Name: __Key__   Period: 345, 6   Date: __2007__

Work the following problems using dimensional analysis/factor label method. You absolutely must show your work! Feel free to express your answers in scientific notation. You will need to!

1. You're going 44 meters/second. How fast are you going in miles/hour?

$$44 \frac{m}{s}\left(\frac{1\ Km}{1000\ m}\right)\left(\frac{1\ mile}{1.6\ Km}\right)\left(\frac{60\ s}{1\ min}\right)\left(\frac{60\ min}{1\ hr}\right) =$$

$$\frac{44 \times 1 \times 1 \times 60 \times 60)}{(1000 \times 1.6 \times 1 \times 1)} = \frac{158,400}{1600} = \boxed{99\ \frac{miles}{hr}}$$

2. How many liters are there in a bottle that holds 128 ounces of milk?

$$128\ oz\left(\frac{29.57\ ml}{1\ oz}\right)\left(\frac{1\ L}{1000\ ml}\right) = \frac{(128 \times 29.57 \times 1)}{(1 \times 1000)} =$$

$$\frac{3784.96}{1000} = \boxed{3.78\ L}$$

3. How many seconds are in one year?

$$1\ year\left(\frac{365.25\ days}{1\ year}\right)\left(\frac{24\ hr}{1\ day}\right)\left(\frac{60\ min}{1\ hr}\right)\left(\frac{60\ sec}{1\ min}\right) =$$

$$\boxed{31,557,600\ sec}$$

4. If there are approximately 6 trillion (6×10^{12}) miles in one light year, how far away is a star that is 430 light years? Express your answer in kilometers

$$430\ ly\left(\frac{6 \times 10^{12}\ miles}{1\ ly}\right)\left(\frac{1.6\ Km}{1\ mile}\right) = 4.128 \times 10^{15}\ Km$$

$$\boxed{4,128,000,000,000,000\ Km}$$

5. The Earth (here in La Cañada) rotates at a rate of about 1,000 miles/hour. How fast is this in micrometers/second?

$$\frac{1000\ miles}{hr}\left(\frac{1.6\ Km}{1\ mile}\right)\left(\frac{1000\ m}{1\ Km}\right)\left(\frac{1,000,000\ \mu m}{1\ m}\right)\left(\frac{1\ hr}{60\ min}\right)\left(\frac{1\ min}{60\ sec}\right) =$$

$$\frac{(1000 \times 1.6 \times 1000 \times 1,000,000 \times 1 \times 1)}{(1 \times 1 \times 1 \times 60 \times 60)} =$$

$$\frac{1600000000000}{3600} = 444444444.444\ \frac{\mu m}{sec} = 4.44444444 \times 10^8\ \frac{\mu m}{sec}$$