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Combined Gas Law

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

P = Pressure (atm)
V = Volume (L)
T = Temp (K)

Gas Law Relationships

P ind. rel. to V ↑↓ OR ↓↑
P and V dir. rel. to T ↑↑ OR ↓↓

Ideal gas: gas that behaves based on combined/ideal gas law

Standard Temp and Pressure (STP)
T = 0°C / 273k
P = 1 atm
V/mol = 22.4L/mol

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Ideal Gas Law

Law that adds "n" (#mol) to the combined gas law

Combined gas law

$$k = \frac{PV}{T}$$

k: constant $\left(\frac{atm \cdot L}{k}\right)$

Ideal gas law

$$R = \frac{PV}{nT}$$

R: constant $\left(\frac{atm \cdot L}{mol \cdot k}\right)$ #mol ideal gas

R: "Ideal" gas constant*

$R = 0.0821 \frac{L \cdot atm}{mol \cdot K}$

*Universal

Ideal gas law "forms"

Base: $PV = nRT$

P (atm), V (L)

n (mol), T (k)

$R = 0.0821 \frac{L \cdot atm}{mol \cdot k}$

$n = \frac{PV}{RT}$ (mol)

$V = \frac{nRT}{P}$ (L)

$P = \frac{nRT}{V}$ (atm)

$T = \frac{PV}{nR}$ (k)

$CO_2(g)$: $V = 1.20L$ $P = 1.50atm$ (50% greater than room P)

$T = 310.0k$ $n_{CO_2(g)} = \_\_mol$

$R = 0.0821 \frac{L \cdot atm}{mol \cdot k}$

$$n = \frac{PV}{RT} = \frac{1.50\cancel{atm} \cdot 1.20\cancel{L}}{0.0821 \frac{\cancel{L} \cdot \cancel{atm}}{mol \cdot \cancel{k}} \cdot 310.0\cancel{K}} = 0.071 \text{ mol } CO_2(g)$$