

Mole Ratio Worksheet

1) Given this equation: $N_2 + 3 H_2 \rightarrow 2 NH_3$, write the following molar ratios:

a) N_2 / H_2 $1 : 3$

b) N_2 / NH_3 $1 : 2$

c) H_2 / NH_3 $3 : 2$

2) Given the following equation: $8 H_2 + S_8 \rightarrow 8 H_2S$, write the following molar ratios:

a) H_2 / H_2S $8 : 8 \rightarrow 1 : 1$

b) H_2 / S_8 $8 : 1$

c) H_2S / S_8 $8 : 1$

3) Answer the following questions for this equation: $2 H_2 + O_2 \rightarrow 2 H_2O$

a) What is the H_2 / H_2O molar ratio? $2 : 2 \rightarrow 1 : 1$

b) Suppose you had 20 moles of H_2 on hand and plenty of O_2 , how many moles of H_2O could you make? $20 H_2 \cdot \frac{2 H_2O}{2 H_2} = 20 \text{ mol } H_2O$

c) What is the O_2 / H_2O molar ratio?

d) Suppose you had 20 moles of O_2 and enough H_2 , how many moles of H_2O could you make? $1 : 2$
 $20 O_2 \cdot \frac{2 H_2O}{1 O_2} = 40 \text{ mol } H_2O$

4) Use this equation: $N_2 + 3 H_2 \rightarrow 2 NH_3$, for the following problems

a) If you used 1 mole of N_2 , how many moles of NH_3 could be produced?

b) If 10 moles of NH_3 were produced, how many moles of N_2 would be required? $1 \text{ mol } N_2 \cdot \frac{2 NH_3}{1 N_2} = 2 \text{ mol } NH_3$

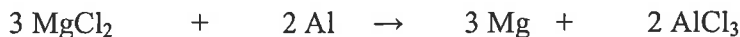
c) If 3.00 moles of H_2 were used, how many moles of NH_3 would be made? $10 \text{ mol } NH_3 \cdot \frac{1 N_2}{2 NH_3} = 5 \text{ mol } N_2$

d) If 0.600 moles of NH_3 were produced, how many moles of H_2 are required?

$3 \text{ mol } H_2 \cdot \frac{2 NH_3}{3 H_2} = 2 \text{ mol } NH_3$
 $0.6 \text{ mol } NH_3 \cdot \frac{3 H_2}{2 NH_3} = 0.9 \text{ mol } H_2$

Mole Ratio Worksheet

1. Consider the chemical reaction represented by the equation below:



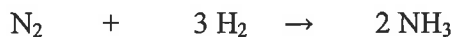
- a. If 8 moles of magnesium chloride react with enough aluminum, how many moles of aluminum chloride are produced?

$$8 \text{ mol MgCl}_2 \cdot \frac{2 \text{ AlCl}_3}{3 \text{ MgCl}_2} = 5.33 \text{ mol AlCl}_3$$

- b. How many moles of magnesium chloride are needed to with 10 moles of aluminum?

$$10 \text{ mol Al} \cdot \frac{3 \text{ MgCl}_2}{2 \text{ Al}} = 15 \text{ mol MgCl}_2$$

2. Consider the following chemical reaction:



- a. How many moles of nitrogen gas are needed to react with to react with 7.5 moles of hydrogen?

$$7.5 \text{ mol H}_2 \cdot \frac{1 \text{ N}_2}{3 \text{ H}_2} = 2.5 \text{ mol N}_2$$

- b. How many moles of ammonia would you get if 4.5 moles of hydrogen gas reacted?

$$4.5 \text{ mol H}_2 \cdot \frac{2 \text{ NH}_3}{3 \text{ H}_2} = 3 \text{ mol NH}_3$$

- c. How many moles of nitrogen gas are needed in order to produce 5 moles of NH₃?

$$5 \text{ mol NH}_3 \cdot \frac{1 \text{ N}_2}{2 \text{ NH}_3} = 2.5 \text{ mol N}_2$$

3. Consider the combustion of methane (CH₄).



- a. How many moles of carbon dioxide are obtained when 20 moles of methane are burned?

$$20 \text{ mol CH}_4 \cdot \frac{1 \text{ CO}_2}{1 \text{ CH}_4} = 20 \text{ mol CO}_2$$

- b. If only 15 moles of oxygen are available, how many moles of methane will burn?

$$15 \text{ mol O}_2 \cdot \frac{1 \text{ CH}_4}{2 \text{ O}_2} = 7.5 \text{ mol CH}_4$$

- c. During combustion, 12 moles of carbon dioxide were obtained. How many moles of water were also obtained?

$$12 \text{ mol CO}_2 \cdot \frac{2 \text{ H}_2\text{O}}{1 \text{ CO}_2} = 24 \text{ mol H}_2\text{O}$$