140a HW 5 Due 2/19/19

⋆ All numbered exercises are from Blundell and Blundell.

1. 14.7. Do the van der Walls part (a Maxwell relation might be useful).

2. 16.7. Here $\rho = M/V$ where M is the total mass of the gas.

3. 17.3.

4. 18.2.

5. A system initially has $U_i = 3 \times 10^5 J$, $V_i = 1m^3$, and $S_i = 10^3 J/K$. It undergoes a process, surrounded by the outside environment, which is at pressure $P_0 = 1atm$ and $T_0 = 300K$. In the final state, the system has internal energy $U_f = 2 \times 10^5 J$, $V_f = 2m^3$, and $S_f = 2 \times 10^3 J/K$. What is the maximum work that this system can do (without violating one of the laws of thermodynamics)? Hint: consider the availability, which was discussed in lecture, and also in the book.