Derived Quantities – Algebra Practice

Name - _____

1.) Find the derived value and units for:

a.) the molar concentration, c, using the equation $c = \frac{n}{V}$, where n = 0.250 mol and V = 0.500 L.

b.) the universal gas constant, R, using the equation, $R = \frac{PV}{nT}$, where P = 1 atm, V = 22.4 L, n = 1 mol, T = 298 K.

c.) the entropy change for boiling water, ΔS, using the equation

ΔH = TΔS   where ΔH = 44.0 kJ and T = 373 K.

2.) If density is mass divided by volume and if mass is measured in grams and volume in litres, what is the unit of density?

3.) A 3.50 mL chunk of boron has a mass of 8.19 g. What is the density of boron?

4.) An iron bar has a mass of 125 g. If iron's density is $7.86 \times 10^3 \frac{g}{L}$, what volume does the bar occupy?

5.) A 70.0 g sphere of manganese (density $7.20 \times 10^3 \frac{g}{L}$) is dropped into a graduated cylinder containing 54.0 mL of water. What will be the water level indicated after the sphere is inserted?

6.) A $25.0 \ mL$ portion of each of W, X, Y, and Z is poured into a $100 \ mL$ graduated cylinder. Each of the 4 compounds is a liquid and will not dissolve in the others. If $55.0 \ mL$ of W has a mass of $107.3 \ g$, $12.0 \ mL$ of X has a mass of $51.8 \ g$, $42.5 \ mL$ of Y has a mass of $46.8 \ g$ and $115.0 \ mL$ of Z has a mass of $74.8 \ g$, list the layers in the cylinder from top to bottom.

7.) Explain why boats made of iron are able to float. The density of iron is $7.86 \times 10^3 \frac{g}{L}$.

8.) The density of copper is $8.92 \times 10^3 \frac{g}{L}$ and the density of magnesium is $1.74 \times 10^3 \frac{g}{L}$. What mass of magnesium occupies the same volume as $100.0 \ g$ of copper?