HW set 3

Problem 1
Assume the electronic density of state of a certain metal is of the form

\[ g(\varepsilon) = \ln \frac{\varepsilon_0}{|\varepsilon|} \quad \text{for} \ -\varepsilon_0 < \varepsilon < \varepsilon_0, \ 0 \text{ otherwise} \]

so it has a logarithmic singularity at \( \varepsilon = 0 \).

Find the leading behavior of the specific heat and Pauli paramagnetic susceptibility versus \( T \) for very low \( T \) when the chemical potential is zero.

Problem 2
AM, 4.1

Problem 3
AM, 4.5

Problem 4
AM, 4.6

Problem 5
Prove that a Bravais lattice cannot have an \( n \)-fold rotation axis (rotation by angle \( 2\pi/n \)) with \( n=5 \) nor with \( n=7 \) or larger.