(b) In step A heat is added while the piston is held fixed. In step B, heat is added while the piston is moved so that the gas expands. In step C, heat is removed such as by placing the canister in a freezer, while the piston is hold still. In step D heat is removed while the piston is compressed.

C) $\sum W = W_A + W_B + W_C + W_D$

$\quad = P_2(V_2 - V_1) + P_1(V_1 - V_2)$

$\quad = (P_2 - P_1)(V_2 - V_1)$

$\sum Q = \frac{5}{2}(P_2 - P_1)V_1 + \frac{3}{2}P_2(V_2 - V_1) + \frac{5}{2}(P_1 - P_2)V_2 + \frac{3}{2}P_1(V_1 - V_2)$

$\quad = \frac{5}{2}((P_2 - P_1)(V_1 - V_2)) + \frac{3}{2}((P_2 - P_1)(V_2 - V_1))$

$\quad = -(P_2 - P_1)(V_2 - V_1)$

$\Delta U = (P_2 - P_1)(V_2 - V_1) - (P_2 - P_1)(V_2 - V_1)$

$\quad = 0$

1.36) (a) $\gamma = \frac{f+2}{f} = \frac{7}{5}$

$\quad P_1 V_1^{\gamma} = P_2 V_2^{\gamma}$

$\quad \frac{1 atm}{7 atm}(1L)^{7/5} = V_2^{7/5}$

$\quad V_2 = \left(\frac{1}{7}\right)^{5/7}$

$\quad = 0.249 \, L$