Homework Discussion, Week 14

Physics 1301 Dr. Andersen

Chapter 18

8) The internal energy of the gas (in chemist notation, bleh...) is $U = 3/2nRT$, and the first law of thermodynamics is $\Delta U = Q - W$, so the heat is $Q = \Delta U + W$. Since we know the initial and final temperatures and number of moles, we can compute ΔU, then stick numbers in the first law equation.
Answer: 5900 J flow in.

20) a) Use $pV = nRT$ (again, bleh...) to find T, where you must get the pressure off of the graph. Since its isothermal, the temperature doesn't change, so you can compute for either endpoint. b) For an isothermal process, $W = nRT\ln(V_f/V_i)$, so just plug in.
Answer: a) $3.32 \times 10^6\ K$ b) 555 kJ.

23) This problem is best done in reverse order. c) The change in internal energy is $\Delta U = 3/2nR\Delta T$. Plug and chug. b) Because the process is adiabatic, there is no heat flow, so $Q = 0$. a) From the first law, $\Delta U = -W$, so just multiply the number you got in part (c) by -1.