Problem Set #1

[To be discussed in class... not required!]

1. Write the following numbers in scientific notation:

a) 32000.0

b) 0.000451

c) 17.862

d) 437.2×10^6

2. Do the following calculations on your (scientific) pocket calculator:

a) $(1.7 \times 10^6) \times (1.38 \times 10^{-16})$

b) $\dfrac{28.0}{6.02 \times 10^{23}}$

c) $(3.4 \times 10^{-15})^3$

d) $4\pi(6.36 \times 10^6)^2$

e) $\dfrac{(6.67 \times 10^{-11})(0.5)(0.3)}{(3.0 \times 10^{-2})^2}$

3. Unit conversion. Express:

a) A furlong (220 yards) in meters

b) A fortnight (2 weeks) in seconds

c) 65 $\frac{\text{mi}}{\text{hr}}$ in $\frac{\text{km}}{\text{hr}}$

d) 65 $\frac{\text{mi}}{\text{hr}}$ in $\frac{\text{m}}{\text{s}}$

4. When *Voyager 2* was at Neptune, it was roughly 4.3×10^{12} m from the Earth.

a) How many miles is this?

b) How long did it take for its signals to reach us? (These signals travel at the speed of light, $2.998 \times 10^8 \frac{\text{m}}{\text{s}}$.)

5. The planet Saturn has a mass of 5.69×10^{26} kg and a radius of 5.8×10^7 m. What is its (average) density? How does this compare with the density of water? (This indicates that Saturn is made of something other than rocks!)

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1 mi = 1.609 km 1 in = 2.54 cm 1 kg = 10^3 g 1 km = 10^3 m 1 m = 10^2 cm

1 light − year = 9.46×10^{15} m 1 hr = 3600 s 1 yr = 365.25 day