

Test x: Astronomy

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

Constants: 1 year = 365 days Tropic of Cancer = 23.5°

Names: Anaxagoras, Aristarchus, Aristotle, Bellarmine, Brahe, Copernicus, Eratosthenes, Euclid, Eudoxus, Galileo, Hipparchus, Kepler, Strato, Thales, Ptolemy, Pythagorus

Identify: 2 points each.

1. _____ The apparent change in position of an object due to the movement of the observer.
2. _____ He is often called the First Astronomer.
3. _____ He wrote the Almagest, which was the first truly predictive model of the solar system in history.
4. _____ His bad physics screws up science for a long, long time.
5. _____ At Uraniborg, he took the most accurate naked-eye astronomical observations in history.
6. _____ This special calendar date happened last week.
7. _____ The path of the sun on the celestial sphere.
8. _____ He discovered Three Laws of Planetary Motion.
9. _____ He was largely responsible for the Greek obsession with spheres.
10. _____ The occasional backwards motion of the planets in the sky.

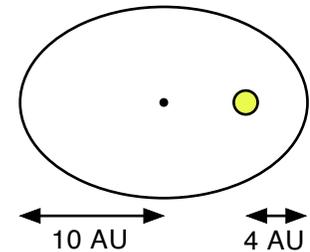
Multiple Choice: 3 points each.

11. _____ Which of the following did Copernicus dislike about Ptolemy's model of the solar system?
 - a. The equant.
 - b. The Greek idea of the Principle of Uniform Circular Motion.
 - c. Epicycles.
 - d. He disliked all of the above.
 - e. Actually, he liked all those, so none of the above is the correct answer.
12. _____ You look up in the sky and find that the North Star is located 50° above the horizon. What latitude are you on?
 - a. 40°.
 - b. 50°.
 - c. 27.5°.
 - d. 73.5°.
 - e. Can't tell because you need to know the time of year.
13. _____ Why was the discovery of the phases of Venus important?
 - a. It proved that the heliocentric model had to be correct.
 - b. It proved the Ptolemeic model was incorrect.
 - c. Both of those are correct statements.
 - d. None of the above are correct.

Test x: Astronomy

Problems 14 to 16 refer to the following:

Planet X goes around the sun in the orbit shown to the right. The center of the orbit and the sun are also shown in the diagram.



14. _____ What is the aphelion distance for Planet X in AU?
 a. 20 AU. b. 16 AU. c. 10 AU.
 d. 6 AU. e. 4 AU.
15. _____ What is the eccentricity of the orbit?
 a. 0.2. b. 0.38. c. 0.4. d. 0.5. e. 0.6.
16. _____ What is the sidereal period of Planet X in days?
 a. 11,500. b. 19,100. c. 23,400. d. 32,600. e. 39,700.
17. _____ How far away (in AU) is a star which has a parallax of 0.0002° ?
 a. 72,000 AU. b. 143,000 AU. c. 286,000 AU. d. 573,000 AU.
18. _____ If you were on the North Pole on the Spring Equinox, where would the sun be at noon?
 a. Directly overhead.
 b. 23.5° from overhead.
 c. 23.5° above the horizon.
 d. Right on the horizon.
 e. Sun can't be seen at that time.
19. _____ If the moon were only about 30° away from the sun, what phase would it be?
 a. Full. b. Gibbous. c. Crescent. d. Quarter. e. New.
20. _____ Galileo discovered all of the following except
 a. The sun has spots on it.
 b. Saturn seems to have two companion stars on either side of it.
 c. Venus has all phases, like the Moon.
 d. The Moon is mountainous.
 e. Don't be stupid, he discovered all those things.

Test x: Astronomy

Short Answer:

21. Apart from liking new ideas, what were the two main reasons one might prefer the Copernican Hypothesis to the Ptolemeic Model in the end of the sixteenth century? *(3 points each)*
22. What were the two main scientific/logical reasons that most people rejected non-geocentric models of the solar system? *(3 points each)*
23. What were the two key observations that led the ancient Greeks to conclude that the earth was a sphere? *(3 points each)*
24. What were the two most important discoveries in Sidereus Nuncius, and why was each important? *(5 points each)*

Test x: Astronomy

Problem Solving: *Show all work.*

25. What is the synodic period for a planet with a greatest elongation of 25° ? (10 points)
26. What is the perihelion distance for a superior comet with a synodic period of 500 days and an orbital eccentricity of 0.7? (10 points)
27. Imagine you lived a long time ago in town A, and at noon on the summer solstice you find that a 1.5 meter long vertical stick will have a shadow that is 9 cm long. At the same time, you know that in town B, 800 units due south of you, a stick will not cast a shadow at all.
- What is the radius of the earth? (6 points)
 - What is the latitude of town A? (4 points)