科目：個體經濟學　系所組：經濟學研究所

1. Suppose you are familar with the presentation of a game. Consider the following game in which player 1 chooses between rows and 2 chooses between columns. The payoffs for them are as follows.

	Left	Middle	Right
Up	1,0	1,2	0,1
Down	0,3	0,1	2,0

Assume that when player 1 moves he does not know whether player 2 is moving simultaneously.

   (a) (6pts) Will the players have dominant strategies? If such strategies exist, please find them. If do not, please explain the reason why.

   (b) (6pts) Based on common knowledge of rationality, find Nash equilibrium by iterated elimination of weakly dominated strategies.

2. Bob will live for only two periods. In the first period he will earn $100,000. In the second period he will retire and live on his savings. Bob has a Cobb-Douglas utility function $U(c_1, c_2) = c_1^2 c_2$, where c_1 is his period 1 consumption and c_2 is his period 2 consumption. The real interest rate is r.

   (a) (6pts) What is his intertemporal budget constraint?

   (b) (6pts) "If the interest rises, then Bob will save less." Is the statement true? Why?

3. (a) (6pts) Please define (mathematically) inferior goods, normal goods, and Giffen goods?
   (b) (6pts) Please write down the Slutsky equation.
   (c) (6pts) Please use the Slutsky equation to explain why Giffen goods may exist in the real world.

4. Suppose that a firm's production function is $q = 10L^{1/2}K^{1/2}$, whereby L is labor and K is capital. The cost of a unit of labor is $20 and the cost of a unit of capital is $80.

   (a) (6pts) The firm is currently producing 100 units of output, and has determined that the cost-minimizing quantities of labor and capital are 20 and 5 respectively. Please draw and specify the isoquant curve, the isocost line (including its slope), and the cost-minimizing tagent point, in a graph.

   (b) (6pts) The firm now wants to increase output to 140 units. In the short run if capital is fixed as that in (a), how much labor will the firm require? Show your result and write it down in the same graph. (Hint: the moving of the isoquant curve)

   (c) (6pts) In the long run if the firm wants to produce 140 units, please find the cost-minimizing levels of capital and labor. Show your results and find write them down in the same graph. (Hint: the moving of the isoquant curve)

5. Assume that in a competitive market all firms have access to the same production technology. The total cost function associated with this technology is $TC(q) = q^2 + 4$, where q is the output of a firm. Let P be the market price. If the market demand is $Q = 400 - 10P$, answer the folowing:

(a) (8pts) Suppose that there exist only 80 firms in the market due to the regulation imposed on the number of firms. We assume that the number of firms is enough to support a competitive market. In equilibrium, please find (1) output of each firm, $q^* = ?$ (2) profits of each firm, $\pi^* = ?$

(b) (8pts) Continue (a). Suppose in the long run free entry is allowed. Find the equilibrium (1) output of each firm, $q^* = ?$ (2) the number of firms, $N^* = ?$

(c) (8pts) Continue (b). Suppose the government imposes a fixed tax \$21 (lump-sum tax) per firm (e.g. a licensing fee). Find the equilibrium (1) output of each firm, $q^* = ?$ (2) the number of firms, $N^* = ?$

(d) (6pts) Continue (a). Suppose the 80 firms in (a) merge into a monopoly. Please find the equilibrium output of the monopolist.

(e) (10pts) Aside from setting its price level, let the monopolist be allowed to adopt an advertising strategy for profit maximization. Assume that the level of advertising expenditure is A. After conducting advertising, the market demand becomes $Q = (20 - P)(1 + 0.1A - 0.01A^2)$. The new cost of the monopolist is given by $TC = 10Q + 15 + A$. Please find the optimal advertising level A^* and the price level P^*.