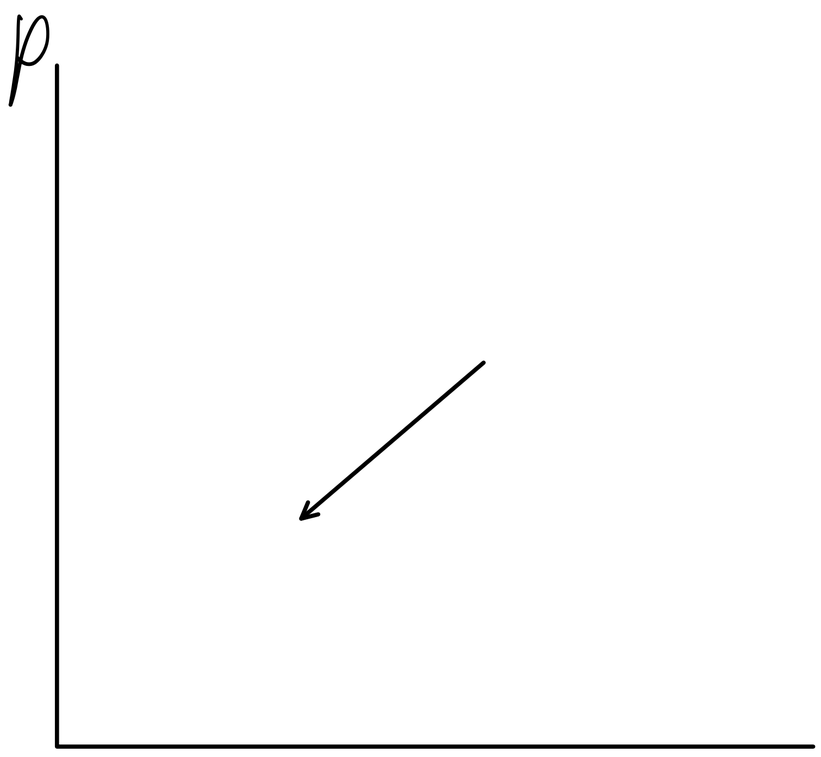
# Exercise 3.3

Sunday, 26 April 2020 12:26




$P = AV \rightarrow V = \frac{P}{A}$

ideal gas: $PV = nRT$

$P_1 V_1 = nRT_1$

$P_2 V_2 = nRT_2$

$V_2 = \frac{1}{2} V_1$

$P_1 = AV_1$

$P_2 = AV_2 = A\frac{1}{2}V_1 = \frac{1}{2}P_1$

$$T_2 = \frac{P_2 V_2}{nR} = \frac{\frac{1}{2}P_1 \times \frac{1}{2}V_1}{nR} = \frac{1}{4}nR \quad P_1 V_1 = \frac{1}{4}T_1$$

$dW = PdV$

$= AVdV$

$$W = A\int_{V_1}^{V_2} V dV = A\cdot\left[\frac{1}{2}V^2\right]_{V_1}^{V_2} = A\left[\frac{1}{2}V^2\right]_{V_1}^{\frac{1}{2}V_1} = A\cdot\frac{1}{2}\cdot\left(\frac{1}{4}V_1^2 - V_1^2\right)$$

$$= -\frac{3}{8}AV_1^2$$

$$= -\frac{3}{8}PV_1$$

$$= -\frac{3}{8}nRT_1$$