EC 11. Homework #4

There is no class on Monday April 25.

1. Explain the following terms:
   (a) Nash Equilibrium. (5)
   (b) Natural Monopoly. (5)
   (c) Sunk Cost. (5)
   (d) Cournot Equilibrium. (5)

2. Suppose that a firm has monopoly in two markets. In market A the demand is given by \( p_a = 10 - q^a \) while in market B the demand is given by \( p_b = 6 - 0.5q^b \). The firm’s cost function is \( C(q_a, q_b) = 2(q_a + q_b) \).
   (i) What is the monopoly price in each market, and does the firm “price discriminate.” (10)
   (ii) Suppose now the government bans price discrimination. What will be the new monopoly price and quantity? [Be careful in deriving the new market demand curve.] (10)
   (iii) Does consumer welfare rise or fall after the ban on price discrimination? (10)
   (iv) From the above analysis, can you think of a simple condition on the structure of the markets that suggests when banning price discrimination will improve welfare? (5) [Read the text book. A full analytic solution is not required.]

3. (i) Consider the following game. Two firms compete by choosing quantities \( q_1 \) and \( q_2 \). Demand is given by \( p = a - b(q_1 + q_2) \). Suppose that each firm has a constant marginal cost of production so that the cost functions are: \( C_1(q_1) = c_1 \cdot q_1 \) and \( C_2((q_2) = c_2 \cdot q_1 \). We assume that \( c_1 > c_2 \). Write down firm 1’s profit function. (5)
   (ii) Derive firm 1’s Reaction function (also called a best response function). (10)
   (iii) Compute the Nash Equilibrium quantities and the equilibrium price. [Hint: Trying graphing the reaction functions.] (10)

4. Suppose that demand for corn dogs is given by \( q_d = 100 - 10p \) and the supply is given by \( q_s = 10p \).
   (a) If the government places a $2 tax per unit sold on corn dog sellers, what happens to the price of corn dogs? What proportion of the tax is borne by consumers? [10]
   (b) If the government places a $2 per unit sales tax paid by the consumer, what
happens to the price of corn dogs? What proportion of the tax is borne by consumers? [10]