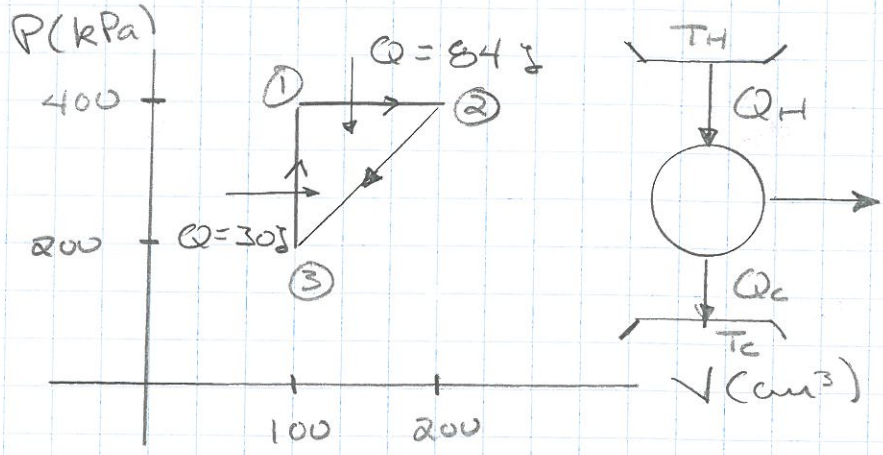

a.) $W_{out} = W_s$ (per cycle) = area bounded by cycle

$= \frac{1}{2}(V_2 - V_1)(P_1 - P_3)$

$= \underline{10\ J}$

Don't forget to convert units.

$Q_H = |Q_{in}| = 30\ J + 84\ J = 114\ J$

and, $Q_H = W_{out} + Q_c \Rightarrow Q_c = Q_H - W_{out}$

$= \underline{104\ J}$

b.) $\eta = \frac{W_{out}}{Q_H} = 0.0877 = \underline{8.77\ \%}$

or,

$\eta = 1 - \frac{Q_c}{Q_H} = 0.0877 = 8.77\ \%$