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Boyle's Law (Pressure-Volume Relationship)

amount of gss[m]= number of moles n) of gas = volume of gass

$p \alpha 1/V$

$p = K_1 1/V$

when **T is constant and amount of gass is fixed** and for a fixed → define your temprature, mass, Pressure, volume

P is inversely Prop. to V

$$\Rightarrow p = k_1 \frac{1}{V} \qquad (5.2)$$

$$pV = k_1 \qquad (5.3)$$

Proportionality Constant.
Its value depends upon the m, T and the units in which p and V are expressed [pascal, cm^3]

If a fixed amount of gas at constant temperature T occupying volume V_1 at pressure p1 undergoes expansion, so that volume becomes V_2 and pressure becomes p_2, then according to Boyle's law

$$p_1V_1 = p_2V_2 = \text{constant} \qquad (5.4)$$

$$\Rightarrow \frac{p_1}{p_2} = \frac{V_2}{V_1} \qquad (5.5)$$

Let x and y be two proportional quantities.
Let k be a constant.

$y = kx$

$\frac{y}{x} = k$

$x \alpha y$

$x = \kappa y$

$x/y = \kappa$

What is the constant of proportionality in the equation $4y = 8x$?

$y = kx$

$\frac{4y}{4} = \frac{8x}{4}$

$y = 2x$