

Directed Reading

(27.2) EVEN

Section: Models of the Solar System

- _____ 1. The first astronomers thought that the stars, planets, and sun revolved around
- the sun.
 - the Milky Way.
 - Earth.
 - the moon.

EARLY MODELS

- _____ 2. More than 2,000 years ago, the Greek philosopher Aristotle suggested a model of the solar system that was Earth-centered, or
- geocentric.
 - geometric.
 - geologic.
 - geothermal.
- _____ 3. The pattern in which planets appear to move backward in the sky relative to the stars is called
- reverse motion.
 - restrained motion.
 - retrograde motion.
 - revolving motion.
- _____ 4. The Greek astronomer Claudius Ptolemy proposed that planets moved in small circles, or epicycles, as they
- revolved in larger circles around the moon.
 - revolved in larger circles around the sun.
 - revolved in even smaller circles around Earth.
 - revolved in larger circles around Earth.
- _____ 5. The Polish astronomer Nicolaus Copernicus proposed a model of the solar system that was sun-centered, or
- lunacentric.
 - astrocentric.
 - heliocentric.
 - celestracentric.
- _____ 6. According to Copernicus, all the planets revolve around
- the sun in the same direction but at different speeds and distances.
 - the moon in the same direction but at different speeds and distances.
 - the sun in different directions but at the same speed and distance.
 - the sun in different directions and at different speeds and distances.

Directed Reading *continued*

KEPLER'S LAWS

7. Upon whose observations did Johannes Kepler base his three laws of planetary motion?

In the space provided, write the letter of the definition that best matches the term or phrase.

- | | |
|--------------------------|--|
| _____ 8. eccentricity | a. a closed curve whose shape is determined by two points, or foci |
| _____ 9. ellipse | b. the time required for a body to complete a single orbit |
| _____ 10. orbital period | c. the degree of elongation of an elliptical orbit |

11. What does the *law of ellipses* state?

12. In planetary orbits, one focus is located within the _____,
and no object is located at the other focus.

13. How is eccentricity determined?

14. What did Kepler discover about the orbit of Mars?

15. The law of equal areas states that the areas through which an object sweeps in a given time period are _____.

Directed Reading *continued*

16. Kepler's third law, the law of periods, describes the relationship between the average distance of a planet from the sun and the _____ of the planet.

17. According to the law of periods, the cube of the average _____ of a planet from the sun is always proportional to the square of the planet's period.

18. What mathematical formula is used to explain the law of periods?

NEWTON'S EXPLANATION OF KEPLER'S LAWS

Use the terms from the list below to complete the sentences that follow. Each term may be used only once.

revolution

gravity

inertia

19. The tendency of an object to remain in motion unless an outside force acts upon it is called _____.

20. Newton observed that an outside force causes the orbit of a planet to curve. He called this force _____.

21. The outer planets have longer periods of _____ than the inner planets because the outer planets are less affected by the sun's gravitational pull.