ECN 453: Mid-term Exam 2: Practice

Instructions:

- You have **70 minutes**

- Please write your final answer in the underlined section provided.

- You may bring a calculator and notes on a two-sided cheat-sheet on letter-size paper.

- Please be neat. If your work is too messy it will not be graded.

- Be sure to show your working.

- This is a long exam, so there are lots of ways to get points. If you get stuck, move on!

- Good luck!

Name: _____

Question:	1	2	3	4	Total
Points:	30	30	30	30	120
Score:					

Short Answer Questions (30 points)

1. Depending on the question, write either:

   - a number
   - one of: True, False, or NEI (Not Enough Information)
   - a definition (i.e. one or a few words)

   (a) (3 points) Assume that Coke and Pepsi compete on price. Which form of competition - out of the ones discussed in class - is best suited to modeling this form of competition?

   (a) ―――――――

   (b) (3 points) True, False, or Not Enough Information: In a Bertrand duopoly where both firms have the same constant marginal cost, producer surplus is 0.

   (b) ―――――――

   (c) (3 points) True, False, or Not Enough Information: In a Bertrand duopoly where both firms have the same constant marginal cost, dead-weight-loss is 0.

   (c) ―――――――

   (d) (3 points) Suppose two firms are capacity constrained with capacities $k_1 = k_2 = 10$, total demand is $Q = 100 - P$, and marginal cost for both firms $= 20$. What is the equilibrium total quantity under Bertrand competition?

   (d) ―――――――

   (e) (3 points) Suppose two firms are capacity constrained with capacities $k_1 = k_2 = 80$, and total demand is $Q = 100 - P$, and marginal cost for both firms $= 20$. What is the equilibrium total quantity under Bertrand competition?

   (e) ―――――――

   (f) (3 points) True, False, or Not Enough Information: The entry deterrence model discussed in class predicts that the incumbent's capacity choice increases as the entry cost increases.

   (f) ―――――――

   (g) (3 points) Consider a two-firm Cournot model where each firm has the same (constant) marginal cost. If Firm 1 plays $q_1 = 0$, what is Firm 2's best response?

   (g) ―――――――

   (h) (3 points) Consider a two-firm Cournot model where each firm has the same (constant) marginal cost. If Firm 1 plays $q_1 = q^c$, where q^c is the perfect competition quantity, what is Firm 2's best response?

   (h) ―――――――

   (i) (3 points) Consider the Cournot model with n identical firms, constant marginal cost, and linear demand. As the number of firms gets very large $n \to \infty$, what value does the quantity produced by each firm converge to?

   (i) ―――――――

   (j) (3 points) Consider the Cournot model with n identical firms, constant marginal cost, and linear demand. As the number of firms gets very large $n \to \infty$, what value does the price converge to?

   (j) ―――――――

2. Cournot Competition With Asymmetric Marginal Costs (30 points)

2. Suppose that total demand in the market for cement is $Q = 100 - p$. Firm 1's marginal cost is $40. Firm 2's marginal cost is $30. The firms compete on quantities (Cournot competition).

   (a) (10 points) Draw the best response curves for Firm 1 and Firm 2.

   (b) (10 points) Determine the equilibrium production choices in the Cournot equilibrium. Show all of your steps.

   (c) (10 points) Draw the best response curves for Firm 1 and Firm 2 (on the same graph as Part (a)) if there is a technology cost shock that decreases marginal costs of both firms by $10.

3. Stackelberg (30 points)

3. There are two firms in a market with total demand $p = 100 - 2Q$. Firm 1 is an incumbent and Firm 2 is a potential entrant, so Firm 1 moves first and Firm 2 moves second. Firm 1's total cost is $C(q_1) = 4q_1^2$. Firm 2's total cost is $C(q_2) = 20q_2$.

   (a) (30 points) Suppose that the firms compete in a Stackelberg equilibrium. What are the equilibrium quantities for Firm 1 and Firm 2? Make sure you show all your steps.

4. Hotelling Model (30 points)

4. Suppose 100 consumers are uniformly distributed on a 1 mile stretch of road. There are two supermarkets on the road: Supermarket 1 is located at the west end of the road (at location $= 0$), and Supermarket 2 is located 0.6 miles along the road (at location $= 0.6$). Transport costs for consumers are $0.50 per mile. The supermarkets' marginal costs are 0. The supermarkets compete on prices: denote Supermarket 1's price p_1 and Supermarket 2's price p_2.

   (a) (15 points) What is the demand for each supermarket?[1]

   (b) (15 points) If Firm 2 chooses $p_2 = 0.5$, what is Firm 1's best response?

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[1]When computing consumer choices, only consider the transport costs to get to the supermarket, don't worry about the return journey. Similarly, don't worry about the fact that the number of consumers is discrete i.e. a demand of 20.7 consumers is ok.