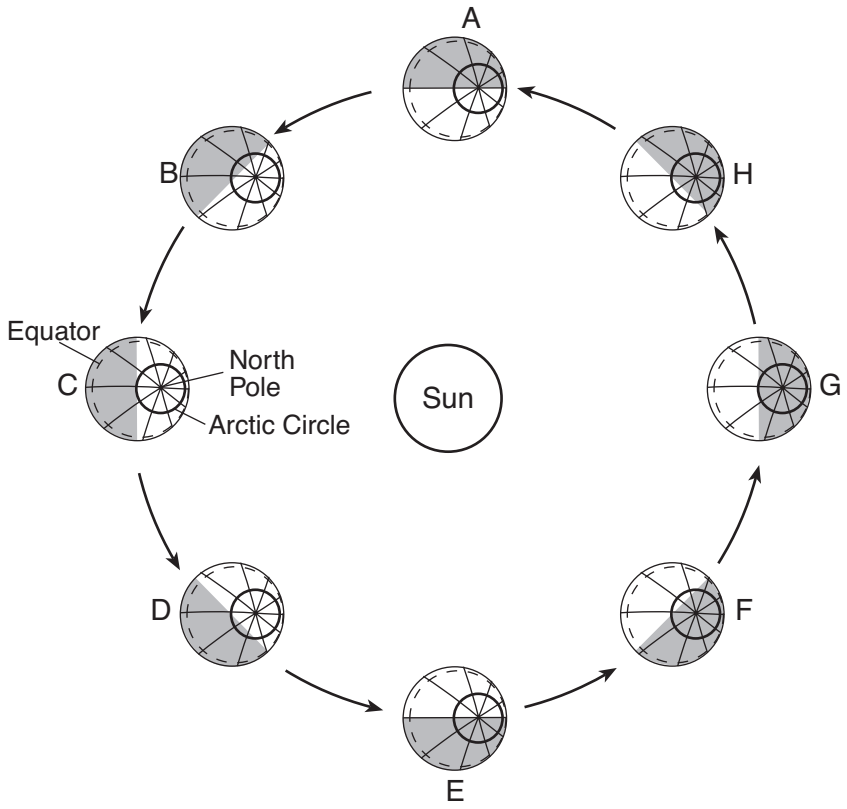
Name_____

Astronomy Regents Review

Base your answers to questions 1 and 2 on the diagram below, which shows Earth's orbit around the Sun as viewed from space. Earth is shown at eight different positions labeled A through H. Earth's North Pole, Arctic Circle, and equator have been labeled at position C. The arrows show the direction of orbital motion.



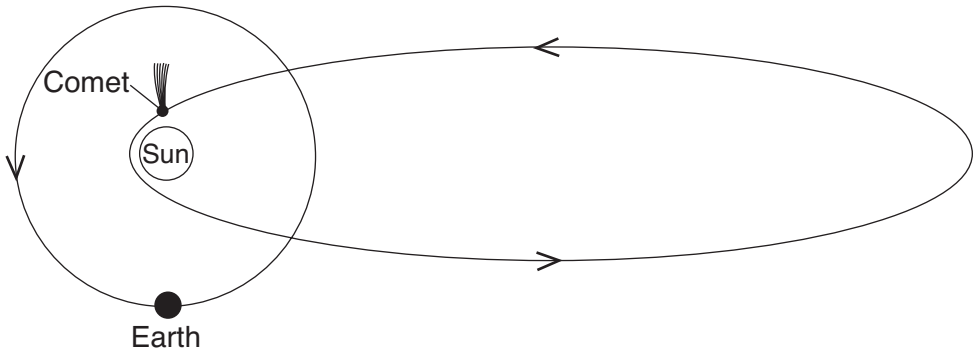
(Not drawn to scale)

1. Complete the data table by placing the letter that represents the position of the Earth at the start of each season in the Northern Hemisphere.

Season	Earth's Position
spring	
summer	
fall	
winter	

2. Approximately how many days does Earth take to move from position A to position C?

Base your answers to questions 3 and 4 on the diagram below, which shows Earth's orbit and the orbit of a comet within our solar system.



(Not drawn to scale)

3. Explain how this comet's orbit illustrates the heliocentric model of our solar system.

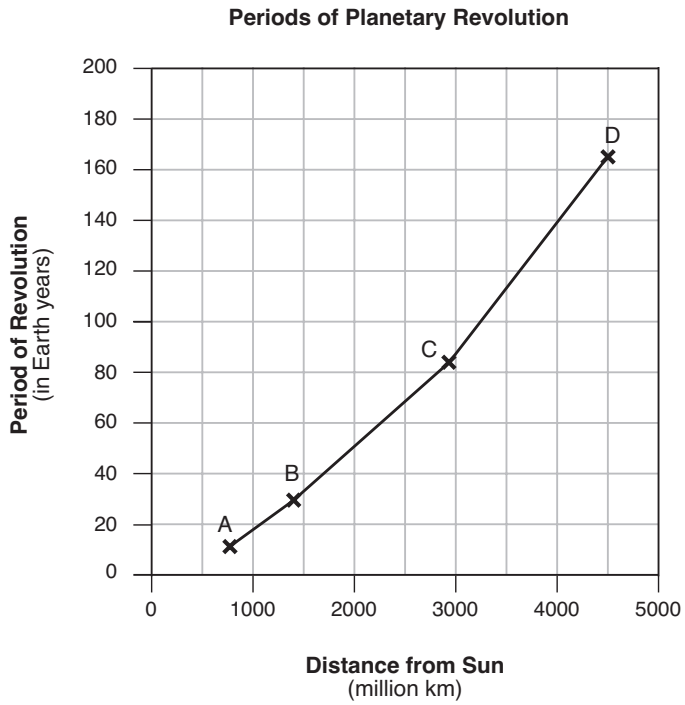
4. Explain why the time required for one revolution of the comet is more than the time required for one revolution of Earth.

Base your answers to questions 5 and 6 on the graph below, which shows the distance from the Sun and the period of four planets in our solar system labeled A, B,C, and D.

5. State the name of each of the planets, represented by A, B, C, and D.

A_____
B_____
C_____
D_____

6. Describe the relationship between the distance from the Sun and the period of revolution for these four planets.



Base your answers to questions 7 through 9 on the passage below.

Extrasolar Planets

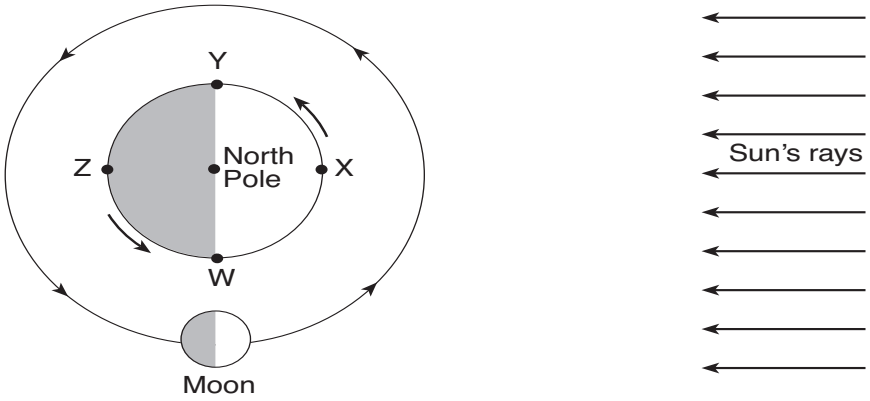
Astronomers have discovered more than 400 planets outside of our solar system. The first extrasolar planet was detected in 1995 orbiting a star known as *51 Pegasi*, which is similar in color and luminosity to our Sun. Astronomers can detect planets by identifying stars that move in response to the gravitational pull of planets revolving around them. Other planets have been discovered by finding stars whose luminosity varies as orbiting planets block outgoing starlight. Nearly all of these discovered planets are thought to be Jovian-like planets similar to Jupiter.

7. Other than Jupiter, identify one Jovian planet in our solar system.

8. Compared to Jupiter, state how Earth's equatorial diameter and density are different.

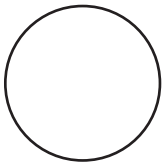
9. State the color and luminosity of *51 Pegasi.*

Base your answers to questions 10 through 12 on the diagram below, which shows one position of the Moon in its orbit around Earth. Letters W,X,Y, and Z are locations on Earth's surface.



(Not drawn to scale)

10. On the diagram of the Moon below, shade the part of the Moon that appears dark to an observer in New York State when the Moon is at the position shown in the diagram.

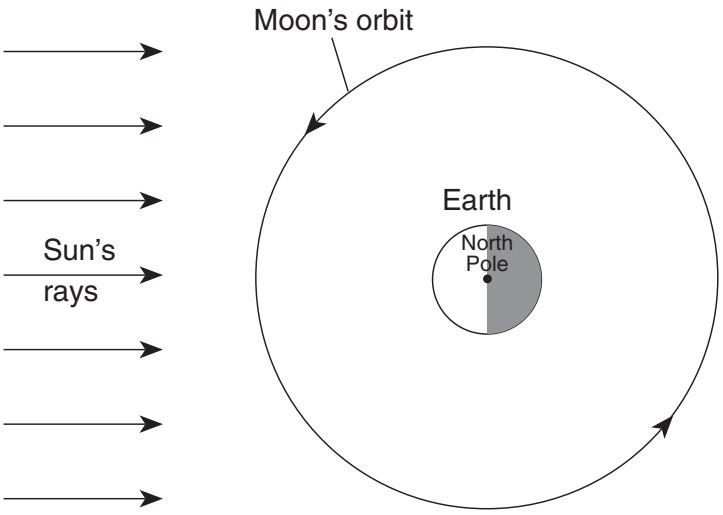


11. Write "high" or "low" to indicate whether a high ocean tide or low ocean tide is occurring at locations W, X, Y, Z.

W: _____tide
X: _____tide
Y: _____tide
Z: _____ tide

12. What is the solar time at location Y? Include a.m. or p.m. in your answer.

Base your answers to questions 13 through 16 on the diagram below, which shows the Moon's orbit around Earth.



(Not drawn to scale)

13. On the diagram above, place a small circle (O) on the Moon's orbit at the new-Moon phase where none of the lighted portion of the Moon is visible from Earth.

14. Explain why ocean tides are considered to be cyclic.

15. How long does it take the Moon to complete one revolution around Earth? Express your answer to the *nearest tenth of a day.*

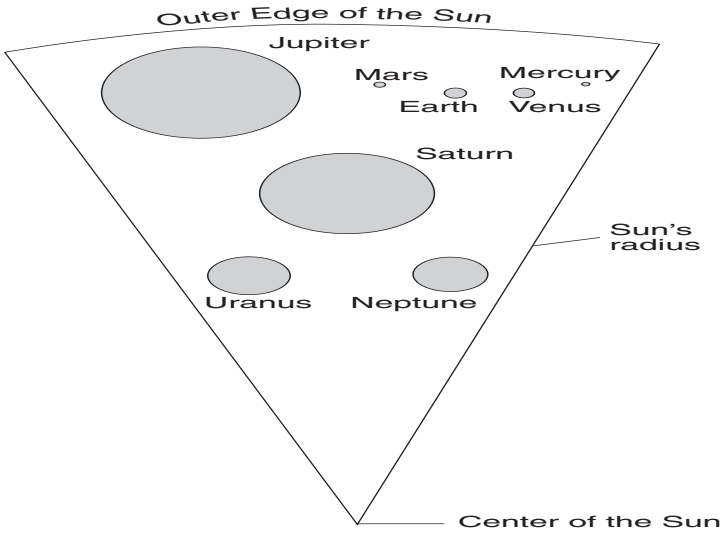
_____

16. Explain why lunar eclipses only occur when the Moon and the Sun are on opposite sides of Earth.

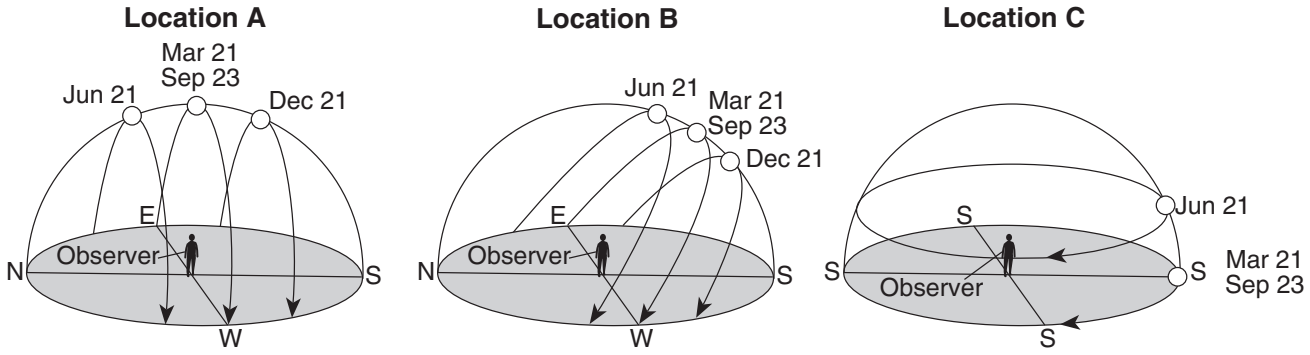
17. On the diagram below, circle only the terrestrial planets.

18. On the diagram below, place an **X** on the planet with the lowest density.

19. How many times larger is the diameter of the Sun than the diameter of Jupiter?



Base your answers to questions 20 through 23 on the diagrams below, which show the apparent path and solar noon positions of the Sun on specific dates at three different locations on Earth.



20. What evidence indicates that the observer at location A is at the equator?

21. Explain why the observer's shadow at location B will always point northward at solar noon.

22. On the diagram above, draw a line representing the apparent path of the Sun at location B on August 21.

23. How many hours of daylight are seen by the observer at location C on June 21?

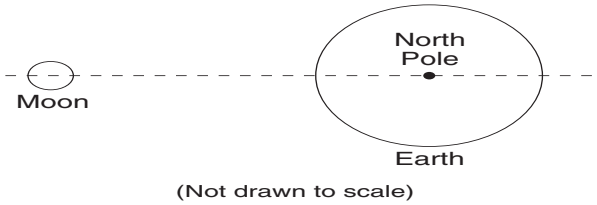
Base your answers to questions 24 through 27 on the passage below.

The Moon Is Moving Away While Earth's Rotation Slows

Tides on Earth are primarily caused by the gravitational force of the Moon acting on Earth's surface. The Moon causes two tidal bulges to occur on Earth: the direct tidal bulge occurs on the side facing the Moon, and the indirect tidal bulge occurs on the opposite side of Earth. Since Earth rotates, the bulges are swept forward along Earth's surface. This advancing bulge helps pull the Moon forward in its orbit, resulting in a larger orbital radius. The Moon is actually getting farther away from Earth, at a rate of approximately 3.8 centimeters per year.

The Moon's gravity is also pulling on the direct tidal bulge. This pulling on the bulge causes friction of ocean water against the ocean floor, slowing the rotation of Earth at a rate of 0.002 second per 100 years.

24. The diagram below shows the Moon and Earth in line with each other in space. On the diagram, place an **X** on the Earth's surface to indicate where the direct tidal bulge is occurring.

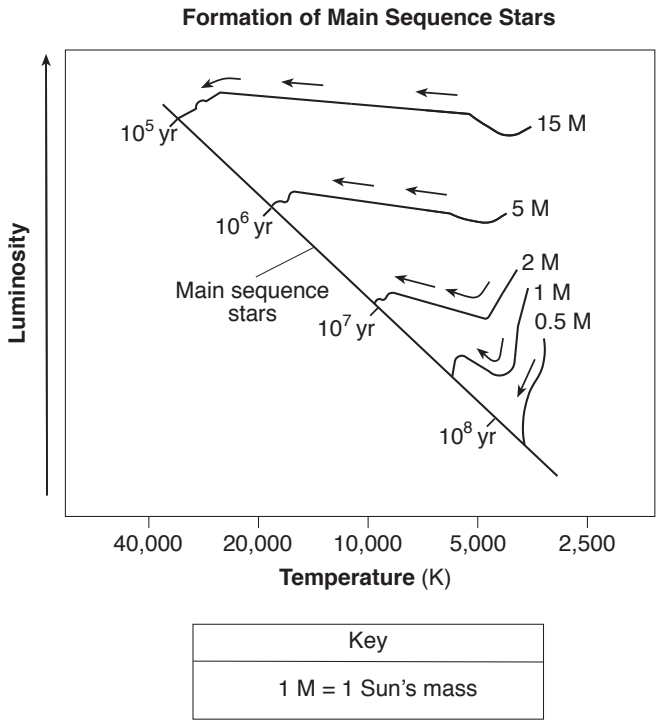


25. Explain why the force of gravity between the Moon and Earth will *decrease* over time.

26. In 100,000 years, the rotation of Earth will be slower by how many seconds?

27. Explain why the Moon has a greater influence than the Sun on Earth's tides.

Base your answers to questions 28 through 30 on the graph below, which shows the early formation of main sequence stars of different masses (M). The arrows represent temperature and luminosity changes as each star becomes part of the main sequence. The time needed for each star to develop into a main sequence star is shown on the main sequence line.



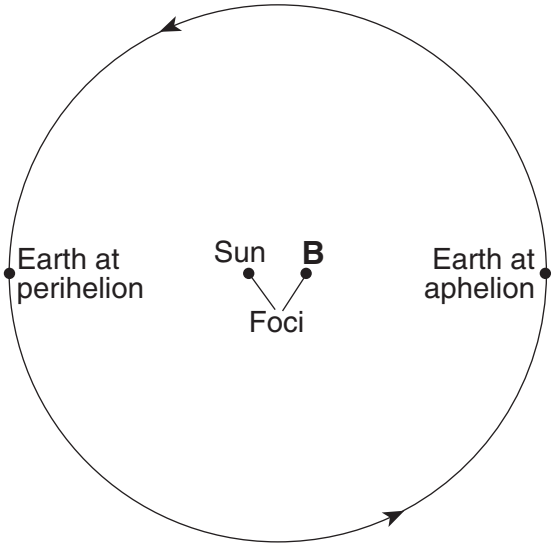
Key
1 M = 1 Sun's mass

28. Describe the relationship between the original mass of a star and the length of time necessary for it to become a main sequence star.

29. Describe the change in luminosity of a star that has an original mass of 0.5 M as it progresses to a main sequence star.

30. Identify the force that causes the accumulation of matter that forms the stars.

Base your answers to questions 31 through 33 on the diagram below, which represents a model of Earth's orbit. Earth is closest to the Sun at one point in its orbit (perihelion) and farthest from the Sun at another point in its orbit (aphelion). The Sun and point B represent the foci of this orbit.



(Not drawn to scale)

31. Explain why Earth's orbit is considered to be elliptical.

32. Describe the change that takes place in the gravitational attraction between Earth and the Sun as Earth moves from perihelion to aphelion and back to perihelion during one year.

33. Describe how the shape of Earth's orbit would differ if the Sun and focus were farther apart.