Ideal Gas Law

$$PV = nRT$$

- P → pressure (atm)
- V → volume (L)
- n → moles (mol)
- T → temp (K)
- R → gas law constant

$$R = \frac{PV}{nT} = \frac{(atm)(L)}{(mol)(K)} = \frac{.0821\ atm \cdot L}{mol \cdot K} \times \frac{760\ mmHg}{1\ atm}$$

Special - all 4 variables

- can be used to derive all other gas Laws

Boyle's $P_1V_1 = P_2V_2$ n held constant? R, n, T

$P_1V_1 = n_1R_1T_1$

$P_2V_2 = n_2R_2T_2$

$n_1 = n_2 = n$

$R_1 = R_2 = R$

$T_1 = T_2 = T$

$P_1V_1 = nRT$

$P_2V_2 = nRT$

$P_1V_1 = P_2V_2$

Charles's

V's & T's

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

$$\frac{PV}{T} = \frac{nR}{P}$$

$$\frac{V}{T} = \frac{nR}{P}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

250. mL (V), 770. mm Hg (P), 2.4 °C (T), n = ?

Given:

$V = 250.\ mL \times \frac{1\ L}{1000\ mL} = .250\ mL$

$P = 770.\ mm\ Hg \times \frac{1\ atm}{760\ mm\ Hg} = 1.01\ atm$

$T = 2.4\ ^\circ C + 273.2 = 275.6\ K$

looking for: n = ?

847

.011

type: Ideal

HOYK?: all 4 variables

formula:

$PV = nRT$

$n = \frac{PV}{RT} = \frac{(1.01\ atm)(.250\ L)}{\left(\frac{.0821\ atm \cdot L}{mol \cdot K}\right)(275.6\ K)}$

$= \frac{(3)\ mol}{}$