ON YOUR PARSCORE: Write your name, and `bubble' your student I.D. number, **your test version**, and your answers.
I will keep the Parscore forms.

ON THIS TEST PACKET: Write your name. Circle your multiple-choice answers on this packet, so you can check them when we go over the test.
I will hand this packet back to you when we go over the test, and you'll keep it. This packet is how you'll get your score.

Astronomy 4 Test #1 PRACTICE VERSION

True/False

Indicate whether the statement is true or false. (3 pts. each)

1. Thousands of years ago, astronomers figured out that the Earth is spherical, because the shape of the Earth's shadow (during lunar eclipses) is always circular.

2. The apparent magnitude of a distant planet like Uranus, which is barely visible to the eye, will be a *larger number* than the apparent magnitude of a nearby planet like Venus, which appears very bright to the eye.

3. When Galileo examined the Moon through a telescope, he saw that its surface was perfectly smooth, just as philosophers had long thought.

4. If you were in a spacecraft, far between any galaxies, and you were moving at a constant speed along a straight line, your spacecraft would come to a stop unless its engine kept firing.

5. If you could see the stars during the daytime, you'd notice that as the year goes by, the Sun seems to move eastward relative to the stars behind it.

Matching (4 pts. each)

For each question, choose the item (from a-e) that fits best. Items from a-e can be used more than once.

a. Solar System
b. Galaxy
c. Geocentric
d. Epicycle
e. Universe

6. A collection of hundreds of millions of stars, such as the Milky Way

7. A group of planets (and other objects) orbiting a star

8. In the Earth-centered model of the solar system, this explained the retrograde motions of the planets.

9. A model of the solar system in which the Sun, Moon, and planets go around the Earth

Multiple Choice - General Knowledge

Choose the ONE best answer and mark it on your Parscore form. (5 pts. each)

10. Which of the following is a unit of DISTANCE?
    a. A millenium
    b. A light-year
    c. A year
    d. A century

11. Which two planets are only seen near the Sun?
    a. Venus and Mercury
    b. Neptune and Pluto
    c. Venus and Mars
    d. Jupiter and Saturn

12. Which of these things was a reasonable objection to Copernicus's heliocentric model, shortly after it was first proposed?
    a. It couldn't explain why some constellations don't look bigger and smaller at different times of year.
    b. It couldn't explain why Mercury and Venus are only seen near the Sun.
    c. It couldn't explain why outer planets like Mars sometimes show retrograde motion.
    d. It couldn't explain why the Sun seems to make one trip around the ecliptic each year.

13. Does the appearance of the constellations follow a seasonal pattern?
    a. Yes, during a winter night all the constellations you can see are different from the ones that appear during a summer night.
    b. Yes, during a summer night many of the constellations you can see are different from those you can see on a winter night.
    c. Yes, as the year progresses, the constellations move to different areas of the sky. Specifically, they appear to drift north and south on the sky.
    d. No, all of the constellations are visible on any clear night of the year.

14. In Kepler's Laws of planetary orbits, where is the Sun located, relative to the orbit of a planet like the Earth?
    a. At the center of the circular orbit.
    b. At one of the two foci of the elliptical orbit.
    c. At the end of one of the axes of the circular orbit.
    d. At the center of the elliptical orbit.

15. When ancient peoples said the Earth didn't rotate on its axis or revolve around the Sun, which of these was part of their argument against the Earth's motion?
    a. The Earth doesn't feel like it's moving.
    b. The stars don't seem to move quickly enough across the sky.
    c. The shape of the Earth's shadow (as cast on the Moon) is always a circle.
    d. The motion of clouds above the surface of the Earth proves it can't be moving.

16. Which of these regions of the sky is invisible from a place like California (which is roughly halfway between the Earth's equator and its north pole)?
    a. The area around the north celestial pole
    b. The celestial equator
    c. The area around the south celestial pole
    d. The region around the ecliptic

17. What sort of data did Tycho collect, which proved useful to Kepler in formulating the laws of planetary motion?
    a. Telescopic observations of Mars
    b. Detailed observations of the positions of the planets relative to the stars.
    c. Careful observations of exploding stars
    d. Telescopic observations of Jupiter and its moons

18. When Galileo saw that the Milky Way is made of many faint-looking stars, he was starting to explore the structure of which of these kinds of astronomical object?
    a. One of the nearby parallel universes
    b. A solar system
    c. A planet
    d. A galaxy

Multiple Choice - Deeper Thought

These questions are just like the other multiple-choice questions, just a little harder. As before, choose the ONE best answer and mark it on your Parscore form.
(8 pts. each)

19. Imagine you're in a spacecraft, moving in a straight line through empty space. You're in a distant region of intergalactic space, very far from any galaxies, with virtually no intergalactic gas around you. You turn off your rocket engine. How long will it take you to coast to a stop?
    a. You will stop as soon as your rocket engine stops firing, and the deceleration will be very sudden.
    b. Your speed will actually increase gradually, until you reach the speed of light, or pass through a galaxy, whichever come first.
    c. Just like a car rolling along a flat road, you will coast to a stop in less than a minute.
    d. You won't coast to a stop, but will keep moving in a straight line at the same speed until you hit something or go through a cloud of gas or dust.

20. Let's say you are an intelligent organism who lives a life floating in the upper atmosphere of Jupiter. Your fellow `Jovians' believe Jupiter is the center of the solar system. When you invent the telescope, which of these observations of the Earth might help to cast doubt on their model?
    a. The Earth has a moon going around it, showing that Jupiter isn't the only thing that can be a `center' of revolution.
    b. The Earth can sometimes show a nearly-full phase, and not just a crescent phase.
    c. The Earth has a spherical shape, similar to the shape of Jupiter and the shapes of its moons.
    d. A and B, but not C
    e. B and C, but not A

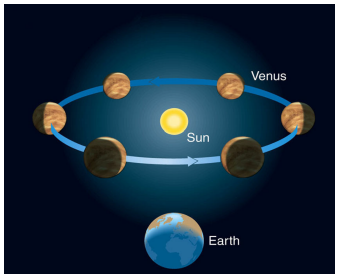
21. Imagine you've found a new, Earth-sized planet out beyond Pluto, in a region known as the Kuiper belt. What should be true about its orbit around the Sun, based on Kepler's laws?
    a. It will orbit the Sun in only a few Earth weeks.
    b. It will be moving slowest when it makes its closest approach to the Sun.
    c. It will take much longer than one Earth year to orbit the Sun.
    d. It will orbit the Sun much faster than the Earth.

22. Someone tells you that you've been sent back in time 10,000 years. You're not sure you believe them. Which of these things (in the sky, as seen from Earth) might make you suspect they're not telling the truth?
    a. The Sun appears to make a trip around the ecliptic once per year.
    b. The north celestial pole is very close to the star Polaris.
    c. The Moon sometimes covers the Sun, causing solar eclipses from time to time.
    d. The Sun, Moon and stars rise in the east and set in the west.

23. (Extra Credit - 9 pts) Imagine you discover a planet orbiting another star. The star is very similar to our Sun, and the planet's average distance from the star is 44 astronomical units. How long does it take this planet to orbit its star?
    a. About 67 Earth years
    b. About 12 Earth years
    c. About 312 Earth years
    d. About 292 Earth years
    e. About 157 Earth years

For each slide: Q1 = 3pts, Q2&3 = 6 pts. ea., Q4 = 8 pts.

Slide Section

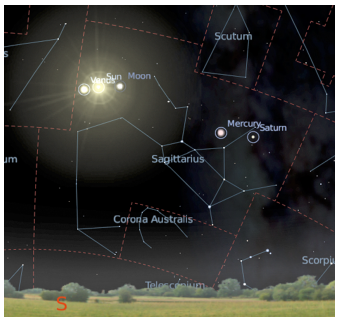


24. (T/F) This image shows Venus moving on its epicycle in the Ptolemaic (geocentric) model of the solar system.

25. How does this diagram illustrate a test of the geocentric versus heliocentric models of the universe?
    a. This model shows Venus orbiting around the Earth.
    b. Only in the heliocentric model can Venus look nearly fully-lit up, as shown in this diagram.
    c. This model shows what the heliocentric model precicts, which is that Venus can only look crescent as seen from the Earth.
    d. This shows that in the geocentric model, Venus can only ever look full (like the Full Moon), as seen from the Earth.

26. When Gailleo looked at Venus with the telescope, what did he notice about its appearance?
    a. It only showed crescent phases, suggesting that the geocentric model is correct.
    b. It looked like this diagram, going through a full cycle of phases, implying that heliocentrism is correct.
    c. It always looks dark, since it is always positioned between the Earth and the Sun.
    d. It always looks half lit-up, like the 1st or 3rd Quarter Moon, and this created an even deeper mystery in the debate over heliocentrism.

27. Imagine you lived on the planet Mercury, and you wanted to use Galileo's method, shown here, to try and determine whether the heliocentric or `Mercury-centric' model of the solar system is correct. Why wouldn't observations of Venus be as useful to you as they were to Galileo?
    a. The other planets are always on the other side of the Sun from Mercury.
    b. Mercury is the closest planet to the Sun, so the other planets can only show a full (or nearly-full) phase.
    c. Since Mercury is the most distant planet from the Sun, the other planets are always invisible in the glare of the distant Sun.
    d. The intense gravitational lensing effect of the Sun's gravity makes the rest of the universe invisible from Mercury.



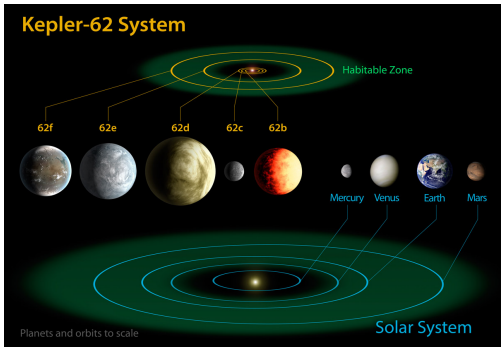
This is a computer-generated image of the sky above the southern horizon, as seen from the northern hemisphere in winter. The atmosphere has been turned off, to
show the stars and planets.

28. (T/F) Mercury and Saturn are the two most distant objects shown in this image.

29. Which of the things shown in this image is the true definition of the constellation Sagittarius?
    a. The red boundary
    b. The white lines that make up the `stick figure' of Sagittarius
    c. The set of the four brightest stars in this part of the sky
    d. The set of planets that lie within it

30. Which of the objects shown in this image emits light that it/they create(s)?
    a. The Sun and the background stars
    b. Venus, the Moon, Mercury, and Saturn
    c. Mercury and Saturn
    d. Venus and the Moon

31. If we could examine this part of the sky for a whole year, without the Earth or the blue sky getting in the way, what would we see changing, compared to this picture?
    a. The Sun would stay in Sagittarius, but the planets would appear to move.
    b. The Sun and planets would appear to move directly northward together, out of Sagittarius.
    c. The planets would mostly appear to move eastward (compared to the stars).
    d. The planets would stay in the same places (compared to the stars), but the Sun would appear to move westward (compared to the stars).



This image show **artists concepts** of the planets in the Kepler-62 system. (The images of the planets in OUR solar system are real, though.) This star system is about 1200 light years from the Earth.

32. (T/F) All of the planets in the Kepler-62 system take the same amount of time to orbit their star.

33. In the Kepler-62 system, which planet probably takes the LONGEST amount of time to orbit this system's star?
    a. Kepler-62b
    b. Kepler-62c
    c. Kepler-62d
    d. Kepler-62e
    e. Kepler-62f

34. Like the planets in our solar system, the Kepler-62 planets probably have near-circular orbits. What is the more accurate general term for the shape of a planetary orbit?
    a. A hyperbola
    b. An eclipse
    c. A parabola
    d. An ellipse

35. Imagine that planet 62f has the right surface temperature for liquid water, and is inhabited by intelligent beings who like to look at the sky. If they wanted to study planet 62d with their telescopes, which of the following issues would they have to deal with?
    a. Planet 62d is only visible in the middle of the night.
    b. Planet 62d can only be seen shortly after sunset or shortly before sunrise.
    c. Planet 62d is much farther away than any of the other planets in the system.
    d. Planet 62d can only ever be seen in a crescent phase; it can never look nearly fully lit-up.

36. (T/F) The photographer probably took this picture by leaving their camera's shutter open for several hours during the course of a single night.

37. Which of the following things causes the curved appearance of the `star trails' in this image?
    a. The effect of gravity, which bends the light from distant stars
    b. The Earth's orbital motion around the Sun
    c. Our solar system's orbital motion within the Milky Way galaxy.
    d. The Earth's rotation on its axis

38. What portion of the `celestial sphere' is shown in the left half of this photograph, at the center of the curving star trails?
    a. The center of the ecliptic
    b. One of the celestial poles
    c. The celestial equator
    d. The point where the Sun is located at the summer solstice

39. Imagine you went from the place where this photograph was taken to another place much farther from the Equator, but in the same hemisphere of the Earth (i.e. northern or southern). If you took a similar time-exposure photograph in this new place, what would look different about the pattern of star trails?
    a. The center of the curved star trails would be out of sight, below the horizon.
    b. The center of the curved star trails would be closer to being directly overhead.
    c. The center of the curved star trails would be closer to being on the horizon.
    d. The stars would all appear to travel in straight lines across the sky, so there would be no curvature to the star trails.

Answers for Astronomy 4 Test #1 Practice Version

A few notes before the answer key:

1) The pattern of answer choices has NO MEANING WHATSOEVER! When I write multiple-choice tests, I DO NOT spend any time or energy on picking the answer choices. I just hit “Scramble” on my test-writing software. Please don't make the mistake of trying to look for “patterns” in the answer choices... I am not spending even a second of my time creating such patterns.
2) The questions on this test only cover a PORTION of the topics on the What2Know list. Many of those topics didn't make it onto this test, but you still have to know them for YOUR test. Don't think that it's not on YOUR test, just because it's not on THIS test. I simply grabbed some questions from my database, and scrambled the answer choices. When preparing for tests, your best bet is always to know the material from the What2Know list as thoroughly as possible!

ANSWERS:

1 T	14 b	27 b
2 T	15 a	28 F
3 F	16 c	29 a
4 F	17 b	30 a
5 T	18 d	31 c
6 b	19 d	32 F
7 a	20 d	33 e
8 d	21 c	34 d
9 c	22 b	35 b
10 b	23 d	36 T
11 a	24 F	37 d
12 a	25 b	38 b
13 b	26 b	39 b