13 23	14 09	14 56		
	20	119 42.9	24.8	17 23.7	11.2	1 17.4	15.0	59.4	20	05 42	06 10	06 34	12 41	13 21	14 02	14 45		
21	134 42.8	24.9	31 53.9	11.3	1 02.4	15.1	59.4	30	05 59	06 28	06 55	12 44	13 18	13 54	14 32			
22	149 42.6	24.9	46 24.2	11.3	0 47.3	15.0	59.4	45	06 07	06 39	07 07	12 45	13 17	13 49	14 24			
23	164 42.5	25.0	60 54.5	11.2	0 32.3	15.1	59.4	0	06 17	06 51	07 21	12 47	13 15	13 44	14 15			
00	179 42.4	N23 25.0	75 24.7	11.3	N 0 17.2	15.0	59.4	S 50	06 39	07 21	07 59	12 52	13 11	13 31	13 54			
01	194 42.2	25.1	89 55.0	11.2	N 0 02.2	15.1	59.4	52	06 44	07 28	08 09	12 53	13 10	13 28	13 48			
02	209 42.1	25.1	104 25.2	11.3	S 0 12.9	15.0	59.4	54	06 50	07 36	08 20	12 54	13 09	13 24	13 42			
03	224 41.9	25.1	118 55.5	11.3	0 27.9	15.1	59.4	56	06 56	07 45	08 33	12 56	13 08	13 20	13 35			
04	239 41.8	25.2	133 25.8	11.2	0 43.0	15.0	59.4	58	07 03	07 56	08 47	12 57	13 06	13 16	13 28			
05	254 41.7	25.2	147 56.0	11.3	0 58.0	15.1	59.4	S 60	07 10	08 07	09 05	12 59	13 05	13 11	13 19			
06	269 41.5	N23 25.3	162 26.3	11.2	S 1 13.1	15.0	59.4											
07	284 41.4	25.3	176 56.5	11.2	1 28.1	15.1	59.4	Lat.	Sunset	Twilight			Moonset					
08	299 41.3	25.3	191 26.7	11.2	1 43.2	15.0	59.4			Civil	Naut.	18	19	20	21			
09	314 41.1	25.4	205 56.9	11.2	1 58.2	15.0	59.4	h	m	h	m	h	m	h	m	h	m	
10	329 41.0	25.4	220 27.1	11.2	2 13.2	15.0	59.4	h	m	h	m	h	m	h	m	h	m	
11	344 40.9	25.5	234 57.3	11.2	2 28.2	15.0	59.4	N 72	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	01 25	00 59	$\left\{ \begin{smallmatrix} 03 \\ 23 \end{smallmatrix} \right\}$	$\left\{ \begin{smallmatrix} 32 \\ 59 \end{smallmatrix} \right\}$	23 04		
12	359 40.7	N23 25.5	249 27.5	11.2	S 2 43.2	15.0	59.4	N 70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	01 18	00 59	00 40	$\left\{ \begin{smallmatrix} 03 \\ 29 \end{smallmatrix} \right\}$	$\left\{ \begin{smallmatrix} 38 \\ 46 \end{smallmatrix} \right\}$		
13	14 40.6	25.5	263 57.7	11.1	2 58.2	14.9	59.4	68	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	01 11	00 59	00 47	00 33			
14	29 40.4	25.6	278 27.8	11.2	3 13.1	15.0	59.4	66	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	01 06	00 59	00 53	00 45			
15	44 40.3	25.6	292 58.0	11.1	3 28.1	14.9	59.4	64	22 32	////	////	01 01	00 59	00 57	00 56			
16	59 40.2	25.6	307 28.1	11.1	3 43.0	14.9	59.4	62	21 54	////	////	00 57	00 59	01 02	01 05			
17	74 40.0	25.7	321 58.2	11.1	3 57.9	14.9	59.4	60	21 27	23 14	////	00 53	00 59	01 05	01 12			
18	89 39.9	N23 25.7	336 28.3	11.0	S 4 12.8	14.9	59.4	N 58	21 07	22 23	////	00 50	00 59	01 09	01 19			
19	104 39.8	25.7	350 58.3	11.1	4 27.7	14.8	59.4	56	20 50	21 53	////	00 47	00 59	01 12	01 25			
20	119 39.6	25.8	5 28.4	11.0	4 42.5	14.8	59.4	54	20 36	21 30	23 18	00 45	00 59	01 14	01 31			
21	134 39.5	25.8	19 58.4	11.0	4 57.3	14.8	59.4	52	20 23	21 12	22 31	00 42	01 00	01 17	01 35			
22	149 39.4	25.8	34 28.4	11.0	5 12.1	14.7	59.4	50	20 12	20 57	22 03	00 40	01 00	01 19	01 40			
23	164 39.2	25.8	48 58.4	10.9	5 26.8	14.8	59.4	45	19 50	20 27	21 17	00 35	01 00	01 24	01 50			
00	179 39.1	N23 25.9	63 28.3	10.9	S 5 41.6	14.7	59.4	N 40	19 32	20 05	20 46	00 32	01 00	01 28	01 58			
01	194 39.0	25.9	77 58.2	10.9	5 56.3	14.6	59.3	35	19 17	19 46	20 23	00 28	01 00	01 31	02 05			
02	209 38.8	25.9	92 28.1	10.9	6 10.9	14.7	59.3	30	19 04	19 31	20 05	00 25	01 00	01 34	02 11			
03	224 38.7	25.9	106 58.0	10.8	6 25.6	14.6	59.3	20	18 42	19 06	19 35	00 20	01 00	01 40	02 21			
04	239 38.5	26.0	121 27.8	10.8	6 40.2	14.5	59.3	N 10	18 23	18 46	19 13	00 15	01 00	01 45	02 31			
05	254 38.4	26.0	135 57.6	10.8	6 54.7	14.5	59.3	0	18 05	18 28	18 54	00 10	01 00	01 49	02 40			
06	269 38.3	N23 26.0	150 27.4	10.7	S 7 09.2	14.5	59.3	S 10	17 48	18 10	18 37	00 06	01 00	01 54	02 49			
07	284 38.1	26.0	164 57.1	10.7	7 23.7	14.5	59.3	20	17 29	17 53	18 20	00 01	01 00	01 58	02 58			
08	299 38.0	26.1	179 26.8	10.7	7 38.2	14.4	59.3	30	17 08	17 34	18 04	25 00	01 00	02 04	03 09			
09	314 37.9	26.1	193 56.5	10.7	7 52.6	14.3	59.3	35	16 55	17 23	17 55	24 59	00 59	02 07	03 15			
10	329 37.7	26.1	208 26.2	10.6	8 06.9	14.3	59.3	40	16 41	17 12	17 46	24 59	00 59	02 11	03 23			
11	344 37.6	26.1	222 55.8	10.5	8 21.2	14.3	59.3	45	16 24	16 58	17 35	24 59	00 59	02 15	03 31			
12	359 37.5	N23 26.1	237 25.3	10.5	S 8 35.5	14.2	59.3	S 50	16 03	16 42	17 24	24 59	00 59	02 20	03 41			
13	14 37.3	26.2	251 54.8	10.5	8 49.7	14.2	59.3	52	15 54	16 35	17 18	24 59	00 59	02 22	03 46			
14	29 37.2	26.2	266 24.3	10.5	9 03.9	14.1	59.3	54	15 42	16 26	17 13	24 59	00 59	02 25	03 51			
15	44 37.1	26.2	280 53.8	10.4	9 18.0	14.0	59.3	56	15 30	16 17	17 06	24 59	00 59	02 28	03 57			
16	59 36.9	26.2	295 23.2	10.4	9 32.0	14.1	59.3	58	15 15	16 07	1							

UT	ARIES		VENUS -4.0		MARS +1.8		JUPITER -1.8		SATURN +0.0		STARS		
	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec	Name	SHA	Dec
F R I D A Y	21 00	269 01.0	138 53.6 N20 22.6	162 12.0 N23 36.5	156 31.6 N22 06.4	189 50.8 N21 47.2	Acamar	315 25.2	S40 17.6				
	01	284 03.5	153 53.1 21.8	177 12.7 36.3	171 33.5 06.3	204 53.0 47.2	Achernar	335 33.3	S57 13.3				
	02	299 06.0	168 52.6 21.0	192 13.4 36.2	186 35.4 06.2	219 55.1 47.2	Acrux	173 19.1	S63 07.0				
	03	314 08.4	183 52.0 . . 20.3	207 14.1 . . 36.0	201 37.2 . . 06.1	234 57.2 . . 47.2	Adhara	255 19.7	S28 58.5				
	04	329 10.9	198 51.5 19.5	222 14.8 35.8	216 39.1 06.1	249 59.3 47.3	Aldebaran	290 59.7	N16 30.8				
	05	344 13.4	213 51.0 18.7	237 15.5 35.6	231 41.0 06.0	265 01.4 47.3							
	06	359 15.8	228 50.5 N20 18.0	252 16.2 N23 35.4	246 42.9 N22 05.9	280 03.5 N21 47.3	Alioth	166 28.0	N55 57.2				
	07	14 18.3	243 49.9 17.2	267 16.9 35.3	261 44.8 05.8	295 05.7 47.3	Alkaid	153 05.4	N49 18.4				
	08	29 20.8	258 49.4 16.4	282 17.6 35.1	276 46.7 05.7	310 07.8 47.4	Al Na'ir	27 54.2	S46 56.8				
	09	44 23.2	273 48.9 . . 15.6	297 18.3 . . 34.9	291 48.6 . . 05.7	325 09.9 . . 47.4	Alnilam	275 55.5	S 1 12.0				
	10	59 25.7	288 48.4 14.9	312 19.0 34.7	306 50.5 05.6	340 12.0 47.4	Alphard	218 04.8	S 8 40.1				
	11	74 28.2	303 47.8 14.1	327 19.7 34.5	321 52.3 05.5	355 14.1 47.4							
	12	89 30.6	318 47.3 N20 13.3	342 20.4 N23 34.3	336 54.2 N22 05.4	10 16.3 N21 47.5	Alphecca	126 18.0	N26 42.5				
	13	104 33.1	333 46.8 12.5	357 21.1 34.2	351 56.1 05.3	25 18.4 47.5	Alpheratz	357 52.5	N29 06.0				
	14	119 35.5	348 46.3 11.8	12 21.8 34.0	6 58.0 05.3	40 20.5 47.5	Altair	62 16.4	N 8 52.4				
	15	134 38.0	3 45.8 . . 11.0	27 22.5 . . 33.8	21 59.9 . . 05.2	55 22.6 . . 47.5	Ankaa	353 24.2	S42 17.4				
	16	149 40.5	18 45.3 10.2	42 23.2 33.6	37 01.8 05.1	70 24.7 47.6	Antares	112 36.6	S26 26.3				
	17	164 42.9	33 44.7 09.4	57 24.0 33.4	52 03.7 05.0	85 26.9 47.6							
	18	179 45.4	48 44.2 N20 08.6	72 24.7 N23 33.2	67 05.6 N22 04.9	100 29.0 N21 47.6	Arcturus	146 03.4	N19 10.4				
	19	194 47.9	63 43.7 07.9	87 25.4 33.1	82 07.4 04.9	115 31.1 47.6	Atria	107 45.7	S69 02.0				
	20	209 50.3	78 43.2 07.1	102 26.1 32.9	97 09.3 04.8	130 33.2 47.7	Avior	234 22.2	S59 31.1				
	21	224 52.8	93 42.7 . . 06.3	117 26.8 . . 32.7	112 11.2 . . 04.7	145 35.3 . . 47.7	Bellatrix	278 41.6	N 6 21.1				
	22	239 55.3	108 42.2 05.5	132 27.5 32.5	127 13.1 04.6	160 37.4 47.7	Betelgeuse	271 11.0	N 7 24.5				
23	254 57.7	123 41.6 04.7	147 28.2 32.3	142 15.0 04.5	175 39.6 47.8								
S A T U R D A Y	22 00	270 00.2	138 41.1 N20 03.9	162 28.9 N23 32.1	157 16.9 N22 04.5	190 41.7 N21 47.8	Canopus	264 00.6	S52 41.8				
	01	285 02.6	153 40.6 03.1	177 29.6 31.9	172 18.8 04.4	205 43.8 47.8	Capella	280 47.8	N46 00.0				
	02	300 05.1	168 40.1 02.4	192 30.3 31.7	187 20.7 04.3	220 45.9 47.8	Deneb	49 37.1	N45 17.1				
	03	315 07.6	183 39.6 . . 01.6	207 31.0 . . 31.6	202 22.5 . . 04.2	235 48.0 . . 47.9	Denebola	182 42.5	N14 33.7				
	04	330 10.0	198 39.1 00.8	222 31.7 31.4	217 24.4 04.1	250 50.2 47.9	Diphda	349 04.6	S17 58.4				
	05	345 12.5	213 38.6 20 00.0	237 32.4 31.2	232 26.3 04.1	265 52.3 47.9							
	06	0 15.0	228 38.1 N19 59.2	252 33.1 N23 31.0	247 28.2 N22 04.0	280 54.4 N21 47.9	Dubhe	194 02.3	N61 44.7				
	07	15 17.4	243 37.6 58.4	267 33.8 30.8	262 30.1 03.9	295 56.5 48.0	Elnath	278 24.0	N28 36.5				
	08	30 19.9	258 37.1 57.6	282 34.6 30.6	277 32.0 03.8	310 58.6 48.0	Eltanin	90 49.6	N51 29.3				
	09	45 22.4	273 36.6 . . 56.8	297 35.3 . . 30.4	292 33.9 . . 03.7	326 00.8 . . 48.0	Enif	33 55.4	N 9 53.0				
	10	60 24.8	288 36.0 56.0	312 36.0 30.2	307 35.7 03.7	341 02.9 48.0	Fomalhaut	15 33.3	S29 36.5				
	11	75 27.3	303 35.5 55.2	327 36.7 30.0	322 37.6 03.6	356 05.0 48.1							
	12	90 29.8	318 35.0 N19 54.4	342 37.4 N23 29.9	337 39.5 N22 03.5	11 07.1 N21 48.1	Gacrux	172 10.7	S57 07.8				
	13	105 32.2	333 34.5 53.6	357 38.1 29.7	352 41.4 03.4	26 09.2 48.1	Gienah	176 01.2	S17 33.3				
	14	120 34.7	348 34.0 52.8	12 38.8 29.5	7 43.3 03.3	41 11.4 48.1	Hadar	149 00.1	S60 23.3				
	15	135 37.1	3 33.5 . . 52.0	27 39.5 . . 29.3	22 45.2 . . 03.3	56 13.5 . . 48.2	Hamal	328 10.8	N23 28.2				
	16	150 39.6	18 33.0 51.2	42 40.2 29.1	37 47.1 03.2	71 15.6 48.2	Kaus Aust.	83 54.9	S34 23.0				
	17	165 42.1	33 32.5 50.4	57 40.9 28.9	52 48.9 03.1	86 17.7 48.2							
	18	180 44.5	48 32.0 N19 49.6	72 41.6 N23 28.7	67 50.8 N22 03.0	101 19.8 N21 48.2	Kochab	137 18.6	N74 09.0				
	19	195 47.0	63 31.5 48.8	87 42.3 28.5	82 52.7 02.9	116 22.0 48.3	Markab	13 46.9	N15 12.9				
	20	210 49.5	78 31.0 48.0	102 43.1 28.3	97 54.6 02.9	131 24.1 48.3	Menkar	314 24.4	N 4 05.9				
	21	225 51.9	93 30.5 . . 47.2	117 43.8 . . 28.1	112 56.5 . . 02.8	146 26.2 . . 48.3	Menkent	148 17.7	S36 23.0				
	22	240 54.4	108 30.0 46.4	132 44.5 27.9	127 58.4 02.7	161 28.3 48.3	Miaplacidus	221 42.4	S69 43.8				
23	255 56.9	123 29.5 45.6	147 45.2 27.7	143 00.3 02.6	176 30.4 48.4								
S U N D A Y	23 00	270 59.3	138 29.0 N19 44.8	162 45.9 N23 27.5	158 02.1 N22 02.5	191 32.5 N21 48.4	Mirfak	308 53.3	N49 52.0				
	01	286 01.8	153 28.5 44.0	177 46.6 27.3	173 04.0 02.4	206 34.7 48.4	Nunki	76 08.7	S26 17.6				
	02	301 04.3	168 28.1 43.2	192 47.3 27.2	188 05.9 02.4	221 36.8 48.4	Peacock	53 32.2	S56 43.5				
	03	316 06.7	183 27.6 . . 42.4	207 48.0 . . 27.0	203 07.8 . . 02.3	236 38.9 . . 48.5	Pollux	243 38.6	N28 01.3				
	04	331 09.2	198 27.1 41.6	222 48.7 26.8	218 09.7 02.2	251 41.0 48.5	Procyon	245 09.1	N 5 13.2				
	05	346 11.6	213 26.6 40.7	237 49.4 26.6	233 11.6 02.1	266 43.1 48.5							
	06	1 14.1	228 26.1 N19 39.9	252 50.1 N23 26.4	248 13.5 N22 02.0	281 45.3 N21 48.5	Rasalhague	96 14.1	N12 33.5				
	07	16 16.6	243 25.6 39.1	267 50.9 26.2	263 15.3 02.0	296 47.4 48.6	Regulus	207 52.9	N11 57.5				
	08	31 19.0	258 25.1 38.3	282 51.6 26.0	278 17.2 01.9	311 49.5 48.6	Rigel	281 20.7	S 8 11.9				
	09	46 21.5	273 24.6 . . 37.5	297 52.3 . . 25.8	293 19.1 . . 01.8	326 51.6 . . 48.6	Rigil Kent.	140 03.4	S60 50.9				
	10	61 24.0	288 24.1 36.7	312 53.0 25.6	308 21.0 01.7	341 53.7 48.6	Sabik	102 22.1	S15 43.7				
	11	76 26.4	303 23.6 35.9	327 53.7 25.4	323 22.9 01.6	356 55.9 48.7							
	12	91 28.9	318 23.1 N19 35.0	342 54.4 N23 25.2	338 24.8 N22 01.6	11 58.0 N21 48.7	Schedar	349 50.7	N56 32.7				
	13	106 31.4	333 22.7 34.2	357 55.1 25.0	353 26.7 01.5	27 00.1 48.7	Shaula	96 33.3	S37 06.4				
	14	121 33.8	348 22.2 33.4	12 55.8 24.8	8 28.5 01.4	42 02.2 48.7	Sirius	258 41.7	S16 43.1				
	15	136 36.3	3 21.7 . . 32.6	27 56.5 . . 24.6	23 30.4 . . 01.3	57 04.3 . . 48.8	Spica	158 40.3	S11 10.4				
	16	151 38.8	18 21.2 31.8	42 57.3 24.4	38 32.3 01.2	72 06.5 48.8	Suhail	222 59.2	S43 26.6				
	17	166 41.2	33 20.7 30.9	57 58.0 24.2	53 34.2 01.1	87 08.6 48.8							
	18	181 43.7	48 20.2 N19 30.1	72 58.7 N23 24.0	68 36.1 N22 01.1	102 10.7 N21 48.8	Vega	80 44.4	N38 47.1				
	19	196 46.1	63 19.8 29.3	87 59.4 23.8	83 38.0 01.0	117 12.8 48.9	Zuben'ubi	137 14.8	S16 03.1				
	20	211 48.6	78 19.3 28.5	103 00.1 23.6	98 39.8 00.9	132 14.9 48.9							
	21	226 51.1	93 18.8 . . 27.7	118 00.8 . . 23.4	113 41.7 . . 00.8	147 17.1 . . 48.9							
	22	241 53.5	108 18.3 26.8	133 01.5 23.2	128 43.6 00.7	162 19.2 48.9	Venus	228 40.9	h 14 46				
23	256 56.0	123 17.8 26.0	148 02.2 23.0	143 45.5 00.7	177 21.3 49.0	Mars	252 28.7	13 09					
						Jupiter	247 16.7	13 29					
						Saturn	280 41.5	11 16					

Mer. Pass.	h m	v	-0.5	d	0.8	v	0.7	d	0.2	v	1.9	d	0.1	v	2.1	d	0.0
	5 59.0																

UT	SUN		MOON				Lat.	Twilight			Moonrise					
	GHA	Dec	GHA	<i>v</i>	Dec	<i>d</i>		HP	Naut.	Civil	Sunrise	21	22	23	24	
							h m		h m	h m	h m	h m	h m	h m	h m	
	$^{\circ}$ $'$	$^{\circ}$ $'$	$^{\circ}$ $'$ $''$	$'$ $''$	$^{\circ}$ $'$ $''$	$'$ $''$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$ $'$	$^{\circ}$ $'$	$^{\circ}$ $'$	$^{\circ}$ $'$		
FRI DAY	179 35.8	N23 26.3	51 16.9	10.0	S11 22.5	13.5	59.2	N 70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18 32	■	■	■	
	194 35.7	26.3	65 45.9	10.0	11 36.0	13.5	59.2	N 70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18 05	■	■	■	
	209 35.6	26.3	80 14.9	9.9	11 49.5	13.3	59.2	68	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17 44	19 49	22 13	■	
	224 35.4	26.3	94 43.8	9.9	12 02.8	13.4	59.2	66	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17 28	19 20	21 14	22 56	
	239 35.3	26.3	109 12.7	9.8	12 16.2	13.2	59.2	64	////	////	01 31	17 14	18 59	20 40	22 08	
	254 35.2	26.3	123 41.5	9.8	12 29.4	13.2	59.2	62	////	////	02 09	17 03	18 41	20 16	21 37	
	269 35.0	N23 26.3	138 10.3	9.7	S12 42.6	13.1	59.2	60	////	00 49	02 36	16 53	18 27	19 56	21 14	
	284 34.9	26.3	152 39.0	9.7	12 55.7	13.0	59.2	N 58	////	01 40	02 56	16 45	18 14	19 40	20 55	
	299 34.7	26.4	167 07.7	9.6	13 08.7	13.0	59.2	56	////	02 11	03 13	16 37	18 04	19 26	20 39	
	314 34.6	26.4	181 36.3	9.5	13 21.7	12.8	59.2	54	00 45	02 33	03 28	16 30	17 54	19 14	20 25	
	329 34.5	26.4	196 04.8	9.6	13 34.5	12.8	59.1	52	01 32	02 51	03 40	16 24	17 45	19 03	20 13	
	344 34.3	26.4	210 33.4	9.4	13 47.3	12.7	59.1	50	02 00	03 06	03 51	16 11	17 27	18 41	19 49	
	359 34.2	N23 26.4	225 01.8	9.4	S14 00.0	12.7	59.1	45	02 46	03 36	04 13	16 01	17 13	18 23	19 29	
	14 34.1	26.4	239 30.2	9.4	14 12.7	12.5	59.1	N 40	03 17	03 59	04 31	15 51	17 01	18 08	19 13	
	29 33.9	26.4	253 58.6	9.3	14 25.2	12.5	59.1	35	03 40	04 17	04 47	15 44	16 50	17 56	18 59	
	44 33.8	26.4	268 26.9	9.2	14 37.7	12.3	59.1	30	03 59	04 32	05 00	15 30	16 31	17 34	18 34	
	59 33.7	26.4	282 55.1	9.2	14 50.0	12.3	59.1	20	04 28	04 57	05 22	15 18	16 16	17 15	18 14	
	74 33.5	26.4	297 23.3	9.1	15 02.3	12.2	59.1	N 10	04 50	05 18	05 41	15 07	16 01	16 57	17 54	
	89 33.4	N23 26.4	311 51.4	9.1	S15 14.5	12.1	59.1	0	05 09	05 36	05 58	14 56	15 46	16 39	17 35	
	104 33.3	26.4	326 19.5	9.0	15 26.6	12.0	59.0	S 10	05 27	05 53	06 16	14 45	15 31	16 21	17 15	
	119 33.1	26.4	340 47.5	9.0	15 38.6	11.9	59.0	20	05 43	06 10	06 34	14 32	15 13	15 59	16 51	
	134 33.0	26.3	355 15.5	8.9	15 50.5	11.9	59.0	30	05 59	06 29	06 56	14 24	15 03	15 47	16 37	
	149 32.8	26.3	9 43.4	8.9	16 02.4	11.7	59.0	45	06 08	06 40	07 08	14 15	14 51	15 32	16 21	
164 32.7	26.3	24 11.3	8.8	16 14.1	11.6	59.0	35	06 17	06 52	07 22	14 06	14 37	15 15	16 02		
SAT DAY	179 32.6	N23 26.3	38 39.1	8.7	S16 25.7	11.5	59.0	S 50	06 40	07 21	08 00	13 54	14 21	14 55	15 38	
	194 32.4	26.3	53 06.8	8.7	16 37.2	11.5	59.0	52	06 45	07 29	08 10	13 48	14 13	14 45	15 26	
	209 32.3	26.3	67 34.5	8.6	16 48.7	11.3	59.0	54	06 51	07 37	08 21	13 42	14 04	14 34	15 13	
	224 32.2	26.3	82 02.1	8.6	17 00.0	11.2	58.9	56	06 57	07 46	08 34	13 35	13 55	14 21	14 59	
	239 32.0	26.3	96 29.7	8.5	17 11.2	11.1	58.9	58	07 04	07 56	08 48	13 28	13 44	14 06	14 41	
	254 31.9	26.3	110 57.2	8.4	17 22.3	11.0	58.9	S 60	07 11	08 08	09 06	13 19	13 31	13 49	14 20	
	269 31.8	N23 26.3	125 24.6	8.4	S17 33.3	10.9	58.9	Lat.	Sunset	Twilight			Moonset			
	284 31.6	26.3	139 52.0	8.4	17 44.2	10.8	58.9			Civil	Naut.	21	22	23	24	
	299 31.5	26.2	154 19.4	8.3	17 55.0	10.7	58.9									
	314 31.4	26.2	168 46.7	8.2	18 05.7	10.6	58.9									
	329 31.2	26.2	183 13.9	8.2	18 16.3	10.5	58.8									
	344 31.1	26.2	197 41.1	8.1	18 26.8	10.3	58.8									
	359 31.0	N23 26.2	212 08.2	8.1	S18 37.1	10.2	58.8	N 72	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23 04	■	■	■	
	14 30.8	26.2	226 35.3	8.0	18 47.3	10.2	58.8	N 70	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	^(09 18) 00 33	■	■	■	
	29 30.7	26.1	241 02.3	7.9	18 57.5	10.0	58.8	68	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	^(00 15) 00 33	■	■	■	
	44 30.6	26.1	255 29.2	7.9	19 07.5	9.8	58.8	66	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	00 45	00 37	00 26	■	
	59 30.4	26.1	269 56.1	7.9	19 17.3	9.8	58.8	64	22 33	////	////	00 56	00 55	00 55	01 00	
	74 30.3	26.1	284 23.0	7.8	19 27.1	9.7	58.7	62	21 54	////	////	01 05	01 09	01 18	01 34	
	89 30.2	N23 26.1	298 49.8	7.7	S19 36.8	9.5	58.7	60	21 28	23 14	////	01 12	01 22	01 36	01 59	
	104 30.0	26.1	313 16.5	7.7	19 46.3	9.4	58.7	N 58	21 07	22 23	////	01 19	01 32	01 51	02 19	
	119 29.9	26.0	327 43.2	7.6	19 55.7	9.2	58.7	56	20 51	21 53	////	01 25	01 42	02 04	02 35	
	134 29.7	26.0	342 09.8	7.6	20 04.9	9.2	58.7	54	20 36	21 31	23 19	01 31	01 50	02 15	02 49	
	149 29.6	26.0	356 36.4	7.5	20 14.1	9.0	58.7	52	20 24	21 13	22 31	01 35	01 58	02 25	03 02	
164 29.5	26.0	11 02.9	7.5	20 23.1	8.9	58.6	50	20 13	20 58	22 03	01 40	02 04	02 34	03 13		
SUN DAY	179 29.3	N23 25.9	25 29.4	7.5	S20 32.0	8.8	58.6	45	19 50	20 28	21 18	01 50	02 19	02 54	03 36	
	194 29.2	25.9	39 55.9	7.3	20 40.8	8.6	58.6	N 40	19 32	20 05	20 47	01 58	02 31	03 09	03 54	
	209 29.1	25.9	54 22.2	7.4	20 49.4	8.5	58.6	35	19 17	19 47	20 24	02 05	02 41	03 22	04 09	
	224 28.9	25.9	68 48.6	7.3	20 57.9	8.4	58.6	30	19 04	19 32	20 05	02 11	02 50	03 34	04 23	
	239 28.8	25.8	83 14.9	7.2	21 06.3	8.2	58.6	20	18 42	19 07	19 36	02 21	03 06	03 54	04 46	
	254 28.7	25.8	97 41.1	7.2	21 14.5	8.1	58.5	N 10	18 23	18 46	19 13	02 31	03 20	04 11	05 06	
	269 28.5	N23 25.8	112 07.3	7.2	S21 22.6	8.0	58.5	0	18 06	18 28	18 54	02 40	03 32	04 27	05 24	
	284 28.4	25.7	126 33.5	7.1	21 30.6	7.8	58.5	S 10	17 48	18 11	18 37	02 49	03 45	04 44	05 43	
	299 28.3	25.7	140 59.6	7.0	21 38.4	7.7	58.5	20	17 30	17 54	18 21	02 58	03 59	05 01	06 03	
	314 28.1	25.7	155 25.6	7.0	21 46.1	7.6	58.5	30	17 08	17 35	18 05	03 09	04 15	05 21	06 26	
	329 28.0	25.6	169 51.6	7.0	21 53.7	7.4	58.4	35	16 56	17 24	17 56	03 15	04 24	05 33	06 40	
	344 27.9	25.6	184 17.6	7.0	22 01.1	7.3	58.4	40	16 42	17 12	17 46	03 23	04 35	05 47	06 55	
	359 27.7	N23 25.6	198 43.6	6.9	S22 08.4	7.1	58.4	45	16 25	16 59	17 36	03 31	04 48	06 03	07 14	
	14 27.6	25.6	213 09.5	6.8	22 15.5	7.0	58.4	S 50	16 04	16 43	17 24	03 41	05 03	06 23	07 37	
	29 27.5	25.5	227 35.3	6.9	22 22.5	6.9	58.4	52	15 54	16 35	17 19	03 46	05 10	06 32	07 49	
	44 27.3	25.5	242 01.2	6.7	22 29.4	6.7	58.3	54	15 43	16 27	17 13	03 51	05 18	06 43	08 01	
	59 27.2	25.4	256 26.9	6.8	22 36.1	6.5	58.3	56	15 30	16 18	17 07	03 57	05 27	06 55	08 16	
	74 27.1	25.4	270 52.7	6.7	22 42.6	6.5	58.3	58	15 16	16 08	17 00	04 04	05 37	07 09	08 33	
	89 26.9	N23 25.4	285 18.4	6.7	S22 49.1	6.3	58.3	S 60	14 58	15 56	16 53	04 11	05 49	07 26	08 55	
	104 26.8	25.3	299 44.1	6.7	22 55.4	6.1	58.3	Day	SUN			MOON				
	119 26.7	25.3	314 09.8	6.6	23 01.5	6.0	58.2		Eqn. of Time	Mer.	Mer. Pass.		Age		Phase	
	134 26.5	25.3	328 35.4	6.6	23 07.5	5.8	58.2		00 ^h	12 ^h	Pass.	Upper	Lower	<i>d</i>	%	
	149 26.4	25.2	343 01.0	6.6	23 13.3	5.7	58.2		m s	m s	h m	h m				