Discussion handout 5

Question 1: Cournot equilibrium

Consider a market with N firms (firms 1, 2, 3,..., N). The (inverse) demand curve is:

p = a - bq where q= q1 + q2 + q3 + q4 + … + qN

Suppose that each of the N firms has a constant marginal cost equal to "k". Fixed cost is assumed to be equal to zero.

1.1) Derive the best response function for firm i-th.
1.2) Show that q1* = q2* = q3* = … = qN* where qi* is the equilibrium quantity of the i-th firm. That is, the model predicts the symmetric equilibrium.
1.3) Show that equilibrium price converges to marginal cost as N is getting large, i.e. $N \to \infty$

Question 2: 3-market price discrimination

Suppose that demand equations for three groups of consumers can be given by,

Group 1: $Q_1 = 90 - 0.5P_1$

Group 2: $Q_2 = 35 - 0.25P_2$

Group 3: $Q_3 = 30 - 0.2P_2$

Assume that monopolist's cost function is given by $C = 25 + 20Q$ where $Q = Q_1 + Q_2 + Q_3$

2.1) Suppose that the monopolist can do the 3-rd degree price discrimination. Construct firm's profit function expressed in terms of prices.

2.2) Solve for the optimal prices for each of the three markets.

2.3) How much does the firm earn for the profit?

Suppose that the monopolist fails to set multiple prices. That is, firm can set only one single price.

2.4) Determine the optimal price under the single linear pricing strategy. Justify your answer.

2.5) Compare the level of non-discriminatory profit and discriminatory profit. Which one is greater?