
2. Schroeder Problem 6.20. For part (a), ignore Schroeder’s comment about proving the formula by long division. Prove it by first multiplying both sides of the equation by \((1 - x)\), and then thinking about the right-hand side of the resulting expression.


5. Schroeder Problem 6.43.

6. In class we showed that the partition function of a monatomic ideal gas is

\[
Z = \frac{V^N}{N!} \left( \frac{2\pi m kT}{h^2} \right)^{3N/2}
\]

Using this, derive expressions for the pressure, energy, chemical potential, and entropy of the ideal gas, and check they agree with results we derived before. Assume \(N\) is large, so that you can use Stirling’s approximation to handle the \(1/N!\) factor.