Exercises in Statistical Mechanics

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This exercises pool is intended for a graduate course in "statistical mechanics". Some of the problems are original, while other were assembled from various undocumented sources. In particular some problems originate from exams that were written by B. Horovitz (BGU), S. Fishman (Technion), and D. Cohen (BGU).

======= [Exercise 0130]

Spectral functions for general dispersion relation

Find the states density function $g(E)$ and the distribution function $Z(\beta)$ for a particle that moves in a d dimensional space with volume $V = L^d$.
Assume the particle has dispersion relation
case a' $E = C|P|^{\nu}$
case b' $E = \sqrt{m^2 + p^2}$
Make sure that you know how to get a result also in the "quantal" and the "semiclassical" way.