

**ECON3120/4120 Mathematics 2, spring 2007**

**Problems for Seminar 9, 2 May 2007**

- 1 Exam problem 22.
- 2 Exam problem 59.
- 3 Exam problem 72.
- 4 Exam problem 121.
- 5 Consider the problem

$$\max f(x, y) = cx + y \quad \text{s.t.} \quad g(x, y) = x^2 + 3y^2 \leq 2, \quad x \geq 0, \quad y \geq 0$$

- (a) Write down the necessary Kuhn–Tucker conditions.
- (b) Solve the problem for all values of the constant  $c$ .
- (c) Let  $V(c)$  denote the maximum value of  $f(x, y)$  as a function of  $c$ . Find  $V(c)$  for all values of  $c$ , and show that it is continuous everywhere.

**A couple of extra problems:**

- 6 Exam problem 99.

- 7 (a) Solve the problem minimize  $(x-2)^2 + (y-2)^2$  s.t.  $\begin{cases} x + y \leq 2, \\ x^2 - 4x + y \leq -2. \end{cases}$
- (b) Can you give a geometric interpretation of the problem and thereby confirm the answer in part (a)?