HW set 3

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

$$g(\varepsilon) = \ln \frac{\varepsilon_0}{|\varepsilon|} \qquad \text{for} - \varepsilon_0 < \varepsilon < \varepsilon_0, 0 \text{ otherwise}$$

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.