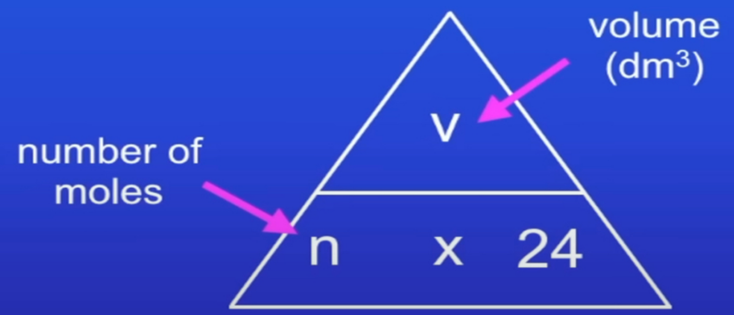
Using gas volumes

- One mole of any gas occupies a volume of 24 dm^3 (at room temperature and pressure).
- Room temperature = 20°C.
- Room pressure = 1 atmosphere.

$$\text{Volume } (dm^3) = \text{Number of moles} \times 24$$



Calculate the volume of 112 g of nitrogen gas (N_2).

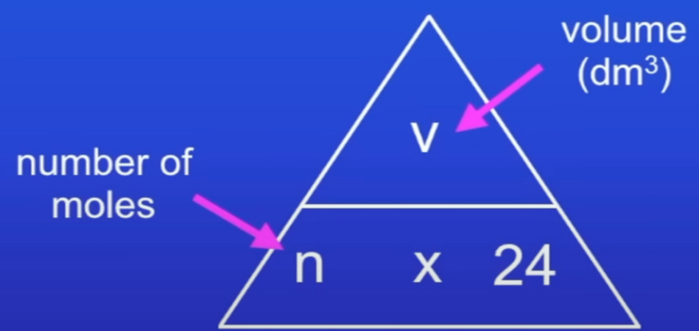
M_r N_2 = 28.

$$\text{Number of moles} = \frac{\text{Mass (g)}}{\text{Relative formula mass } M_r}$$

$$\frac{112}{28} = 4 \text{ mols}$$

$v = 4 \times 24 = 96 dm^3$

Volume (dm^3) = Number of moles x 24



Work out the number of moles in $168dm^3$ of substance A.

volume

$\frac{168}{24} = 7$ moles

$\frac{V}{n} = 24$

$n \times 24 = V$

$\frac{V}{24} = n$

work out the volume of 12 moles of gas B.

$12 \times 24 = 288\ dm^3$

Calculate the volume of 51 g of ammonia gas (NH_3).
M_r NH_3 = 17.

$$\text{Number of moles} = \frac{\text{Mass (g)}}{\text{Relative formula mass } M_r}$$

$$\frac{51}{17} = 3 \text{ mols}$$

Volume of gas = n (mols) x 24

$3 \times 24 = 72 dm^3$

Calculate the volume of 150 g of ethane (C_2H_6).
M_r C_2H_6 = 30.

$$\frac{150}{30} = 5 \text{ mols}$$

$$V = 5 \times 24 = 120 \, dm^3$$

Calculate the volume of 0.1mol of Oxygen at room temperature and pressure.

$0.1 \times 24 = 2.4 dm^3$

Calculate the amount of helium that occupies 36 dm3 at room temperature and pressure. (Molar volume = 24 dm3)

$\frac{36}{24} = 1.5 \text{ mols}$