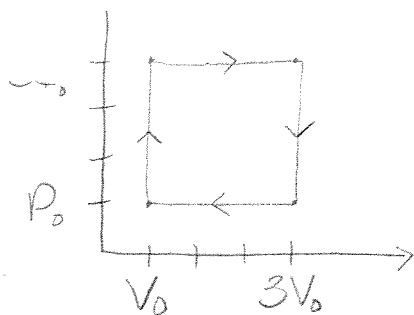


P #54

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a) $W = - \text{area inside graph}$
 $= -(3P_0 - P_0)(3V_0 - V_0)$
 $= -(2P_0)(2V_0)$

$$W = -4P_0V_0$$

b) $\Delta U = 0$ (gas returns to its original state)
 $\Delta U = Q + W$ so $0 = Q + (-4P_0V_0)$

$$Q = +4P_0V_0$$

c) $T_0 = 0^\circ\text{C} = 273\text{ K}$
 $n = 1$

$$P_0V_0 = n \cdot R \cdot T_0 \quad \text{so} \quad -4P_0V_0 = -4(n \cdot R \cdot T_0)$$

$$W = -(4)(1 \text{ mol}) \cdot (8.31)(273 \text{ K})$$

$$W = -9000 \text{ J}$$