Chemical Stoichiometry

Calculations based on a balanced chemical reaction or correct chemical formula.

For the reaction: \[ aA + bB \rightarrow cC + dD \]

a, b, c and d are stoichiometric coefficients or our stoichiometric numbers.
These numbers are the atom, mole or formula unit count.

Then: \[ \text{moles of a reactant or product} = \frac{\text{moles of another reactant or product}}{\text{the stoichiometric number}} \]

that is, \[ \frac{\text{moles A}}{a} = \frac{\text{moles B}}{b} = \frac{\text{moles C}}{c} = \frac{\text{moles D}}{d} \]

For the formula: \[ MxEy \]

and, \[ \text{moles of one constituent} = \frac{\text{moles of the other constituent}}{\text{the stoichiometric number}} \]

that is, \[ \frac{\text{moles M}}{x} = \frac{\text{moles E}}{y} \]

The number of moles of a given substance can be obtained as follows:

\[ \text{moles} = \frac{\text{mass}}{\text{formula mass}} \]
\[ \text{moles} = \frac{\text{the number of formula units}}{\text{the Avagadro number}} \]
\[ \text{moles} = \text{the volume of solution} \times \text{the molarity of the solution} \]
\[ \text{moles} = \frac{PV}{RT} \]

Percent yield = \[ \frac{\text{the actual product mass} \times 100}{\text{the maximum theoretical product mass}} \]