

PROBLEM SET 1

CHM 3400, Dr. Chatfield, Fall 2011

Due Thursday, Oct. 1

1. Discuss the differences between the van der Waals equation and the virial equation. In particular, explain why the virial is more flexible.
2. Atkins, 1.8. It is necessary to assume that pressure is constant.
3. Atkins, 1.17
4. Atkins, 1.25
5. Atkins, 1.30
6. Atkins, 1.32 (Hint: you must mathematically manipulate the van der Waals equation so that it has the same form as the virial equation, which is a power series in $1/V$.)
7. A 44.8 L vessel with diathermic walls (conducts heat) is immersed in a temperature bath at 273.15 K. The vessel is filled with 3.0 mol H_2 and 2.0 mol N_2 initially. All of the H_2 reacts to form NH_3 . In the final mixture, what gases are present, what is the total pressure, and what are the partial pressures?