1. Show mathematically that the entropy maximum principle implies the energy minimum condition

(Hint:

$$1. \left(\frac{\partial S}{\partial X} \right)_U = 0, and \left(\frac{\partial^2 S}{\partial X^2} \right)_U < 0$$

$$2. \left(\frac{\partial y}{\partial x} \right)_z = -\frac{\left(\frac{\partial z}{\partial x} \right)_y}{\left(\frac{\partial z}{\partial y} \right)_x} \qquad)$$

2. Find the maxwell relations corresponding to H and G

3. Using the maxwell relations derived in the previous problem show that $(\delta H/\delta V)_{T,N}$ is

equal to $(T\alpha - 1)/\kappa_T$