Kepler's Laws WS I

1. Find the orbital speed of a satellite in a circular orbit 1.50×10^3 km above the surface of the Earth.

2. In July of 1999, a planet was reported to be orbiting the Sun-like star Iota Horologii with a period of 3.20×10^2 days. Find the radius of the planet's orbit, assuming that Iota Horologii has the same mass as the Sun (mass of Sun = 2.00×10^{30} kg). (This planet is presumably similar to Jupiter, but it may have large, rocky moons that enjoy a pleasant climate.)

3. Phobos, one of the moons of Mars, orbits at a distance of 9378 km from the center of the red planet. What is the period of Phobos (in hr)? (Mass of Mars = 6.42×10^{23} kg)

4. The Martian moon Deimos has a period that is greater than the other Martian moon, Phobos. Both moons have approximately circular orbits. (a) Is Deimos closer to or farther from Mars than Phobos? Explain. (b) Calculate the distance from the center of Mars to Deimos given that its period is 1.10×10^5 s.