1. Consider a gas of $N$ free spin-1/2 fermions of mass $m$ on a planar surface of area $A$. Obtain an *explicit* expression for the chemical potential of this gas as a function of the temperature $T$. Discuss the limits of high and low temperatures.


3. Huang’s problem 12.1.

4. For a Debye model of phonons in a $d$-dimensional isotropic solid, obtain expressions for the limiting behavior of $C_V$ at very high and very low temperatures and for the leading corrections to these limits. Evaluate these expressions explicitly for $d = 3$.

5. Huang’s problem 12.6.