

Review Questions

1. Make a list of each main phase of the Moon, describing roughly when the Moon rises and sets for each phase. During which phase can you see the Moon in the middle of the morning? In the middle of the afternoon?
2. What are the two ways that the tilt of Earth's axis causes the summers in the United States to be warmer than the winters?
3. Why is it difficult to construct a practical calendar based on the Moon's cycle of phases?
4. Explain why there are two high tides and two low tides each day. Strictly speaking, should the period during which there are two high tides be 24 hours? If not, what should the interval be?
5. What is the phase of the Moon during a total solar eclipse? During a total lunar eclipse?
6. What is the origin of the terms "a.m." and "p.m." in our timekeeping?
7. Explain the origin of the leap year. Why is it necessary?
8. Explain why the year 1800 was not a leap year, even though years divisible by four are normally considered to be leap years.
9. What fraction of the Moon's visible face is illuminated during first quarter phase? Why is this phase called first quarter?
10. Why don't lunar eclipses happen during every full moon?
11. Why does the Moon create tidal bulges on both sides of Earth instead of only on the side of Earth closest to the Moon?
12. Why do the heights of the tides change over the course of a month?
13. Explain how tidal forces are causing Earth to slow down.
14. Explain how tidal forces are causing the Moon to slowly recede from Earth.
15. Explain why the Gregorian calendar modified the nature of the leap year from its original definition in the Julian calendar.
16. The term *equinox* translates as "equal night." Explain why this translation makes sense from an astronomical point of view.
17. The term *solstice* translates as "Sun stop." Explain why this translation makes sense from an astronomical point of view.
18. Why is the warmest day of the year in the United States (or in the Northern Hemisphere temperate zone) usually in August rather than on the day of the summer solstice, in late June?
19. Where are you on Earth if you experience each of the following? (Refer to the discussion in Observing the Sky: The Birth of Astronomy as well as this chapter.)
 - A The stars rise and set perpendicular to the horizon.
 - B The stars circle the sky parallel to the horizon.
 - C The celestial equator passes through the zenith.

D In the course of a year, all stars are visible.

E The Sun rises on September 21 and does not set until March 21 (ideally).

20. What is the right ascension and declination of the vernal equinox?

21. What is the right ascension and declination of the autumnal equinox?

22. What is the right ascension and declination of the Sun at noon on the summer solstice in the Northern Hemisphere?

23. Regions north of the Arctic Circle are known as the “land of the midnight Sun.” Explain what this means from an astronomical perspective.

24. In a part of Earth’s orbit where Earth is moving faster than usual around the Sun, would the length of the sidereal day change? If so, how? Explain.

25. In a part of Earth’s orbit where Earth is moving faster than usual around the Sun, would the length of the solar day change? If so, how? Explain.

26. If Sirius rises at 8:00 p.m. tonight, at what time will it rise tomorrow night, to the nearest minute? Explain.

27. If the Moon rises at a given location at 6:00 p.m. today, about what time will it rise tomorrow night?

28. Explain why some solar eclipses are total and some are annular.

29. Why are lunar eclipses more common than solar eclipses?

30. What is the altitude of the Sun at noon on December 22, as seen from a place on the Tropic of Cancer?