[tex136] Irreversible decompression

Consider an insulating box with two compartments. Each compartment initially contains N atoms of a monatomic classical ideal gas in equilibrium at initial pressures $p_1 \neq p_2$ and at the same initial temperature T. Gas atoms are then allowed to leak through a hole in the dividing wall.
(a) Show that the temperature remains the same in the final equilibrium state.
(b) Find the uniform pressure p in the final equilibrium state as a function of p_1 and p_2.
(c) Find the increase in total entropy, ΔS, between the initial and final equilibrium states.

Solution: