1. As an object moves away from you, its angular size will  
   increase  decrease  stay the same \( \theta = \frac{57.3 D}{r} \)

2. A planet in retrograde motion
   shifts eastward with respect to the stars.
   will be at the north celestial pole.
   will be exactly overhead no matter where you are on Earth.
   \textit{shifts westward with respect to the stars}.
   rises in the west and sets in the east.

3. A synodic month is ___ a sidereal month because ___.
   longer than ... the Earth orbits the Sun
   longer than ... the Earth spins on its axis
   longer than ... the Moon orbits the Earth
   shorter than ... the Earth orbits the Sun
   shorter than ... the Earth spins on its axis
   shorter than ... the Moon orbits the Earth

4. In order to more easily measure the parallax angle of a very distant object, one can
   decrease the length of the baseline.
   do nothing, the length of the baseline does not affect the parallax angle.
   increase the length of the baseline.

5. What would the distance to an object in kilometers be if it was observed along a baseline of 13 km with a
   parallax angle of 0.1 degrees?
   \[
   \text{distance (km)} = 57.3 \times \frac{\text{baseline (km)}}{\text{parallax angle (°)}} = 57.3 \times \frac{13 \text{ km}}{0.10°} = 7450 \text{ km}
   \]

6. Which of the following were true for the Ptolemaic model of the Universe? (Mark all that apply.)
   \textit{The moon orbits the Earth.}
   The orbit distances of the planets were predictable.
   The Sun is at the center of the universe.
   \textit{The planets move on epicycles in circular orbits.}
   The Earth orbits on an ellipse.

7. What was one of the key contributions that Copernicus made to astronomy?
   He used state-of-the-art equipment to make extensive and detailed observations of the positions
   of the planets.
   He was first to use a telescope to observe the heavens, thereby reinforcing the notion of heliocentricity.
   He discovered that the planets move around the Sun in elliptical orbits.
   \textit{He made a convincing argument to revive the heliocentric model of the solar system.}

8. We would not expect to see Venus go through any phases if Venus orbited the Sun.
   True  False
9. What contribution to astronomy was made by Tycho Brahe?
   He discovered that the planets move around the Sun in elliptical orbits.
   He developed a theory of gravity that could explain orbital motions.
   He was first to use a telescope to observe the heavens, thereby reinforcing the heliocentric model.
   **He used state-of-the-art equipment to make extensive and detailed observations of the positions of the planets.**

10. The first person to use a telescope to observe Jupiter was **Galileo**. (Capitalize the first letter of the name. Check the spelling! Do not include any punctuation.)

11. An asteroid is found orbiting the Sun with an orbital period of 6 years. What can we say about its distance from the Sun?
   - It orbits at the same distance from the Sun than does the Earth.
   - It orbits closer to the Sun than does the Earth.
   - **It orbits further from the Sun than does the Earth.**
   - It must be in a highly elliptical orbit.

12. A new comet is discovered where the semi-major axis of its orbit is 100 AU and the orbital eccentricity is 0.9. Where will it spend most of its orbital period?
   - Closer than 100 AU to the Sun.
   - At a distance of 100 AU from the Sun.
   - **Farther than 100 AU from the Sun.**

13. What important property of a planet do we learn by studying the motion of its moons?
   - distance
   - temperature
   - mass
   - spin period

14. A newly discovered asteroid has a reported orbital eccentricity of 0.9. What is the shape of its orbit?
   - Perfectly circular.
   - **Very thin and elongated.**
   - A straight line.
   - Almost circular, but slightly elliptical.

15. You have discovered a new asteroid with an orbital period of 7.1 years. Its semimajor axis must be _____ AU.
   \[
P^2 = a^3 \implies a = \frac{P^2}{3} = \frac{3}{3}(7.1 \text{ yr})^2 = 3.69 \text{ AU}
\]

16. A planet orbiting the sun in a circular path is said to be **accelerating**.
   - not experiencing any forces.
   - constantly changing its speed.
   - moving at a constant velocity.

17. If the Sun suddenly disappeared the Earth would start to move along a straight line. (Ignore the effects of the other planets on the Earth.) **True**    **False**
18. If the distance between two asteroids in outer space is cut to a third, the gravitational force between them is nine times greater. Is cut to a ninth. Triples. Is cut to a third.

19. If the Earth were to double its mass and double its radius, your weight on its surface would be four times greater. Be cut to a fourth. Double. Be cut in half.

\[
\frac{W_{\text{new}}}{W_{\text{old}}} = \frac{\frac{GM_{\text{Earth,new}} m_{\text{you}}}{R_{\text{new}}^3}}{\frac{GM_{\text{Earth,old}} m_{\text{you}}}{R_{\text{old}}^3}} = \frac{M_{\text{Earth,new}}}{M_{\text{Earth,old}}} \left(\frac{R_{\text{old}}}{R_{\text{new}}}\right)^2 = \frac{2M_{\text{Earth,old}}}{M_{\text{Earth,old}}} \left(\frac{R_{\text{old}}}{2R_{\text{old}}}\right)^2
\]

\[
\frac{W_{\text{new}}}{W_{\text{old}}} = \frac{2}{2^2} = \frac{2}{4} = \frac{1}{2} \Rightarrow W_{\text{new}} = \frac{1}{2} W_{\text{old}}
\]

20. Two identical stars orbit each other with a semi-major axis of 2.0 AU and with a period of 2.0 years. What is the mass of each star in solar masses? _____ solar masses

\[
(M_1 + M_2) P^2 = a^3 \quad \Rightarrow (2M) P^2 = a^3 \quad \text{because} \quad M_1 = M_2
\]

\[
2M = \frac{a^3}{P^2} = \frac{(2.0 \text{ AU})^3}{(2.0 \text{ y})^2} = \frac{8}{4} M_\odot = 2M_\odot
\]

\[
M = \frac{1}{2} (2M_\odot) = 1.0M_\odot
\]