

Test x: Astronomy

Equations: $T = \frac{S}{S \pm 1}$ $e = \frac{c}{R}$ $\frac{T^2}{R^3} = k$

Identify: *2 points each.*

1. _____ He made the most accurate naked-eye astronomical data in history.
2. _____ The path of the sun on the celestial sphere.
3. _____ He made the first working model of the solar system in history.
4. _____ The period of a planet with respect to the sun.
5. _____ The farthest point a planet or comet will ever be from the sun.
6. _____ The brief backwards motion of a planet along the celestial sphere.
7. _____ This planet was the key to figuring out the elliptical nature of the planetary orbits.
8. _____ The apparant change in position of an object due to the motion of the observer.
9. _____ The basic principle of motion behind the ancient Greek model of the solar system.
10. _____ The smaller secondary circle that carried the planets in the circular-based solar system models.
11. _____ Who first accurately calculated the distance to the moon compared to the size of the earth?

Short Answer: *6 points each.*

12. What was the first observational proof that the Ptolemeic Model of the solar system was incorrect? Why did this not prove that the earth went around the sun?

13. What observational evidence did the ancient Greeks site as evidence that the earth was a sphere? (Don't include large mammals in your answer.)

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14. What were the two key reasons why the ancient Greeks rejected a solar system model involving a moving earth?
15. What was the first observational proof that the earth went around the sun?
16. Why did Copernicus propose his heliocentric model?
17. What were Kepler's 3 Laws of Planetary Motion?
18. Galileo made some discoveries concerning the moon and Jupiter that he published in Sidereus Nuncius. What were they and why were they important?

Test x: Astronomy**Problem Solving:** *Show all work. 6 points each.*

19. Imagine you looked at the moon and it looked like the picture to the right. Imagine also that the sun was 30 times farther away than the moon. What would be the angular distance between the sun and the moon?



20. What is the stellar parallax of a star that is 100,000 AU away?

21. Imagine you live on a planet in city A. On your equinox, a 1.5 m long stick that is held vertically will have a shadow that is 12 cm long. At the exact same time, in city B that is 800 km to your south, a stick won't have any shadow at all. What is the radius of your planet?

22. What would be the maximum height of the sun at the following locations:

- The North Pole on the Summer Solstice.
- The equator on the Summer Solstice.
- At a latitude of 35° on the spring equinox.

23. A planet takes 0.75 years to go around the sun. What is its angle of greatest elongation? Include a correctly labeled diagram.

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24. A planet is in opposition every 450 days. It also has an orbital eccentricity of 0.15. What is its perihelion distance?
25. An asteroid has a perihelion distance of 0.6 AU and an aphelion distance of 1.1 AU.
- What is the eccentricity of its orbit?
 - What is its synodic period?