(b) $W = \int_{V_1}^{V_2} P(V)\, dV$

$P(V) = P_1 \left(\frac{V_1}{V}\right)^{\gamma}$

$W = \int_{V_i}^{V_f} P_1 \left(\frac{V_1}{V^{\gamma}}\right) dV$

$= P_1 V_1^{\gamma} \dfrac{V_2^{1-\gamma} - V_1^{1-\gamma}}{1-\gamma}$

$= \dfrac{P_2 V_2 - P_1 V_1}{1-\gamma}$

$= \dfrac{7\,atm \cdot \left(\frac{1}{7}\right)^{5/7} - 1\,atm/L}{1 - 5/7}$

$= \dfrac{7}{2} \left(7^{2/7} - 1\right)$ L·atm

$= 2.60$ L·atm

$= 263$ J