13.6.1. The magnitude of the gravitational potential energy is related to the distance from a mass. Which of the following choices gives the correct relationship between the distance \( r \) and the gravitational potential energy?

a) \(-\frac{1}{r}\)
b) \(r^2\)

13.6.2. Consider the objects of various masses and separations indicated below. In which of these situations is the gravitational potential energy of the two objects the largest (i.e. the least negative)?

a) \#1
b) \#2
c) \#3
d) \#2 and \#3
e) \#1, \#2, and \#3

13.7.1. Which one of the following statements concerning Kepler’s Law of Orbits is true?

a) All planets move in elliptical orbits, with the Sun at one focus.
b) All planets move in circular orbits, with the Sun at the center.
c) All planets move in elliptical orbits, with the planet at one focus.
d) All planets move in circular orbits around the center of mass of the solar system.
e) All planets move in helical orbits, with the Sun at one end of the helix.

13.8.1. Each of the orbits shown has the same length semi-major axis, but differs in the eccentricities, which are given. In which of these orbits is the distance between the center of the orbit and the focus at \( M \) largest?

a) \( \varepsilon = 0.9 \)
b) \( \varepsilon = 0.8 \)
c) \( \varepsilon = 0.5 \)
d) \( \varepsilon = 0 \)
e) All of the orbits have the same distance center to focus

13.7.3. Which one of the following statements represents the Law of Periods?

a) The orbital period of a satellite in orbit of a planet is inversely proportional to its mass.
b) The period of a planet in its orbit about the Sun is directly proportional to the radius of its orbit.
c) The rotational period of the Sun equals the sum of the rotational periods of the planets.
d) Every planet sweeps out the same area in a one Earth year period, making one complete orbit about the Sun.
e) The square of the period of any planet is proportional to the cube of the semimajor axis of its orbit.