Problem Set 5

ECON 5153

For full credit you must show all your work.

1. Use Lagrangian method to solve the following maximization problem with *several equality constraints*:

$$\max \quad f(x, y, z) = xyz$$
$$\text{subject to } x + y + z = 1 \text{ and } x = 1/2.$$

2. Use Lagrangian method to solve the following maximization problem with *mixed constraints*:

$$\max \quad f(x, y) = -2x^2 + y$$
$$\text{subject to } 3x - y = 1, x \geq 0, y \geq 0.$$

3. Use Lagrangian method to solve the following *minimization problem*:

$$\min \quad f(x, y) = -x^2 - y^2$$
$$\text{subject to } 2x + y \leq 2, x \geq 0, y \geq 0.$$

4. Use Kuhn-Tucker Lagrangian and *Kuhn-Tucker conditions* to solve the following maximization problem:

$$\max \quad f(x_1, x_2) = 2x_1^{1/2}x_2^{1/2}$$
$$\text{subject to } 2x_1 + 3x_2 \leq 4, x_1 \geq 0, x_2 \geq 0.$$

5. (1) Exercise 19.2 a) on page 453;
(2) Exercise 19.13 on page 457.