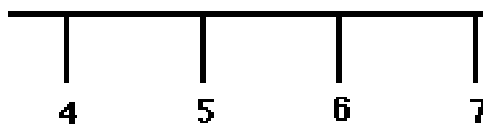Name_____

TA Name _____

Lab Section #_____

ALL work must be shown to receive full credit. **Due at the end of laboratory.**

ICE2.1. What is the difference in meaning between the length 4.2 meters and 4.20 meters?

The difference is in the measuring device. To measure 4.2 meters the last digit has some uncertainty. So the measuring device was probably marked in meters with no marks inbetween.

The measuring device that measured 4.20 meters had 10 marks between each meter mark.
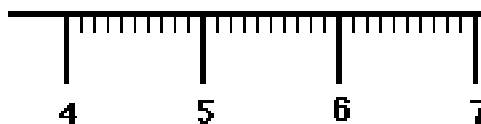
ICE2.2. Which of the following measurements are inconsistent with precision of the graduated cylinder in your locker? Explain.

30 mL, 42.56 mL, 35 mL, 92.5 mL

ICE2.3   Round off the following numbers to the indicated number of sig figs.

a) 0.350763 (3 sig figs)   **0.351**

b) 22.55555 (5 sig figs)   **22.556**

c) 653.899 (4 sig figs)   **653.9**

d) 5.0499×10^{-5} (4 sig figs) **5.050×10^{-5}**

e) 5.0499×10^{-5} (2 sig figs) **5.0×10^{-5}**

f) 235,000 (2 sig figs)   **2.4×10^{5}**

ICE2.4. Determine the result to the correct number of significant figures.

    a) 4.5 x 4.05 x 4.50 = **82**

    b) $\left(\dfrac{655000}{6.5500}\right)$ = **1.00 x 10^5**

    c) $\left(\dfrac{6.00}{33.000}\right)$ = **0.182**

    d) $\left(\dfrac{4.5 \cdot 6.3}{7.22}\right)$ = **3.9**

    e) $\left(\dfrac{112 \cdot 20}{30 \cdot 63}\right)$ = **1**

ICE2.5. Determine the result to the correct number of significant figures.

    a) 12.1 + 23.1 + 127.01 = **162.2**

    b) 43.65 − 23.7 = **20.0**

    c) 1237.6 + 23 + 0.12 = **1.2376 x 10^3 + 2.3 x 10^1 + 1.2 x 10^{-1} =**

                      1.2376 x 10^3 + 0.023 x 10^3 + 0.00012 x 10^3 = 1.261 x 10^3

    d) 4650 + 25 + 200 = **4.65 x 10^3 + 2.5 x 10^1 + 2 x 10^2 =**

                      4.65 x 10^3 + 0.025 x 10^3 + 0.2 x 10^3 = 4.9 x 10^3

    e) 4.72 − 3.908 = **0.81**

    f) $\left(\dfrac{12.376 + 12.374}{2.13}\right)$ = **11.6**

    g) 5.0499 x 10^{-5} + 6.012 x 10^{-4} = **6.517 x 10^{-4}**

    h) 1.35 x 10^3 − 6.234 x 10^2 = **7.3 x 10^2**

ICE2.6. Perform the following conversions;

    a) 73.5 km to miles (use at least 3 conversion factors)

        73.5 km $\left(\dfrac{1000 \text{ m}}{1 \text{ km}}\right)\left(\dfrac{100 \text{ cm}}{1 \text{ m}}\right)\left(\dfrac{1 \text{ in}}{2.54 \text{ cm}}\right)\left(\dfrac{1 \text{ ft}}{12 \text{ in}}\right)\left(\dfrac{1 \text{ mile}}{5280 \text{ ft}}\right)$ = 45.7 mile

b) liquid nitrogen boils at –196 ˚C, calculate the temperature in ˚F and K.

$$\mathbf{˚F} = \frac{9}{5}\mathbf{˚C} + 32 = \frac{9}{5}(-196) + 32 = -321\ \mathbf{˚F}$$

$$\mathbf{K} = \mathbf{˚C} + 273 = -196 + 273 = 77\ \mathbf{K}$$

c) a fertilizer suggests an application of $2.06 \times 10^{-1}\ \dfrac{kg}{m^2}$. Convert to $\dfrac{pounds}{foot^2}$.

$$2.06\ \mathbf{x}\ \mathbf{10^{-1}}\ \frac{\mathbf{kg}}{\mathbf{m^2}}\left(\frac{\mathbf{1000\ g}}{\mathbf{1\ kg}}\right)\left(\frac{\mathbf{1\ lb}}{\mathbf{454\ g}}\right)\left(\frac{\mathbf{1\ m}}{\mathbf{100\ cm}}\right)^2\left(\frac{\mathbf{2.54\ cm}}{\mathbf{1\ inch}}\right)^2\left(\frac{\mathbf{12\ in}}{\mathbf{1\ ft}}\right)^2$$

$$= 4.22\ \mathbf{x}\ \mathbf{10^3}\ \frac{\mathbf{lb}}{\mathbf{ft^2}}$$

d) How many gallons in a 575 mLs?

$$575\ \mathbf{mL}\left(\frac{\mathbf{1\ L}}{\mathbf{1000\ mL}}\right)\left(\frac{\mathbf{1.0567\ quart}}{\mathbf{1\ L}}\right)\left(\frac{\mathbf{1\ gal}}{\mathbf{4\ guart}}\right) = 1.52\ \mathbf{x}\ \mathbf{10^{-1}}\ \mathbf{gallons}$$

ICE2.7. What is the formula for the compound formed from the following combination of elements;

a) Na and bromine   **NaBr**

b) magnesium and oxygen   **MgO**

c) aluminum and Cl_2 **AlCl$_3$**

d) iron and sulfur   **FeS or Fe$_2$S$_3$**

ICE2.8. Complete the following table.

Name of the compound	Formula of the compound
diphosphorus pentoxide	P_2O_5
Lead sulfide	PbS
Hydrogen fluoride	$HF_{(g)}$
ammonia	NH_3
diboron trioxide	B_2O_3
copper(I) chloride	CuCl
silver sulfide	Ag_2S
Dinitrogen tetrabromide	N_2Br_4
potassium peroxide	K_2O_2