1) The figure shows two processes, A and B, carried out on an ideal gas, starting from the initial state \( i \) and ending at the final state \( f \).

a) In which process was the (magnitude of the) change in energy of the gas greater?

\[ \begin{array}{ccc}
A & B & \text{same} \\
\text{not enough info} & &
\end{array} \]

b) In which process was the (magnitude of the) change in entropy of the gas greater?

\[ \begin{array}{ccc}
A & B & \text{same} \\
\text{not enough info} & &
\end{array} \]

c) In which process was the (magnitude of the) work done by the gas greater?

\[ \begin{array}{ccc}
A & B & \text{same} \\
\text{not enough info} & &
\end{array} \]

d) In which process was the (magnitude of the) energy transferred thermally to the gas greater?

\[ \begin{array}{ccc}
A & B & \text{same} \\
\text{not enough info} & &
\end{array} \]

2) An ideal gas undergoes the 3 step process shown in the \( PV \) diagram. Calculate the work done by the gas in terms of \( P_i \) and \( V_i \).
3) A diatomic ideal gas ($d = 5, \gamma = 7/5 = 1.4$) initially has a volume of $1.5 \text{ m}^3$ and a pressure of $1.5 \times 10^7 \text{ Pa}$. The gas is then slowly compressed isentropically and adiabatically to a final volume of $0.5 \text{ m}^3$.

a) Determine the final pressure of the gas after the compression.

b) Determine the work done on the gas during the compression. If you couldn’t answer part a), use $6.0 \times 10^7 \text{ Pa}$.

c) Imagine the compression from initial volume $1.5 \text{ m}^3$ to final volume $0.5 \text{ m}^3$ had been isothermal instead of isentropic and adiabatic. For which compression process (the isotherm or the isentrope/adiabat) would the work done on the gas be greater? Explain your reasoning; you might not have to do any new calculations (Hint: draw the processes on a PV diagram).