Solution Problem 3:

a) $P_1 V_1 = nRT$

$P_2 V_2 = nRT \longrightarrow P_2 = \dfrac{nRT}{V_2}$

$V_2 = 200\ \text{cm}^3 \left| \dfrac{1\ \text{m}}{100\ \text{cm}} \right|^3 = 2 \times 10^{-4}\ \text{m}^3$

$T = 27°C + 273 = 300\ \text{K}$

$R = 8.31\ \dfrac{\text{J}}{\text{mol K}}$

$P_2 = \dfrac{(0.02\ \text{mol})\ (8.31\ \text{J/mol K})\ (300\ \text{K})}{2 \times 10^{-4}\ \text{m}^3}$

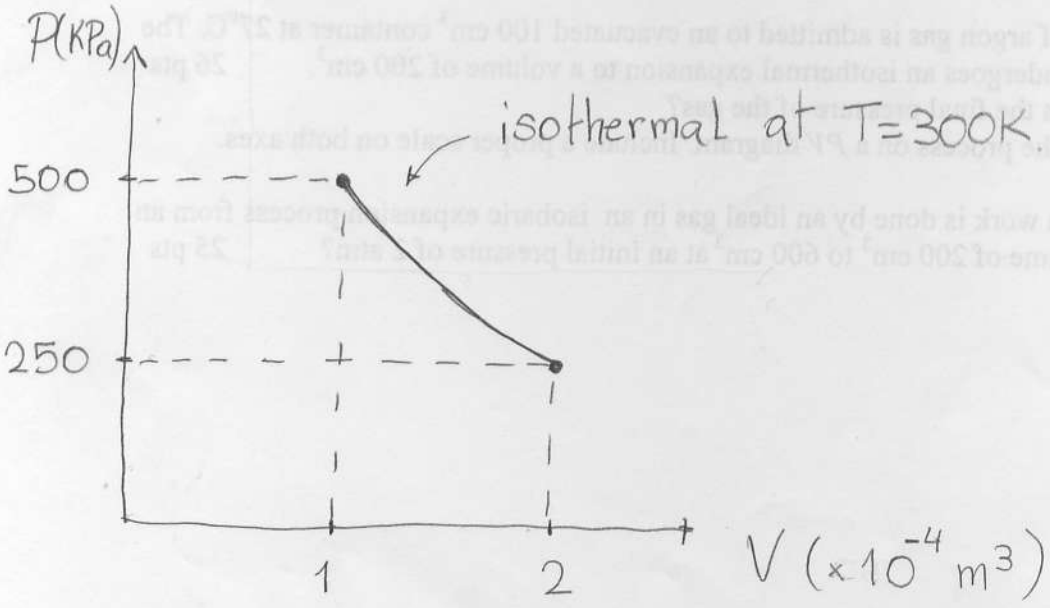
$P_2 = 2.493 \times 10^5\ \dfrac{\text{J}}{\text{m}^3} = 2.493 \times 10^5\ \dfrac{\text{N} \cdot \text{m}}{\text{m}^3} = 2.493 \times 10^5\ \text{Pa}$

$\underbrace{\text{N/m}^2}$

$= 249.3\ \text{KPa}$

$\simeq 250\ \text{KPa}$

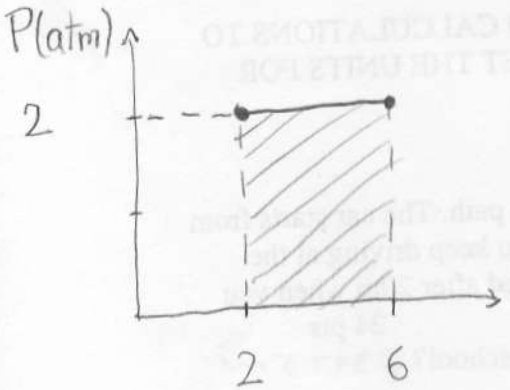
b) $P_1 = \dfrac{nRT}{V_1} = 498.6\ \text{KPa} \simeq 500\ \text{KPa}$



Solution Problem 4:

isobaric → const. Pressure.

$$P = 2\,\text{atm}\left|\frac{10^5\,\text{Pa}}{1\,\text{atm}}\right| = 2\times10^5\,\text{Pa}$$



$$W = P(V_f - V_i)$$

$$= (2\times10^5\,\text{Pa})\,(4\times10^{-4}\,\text{m}^3)$$

$$\boxed{W = 80\ \text{J}}$$