

D 1) Kepler's First Law says that:

- A) The planets move in elliptical orbits with the Sun at the center of the orbit.
- B) The planets move in circular orbits with the Sun at the center of the orbit.
- C) The planets move in circular orbits with the Sun slightly off to one side.
- D) The planets move in elliptical orbits with the Sun at one of the foci.
- E) The Sun orbits the Earth, but the rest of the planets orbit the Sun.

C 2) An epicycle is:

- A) Another name for a rotating ellipse.
- B) A circle placed concentrically within another circle.
- C) A rotating circle placed on the edge of another circle.
- D) What the Earth occupies as it orbits the Sun.
- E) An extremely elongated ellipse.

A 3) Kepler's Second Law is:

- A) A manifestation of the law of conservation of angular momentum.
- B) A manifestation of centrifugal force.
- C) A variation in planetary speed created by epicycles.
- D) A law that only works for planets orbiting in perfect circles.
- E) A statement that planets must move at constant speeds.

E 4) Kepler's Third Law can be derived by:

- A) Assuming conservation of kinetic energy.
- B) Assuming conservation of angular momentum.
- C) Using  $E = I\omega$  and assuming the planets are spheres.
- D) Assuming elliptical instead of circular epicycles.
- E) Setting the gravitational force equal to the centrifugal force.

C 5) For any satellite moving in an elliptical orbit:

- A) Its kinetic energy  $K$  must be independently conserved.
- B) Its gravitational potential energy  $U$  must be independently conserved.
- C) Only its total energy  $T = K + U$  can be conserved.
- D) Its total energy must vary with its radius from the planet.
- E) Its kinetic energy depends directly on its angular momentum.