ECN 594: Practice Final Exam

Instructions:

- You have **70 minutes**
- You may bring a calculator and notes on a two-sided cheat-sheet (letter-size paper)
- Please be neat. If your work is too messy it will not be graded.
- Be sure to show your working.
- This exam is **cumulative**—it covers all course material
- Good luck!

Name: _____

Question:	1	2	3	4	5	Total
Points:	30	25	20	15	10	100
Score:						

1. Short Answer Questions (30 points)

1. For each question, write either a number/formula, True/False/NEI, or a brief answer.

   (a) (3 points) In a Cournot duopoly with linear demand $P = 100 - Q$ and $MC = 20$, what is the equilibrium price?

   (a) _____

   (b) (3 points) Write the formula for the critical discount factor in Cournot collusion with N firms.

   (b) _____

   (c) (3 points) True, False, or NEI: In Bertrand competition with homogeneous products and identical costs, the equilibrium price equals marginal cost regardless of the number of firms.

   (c) _____

   (d) (3 points) What is "double marginalization" and why does it occur in vertical relationships?

   (d) _____

   (e) (3 points) True, False, or NEI: A horizontal merger always reduces consumer welfare.

   (e) _____

   (f) (3 points) What does HHI stand for, and how is it calculated?

   (f) _____

   (g) (3 points) True, False, or NEI: In the Hotelling model of spatial competition, firms locate at the center when transportation costs are linear.

   (g) _____

   (h) (3 points) What is an "efficiency defense" in merger review?

   (h) _____

   (i) (3 points) True, False, or NEI: Entry deterrence through capacity commitment is only credible if capacity is costly to reduce.

   (i) _____

   (j) (3 points) Name one factor that makes collusion easier to sustain (higher δ^*).

   (j) _____

2. Cournot Competition and Mergers (25 points)

2. Consider a market with 3 firms competing in quantities (Cournot). Market demand is $P = 120 - Q$ where $Q = q_1 + q_2 + q_3$. All firms have marginal cost $c = 30$.

   (a) (8 points) Find the Cournot-Nash equilibrium quantities, price, and per-firm profits.

   (b) (7 points) Firms 1 and 2 merge. The merged firm has marginal cost $c = 30$ (no efficiency gains). Find the new equilibrium and compare total output, price, consumer surplus, and total welfare to the pre-merger equilibrium.

   (c) (5 points) Now suppose the merger creates efficiency gains, reducing the merged firm's marginal cost to $c = 20$. How does this change your welfare analysis?

   (d) (5 points) Calculate the HHI before and after the merger. Would this merger likely face antitrust scrutiny?

3. Collusion (20 points)

3. Return to the 3-firm Cournot market from Question 2 (before any merger). Firms consider forming a cartel where each produces the monopoly quantity divided by 3.

   (a) (5 points) What is the monopoly quantity and price? What would each firm's collusive profit be?

   (b) (5 points) If one firm deviates while others stick to the collusive quantity, what is its optimal deviation quantity and profit?

   (c) (5 points) Compute the critical discount factor δ^* for sustaining collusion with grim trigger strategies.

   (d) (5 points) The industry is investigated for collusion. Explain how a leniency program works and why it can destabilize cartels.

4. Vertical Relationships (15 points)

4. A manufacturer (M) sells to a retailer (R), who sells to final consumers. Consumer demand is $Q = 100 - P$. The manufacturer's marginal cost is $c_M = 10$. The retailer's only cost is the wholesale price w paid to the manufacturer.

   (a) (5 points) If the manufacturer sets a wholesale price w and the retailer then sets the retail price P, find the equilibrium wholesale price, retail price, and total industry profit. This is the "double marginalization" outcome.

   (b) (5 points) What would be the vertically integrated (single monopolist) outcome? Compare to part (a).

   (c) (5 points) Describe two contractual solutions that can eliminate double marginalization without vertical integration.

5. Demand Estimation (10 points)

5. Consider a logit demand model with 2 products. Product 1 has $\delta_1 = 1$ and $p_1 = 5$. Product 2 has $\delta_2 = 0.5$ and $p_2 = 4$. The price coefficient is $\alpha = -0.3$.

   (a) (5 points) Compute the market shares for both products and the outside option.

   (b) (5 points) Using the log-sum formula, compute consumer surplus per consumer. If product 2's price increases to $p_2 = 5$, what happens to consumer surplus?