Universal Gravitation
Chapter Eight- The ReReview
Physics

$m_e = 5.98 \times 10^{24}$ kg $\qquad m_s = 1.99 \times 10^{30}$ kg $\qquad m_m = 7.22 \times 10^{22}$ kg

$r_e = 6.38 \times 10^6$ m $\qquad r_s = 6.96 \times 10^8$ m $\qquad r_m = 1.785 \times 10^6$ m

$r_e = 1.5 \times 10^{11}$ m (orbital) $\qquad\qquad\qquad\qquad r_m = 3.9 \times 10^8$ m (from earth)

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad T_m = 27.3$ days

1. Using Kepler's Third Law find the period of a planet that is 3.5 times further from the sun than the earth is?

2. What would the orbiting velocity of that (from #1) planet be?

3. A rocket weighs 4.55×10^4 N on the surface of the earth. What's it weight when it is orbiting:
   a. 1500 km above the earth?

   b. 3500 km above the earth?

   c. 5500 km above the earth?

4. What is "g" on a planet that is 8.40×10^{24} kg and has a radius of 7.88×10^6 m?…b) What you weigh on that planet if you were 89.0 kg?

5. Using Newton's Variation of Kepler's Third Law to find the mass of a planet if its moon has an orbital radius of 3.90×10^7 m and a period of 47.0 earth days?

6. What would "g" be on the surface of the sun if it "red gianted" and expanded to have a radius of ;   a) 7.5 x 10^{10} m?….. and then collapsed to have a radius of 2.2 x 10^6 m?

7. What is the force of gravity between a 65 kg boy and a 55 kg girl that are 55 cm apart?

8. What is the orbiting velocity of Saturn as it circles the sun?,,,r_{so} = 1.427 x 10^{12} m.

9. What is the period of a rocket that is twice as close to the earth as the moon is?