

Economics 200b
Spring 2008
Prof. Haile
Midterm Exam

Answer each of the following questions. Explain all answers and show all work. Partial credit will be given for partially correct analysis. No credit is given for answers without work shown. Only blue books turned in with your name on them will be graded. No notes, books, etc. may be consulted during the exam, and calculators are not needed.

1. (15 pts) Write your name on this page. Turn it in with your blue books.
2. (25 pts) Consider an n -firm oligopoly market for a homogenous good. Market demand is given by the equation

$$Q(p) = 10 - p.$$

Firms are homogeneous with cost functions $c(q) = 1 + 2q$.

- a. What is the price that maximizes total profit in the industry?
- b. What is the Cournot equilibrium price and profit (as a function of n)
- c. Assuming Cournot competition, what is the free-entry equilibrium number of firms in the market? (your answer should be an integer).
- d. Provide intuition for why this equilibrium number of firms will generally differ from the efficient number of firms (be sure to say whether there will be inefficiently few or inefficiently many firms in equilibrium).

3. (20 pts) Consider a two-period dynamic model in which there is a monopoly producer of a durable good. The willingness to pay of consumers for one period's use of the good is given by the inverse demand function $P(Q) = 10 - Q$. The good can be produced at zero cost. Firms and consumers have a discount rate of zero (no discounting).

- a. Suppose the monopolist can rent the good. What is the profit-maximizing per-period rental rate? What will be the total profit earned by the monopolist?
- b. Now suppose the monopolist cannot rent and cannot commit in period 1 to the price that will be charged in period 2. What will be the total profit earned by the monopolist?

4. (20 pts) Consider a monopoly market for pencils with two types of potential student consumers: one half (the "nerds") have inverse demand curve $p = 10 - q/2$. The other half (the "jocks") have inverse demand curve $p = 10 - q$. Normalize the total number of consumers to 2. For simplicity, let firms have marginal cost (and fixed cost) of zero.

- a. What is the optimal (profit-maximizing) two-part tariff, assuming it is optimal to sell to both types of consumer?
- b. What is the optimal 2-part tariff when if the firm is to sell only to nerds? What profit does the firm make?
- c. Suppose now that the pencil monopolist is also a monopolist in the market for erasers. Nerds have inverse demand for erasers given by the equation $p = 10 - q$, while jocks have inverse demand $p = 10 - q/2$ for erasers. What is the maximum profit the monopolist can extract by bundling the two goods (i.e., by attaching an eraser to the tip of each pencil)? Is this more or less than two independent monopolists could make by selling pencils and erasers separately?

5. (20 points) Consider a 2-firm cartel. Market demand is given by the equation $Q = 20 - P$. Each firm has constant marginal cost of 4. Firms compete in an infinitely repeated simultaneous price setting game. Each firm discounts future payoffs with the discount factor δ .

- a. How large must δ be for the firms to be able to sustain the monopoly price every period as a subgame perfect equilibrium?
- b. How large must δ be for the firms to be able to sustain the symmetric Cournot equilibrium price every period as a subgame perfect equilibrium?
- c. Provide some intuition for the difference between your answers to parts a and b.