Chem I   Worksheet #38   Stoichiometry (Mole Ratios)   Name _____
Text Reference pgs 275-281
Vocabulary: stoichiometry, mole ratio
Summary: Chemical reactions give information about the amount of MOLES involved the reaction. The coefficients are the relative amounts of moles of each reactant and product used or produced in the reaction. A mole ratio relates the proportions of moles of any 2 reactants or products.

1) Explain why, in the balanced chemical equation $C + O_2 \rightarrow CO_2$ we know that 1 g of C will *not* react exactly with 1 g of O_2.

2) Define mole ratio.

3) True or False. For the reaction represented by the balanced equation
        $Mg(OH)_2(aq) + 2HCl(aq) \rightarrow 2H_2O(l) + MgCl_2(aq)$

if 0.40 mol of $Mg(OH)_2$ is to react, then 0.20 mol of HCl will be needed.

4) If number 3 above is false, how many moles of HCl will be needed?

5) Consider the balanced equation $C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$.
a) What is the mole ratio that would enable you to calculate the number of moles of oxygen needed to react exactly with a given number of moles of $C_3H_8(g)$?_____

b) What mole ratio would enable you to calculate how many moles of carbon dioxide product would form from a given number of moles of $C_3H_8(g)$?_____

c) What mole ratio would enable you to calculate how many moles of water vapor product would form from a given number of moles of $C_3H_8(g)$?_____

6) Using the following balanced equation $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$
a) How many moles of product would be produced by complete reaction of 0.15 moles of magnesium? (Be sure to show your work including the mole ratio you used)
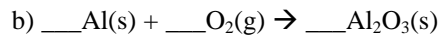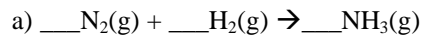
b) How many moles of product would be produced by complete reaction of 0.15 moles of oxygen gas? (Be sure to show your work including the mole ratio you used)

7) Using the following balanced equation $4 Fe(s) + 3O_2(g) \rightarrow 2Fe_2O_3(s)$
a) How many moles of product would be produced by complete reaction of 0.15 moles of iron? (Be sure to show your work including the mole ratio you used)

b) How many moles of product would be produced by complete reaction of 0.15 moles of oxygen gas? (Be sure to show your work including the mole ratio you used)

8) For each of the following **unbalanced** equations, calculate how many moles of the *second* reactant would be required to react exactly with 3.125 mol of the *first* reactant. Write clearly the mole ratio used for the conversion.

a) ___N_2(g) + ___H_2(g) → ___NH_3(g)

b) ___Al(s) + ___O_2(g) → ___Al_2O_3(s)

9) For the following balanced equation, NH_3(g) + HCl(g) → NH_4Cl(s) how many moles of the product could be produced by complete reaction of 1.00g of ammonia?