1. For the following processes, state whether the driving force is the first or second law of thermodynamics. The systems are in italics and we are only interested in whether the properties of the system have changed. Explain your choice in 1-2 sentences.
   1. *Warming up exercises* when muscles are worked the cells “burn” more glucose and the oxidation releases energy which is stored as ATP. However only about 50% is stored and the rest increases the temperature of the muscle tissue.
   2. *You observe the trees in the forest do not grow in straight lines.* Forests that were plants by the CCC camps in the Great Depression have the trees plants in long straight rows. Anyone visiting these knows immediately that this is not a natural forest.
2. 12.0L of monoatomic ideal gas at 15◦C and 4atm are expanded to a final pressure of 1.2atm. Calculate ∆U, q, w, and ∆S if the process is:
   1. Reversible and isothermal
   2. Reversible and adiabatic
      1. Prove that for the process in part b ∆S is zero.
   3. Irreversible and adiabatically
   4. Explain, in 3-4 sentences, why ∆S is different in all three parts
3. The following equation is an equation of state for an imagined gas: . The term  accounts for the attractions between the gas molecules. Determine ?