Problem Set #6

ECON 407: Mathematical Economics

(**due next class**)

1. Find the extreme values of the following constrained optimization problems. Check the second-order conditions to determine if the objective function is maximized, minimized, or neither at the extreme values you calculate.

a) $U=xy+x$ subject to the budget constraint $6x+2y=110$

b) $U=2xy$ subject to the budget constraint $3x+4y=90$

2. Minimize a firm’s total costs $c=45x^{2}+90xy+90y^{2}$ when the firm has to meet a production quota $g$ equal to $2x+3y=60$ by (i) finding the critical values and (ii) using the bordered Hessian to test the second-order conditions.

3. Write the Lagrangian function and find the first-order conditions for the following (you do not need to solve for the critical values):

$z=x+2y+3w+xy-yw$ subject to $x+y+2w=10$