

Homework Set #1, Due Jan 20

Problem #1

Use $dQ = C_v dT + pdV$ and the Ideal Gas Law $pV = Nk_B T$ to derive the p, V relation for adiabatic expansion. (Note: for the ideal monoatomic gas $C_v = \frac{3}{2}Nk_B$)

Problem #2

Calculate Q_2, Q_1 and W for a reversible Carnot cycle expanding from V_A to V_B at temperature T_2 and contracting at $T_1 < T_2$. Confirm Carnot's result for the efficiency of heat conversion to work by an explicit calculation.