Practice Question for the Midterm Exam, No. 2

Question 1

Suppose that the market size is S, inverse demand curve is $P = 3 - \frac{Q}{S}$, where P is the market price and Q is the total quantity. If there are n firms, then the output per firm is $q = \frac{Q}{n}$. The total cost function of a firm is $C(Q) = 1 + q$ where 1 is the fixed cost.

1. Write down the profit function of a firm.

2. Derive the equilibrium price, quantity and profit of the monopolist.

3. Given there are n firms, derive the Nash equilibrium price, quantity and profit of each firm.

4. Calculate the market size S which gives zero profit for n firms.

Question 2

Suppose you have the circular city model with the circumference 1 and density D. Suppose that the transportation cost of the consumer is t per unit distance and the firm entry cost is f. Consumer only buys one unit of the good.

1. Derive the equilibrium price and quantity and the equilibrium profit given the number of firms being n.

2. Derive the zero profit number of firms, equilibrium price and quantity.

3. Derive the total welfare (total consumer unility minus the total travel cost).

4. Suppose the circular city has circumference S and density D. Derive the zero profit number of firms, equilibrium price and quantity. Discuss the difference between the market size effect S and the market density effect D.