Mole HW #1 name

Show all work, watch out for SF and Units always. Both Sides.

1	How many atoms are in 2.00 moles of aluminum?
2	How many molecules are in 2.45 mole of CO_2?
3	How many atoms are in 3.50 moles of titanium?
4	How many moles are in 1.50×10^{23} molecules NH_3 (ammonia)

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5	How many moles are in 6.02×10^{22} molecules of Br_2?
6	How many moles are in 6.02×10^{24} atoms of Li (lithium)
7	How many grams are in 2.00 moles of aluminum?
8	How many moles are in 10.0×10^{19} molecules O_2 (that's a lot!)

Mole HW #2 name

Write the ions and their charges in the boxes, then the formula of each of these 4 compounds. Calculate the MOLAR MASSES for each of these four compounds.

Ammonium Phosphate

Cation	Anion	Formula

Lithium Dichromate

Cation	Anion	Formula

Gold I Thiosulfate

Cation	Anion	Formula

Barium Hydrogen Sulfate

Cation	Anion	Formula

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Mole HW #3 name

Show all work, watch out for SF and Units always. Both Sides.

1	You have a balloon containing 302 liters of nitrogen gas at STP. What does the mass of this gas?
2	There are 185 grams of sucrose, with this formula: $C_{12}H_{22}O_{11}$ in a batch of chocolate chip cookies that you just ate. How many grams were just carbon?
3	In the 185 grams of sucrose, how many grams are just oxygen?

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A molecular formula, or chemical formula gives the ratio of atoms to atoms, or ions to ions, in a compound. John Dalton said simple whole number ratios only, but he did not understand then that carbon based compounds could break that rule because carbon can make "chains" and even "rings" of carbon, which makes many molecular formulas break that rule, like glucose, and then octane in the two examples.

An empirical formula is a formula that mathematically "reduces" the molecular formula ratio to simple whole numbers. The empirical formulas for the first two examples are not glucose or octane, and most empirical formulas can't even bond together as real molecules at all. Empirical formulas are more "math" than chemistry.

Example three is the silliest, sometimes a molecular formula can't be reduced, so the molecular formula IS the empirical formula as well.

	Molecular formula	Empirical formula
ex 1	$C_6H_{12}O_6$ 6:12:6 reduces →	CH_2O 1:2:1
ex 2	C_8H_{18} 8:18 reduces →	C_4H_9 4:9
ex 3	CO_2 1:2 can't be reduced	CO_2 so molecular + empirical formula match
1	C_6H_{12} (hexane)	
2	$C_{10}H_{22}$ (decene)	
3	CH_4 (methane)	
4	$C_{10}H_{18}$ (decyne)	
5	C_3H_6 (propane)	
6	C_3H_6 (propene)	
7	C_3H_4 (propyne)	
8	$C_{22}H_{44}$ (docosene)	
9	C_2H_5OH (ethanol)	
10	$C_{32}H_{66}$ (dotriacontane)	

Mole HW #5 name

Show all work, including molar mass and percent comp by mass calculations.
Write ions, and then the formula, and then do molar mass at left, then % comp at right. 2 sides.

What is the percent composition by mass for ammonium hydrogen sulfate?	Cation	Anion	Formula
Molar mass	Percent comp by mass		

What is the percent composition by mass for chromium (III) acetate?	Cation	Anion	Formula

What is the percent composition by mass for aluminum hydroxide?	Cation	Anion	Formula
Molar mass	Percent comp by mass		

What is the percent composition by mass for magnesium chlorite?	Cation	Anion	Formula