Read: §6.3

Homework #24 due Nov. 4:

1. problem 6.17

2. problem 6.19

3. In problem 6.18 we derived

$$\left(\frac{\partial \overline{E}}{\partial T}\right)_{V,N} = \frac{1}{kT^2}\sigma_E^2 = \frac{1}{kT^2}\left(\overline{E^2} - (\overline{E})^2\right)$$

Derive a similar relation for $\chi = \frac{\partial \overline{\mu_z}}{\partial B}$ for the model of a two-state paramagnet. This means that for a single spin there are two states: up and down with energies $E_{\text{up}} = -\mu B$ and $E_{\text{down}} = -\mu B$ and magnetic moments $\mu_{z,\text{up}} = \mu$ and $\mu_{z,\text{down}} = -\mu$.