Orbital Motion

$$a_c = \frac{v^2}{r} \qquad F_{net} = ma \qquad F_g = \frac{Gm_1m_2}{r^2} \qquad \overline{V} = \frac{\Delta d}{\Delta t} \qquad C = 2\pi r \qquad T = \frac{1}{f}$$

1. A 50 kg satellite is in orbit around the Earth at a distance 1×10^7 m from the Earth's center. Using the values found in the Physics Reference Tables, Find:
   a. the centripetal force on the satellite.

   b. the centripetal acceleration of the satellite.

   c. How fast is the satellite moving?

   d. How much time does it take to go around the Earth once?

2. Using the values found in the Physics Reference Tables in addition to the mass of the Sun which is 2×10^{30} kg, find:
   a. the speed of the Earth as it orbits the Sun.

   b. the centripetal acceleration of the Earth as it orbits around the Sun.

3. A moon is orbiting planet Alpha at a distance of 1×10^8 m. It takes 2.5×10^6 sec to go around the planet once.

    a. Find the frequency of the moons orbit.

    b. How fast is the moon travelling?

    c. What is the acceleration of the moon?

Bonus: d. Find the mass of planet Alpha.