

Determining Molecular Formulas

1. Complete the following table.

Elements combined	Type of Bond	Cross-over Rule	Lewis Dot Diagram	Formula
lithium + nitrogen	1	$\text{Li}^{+1} \text{N}^{-3}$ 1×3	$\text{Li}^{+1} \text{N}^{-3} \text{Li}^{+1} \text{Li}^{+1}$	Li_3N
calcium + chlorine	1	$\text{Ca}^{+2} \text{Cl}^{-1}$ 2×1	$\text{Cl}^{-1} \text{Ca}^{+2} \text{Cl}^{-1}$	CaCl_2
strontium + sulfur	1	$\text{Sr}^{+2} \text{S}^{-2}$ 2×2	$\text{Sr}^{+2} \text{S}^{-2}$	SrS
potassium + iodine	1	$\text{K}^{+1} \text{I}^{-1}$ 1×1	$\text{K}^{+1} \text{I}^{-1}$	KI
magnesium + nitrogen	1	$\text{Mg}^{+2} \text{N}^{-3}$ 2×3	$\text{Mg}^{+2} \text{N}^{-3} \text{Mg}^{+2} \text{Mg}^{+2}$	Mg_3N_2
potassium + phosphorus	1	$\text{K}^{+1} \text{P}^{-3}$ 1×3	$\text{K}^{+1} \text{P}^{-3} \text{K}^{+1} \text{K}^{+1}$	K_3P
barium + oxygen	1	$\text{Ba}^{+2} \text{O}^{-2}$ 2×2	$\text{Ba}^{+2} \text{O}^{-2}$	BaO
sodium + chlorine	1	$\text{Na}^{+1} \text{Cl}^{-1}$ 1×1	$\text{Na}^{+1} \text{Cl}^{-1}$	NaCl
beryllium + bromine	1	$\text{Be}^{+2} \text{Br}^{-1}$ 2×1	$\text{Be}^{+2} \text{Br}^{-1} \text{Br}^{-1}$	BeBr_2
boron + iodine	C	$\text{B} \text{I}^{-1}$ 3×1	$\text{I} \text{B} \text{I}$	BI_3

metalloid ∴ acts as a non-metal

no charges
no arrows

may use
but be careful

2. Complete the following table.

Elements combined	Type of Bond	Lewis Dot Diagram	Formula
carbon + oxygen	C		CO ₂
oxygen + oxygen	e		O ₂
phosphorus + chlorine	C		PCl ₃
oxygen + fluorine	C		OF ₂
nitrogen + nitrogen	C		N ₂
carbon + chlorine	C		CCl ₄
hydrogen + oxygen	C		H ₂ O
chlorine + chlorine	C		Cl ₂
carbon + hydrogen	C		CH ₄
nitrogen + hydrogen	C		NH ₃

C O
4 x 2
C₂O₄

P Cl
3 x 1

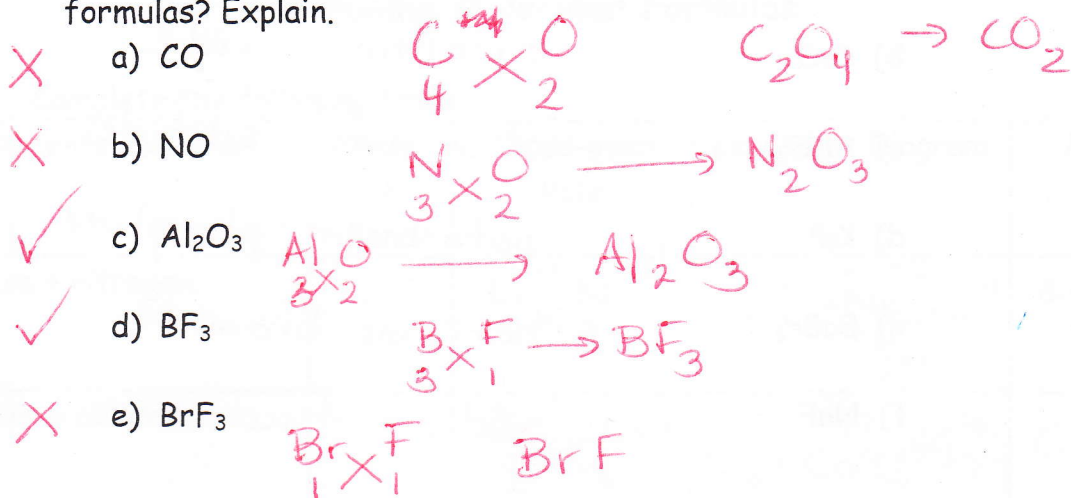
O F
2 x 1

C Cl
4 x 1

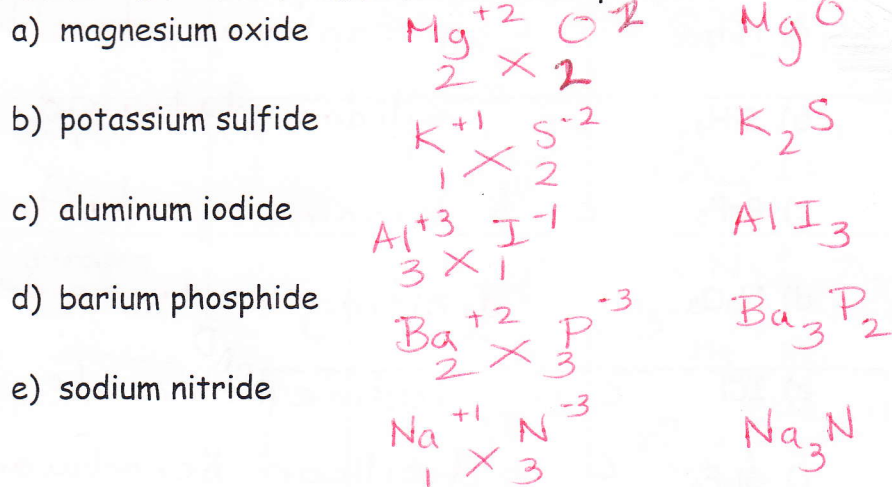
C H
4 x 1

N H
3 x 1

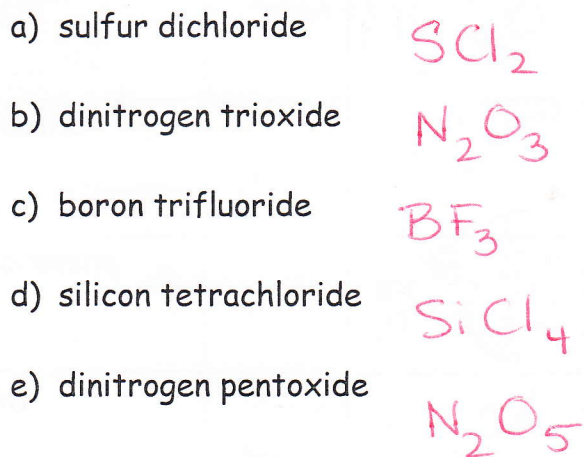
3. Can the Octet Rule be used to explain the following chemical formulas? Explain.



4. Write the molecular formula for each compound.



5. Write the molecular formula for each compound.



3. Can the Octet Rule be used to explain the following chemical formulas? Explain.

- X a) CO $\begin{matrix} C^{+4} & O \\ 4 & \times & 2 \end{matrix}$ $C_2O_4 \rightarrow CO_2$
- X b) NO $\begin{matrix} N & O \\ 3 & \times & 2 \end{matrix} \longrightarrow N_2O_3$
- ✓ c) Al_2O_3 $\begin{matrix} Al & O \\ 3 & \times & 2 \end{matrix} \longrightarrow Al_2O_3$
- ✓ d) BF_3 $\begin{matrix} B & F \\ 3 & \times & 1 \end{matrix} \longrightarrow BF_3$
- X e) BrF_3 $\begin{matrix} Br & F \\ 1 & \times & 1 \end{matrix}$ BrF

4. Write the molecular formula for each compound.

- a) magnesium oxide $\begin{matrix} Mg^{+2} & O^{-2} \\ 2 & \times & 2 \end{matrix}$ MgO
- b) potassium sulfide $\begin{matrix} K^{+1} & S^{-2} \\ 1 & \times & 2 \end{matrix}$ K_2S
- c) aluminum iodide $\begin{matrix} Al^{+3} & I^{-1} \\ 3 & \times & 1 \end{matrix}$ AlI_3
- d) barium phosphide $\begin{matrix} Ba^{+2} & P^{-3} \\ 2 & \times & 3 \end{matrix}$ Ba_3P_2
- e) sodium nitride $\begin{matrix} Na^{+1} & N^{-3} \\ 1 & \times & 3 \end{matrix}$ Na_3N

5. Write the molecular formula for each compound.

- a) sulfur dichloride SCl_2
- b) dinitrogen trioxide N_2O_3
- c) boron trifluoride BF_3
- d) silicon tetrachloride $SiCl_4$
- e) dinitrogen pentoxide N_2O_5

6. Give the chemical name for each compound.

- a) Li_2S i lithium sulfide
- b) CaO i calcium oxide
- c) Al_2S_3 i aluminum sulfide
- d) K_3P i potassium phosphide
- e) BaBr_2 i barium bromide
- f) NaF i sodium fluoride

7. Give the chemical name for each compound.

- a) PCl_3 c phosphorus trichloride
- b) SiH_4 c silicon tetrahydride
- c) BrF_5 c bromine pentafluoride
- d) N_2O_3 c dinitrogen trioxide
- e) ICl c iodine monochloride
- f) Si_2F_6 c disilicon hexafluoride