



Chemistry

Name: _____

Section _____

MOLE TO MOLE

Date: _____

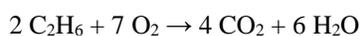
Solve the following mole to mole ratio problems using conversion factors from the balanced equations. Show all your work and unit cancellations.

1. Given the reaction $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$, how many moles of oxygen must react if 32.7 moles of hydrogen react completely?

$$32.7 \text{ mol}_{\text{H}_2} \times \frac{1 \text{ mol}_{\text{O}_2}}{2 \text{ mol}_{\text{H}_2}} = 16.35 \text{ mol}_{\text{O}_2}$$

16.4 mol of O₂

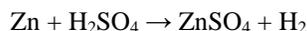
2. If 23.8 moles of oxygen are consumed in the reaction below, how many moles of carbon dioxide are produced?



$$23.8 \text{ mol}_{\text{O}_2} \times \frac{4 \text{ mol}_{\text{CO}_2}}{7 \text{ mol}_{\text{O}_2}} = 13.6 \text{ mol}_{\text{CO}_2}$$

13.6 mol of CO₂

3. How many moles of hydrogen are produced when 2.53 moles of zinc react according to the following reaction?



$$2.53 \text{ mol}_{\text{Zn}} \times \frac{1 \text{ mol}_{\text{H}_2}}{1 \text{ mol}_{\text{Zn}}} = 2.53 \text{ mol}_{\text{H}_2}$$

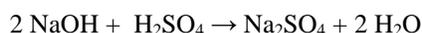
2.53 mol of H₂

4. Given the reaction $2 \text{CO} + \text{O}_2 \rightarrow 2 \text{CO}_2$, how many moles of carbon dioxide are produced if 75.1 moles of oxygen are burned completely?

$$75.1 \text{ mol}_{\text{O}_2} \times \frac{2 \text{ mol}_{\text{CO}_2}}{1 \text{ mol}_{\text{O}_2}} = 150.2 \text{ mol}_{\text{CO}_2}$$

150. mol of O₂

5. How many moles of water are produced if 2.93 moles of sodium sulfate are produced in the reaction below?



$$2.93 \text{ mol}_{\text{Na}_2\text{SO}_4} \times \frac{2 \text{ mol}_{\text{H}_2\text{O}}}{1 \text{ mol}_{\text{Na}_2\text{SO}_4}} = 5.86 \text{ mol}_{\text{H}_2\text{O}}$$

5.86 mol of H₂O

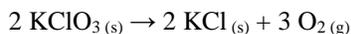
6. If 14.2 moles of aluminum chloride are decomposed, how many moles of chlorine gas are produced? (Hint: write the balanced equation first.)



$$14.2 \text{ mol}_{\text{AlCl}_3} \times \frac{3 \text{ mol}_{\text{Cl}_2}}{2 \text{ mol}_{\text{AlCl}_3}} = 21.3 \text{ mol}_{\text{Cl}_2}$$

21.3 mol of Cl₂

7. How many moles of oxygen gas are produced if 5.16 moles of potassium chlorate decompose completely?



$$5.16 \text{ mol}_{\text{KClO}_3} \times \frac{3 \text{ mol}_{\text{O}_2}}{2 \text{ mol}_{\text{KClO}_3}} = 7.74 \text{ mol}_{\text{O}_2}$$

7.74 mol of O₂

8. How many moles of aluminum must react to produce when 0.594 moles of aluminum sulfide?



$$0.594 \text{ mol}_{\text{Al}_2\text{S}_3} \times \frac{16 \text{ mol}_{\text{Al}}}{8 \text{ mol}_{\text{Al}_2\text{S}_3}} = 1.188 \text{ mol}_{\text{Al}}$$

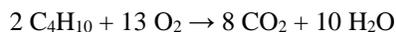
1.19 mol of Al

9. Given the reaction $\text{Fe}_2\text{O}_3 (\text{s}) + 3 \text{CO} (\text{g}) \rightarrow 2 \text{Fe} (\text{l}) + 3 \text{CO}_2 (\text{g})$, how many moles of liquid iron are produced when 0.619 moles of carbon monoxide react completely?

$$0.619 \text{ mol}_{\text{CO}} \times \frac{2 \text{ mol}_{\text{Fe}}}{3 \text{ mol}_{\text{CO}}} = 0.4126667 \text{ mol}_{\text{Fe}}$$

0.413 mol of Fe

10. How many moles of oxygen are required for the complete combustion of 0.758 moles of butane, C₄H₁₀?



$$0.758 \text{ mol}_{\text{C}_4\text{H}_{10}} \times \frac{13 \text{ mol}_{\text{O}_2}}{2 \text{ mol}_{\text{C}_4\text{H}_{10}}} = 4.927 \text{ mol}_{\text{O}_2}$$

4.93 mol of O₂