More practice for Test Review: Sept. 6

1) Convert 42 Mm/hr to Miles/sec

$$\left(\frac{42\ \text{Mm}}{1\text{hr}}\right)\left(\frac{1{,}000{,}000\ \text{m}}{1\ \text{Mm}}\right)\left(\frac{3.3\ \text{ft}}{1\ \text{m}}\right)\left(\frac{1\text{mi}}{5{,}280\ \text{ft}}\right)\left(\frac{1\ \text{hr}}{60\ \text{min}}\right)\left(\frac{1\ \text{min}}{60\text{sec}}\right)=$$

$$\frac{138{,}600{,}000\ \text{mi}}{19{,}008{,}000\ \text{sec}} = \frac{1.38\text{x}10^{8}\text{mi}}{1.9008\text{x}10^{7}\text{sec}} = 7.26\ \text{mi/sec}$$

2) Understand the Scientific Method, especially the role of procedures:
A) purpose of scientific method – *"Acquire Facts"*
B) how this is achieved – *"through repeatable and verifiable experiments"*
C) how do procedures provide this: *"by allowing duplication"*

3) Accuracy vs. precision: *(see "Teacher's Notes" on Website)*
A) given # is 6.78 meters: |
your readings: 6.6 m; 6.7 m; 6.8 m. Accurate or precise? ***Accurate***
B) Do you want a precise or accurate instrument? ***Precise***
C) Why? – *it can be calibrated (first time) or recalibrated (subsequent times).*
Note: This is why <u>standards</u> are so important: they allow us to calibrate precise instruments so that we can duplicate experiments, verifying data, which become facts – knowledge.)

4) You need to precisely determine the width of a floor tile to the closest millimeter, but your measuring tape only has centimeters.
How would you accomplish this?

Take many samples (like 100 tiles in a row). Then only the first and last are inaccurate (where it was measured). The middle tiles aren't measure and are therefore have no error.
The 2 cm error is divided amongst the samples: 2 cm ÷ 100 = .2 mm (that's accurate enough).

5) Know the general sizes of:
cm: width of pinky finger;
mm: thickness of finger nail;
liter: just bigger than a quart;
gram: weight of a dollar bill
kg: 2.2 pounds
meter: 3.3 ft;
km: 0.6 miles

6) An object going 3.6 m/s experiences an acceleration of 3.2 m/s^2 for 14.2 seconds. Find its final velocity. Give your answer with the correct number of significant figures.

$v_i = 3.6$ m/s
a = 3.2 m/s2
t = 14.2 sec
$v_f = ?$

$v_f = v_i + at$
$v_f = 3.6 + 3.2(14.2)$
$v_f = 3.6 + 45$ *(calculator gives 3.2(14.2) = 45.44 but in mult use least # of sig figs = 45)*
$v_f = 49$ m/s *(calculator gives 48.6: but in add use least # of decimals = 49)*