Problem Set #7

ECON 407: Mathematical Economics

(**due next class**)

1. A firm produces output according to a Cobb-Douglas production function, $q=K^{0.25}L^{0.4}$, where $K$ is capital and $L$ is labor. Let the price of a unit of capital be $p\_{K}=2$ and the price of a unit of labor be $p\_{L}=8$. Suppose total expenditures by the firm must be equal to $104.

a) Maximize output by finding the critical values $K^{\*}$ and $L^{\*}$.

b) Construct the bordered Hessian. If $K>0$ and $L>0$ can you determine if the production function is maximized at $K^{\*}, L^{\*}$? If so, explain why there is a maximum. If not, explain why there is not a maximum.

2. Maximize profits $π=64x-2x^{2}+96y-4y^{2}-13$ subject to the production constraint $x+y\leq 20$. Use the Kuhn-Tucker conditions for a maximum to solve.