

Name: _____ Date: _____ Block: _____

Directions: Complete the calculations below. Show all work. **Circle your final answer.**

1. What is the empirical formula of a substance composed of 56.6% potassium, 8.68% carbon, and 34.7% oxygen?

2. What is the empirical formula of a compound composed of 3.26 g of arsenic and 1.04 g of oxygen?

3. An unknown compound is analyzed and found to consist of 24.3% carbon, 4.1% hydrogen, and 71.6% chlorine. If the molecular mass of the compound is 98 g/mol, what is the molecular formula of the compound?

4. Find the molecular formula for a compound with a percent composition of 85.6% C, 14.4% H and that has a molecular mass of 42 g/mol.

5. The compound benzene has the following percent composition: 92.3% C, 7.8% H
 - a. Find benzene's empirical formula

- b. Find the molecular formula of benzene if the molecular mass is 78.12 g/mol
6. Tryptophan, the chemical in turkey that is believed to make you sleepy, has the empirical formula $C_{11}H_{12}N_2O_2$. Find the molecular formula if the molecular mass is 408 g/mol.
7. Caffeine is made up of 49.05% carbon, 5.08% hydrogen, 16.75% oxygen, and 29.12% nitrogen. Find the molecular formula of caffeine if its overall molecular mass is 194 g/mol.
8. A compound is 36.1% calcium and the rest is chlorine
- If you had 100g of the compound, how many grams of calcium would you have?
 - If you had 100g of the compound, how many grams of chlorine would you have?
 - How many moles of calcium would that be?
 - How many moles of chlorine would that be?
 - What is the ratio of $\frac{\text{moles of chlorine}}{\text{moles of calcium}}$?
 - What is the simplest (empirical) formula of this substance?