



CALENDAR

**Morning and Evening Stars
Seasons, Eclipses, Meteor Showers
Chronological Eras and Cycles
Calendars for 2018 and 2019**

Star trails whirl around Polaris, the North Star, in early evening above the dome of the Otto Struve Telescope. The dome of the Harlan J. Smith Telescope is at right. Courtesy of Ethan Tweedie Photography.

Astronomical Calendars for 2018 & 2019

An Explanation of Texas Time

The subsequent calendars were calculated principally from data on the **U.S. Naval Observatory's website** (<http://www.usno.navy.mil/USNO>) and from its publications *Astronomical Phenomena for 2018* and *Astronomical Phenomena for 2019*.

Times listed here are **Central Standard Time**, except for the period from 2:00 a.m. on the second Sunday in March until 2:00 a.m. on the first Sunday in November, when **Daylight Saving Time**, which is one hour later than Central Standard Time, is in effect.

All of Texas is in the Central Time Zone, except El Paso and Hudspeth counties and the northwest corner of Culberson County, which observe Mountain Time. Mountain Time is one hour earlier than Central Time.

All times are calculated for the intersection of 99° 20' west longitude and 31° 08' north latitude, which is closest to the **town of Mercury** and about 15 miles northeast of Brady, McCulloch County. This point is the **approximate geographical center** of the state.

How to Adjust Rise & Set Times

To adjust the time of sunrise or sunset, moonrise or moonset for any point in Texas, apply the following rule: **Add four minutes** to the time given in this calendar for each degree of longitude that the place lies west of the 99th meridian; **subtract four minutes** for each degree of longitude the place lies east of the 99th meridian.

At times there will be considerable variation for distances north and south of the line of 31° 08' north latitude, but this formula will give sufficiently close results.

The **accompanying map** shows the intersection for which all times given here are calculated, with some major cities and longitudes to aid in calculating times.

Planetary Configurations & Phenomena

The phenomena and planetary configurations of the heavens for 2018 and 2019 are given in the center column of the calendars on pages 163–170. Below is an explanation of the symbols used in those tables:

☉ The Sun	● The Earth	♅ Uranus
☾ The Moon	♂ Mars	♆ Neptune
☿ Mercury	♃ Jupiter	♇ Pluto
♀ Venus	♄ Saturn	

Aspects: Conjunction & Opposition

♁ This symbol, appearing between symbols for heavenly bodies, means they are **"in conjunction,"** that is, having the same longitude in the sky and appearing near each other. For example, ♀ ♂ ☾ means Venus is **north or south** of the moon by a few degrees. Conjunctions listed in this calendar are separated by **10 degrees** or less. **Inferior** and **superior conjunctions** mean an inner planet, Venus or Mercury, is in line with the Sun, either between the Earth and the Sun (**inferior**) or on the opposite side of the Sun (**superior**).

♁ This symbol means that the heavenly body listed is in **"opposition"** to the Sun, or that they differ by 180 degrees of longitude.

Common Astronomical Terms

- ★ **Aphelion** — Point at which a planet's orbit is farthest from the sun.
- ★ **Perihelion** — Point at which a planet's orbit is nearest the sun.
- ★ **Apogee** — That point of the moon's orbit farthest from the earth.
- ★ **Perigee** — That point of the moon's orbit nearest the earth.

The Seasons

2018

Spring — Tuesday, **March 20**, at 11:15 a.m. (CDT);
Summer — Thursday, **June 21**, at 5:07 a.m. (CDT);
Autumn — Saturday, **Sept. 22**, at 8:54 p.m. (CDT);
Winter — Friday, **Dec. 21**, at 4:23 p.m. (CST).

2019

Spring — Wednesday, **March 20**, at 4:58 p.m. (CDT);
Summer — Friday, **June 21**, at 10:54 a.m. (CDT);
Autumn — Monday, **Sept. 23**, at 2:50 a.m. (CDT);
Winter — Saturday, **Dec. 21**, at 10:19 p.m. (CST).

Morning & Evening Stars

Morning Stars, 2018

Venus ♀ — Nov. 1 – Dec. 31
 Mars ♂ — Jan. 1 – July 27
 Jupiter ♃ — Jan. 1 – May 9; Dec. 9 – Dec. 31
 Saturn ♄ — Jan. 8 – June 27

Evening Stars, 2018

Venus ♀ — Feb. 20 – Oct. 22
 Mars ♂ — July 27 – Dec. 31
 Jupiter ♃ — May 9 – Nov. 13
 Saturn ♄ — June 27 – Dec. 16

Morning Stars, 2019

Venus ♀ — Jan. 1 – July 8
 Mars ♂ — Oct. 17 – Dec. 31
 Jupiter ♃ — Jan. 1 – June 10
 Saturn ♄ — Jan. 19 – July 9

Evening Stars, 2019

Venus ♀ — Sept. 20 – Dec. 31
 Mars ♂ — Jan. 1 – July 18
 Jupiter ♃ — June 10 – Dec. 15
 Saturn ♄ — July 9 – Dec. 27

Major Meteor Showers

These are **approximate dates**. Listen to local news/weather broadcasts several days beforehand to determine peak observation days and hours. Generally, viewing is best between midnight and dawn of the date listed.

Meteor shower dates are provided by McDonald Observatory, The University of Texas at Austin.

Meteor Shower	Peak 2018	Peak 2019
Quadrantid	Jan. 3	Jan. 4
Lyrid	April 21	April 22
Eta Aquarid	May 5	May 6
Perseid	Aug. 12	Aug. 13
Orionid	Oct. 21	Oct. 22
Leonid	Nov. 17	Nov. 18
Geminid	Dec. 13	Dec. 14

Eclipses 2018

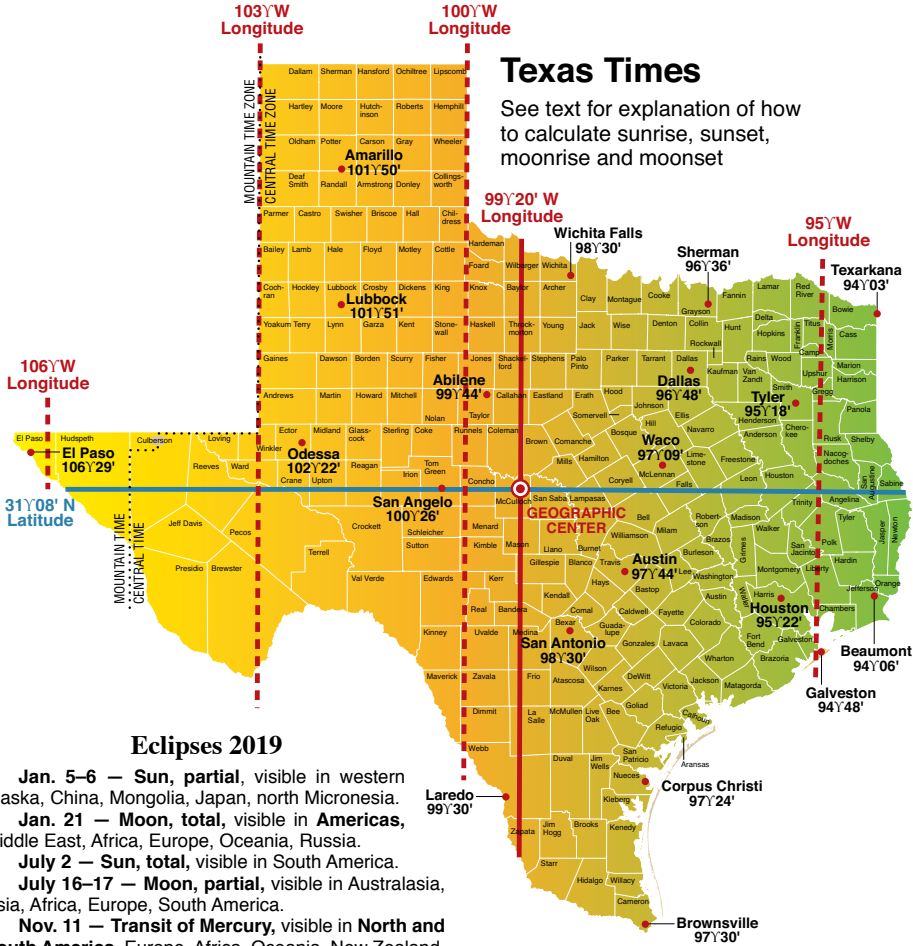
Jan. 31 — **Moon, total**, visible **North America** except in East, Oceania, Russia, Asia, Middle East, northern Scandinavia, eastern Europe.

Feb. 15 — **Sun, partial**, Antarctica, southern South America, Falkland Islands.

July 13 — **Sun, partial**, visible Tasmania, southern-most Australia, Stewart Island.

July 27 — **Moon, total**, visible in Antarctica, Australasia, Russia, Asia, Africa, Scandinavia, Europe, central and eastern South America.

Aug. 11 — **Sun, partial**, visible in northernmost Canada, Greenland, Iceland, British Isles, Scandinavia, Russia, Kazakhstan, Kyrgyzstan, Mongolia, China.



Texas Times

See text for explanation of how to calculate sunrise, sunset, moonrise and moonset

Eclipses 2019

- Jan. 5–6 — Sun, partial, visible in western Alaska, China, Mongolia, Japan, north Micronesia.
- Jan. 21 — Moon, total, visible in Americas, Middle East, Africa, Europe, Oceania, Russia.
- July 2 — Sun, total, visible in South America.
- July 16–17 — Moon, partial, visible in Australasia, Asia, Africa, Europe, South America.
- Nov. 11 — Transit of Mercury, visible in North and South America, Europe, Africa, Oceania, New Zealand.
- Dec. 26 — Sun, annular, visible in Asia, Africa.

Chronological Eras & Cycles

Chronological Eras, 2018

The year 2018 of the **Christian** era comprises the latter part of the 242nd and the beginning of the 243rd year of the independence of the United States of America, and corresponds to the year 6731 of the Julian period. All dates, below, are given in terms of the Gregorian calendar, in which Jan. 14, 2018, corresponds to Jan. 1, 2018, of the Julian calendar:

Era	Year	Begins
Byzantine	7527	Sept. 14
Jewish (A.M.)*	5779	Sept. 9
Chinese (bǐng shēn)	4655	Feb. 16
Roman (A.U.C.)	2771	Jan. 14
Nabonassar	2767	April 19
Japanese	2678	Jan. 1
Grecian (Seleucidæ)	2330	Sept. 14 or Oct. 14
Indian (Saka)	1940	March 22
Diocletian (Coptic)	1735	Sept. 11
Islamic (Hegira)*	1440	Sept. 11

*Year begins at sunset.

Chronological Cycles, 2018

Dominical Letter	G	Julian Period	6731
Epact	13	Roman Indiction	11

Chronological Eras, 2019

The year 2019 of the **Christian** era comprises the latter part of the 243rd and the beginning of the 244th year of the independence of the United States of America, and corresponds to the year 6732 of the Julian period. All dates, below, are given in terms of the Gregorian calendar, in which Jan. 14, 2019, corresponds to Jan. 1, 2019, of the Julian calendar:

Era	Year	Begins
Byzantine	7528	Sept. 14
Jewish (A.M.)*	5780	Sept. 29
Chinese (dīng yóu)	4656	Feb. 5
Roman (A.U.C.)	2772	Jan. 14
Nabonassar	2768	April 19
Japanese	2679	Jan. 1
Grecian (Seleucidæ)	2331	Sept. 14 or Oct. 14
Indian (Saka)	1941	March 22
Diocletian (Coptic)	1736	Sept. 12
Islamic (Hegira)*	1441	Aug. 31

*Year begins at sunset.

Chronological Cycles, 2019

Dominical Letter	F	Julian Period	6732
Epact	24	Roman Indiction	12
Golden Number or Lunar Cycle	VI	Solar Cycle	12

of the state. See page 161 for explanation of how to get the approximate time at any other Texas point. (On the web: <http://www.usno.navy.mil/astro>) Please note: Not all eclipses are visible in United States. For visibility, see listing beginning on page 161.

Times are Central Standard Time, except from March 11 to Nov. 4, during which Daylight Saving Time is observed. Boldface times for moonrise and moonset indicate p.m. Times are figured for the point 99° 20' West and 31° 08' North, the approximate geographical center

2018

Day of		Planetary Configurations and Phenomena	Hour of		
Year	Month		Week	Sunrise	Moonset
3rd Month March 2018					
Moon Phases — Full, March 1, 6:51 p.m.; Last Qtr., March 9, 5:20 a.m.; New, March 17, 8:12 a.m.; First Qtr., March 24, 10:35 a.m.; Full, March 31, 7:37 a.m.					
60	1 Th.	Full ☾; Regulus ♂	7:04	6:36	6:30
61	2 Fr.		7:03	6:36	7:30
62	3 Sa.		7:02	6:37	8:37
63	4 Su.		7:00	6:38	9:37
64	5 Mo.		6:59	6:39	10:36
65	6 Tu.		6:58	6:39	11:32
66	7 We.	♁ ♂ (1 am)	6:57	6:40	10:44
67	8 Th.		6:56	6:41	12:28
68	9 Fr.	Last qtr. ☾; ♂ ♂	6:55	6:41	12:06
69	10 Sa.	♄ ♂ (8 pm)	6:53	6:42	2:13
70	11 Su.	DST begins; ☾ apogee	6:52	7:43	4:02
71	12 Mo.		7:51	7:44	4:48
72	13 Tu.		7:50	7:44	5:31
73	14 We.		7:48	7:45	6:12
74	15 Th.	♁ gr. elongation E	7:47	7:46	6:50
75	16 Fr.		7:46	7:47	7:10
76	17 Sa.	New ☾; ♃ ♀ (8 pm)	7:45	7:47	8:02
77	18 Su.		7:44	7:48	8:38
78	19 Mo.		7:41	7:49	9:14
79	20 Tu.	Equinox (11:15 am)	7:41	7:49	9:51
80	21 We.		7:40	7:50	10:32
81	22 Th.	Aldebaran ♂ (6 pm)	7:39	7:50	11:17
82	23 Fr.		7:37	7:51	12:06
83	24 Sa.	First qtr. ☾	7:36	7:52	1:01
84	25 Su.		7:35	7:52	2:01
85	26 Mo.	♄ at perigee (12 pm)	7:34	7:53	3:03
86	27 Tu.		7:32	7:53	4:08
87	28 We.		7:31	7:54	5:13
88	29 Th.		7:30	7:55	6:17
89	30 Fr.		7:29	7:55	7:19
90	31 Sa.	Full ☾	7:27	7:56	8:20

Day of		Planetary Configurations and Phenomena	Hour of		
Year	Month		Week	Sunrise	Moonset
2nd Month February 2018					
Moon Phases — Last Qtr., Feb. 7, 9:54 a.m.; New, Feb. 15, 3:05 p.m.; First Qtr., Feb. 23, 2:09 a.m.					
32	1 Th.		7:29	6:13	7:47
33	2 Fr.		7:29	6:14	8:52
34	3 Sa.		7:28	6:15	9:55
35	4 Su.		7:27	6:15	10:55
36	5 Mo.		7:27	6:16	11:52
37	6 Tu.		7:26	6:17	11:34
38	7 We.	Last qtr. ☾	7:25	6:18	12:49
39	8 Th.	♂ ♂ (11 pm)	7:24	6:19	1:43
40	9 Fr.		7:24	6:20	2:37
41	10 Sa.		7:23	6:21	3:29
42	11 Su.	♄ at apogee (8 am)	7:22	6:22	4:19
43	12 Mo.		7:21	6:22	5:07
44	13 Tu.		7:20	6:23	5:52
45	14 We.		7:19	6:24	6:35
46	15 Th.	New ☾	7:18	6:25	7:15
47	16 Fr.	♁ in superior ♂ (6 am)	7:17	6:26	7:52
48	17 Sa.	♁ in superior ♂ (6 am)	7:16	6:26	8:28
49	18 Su.		7:16	6:27	9:03
50	19 Mo.		7:15	6:28	9:38
51	20 Tu.	♁ ♂ (2 am)	7:14	6:29	10:13
52	21 We.		7:13	6:30	10:51
53	22 Th.		7:11	6:31	11:33
54	23 Fr.	First qtr. ☾	7:10	6:31	12:19
55	24 Sa.		7:09	6:32	1:11
56	25 Su.		7:08	6:33	2:08
57	26 Mo.		7:07	6:34	3:11
58	27 Tu.	♄ at perigee (9 am)	7:06	6:34	4:17
59	28 We.		7:05	6:35	5:24

Day of		Planetary Configurations and Phenomena	Hour of		
Year	Month		Week	Sunrise	Moonset
1st Month January 2018					
Moon Phases — Full, Jan. 1, 8:24 p.m.; Last Qtr., Jan. 8, 4:25 p.m.; New, Jan. 16, 8:17 p.m.; First Qtr., Jan. 24, 4:20 p.m.; Full, Jan. 31, 7:27 a.m.					
1	1 Mo.	Full ☾ at perigee (4 pm)	7:36	5:46	5:43
2	2 Tu.		7:36	5:47	6:49
3	3 We.	perihelion (12 am)	7:36	5:48	7:57
4	4 Th.		7:36	5:49	9:04
5	5 Fr.	Regulus ♂ (2 am)	7:37	5:49	10:09
6	6 Sa.	♂ ♂ ♁ (10 pm)	7:37	5:50	11:11
7	7 Su.		7:37	5:51	11:51
8	8 Mo.	Last qtr. ☾	7:37	5:52	12:10
9	9 Tu.	♀ in superior ♂	7:37	5:53	1:07
10	10 We.		7:37	5:54	2:02
11	11 Th.	♁ ♂ (12 am) ♂ ♂	7:37	5:54	2:57
12	12 Fr.		7:37	5:55	3:50
13	13 Sa.	♁ ♂ ♁ (1 am)	7:37	5:56	4:43
14	14 Su.	♄ at apogee (8 pm)	7:36	5:57	5:34
15	15 Mo.	♁ ♂ (1 am)	7:36	5:58	6:24
16	16 Tu.	New ☾	7:36	5:59	7:11
17	17 We.		7:36	5:59	7:55
18	18 Th.		7:36	6:00	8:37
19	19 Fr.		7:35	6:01	9:15
20	20 Sa.		7:35	6:02	9:51
21	21 Su.		7:35	6:03	10:26
22	22 Mo.		7:34	6:04	11:01
23	23 Tu.	♁ ♂ (7 pm)	7:34	6:05	11:36
24	24 We.	First qtr. ☾	7:34	6:06	12:12
25	25 Th.		7:33	6:07	12:52
26	26 Fr.		7:33	6:07	1:36
27	27 Sa.	Aldebaran ♂ (5 am)	7:32	6:08	2:26
28	28 Su.		7:32	6:09	3:22
29	29 Mo.		7:31	6:10	4:24
30	30 Tu.	♄ at perigee (4 am)	7:31	6:11	5:31
31	31 We.	Full ☾	7:30	6:12	6:39

† Daylight Saving Time begins at 2 a.m.

Astronomical Calendar for 2018

4th Month				April 2018				30 Days							
Moon Phases — Last Qtr., April 8, 2:18 a.m.; New, April 15, 8:57 p.m.; First Qtr., April 22, 4:46 p.m.; Full, April 29, 7:58 p.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
91	1	Su.	♃ in inferior σ	7:26 7:57	9:20	8:24									
92	2	Mo.		7:25 7:57	10:19	9:00									
93	3	Tu.		7:24 7:58	11:16	9:38									
94	4	We.		7:22 7:59		10:17									
95	5	Th.		7:21 7:59	12:11	10:59									
96	6	Fr.		7:20 8:00	1:04	11:44									
97	7	Sa.		7:19 8:01	1:55	12:31									
98	8	Su.	Last qtr. \llcorner at apogee	7:18 8:01	2:42	1:21									
99	9	Mo.		7:16 8:02	3:27	2:13									
100	10	Tu.		7:15 8:02	4:08	3:06									
101	11	We.		7:14 8:03	4:47	4:01									
102	12	Th.	Ψ σ \llcorner (6 pm)	7:13 8:04	5:24	4:57									
103	13	Fr.		7:12 8:04	6:00	5:55									
104	14	Sa.	Υ σ \llcorner (4 am)	7:10 8:05	6:35	6:54									
105	15	Su.	New \llcorner	7:09 8:06	7:11	7:55									
106	16	Mo.		7:08 8:06	7:48	8:57									
107	17	Tu.		7:07 8:07	8:29	10:01									
108	18	We.		7:06 8:08	9:13	11:06									
109	19	Th.	Aldebaran σ \llcorner (12 am)	7:05 8:08	10:02										
110	20	Fr.	\llcorner at perigee (10 am)	7:04 8:09	10:56	12:10									
111	21	Sa.		7:03 8:10	11:55	1:11									
112	22	Su.	First qtr. \llcorner	7:02 8:10	12:57	2:09									
113	23	Mo.		7:01 8:11	2:00	3:01									
114	24	Tu.		7:00 8:12	3:04	3:47									
115	25	We.		6:59 8:12	4:07	4:30									
116	26	Th.		6:58 8:13	5:08	5:09									
117	27	Fr.		6:57 8:14	6:08	5:45									
118	28	Sa.		6:56 8:14	7:08	6:21									
119	29	Su.	Full \llcorner	6:55 8:15	8:06	6:57									
120	30	Mo.		6:54 8:16	9:04	7:34									

5th Month				May 2018				31 Days							
Moon Phases — Last Qtr., May 7, 9:09 p.m.; New, May 15, 6:48 a.m.; First Qtr., May 21, 10:49 p.m.; Full, May 29, 9:20 a.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
121	1	Tu.		6:53 8:16	10:00	8:12									
122	2	We.		6:52 8:17	10:55	8:53									
123	3	Th.		6:51 8:18	11:47	9:37									
124	4	Fr.		6:50 8:19		10:23									
125	5	Sa.	\llcorner at apogee (8 pm)	6:49 8:19	12:36	11:12									
126	6	Su.	σ \llcorner (2 am)	6:48 8:20	1:22	12:03									
127	7	Mo.	Last qtr. \llcorner	6:48 8:21	2:05	12:56									
128	8	Tu.		6:47 8:21	2:44	1:50									
129	9	We.		6:46 8:22	3:21	2:44									
130	10	Th.	Ψ σ \llcorner (4 am)	6:45 8:23	3:57	3:41									
131	11	Fr.		6:44 8:23	4:31	4:38									
132	12	Sa.		6:44 8:24	5:06	5:38									
133	13	Su.		6:43 8:25	5:43	6:40									
134	14	Mo.		6:42 8:25	6:22	7:44									
135	15	Tu.	New \llcorner	6:42 8:26	7:05	8:50									
136	16	We.		6:41 8:27	7:52	9:57									
137	17	Th.	\llcorner at perigee (4 pm)	6:40 8:27	8:46	11:02									
138	18	Fr.		6:40 8:28	9:45										
139	19	Sa.		6:39 8:29	10:48	12:03									
140	20	Su.		6:39 8:29	11:53	12:58									
141	21	Mo.	First qtr. \llcorner	6:38 8:30	12:57	1:47									
142	22	Tu.		6:38 8:31	2:01	2:31									
143	23	We.		6:37 8:31	3:02	3:11									
144	24	Th.		6:37 8:32	4:00	3:47									
145	25	Fr.		6:36 8:32	5:00	4:23									
146	26	Sa.		6:36 8:33	5:58	4:57									
147	27	Su.		6:36 8:34	6:55	5:33									
148	28	Mo.		6:35 8:34	7:52	6:10									
149	29	Tu.	Full \llcorner	6:35 8:35	8:47	6:50									
150	30	We.		6:35 8:35	9:40	7:32									
151	31	Th.		6:34 8:36	10:31	8:17									

6th Month				June 2018				30 Days							
Moon Phases — Last Qtr., June 6, 1:32 p.m.; New, June 13, 2:43 p.m.; First Qtr., June 20, 5:51 a.m.; Full, June 27, 11:53 p.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
152	1	Fr.		6:34 8:37	11:18	9:05									
153	2	Sa.	\llcorner at apogee (12 pm)	6:34 8:37		9:55									
154	3	Su.		6:34 8:38	12:02	10:47									
155	4	Mo.		6:33 8:38	12:42	11:41									
156	5	Tu.		6:33 8:39	1:20	12:34									
157	6	We.	Last qtr. \llcorner	6:33 8:39	1:55	1:29									
158	7	Th.		6:33 8:40	2:29	2:25									
159	8	Fr.	Ω σ Pollux (8 pm)	6:33 8:40	3:03	3:22									
160	9	Sa.	Ω σ \llcorner (10 pm)	6:33 8:40	3:38	4:22									
161	10	Su.		6:33 8:41	4:15	5:24									
162	11	Mo.		6:33 8:41	4:55	6:29									
163	12	Tu.		6:33 8:42	5:40	7:36									
164	13	We.	New \llcorner	6:33 8:42	6:31	8:43									
165	14	Th.	\llcorner at perigee (7 pm)	6:33 8:42	7:29	9:48									
166	15	Fr.		6:33 8:43	8:32	11:42									
167	16	Sa.		6:33 8:43	9:38	11:42									
168	17	Su.		6:33 8:43	10:46										
169	18	Mo.	\hbar σ \llcorner (7 pm)	6:33 8:44	11:51	12:29									
170	19	Tu.		6:34 8:44	12:55	1:11									
171	20	We.	First qtr. \llcorner	6:34 8:44	1:56	1:50									
172	21	Th.	Solstice (5:07 am)	6:34 8:44	2:55	2:25									
173	22	Fr.		6:34 8:45	3:53	3:00									
174	23	Sa.		6:35 8:45	4:50	3:35									
175	24	Su.		6:35 8:45	5:46	4:11									
176	25	Mo.		6:35 8:45	6:41	4:49									
177	26	Tu.		6:35 8:45	7:35	5:30									
178	27	We.	Full \llcorner ; \hbar σ \llcorner (11 pm)	6:36 8:45	8:26	6:14									
179	28	Th.		6:36 8:45	9:15	7:01									
180	29	Fr.	\llcorner at apogee (10 pm)	6:36 8:45	10:00	7:50									
181	30	Sa.	σ \llcorner (9 pm)	6:37 8:45	10:42	8:42									

☉ The Sun ● The Earth ☾ The Moon ☿ Mercury ♀ Venus ♂ Mars ♃ Jupiter ♄ Saturn ♅ Neptune ♆ Uranus ♁ Pluto σ = in conjunction δ = opposition to the ☉

Astronomical Calendar for 2018

7th Month			July 2018			31 Days			Moon Phases — Last Qtr., July 6, 2:51 a.m.; New, July 12, 9:48 p.m.; First Qtr., July 19, 2:52 p.m.; Full, July 27, 3:20 p.m.		
Year	Month	Week	Planetary Configurations and Phenomena			Hour of			Sunrise	Moon rise	Moon set
			Day of	Planetary Configurations and Phenomena	Sunrise	Sunset	Moon rise	Moon set			
182	1	Su.		6:37 8:45	11:20	9:34					
183	2	Mo.		6:38 8:45	11:56	10:28					
184	3	Tu.	☿ (7 pm)	6:38 8:45	11:22						
185	4	We.		6:38 8:45	12:30	12:16					
186	5	Th.		6:39 8:45	1:03	1:11					
187	6	Fr.	● aphelion; Last qtr. ☾	6:39 8:45	1:36	2:08					
188	7	Sa.		6:40 8:45	2:11	3:07					
189	8	Su.		6:40 8:44	2:48	4:09					
190	9	Mo.		6:41 8:44	3:29	5:14					
191	10	Tu.	Aldebaran σ (5 am)	6:41 8:44	4:16	6:20					
192	11	We.		6:42 8:44	5:10	7:27					
193	12	Th.	New ☾	6:42 8:43	6:10	8:30					
194	13	Fr.	☾ at perigee (3 am)	6:43 8:43	7:16	9:28					
195	14	Sa.		6:43 8:43	8:25	10:20					
196	15	Su.	☿ σ (11 pm)	6:44 8:42	9:34	11:06					
197	16	Mo.		6:45 8:42	10:41	11:47					
198	17	Tu.		6:45 8:42	11:46						
199	18	We.		6:46 8:41	12:47	12:25					
200	19	Th.	First qtr. ☾	6:46 8:41	1:47	1:01					
201	20	Fr.	☿ σ (7 pm)	6:47 8:40	2:45	1:37					
202	21	Sa.		6:48 8:39	3:41	2:12					
203	22	Su.		6:48 8:39	4:36	2:50					
204	23	Mo.		6:49 8:39	5:30	3:29					
205	24	Tu.		6:49 8:38	6:22	4:12					
206	25	We.	☿ σ (1 am)	6:50 8:37	7:12	4:58					
207	26	Th.		6:51 8:37	7:58	5:46					
208	27	Fr.	Full ☾ at apogee (1 am)	6:51 8:36	8:41	6:37					
209	28	Sa.		6:52 8:35	9:21	7:30					
209	29	Su.		6:52 8:35	9:57	8:23					
211	30	Mo.		6:53 8:34	10:32	9:17					
212	31	Tu.	☿ σ (1 am)	6:54 8:33	11:05	10:11					

8th Month			August 2018			31 Days			Moon Phases — Last Qtr., Aug. 4, 1:18 p.m.; New, Aug. 11, 4:58 a.m.; First Qtr., Aug. 18, 2:49 a.m.; Full, Aug. 26, 6:56 a.m.		
Year	Month	Week	Planetary Configurations and Phenomena			Hour of			Sunrise	Moon rise	Moon set
			Day of	Planetary Configurations and Phenomena	Sunrise	Sunset	Moon rise	Moon set			
213	1	We.		6:54 8:33	11:38	11:06					
214	2	Th.		6:55 8:32		12:01					
215	3	Fr.		6:56 8:31	12:11	12:58					
216	4	Sa.	Last qtr. ☾	6:56 8:30	12:46	1:57					
217	5	Su.		6:57 8:29	1:24	2:58					
218	6	Mo.		6:58 8:28	2:07	4:02					
219	7	Tu.		6:58 8:28	2:56	5:07					
220	8	We.	☿ in inferior σ	6:59 8:27	3:51	6:10					
221	9	Th.		7:00 8:26	4:53	7:10					
222	10	Fr.	☾ at perigee (1 pm)	7:00 8:25	6:01	8:06					
223	11	Sa.	New ☾	7:01 8:24	7:10	8:55					
224	12	Su.		7:01 8:23	8:20	9:40					
225	13	Mo.		7:02 8:22	9:27	10:20					
226	14	Tu.		7:03 8:21	10:32	10:58					
227	15	We.		7:03 8:20	11:35	11:35					
228	16	Th.		7:04 8:19	12:35						
229	17	Fr.	♀ elongation E	7:04 8:18	1:33	12:11					
230	18	Sa.	First qtr. ☾	7:05 8:17	2:30	12:49					
231	19	Su.		7:06 8:16	3:25	1:28					
232	20	Mo.		7:06 8:15	4:18	2:10					
233	21	Tu.		7:07 8:13	5:08	2:55					
234	22	We.		7:08 8:12	5:56	3:42					
235	23	Th.	☾ at apogee (6 am)	7:08 8:11	6:40	4:32					
236	24	Fr.		7:09 8:10	7:20	5:24					
237	25	Sa.		7:09 8:09	7:58	6:18					
238	26	Su.	Full ☾	7:10 8:08	8:33	7:12					
239	27	Mo.		7:10 8:07	9:07	8:06					
240	28	Tu.		7:11 8:05	9:40	9:01					
241	29	We.		7:12 8:04	10:13	9:57					
242	30	Th.	♁ σ (11 pm)	7:12 8:03	10:47	10:53					
243	31	Fr.		7:13 8:02	11:24	11:51					

9th Month			September 2018			30 Days			Moon Phases — Last Qtr., Sept. 2, 9:37 p.m.; New, Sept. 9, 1:01 p.m.; First Qtr., Sept. 16, 6:15 p.m.; Full, Sept. 24, 9:52 p.m.		
Year	Month	Week	Planetary Configurations and Phenomena			Hour of			Sunrise	Moon rise	Moon set
			Day of	Planetary Configurations and Phenomena	Sunrise	Sunset	Moon rise	Moon set			
244	1	Sa.		7:13 8:01		12:50					
245	2	Su.	Last qtr. ☾	7:14 7:59	12:04	1:52					
246	3	Mo.		7:15 7:58	12:49	2:54					
247	4	Tu.		7:15 7:57	1:40	3:56					
248	5	We.	☿ Regulus (6 pm)	7:16 7:56	2:37	4:56					
249	6	Th.		7:16 7:54	3:40	5:52					
250	7	Fr.	☾ at perigee (8 pm)	7:17 7:53	4:48	6:43					
251	8	Sa.		7:17 7:52	5:56	7:29					
252	9	Su.	New ☾	7:18 7:51	7:05	8:11					
253	10	Mo.		7:19 7:49	8:11	8:51					
254	11	Tu.		7:19 7:48	9:16	9:29					
255	12	We.		7:20 7:47	10:19	10:06					
256	13	Th.	♁ σ (9 pm)	7:20 7:45	11:20	10:44					
257	14	Fr.		7:21 7:44	12:19	11:24					
258	15	Sa.	First qtr. ☾	7:22 7:43	1:16						
259	16	Su.		7:22 7:42	2:11	12:05					
260	17	Mo.		7:23 7:40	3:03	12:49					
261	18	Tu.		7:23 7:39	3:52	1:36					
262	19	We.	☾ at apogee (8 pm)	7:24 7:38	4:37	2:26					
263	20	Th.	♁ σ (2 am)	7:24 7:36	5:19	3:18					
264	21	Fr.		7:25 7:35	5:57	4:11					
265	22	Sa.	Equinox (8:54 pm)	7:26 7:34	6:34	5:05					
266	23	Su.		7:26 7:33	7:08	5:59					
267	24	Mo.	Full ☾	7:27 7:31	7:41	6:54					
268	25	Tu.		7:27 7:30	8:14	7:50					
269	26	We.		7:28 7:29	8:48	8:47					
270	27	Th.	♁ σ (2 am)	7:29 7:27	9:24	9:45					
271	28	Fr.		7:29 7:26	10:04	10:45					
272	29	Sa.		7:30 7:25	10:47	11:46					
273	30	Su.		7:30 7:24	11:35	12:48					

Bright stars = Aldebaran, Antares, Spica, Pollux, Regulus. Minor planets or asteroids = Ceres, Pallas, Juno, Vesta. σ = in conjunction by 10° or < δ = opposition to ☾

Astronomical Calendar for 2018

10th Month			October 2018			31 Days			12th Month			December 2018			31 Days											
Moon Phases — Last Qtr., Oct. 2, 4:45 a.m.; New, Oct. 8, 10:47 p.m.; First Qtr., Oct. 16, 1:02 p.m. Full, Oct. 24, 11:45 a.m.; Last Qtr., Oct. 31, 11:40 a.m.									Moon Phases — New, Nov. 7, 10:02 a.m.; First Qtr., Nov. 15, 8:54 a.m.; Full, Nov. 22, 11:39 p.m.; Last Qtr., Nov. 29, 6:19 p.m.									Moon Phases — New, Dec. 7, 1:20 a.m.; First Qtr., Dec. 15, 5:49 a.m.; Full, Dec. 22, 11:49 a.m.; Last Qtr., Dec. 29, 3:34 a.m.								
Year	Month	Week	Planetary Configurations and Phenomena			Hour of			Year	Month	Week	Planetary Configurations and Phenomena			Hour of											
			Sunrise	Sunset	Moon rise	Moon set					Sunrise	Sunset	Moon rise	Moon set												
274	1	Mo.	7:31 7:22		1:49			305	1	Th.	7:53 6:49	1:30	3:20		335	1	Sa.	♀ gr. illuminated extent	7:18 5:35	1:36	2:20					
275	2	Tu.	7:32 7:21	12:30	2:49			306	2	Fr.	7:54 6:48	2:35	4:03		336	2	Su.		7:19 5:35	2:37	2:56					
276	3	We.	7:32 7:20	1:29	3:44			307	3	Sa.	7:54 6:47	3:39	4:42		337	3	Mo.		7:20 5:35	3:38	3:31					
277	4	Th.	7:33 7:19	2:33	4:35			308	4	Su.	6:55 5:46	3:43	4:19		338	4	Tu.		7:20 5:35	4:38	4:08					
278	5	Fr.	7:34 7:17	3:39	5:22			309	5	Mo.	DST ends 6:56 5:45	4:45	4:55		339	5	We.		7:21 5:35	5:37	4:46					
279	6	Sa.	7:34 7:16	4:46	6:04			310	6	Tu.	6:57 5:45	5:47	5:32		340	6	Th.		7:22 5:35	6:36	5:28					
280	7	Su.	7:35 7:15	5:52	6:44			311	7	We.	New ☾ 6:58 5:44	6:48	6:10		341	7	Fr.	New ☾	7:23 5:35	7:33	6:12					
281	8	Mo.	7:35 7:14	6:57	7:22			312	8	Th.	6:59 5:43	7:49	6:50		342	8	Sa.	♄, ♀ ☾ (11 pm)	7:24 5:35	8:28	6:59					
282	9	Tu.	7:36 7:12	8:00	7:59			313	9	Fr.	6:59 5:43	8:47	7:33		343	9	Su.	♂ ☾ (11 pm)	7:24 5:35	9:19	7:50					
283	10	We.	7:37 7:11	9:03	8:37			314	10	Sa.	7:00 5:42	9:44	8:19		344	10	Mo.		7:25 5:35	10:07	8:42					
284	11	Th.	7:37 7:10	10:04	9:16			315	11	Su.	7:01 5:41	10:37	9:08		345	11	Tu.		7:26 5:36	10:49	9:35					
285	12	Fr.	7:38 7:09	11:03	9:58			316	12	Mo.	7:02 5:41	11:26	9:59		346	12	We.		7:26 5:36	11:28	10:28					
286	13	Sa.	7:39 7:08	12:00	10:42			317	13	Tu.	7:03 5:40	12:11	10:51		347	13	Th.		7:27 5:36	12:04	11:22					
287	14	Su.	7:39 7:07	12:55	11:28			318	14	We.	☾ at apogee (10 am)	7:04 5:40	12:53	11:44	348	14	Fr.		7:28 5:36	12:38						
288	15	Mo.	7:40 7:06	1:46				319	15	Th.	First qtr. ☾, ☽ ☾ 7:04 5:39	1:30			349	15	Sa.	First qtr. ☾	7:28 5:37	1:10	12:15					
289	16	Tu.	7:41 7:04	2:32	12:18			320	16	Fr.	☽ stationary (11 pm) 7:05 5:39	2:05	12:38		350	16	Su.		7:29 5:37	1:42	1:10					
290	17	We.	7:42 7:03	3:16	1:09			321	17	Sa.	7:06 5:38	2:39	1:32		351	17	Mo.		7:30 5:38	2:14	2:05					
291	18	Th.	7:42 7:02	3:55	2:01			322	18	Su.	7:07 5:38	3:11	2:27		352	18	Tu.	♁ ☾ (11 pm)	7:30 5:38	2:49	3:03					
292	19	Fr.	7:43 7:01	4:32	2:55			323	19	Mo.	7:08 5:37	3:44	3:23		353	19	We.	♃ ♁ Antares (8 pm)	7:31 5:38	3:28	4:03					
293	20	Sa.	7:44 7:00	5:07	3:49			324	20	Tu.	7:09 5:37	4:19	4:20		354	20	Th.		7:31 5:39	4:11	5:06					
294	21	Su.	7:44 6:59	5:40	4:44			325	21	We.	7:10 5:37	4:56	5:20		355	21	Fr.	Solstice (4:23 pm)	7:32 5:39	5:01	6:11					
295	22	Mo.	7:45 6:58	6:13	5:40			326	22	Th.	Full ☾ 7:10 5:36	5:37	6:23		356	22	Sa.	Full ☾	7:32 5:40	5:07	7:17					
296	23	Tu.	7:46 6:57	6:47	6:37			327	23	Fr.	7:11 5:36	6:23	7:27		357	23	Su.		7:33 5:40	7:00	8:21					
297	24	We.	7:47 6:56	7:23	7:35			328	24	Sa.	7:12 5:36	7:16	8:32		358	24	Mo.	☾ at perigee (4 am)	7:33 5:41	8:07	9:21					
298	25	Th.	7:47 6:55	8:01	8:36			329	25	Su.	☽ stationary (2 am) 7:13 5:35	8:14	9:36		359	25	Tu.		7:34 5:41	9:16	10:15					
299	26	Fr.	7:48 6:54	8:44	9:38			330	26	Mo.	☾ at perigee (6 am)	7:14 5:35	9:17	10:36	360	26	We.		7:34 5:42	10:23	11:02					
300	27	Sa.	7:49 6:53	9:32	10:41			331	27	Tu.	☽ in inferior ☽	7:15 5:35	10:22	11:31	361	27	Th.		7:34 5:43	11:28	11:44					
301	28	Su.	7:50 6:52	10:25	11:44			332	28	We.	7:16 5:35	11:28	12:20		362	28	Fr.		7:35 5:43		12:23					
302	29	Mo.	7:50 6:51	11:23	12:45			333	29	Th.	Last qtr. ☾ 7:16 5:35		1:04		363	29	Sa.	Last qtr. ☾	7:35 5:44	12:31	12:59					
303	30	Tu.	7:51 6:50	1:42				334	30	Fr.	7:17 5:35	12:32	1:44		364	30	Su.		7:35 5:45	1:32	1:34					
304	31	We.	Last qtr. ☾ at perigee 7:52 6:49	12:25	2:33			335	31	Mo.					365	31	Mo.		7:36 5:45	2:32	2:09					

☉ The Sun ● The Earth ☾ The Moon ☿ Mercury ♀ Venus ♂ Mars ♃ Jupiter ♄ Saturn ♅ Neptune ♆ Uranus ♇ Pluto ☽ = in conjunction ☽ = opposition to the ☉

2019

Times are Central Standard Time, except from March 10 to Nov. 3, during which Daylight Saving Time is observed. Boldface times for moonrise and moonset indicate p.m. Times are figured for the point 99° 20' West and 31° 08' North, the approximate geographical center of the state. See page 161 for explanation of how to get the approximate time at any other Texas point. (On the web: <http://www.usno.navy.mil/astrometry>) Please note: Not all eclipses are visible in United States. For visibility, see listing beginning on page 162.

page 161 for explanation of how to get the approximate time at any other Texas point. (On the web: <http://www.usno.navy.mil/astrometry>) Please note: Not all eclipses are visible in United States. For visibility, see listing beginning on page 162.

1st Month January 2019 31 Days
Moon Phases — New, Jan. 5, 7:28 p.m.; First Qtr., Jan. 14, 12:46 a.m.; Full, Jan. 20, 11:16 p.m.; Last Qtr., Jan. 27, 3:10 p.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of			
	Month	Week		Sunrise	Sunset	Moonrise	Moonset
1	Tu.	1	☽ (4 pm)	7:36	5:46	3:31	2:47
2	We.	2	☉ at perihelion (11 pm)	7:36	5:47	4:29	3:26
3	Th.	3	☽ (2 am)	7:36	5:48	5:26	4:08
4	Fr.	4		7:36	5:48	6:21	4:54
5	Sa.	5	New ☾	7:37	5:49	7:13	5:43
6	Su.	6		7:37	5:50	8:02	6:35
7	Mo.	7		7:37	5:51	8:47	7:27
8	Tu.	8	☾ at apogee (10 pm)	7:37	5:51	9:27	8:21
9	We.	9		7:37	5:52	10:04	9:14
10	Th.	10		7:37	5:53	10:38	10:07
11	Fr.	11		7:37	5:54	11:10	11:01
12	Sa.	12		7:37	5:55	11:42	11:55
13	Su.	13		7:37	5:56	12:13	
14	Mo.	14	First qtr. ☾	7:36	5:57	12:46	12:50
15	Tu.	15		7:36	5:57	1:21	1:47
16	We.	16		7:36	5:58	2:01	2:46
17	Th.	17		7:36	5:59	2:46	3:49
18	Fr.	18		7:36	6:00	3:38	4:53
19	Sa.	19		7:35	6:01	4:37	5:59
20	Su.	20	Full ☾	7:35	6:02	5:43	7:01
21	Mo.	21	☾ at perigee (2 pm)	7:35	6:03	6:53	7:59
22	Tu.	22	☽ (12 am)	7:34	6:04	8:03	8:51
23	We.	23		7:34	6:05	9:12	9:38
24	Th.	24		7:34	6:05	10:19	10:19
25	Fr.	25		7:33	6:06	11:23	10:58
26	Sa.	26		7:33	6:07	11:34	11:34
27	Su.	27	Last qtr. ☾	7:32	6:08	12:25	12:17
28	Mo.	28		7:32	6:09	1:25	12:47
29	Tu.	29	☽ in superior ☽ (9 pm)	7:31	6:10	2:24	1:26
30	We.	30	☽ (6 pm)	7:31	6:11	3:21	2:08
31	Th.	31		7:30	6:12	4:17	2:52

2nd Month February 2019 28 Days
Moon Phases — New, Feb. 4, 3:04 p.m. First Qtr., Feb. 12, 4:26 p.m. Full, Feb. 19, 9:54 a.m.; Last Qtr., Feb. 26, 5:28 a.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of			
	Month	Week		Sunrise	Sunset	Moonrise	Moonset
32	1	Fr.	☾ (1 am)	7:30	6:13	5:09	3:40
33	2	Sa.		7:29	6:14	5:59	4:30
34	3	Su.		7:28	6:14	6:45	5:22
35	4	Mo.	New ☾	7:28	6:15	7:26	6:15
36	5	Tu.	☾ at apogee (3 am)	7:27	6:16	8:04	7:09
37	6	We.	Vesta ☽ (2 am)	7:26	6:17	8:39	8:02
38	7	Th.	☽ (12 am)	7:25	6:18	9:12	8:55
39	8	Fr.		7:25	6:19	9:43	9:49
40	9	Sa.		7:24	6:20	10:14	10:43
41	10	Su.		7:23	6:20	10:46	11:38
42	11	Mo.		7:22	6:21	11:19	
43	12	Tu.	First qtr. ☾	7:21	6:22	11:56	12:35
44	13	We.		7:20	6:23	12:37	1:34
45	14	Th.		7:20	6:24	1:23	2:36
46	15	Fr.		7:19	6:25	2:17	3:38
47	16	Sa.		7:18	6:25	3:18	4:40
48	17	Su.		7:17	6:26	4:25	5:40
49	18	Mo.		7:16	6:27	5:36	6:35
50	19	Tu.	Full ☾ at perigee (9 am)	7:15	6:28	6:47	7:24
51	20	We.		7:14	6:29	7:57	8:09
52	21	Th.		7:13	6:29	9:05	8:50
53	22	Fr.		7:12	6:30	10:10	9:29
54	23	Sa.		7:11	6:31	11:13	10:07
55	24	Su.		7:10	6:32	10:45	
56	25	Mo.		7:09	6:33	12:15	11:24
57	26	Tu.	Last qtr. ☾	7:07	6:33	1:14	12:05
58	27	We.		7:06	6:34	2:11	12:49
59	28	Th.		7:05	6:35	3:06	1:36

† Daylight Saving Time begins at 2 a.m.

3rd Month March 2019 31 Days
Moon Phases — New, March 6, 10:04 a.m.; First Qtr., March 14, 5:27 a.m.; Full, March 20, 8:43 p.m.; Last Qtr., March 27, 11:10 p.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of			
	Month	Week		Sunrise	Sunset	Moonrise	Moonset
60	1	Fr.	☽ (10 pm)	7:04	6:36	3:56	3:26
61	2	Sa.		7:03	6:36	4:43	3:17
62	3	Su.		7:02	6:37	5:26	4:10
63	4	Mo.	☾ at apogee (5 am)	7:01	6:36	6:05	5:04
64	5	Tu.		7:00	6:38	6:41	5:57
65	6	We.	New ☾	6:58	6:39	7:14	6:51
66	7	Th.		6:57	6:40	7:46	7:44
67	8	Fr.		6:56	6:41	8:17	8:38
68	9	Sa.	☽ (10 pm)	6:55	6:41	8:48	9:33
69	10	Su.	DST begins	7:54	7:42	10:21	11:29
70	11	Mo.		7:52	7:43	10:56	
71	12	Tu.		7:51	7:43	11:34	12:27
72	13	We.		7:50	7:44	12:17	1:27
73	14	Th.	First qtr. ☾	7:49	7:45	1:07	2:27
74	15	Fr.		7:48	7:45	2:03	3:28
75	16	Sa.		7:46	7:46	3:05	4:26
76	17	Su.		7:45	7:47	4:12	5:21
77	18	Mo.		7:44	7:47	5:21	6:12
78	19	Tu.	☾ at perigee (3 pm)	7:43	7:48	6:31	6:58
79	20	We.	Equinox (5 pm) Full ☾	7:41	7:49	7:40	7:40
80	21	Th.		7:40	7:49	8:48	8:20
81	22	Fr.		7:39	7:50	9:54	8:59
82	23	Sa.		7:38	7:51	10:58	9:37
83	24	Su.		7:36	7:51	10:17	
84	25	Mo.		7:35	7:52	12:01	10:59
85	26	Tu.	☽ (9 pm)	7:34	7:53	1:01	11:43
86	27	We.	Last qtr. ☾	7:33	7:53	1:58	12:30
87	28	Th.		7:31	7:54	2:51	1:19
88	29	Fr.	☽ (12 am)	7:30	7:55	3:40	2:11
89	30	Sa.		7:29	7:55	4:24	3:04
90	31	Su.	☾ at apogee (7 pm)	7:28	7:56	5:05	3:57

Astronomical Calendar for 2019

4th Month				April 2019				30 Days							
Moon Phases — New, April 5, 3:50 a.m.; First Qtr., April 12, 2:06 p.m.; Full, April 19, 6:12 a.m.; Last Qtr., April 26, 5:18 p.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
91	1	Mo.	♁ ♂ (11 pm)	7:26 7:57	5:41	4:51									
92	2	Tu.	♁ ♀ ♀ ♂ (6 pm)	7:25 7:57	6:15	5:44									
93	3	We.		7:24 7:58	6:47	6:38									
94	4	Th.		7:23 7:58	7:19	7:33									
95	5	Fr.	New ☾	7:21 7:59	7:50	8:28									
96	6	Sa.		7:20 8:00	8:22	9:24									
97	7	Su.		7:19 8:00	8:56	10:22									
98	8	Mo.		7:18 8:01	9:34	11:22									
99	9	Tu.	♁ ♂ ♂ (2 am); ♁ ♂ ♀ (11 pm)	7:17 8:02	10:16										
100	10	We.		7:15 8:02	11:03	12:22									
101	11	Th.		7:14 8:03	11:56	1:22									
102	12	Fr.	First qtr. ☾	7:13 8:04	12:55	2:20									
103	13	Sa.		7:12 8:04	1:58	3:15									
104	14	Su.		7:11 8:05	3:04	4:05									
105	15	Mo.		7:10 8:06	4:12	4:51									
106	16	Tu.	☾ at perigee (5 pm)	7:08 8:06	5:19	5:33									
107	17	We.		7:07 8:07	6:26	6:13									
108	18	Th.		7:06 8:08	7:32	6:51									
109	19	Fr.	Full ☾	7:05 8:08	8:38	7:29									
110	20	Sa.		7:04 8:09	9:42	8:08									
111	21	Su.		7:03 8:10	10:45	8:49									
112	22	Mo.		7:02 8:10	11:45	9:33									
113	23	Tu.		7:01 8:11		10:20									
114	24	We.		7:00 8:12	12:42	11:09									
115	25	Th.		6:59 8:12	1:34	12:01									
116	26	Fr.	Last qtr. ☾	6:58 8:13	2:21	12:55									
117	27	Sa.		6:57 8:14	3:03	1:48									
118	28	Su.	☾ at apogee (1 pm)	6:56 8:14	3:41	2:42									
119	29	Mo.	♁ stationary (9 pm)	6:55 8:15	4:16	3:36									
120	30	Tu.	♁ ♀ ♂ (9 am)	6:54 8:16	4:48	4:30									

5th Month				May 2019				31 Days							
Moon Phases — New, May 4, 5:46 p.m.; First Qtr., May 11, 8:12 p.m.; Full, May 18, 4:11 p.m.; Last Qtr., May 26, 11:34 a.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
121	1	We.		6:53 8:16	5:19	5:24									
122	2	Th.		6:52 8:17	5:50	6:19									
123	3	Fr.	♁ ♂ (1 am)	6:51 8:18	6:22	7:15									
124	4	Sa.	New ☾	6:50 8:18	6:56	8:14									
125	5	Su.		6:49 8:19	7:32	9:14									
126	6	Mo.		6:49 8:20	8:13	10:15									
127	7	Tu.	♁ ♂ (7 pm)	6:48 8:20	8:59	11:17									
128	8	We.		6:47 8:21	9:51										
129	9	Th.		6:46 8:22	10:49	12:17									
130	10	Fr.		6:45 8:23	11:51	1:13									
131	11	Sa.	First qtr. ☾	6:44 8:24	12:56	2:04									
132	12	Su.		6:44 8:24	2:02	2:50									
133	13	Mo.	☾ at perigee (5 pm)	6:43 8:25	3:07	3:32									
134	14	Tu.		6:43 8:25	4:12	4:11									
135	15	We.		6:42 8:26	5:17	4:49									
136	16	Th.		6:41 8:27	6:21	5:25									
137	17	Fr.		6:41 8:27	7:25	6:03									
138	18	Sa.	Full ☾; ♁ ♂ ♂ (3 am)	6:40 8:28	8:28	6:42									
139	19	Su.		6:39 8:29	9:30	7:24									
140	20	Mo.		6:39 8:29	10:29	8:09									
141	21	Tu.		6:38 8:30	11:24	8:58									
142	22	We.	♁ ♂ (11 pm)	6:38 8:30		9:50									
143	23	Th.		6:37 8:31	12:14	10:44									
144	24	Fr.		6:37 8:32	12:59	11:38									
145	25	Sa.		6:37 8:32	1:39	12:32									
146	26	Su.	Last qtr. ☾ at apogee	6:36 8:33	2:15	1:26									
147	27	Mo.		6:36 8:34	2:48	2:20									
148	28	Tu.		6:35 8:34	3:20	3:13									
149	29	We.		6:35 8:35	3:50	4:08									
150	30	Th.		6:35 8:35	4:21	5:03									
151	31	Fr.	♁ ♂ ♂ (5 am)	6:34 8:36	4:54	6:01									

6th Month				June 2019				30 Days							
Moon Phases — New, June 3, 5:02 a.m.; First Qtr., June 10, 12:59 a.m.; Full, June 17, 3:31 a.m.; Last Qtr., June 25, 4:46 a.m.				Planetary Configurations and Phenomena				Hour of							
Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set	Year	Month	Week	Day of	Sunrise	Sunset	Moon rise	Moon set
152	1	Sa.		6:34 8:36	5:29	7:01									
153	2	Su.		6:34 8:37	6:08	8:03									
154	3	Mo.	New ☾	6:34 8:37	6:52	9:06									
155	4	Tu.		6:34 8:38	7:43	10:07									
156	5	We.		6:33 8:39	8:40	11:08									
157	6	Th.		6:33 8:39	9:42										
158	7	Fr.	☾ at perigee (6 pm)	6:33 8:39	10:48	12:02									
159	8	Sa.		6:33 8:40	11:54	1:50									
160	9	Su.		6:33 8:40	1:00	1:34									
161	10	Mo.	First qtr. ☾	6:33 8:41	2:05	2:13									
162	11	Tu.		6:33 8:41	3:08	2:50									
163	12	We.		6:33 8:42	4:11	3:26									
164	13	Th.		6:33 8:42	5:14	4:02									
165	14	Fr.		6:33 8:42	6:16	4:39									
166	15	Sa.		6:33 8:43	7:17	5:19									
167	16	Su.		6:33 8:43	8:17	6:03									
168	17	Mo.	Full ☾	6:33 8:43	9:14	6:50									
169	18	Tu.	♁ ♂ (11 pm)	6:33 8:44	10:06	7:40									
170	19	We.		6:34 8:44	10:53	8:33									
171	20	Th.		6:34 8:44	11:36	9:28									
172	21	Fr.	Solstice (10:54 am)	6:34 8:44		10:22									
173	22	Sa.		6:34 8:44	12:14	11:17									
174	23	Su.	☾ at apogee (3 am)	6:34 8:45	12:48	12:10									
175	24	Mo.		6:35 8:45	1:20	1:04									
176	25	Tu.	Last qtr. ☾	6:35 8:45	2:01	1:57									
177	26	We.		6:35 8:45	2:51	2:51									
178	27	Th.		6:36 8:45	3:42	3:47									
179	28	Fr.		6:36 8:45	4:25	4:45									
180	29	Sa.		6:36 8:45	5:02	5:46									
181	30	Su.		6:37 8:45	5:43	6:48									

☉ The Sun ● The Earth ☾ The Moon ☿ Mercury ♀ Venus ♂ Mars ♃ Jupiter ♄ Saturn ♅ Neptune ♆ Uranus ♇ Pluto ♂ = in conjunction ♁ = opposition to the ☉

Astronomical Calendar for 2019

7th Month July 2019 31 Days
Moon Phases — New, July 2, 2:16 p.m.; First Qtr., July 9, 5:55 a.m.; Full, July 16, 4:38 p.m.; Last Qtr., July 24, 8:18 p.m.; New, July 31, 10:12 p.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of		
	Month	Week		Sunset	Moon rise	Moon set
182	1	Mo.		6:37 8:45	5:31	7:52
183	2	Tu.	New ☾	6:37 8:45	6:26	8:54
184	3	We.		6:38 8:45	7:27	9:52
185	4	Th.	● at aphelion (5 pm)	6:38 8:45	8:34	10:45
186	5	Fr.	☾ at perigee (12 am)	6:39 8:45	9:42	11:32
187	6	Sa.		6:39 8:45	10:50	
188	7	Su.		6:40 8:45	11:57	12:13
189	8	Mo.		6:40 8:44	1:02	12:52
190	9	Tu.	First qtr. ☾	6:41 8:44	2:05	1:28
191	10	We.		6:41 8:44	3:07	2:04
192	11	Th.		6:42 8:44	4:09	2:40
193	12	Fr.		6:42 8:44	5:10	3:19
194	13	Sa.		6:43 8:43	6:09	4:00
195	14	Su.		6:43 8:43	7:06	4:45
196	15	Mo.		6:44 8:42	8:00	5:34
197	16	Tu.	Full ☾; ♄, ♀ ☾ (2 am)	6:44 8:42	8:48	6:25
198	17	We.		6:45 8:42	9:32	7:19
199	18	Th.		6:46 8:41	10:12	8:14
200	19	Fr.		6:46 8:41	10:48	9:09
201	20	Sa.	☾ at apogee (7 pm)	6:47 8:40	11:20	10:03
202	21	Su.	♄, ♀ ☾ (3 am)	6:47 8:40	11:51	10:56
203	22	Mo.		6:48 8:39		11:49
204	23	Tu.		6:49 8:39	12:21	12:42
205	24	We.	Last qtr. ☾	6:49 8:38	12:51	1:36
206	25	Th.	♁, ♀ ☾ (2 am)	6:50 8:38	1:23	2:32
207	26	Fr.		6:50 8:37	1:57	3:30
208	27	Sa.		6:51 8:36	2:35	4:30
209	28	Su.		6:52 8:36	3:19	5:33
210	29	Mo.		6:52 8:35	4:10	6:35
211	30	Tu.		6:53 8:34	5:08	7:36
212	31	We.	New ☾	6:54 8:33	6:12	8:32

8th Month August 2019 31 Days
Moon Phases — First Qtr., Aug. 7, 12:31 p.m.; Full, Aug. 15, 7:29 a.m.; Last Qtr., Aug. 23, 9:56 a.m.; New, Aug. 30, 5:37 a.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of		
	Month	Week		Sunset	Moon rise	Moon set
213	1	Th.		6:54 8:33	7:22	9:23
214	2	Fr.	☾ at perigee (2 am)	6:55 8:32	8:32	10:08
215	3	Sa.		6:56 8:31	9:42	10:49
216	4	Su.		6:56 8:30	10:50	11:27
217	5	Mo.		6:57 8:29	11:56	
218	6	Tu.		6:57 8:29	1:00	12:04
219	7	We.	First qtr. ☾	6:58 8:28	2:03	12:41
220	8	Th.		6:59 8:27	3:04	1:19
221	9	Fr.	♄, ♀ ☾ (6 pm)	6:59 8:26	4:04	2:00
222	10	Sa.		7:00 8:25	5:01	2:43
223	11	Su.		7:01 8:24	5:55	3:30
224	12	Mo.	♄, ♀ ☾ (5 am)	7:01 8:23	6:45	4:21
225	13	Tu.		7:02 8:22	7:31	5:14
226	14	We.		7:02 8:21	8:11	6:08
227	15	Th.	Full ☾	7:03 8:20	8:48	7:02
228	16	Fr.		7:04 8:19	9:21	7:56
229	17	Sa.	☾ at apogee (6 am)	7:04 8:18	9:53	8:50
230	18	Su.		7:05 8:17	10:23	9:43
231	19	Mo.		7:06 8:16	10:52	10:36
232	20	Tu.		7:07 8:15	11:23	11:29
233	21	We.		7:07 8:14	11:55	12:23
234	22	Th.		7:08 8:13		1:19
235	23	Fr.	Last qtr. ☾	7:08 8:11	12:31	2:17
236	24	Sa.		7:09 8:10	1:11	3:17
237	25	Su.		7:09 8:09	1:57	4:18
238	26	Mo.		7:10 8:08	2:50	5:18
239	27	Tu.		7:10 8:07	3:51	6:16
240	28	We.		7:11 8:06	4:57	7:09
241	29	Th.		7:12 8:04	6:07	7:57
242	30	Fr.	New ☾ at perigee	7:12 8:03	7:18	8:41
243	31	Sa.		7:13 8:02	8:29	9:21

9th Month September 2019 30 Days
Moon Phases — First Qtr., Sept. 5, 10:10 p.m.; Full, Sept. 13, 11:33 p.m.; Last Qtr., Sept. 21, 9:41 p.m.; New, Sept. 28, 1:26 p.m.

Year	Day of		Planetary Configurations and Phenomena	Hour of		
	Month	Week		Sunset	Moon rise	Moon set
244	1	Su.		7:13 8:01	9:38	10:00
245	2	Mo.		7:14 8:00	10:45	10:38
246	3	Tu.	♄ in superior ♀	7:14 7:58	11:51	11:16
247	4	We.		7:15 7:57	12:55	11:57
248	5	Th.	First qtr. ☾	7:16 7:56		1:57
249	6	Fr.	♄, ♀ ☾ (2 am)	7:16 7:55	2:56	12:41
250	7	Sa.		7:17 7:53	3:52	1:27
251	8	Su.	♁, ♀ ☾ (10 pm)	7:17 7:52	4:43	2:17
252	9	Mo.		7:18 7:51	5:30	3:09
253	10	Tu.		7:19 7:50	6:12	4:03
254	11	We.		7:19 7:48	6:49	4:57
255	12	Th.		7:20 7:47	7:25	5:51
256	13	Fr.	Full ☾ at apogee (9 am)	7:20 7:46	7:55	6:45
257	14	Sa.		7:21 7:44	8:25	7:38
258	15	Su.		7:21 7:43	8:55	8:31
259	16	Mo.		7:22 7:42	9:25	9:24
260	17	Tu.		7:23 7:39	10:30	11:14
261	18	We.		7:23 7:39	10:30	11:14
262	19	Th.		7:24 7:38	11:08	12:10
263	20	Fr.		7:24 7:37	11:51	1:09
264	21	Sa.	Last qtr. ☾	7:25 7:35		2:06
265	22	Su.		7:25 7:34	12:40	3:06
266	23	Mo.	Equinox (2:50 am)	7:26 7:33	1:35	4:03
267	24	Tu.		7:27 7:32	2:37	4:56
268	25	We.		7:27 7:30	3:44	5:45
269	26	Th.		7:28 7:29	4:53	6:30
270	27	Fr.	☾ at perigee (9 pm)	7:28 7:28	6:03	7:12
271	28	Sa.	New ☾	7:29 7:26	7:14	7:51
272	29	Su.		7:30 7:25	8:23	8:30
273	30	Mo.		7:30 7:24	9:31	9:09

Bright stars = Aldebaran, Antares, Spica, Pollux, Regulus.

Minor planets or asteroids = Ceres, Pallas, Juno, Vesta

♁ = in conjunction by 10° or < ♂ = opposition to ☾

