

Econ 100B (Grossman)—Winter 2010
Midterm 2— Version A

February 18, 2010

Instructions: This is a closed-book, closed-notes exam. No calculators or electronic devices are allowed. Please turn off and put away all phones and other electronic devices. There are 8 multiple-choice questions and two free-response questions. Answer as many as you can in the time allowed. I do not expect everyone to be able to answer all questions. If you get stuck on something, I suggest moving on and coming back later when/if you have time. If you have a question, please raise your hand. Good luck!

Multiple choice – 25 out of 50 pts. (8 qns., 3 pts. each + 1)

*Answer these questions on your Scantron. Your score will **only** be based on the marks on your Scantron. You will not receive any credit for anything written on your exam paper. You will receive 1 point for correctly writing your name, perm number, version (A,B,C, or D), and TA's name on your Scantron.*

1. A profit-maximizing monopolist faces a constant marginal cost of \$2 per unit. If, at the price she's chosen, the price elasticity of demand is $-\frac{6}{5}$, what is the price?
 - (a) 6
 - (b) $2\frac{2}{3}$
 - (c) 12
 - (d) 9

2. Livia has a monopoly on the robot market and faces inverse demand given by $P = 20 - 2q$ and a marginal cost of $MC = q$. What quantity does she produce?
 - (a) 4
 - (b) 5
 - (c) 2.5
 - (d) 3

3. The government imposes a tax of $t = 10$ per robot on Livia's sales. By how much does her price increase?
 - (a) 1
 - (b) 4
 - (c) 2.5
 - (d) 5

4. Anand runs an airport coffee shop. He sells yogurt for \$10 and granola for \$3. Customers are only interested buying one yogurt, one granola, or both. In a typical hour, he'll have one person buying both the yogurt and granola, three people buying only the yogurt and three other people buying only the granola. He surveys his customers and finds that the people buying only the yogurt would buy granola if it cost only \$2 and the people only buying the granola would buy the yogurt if it only cost \$3. Should he start selling yogurt and granola together (in addition to selling them separately at the original prices) and, if so, what is the optimal price of the bundle? You can assume that the cost of producing a good or creating a bundle is zero.
 - (a) Yes, \$12
 - (b) Yes, \$13
 - (c) Yes, \$6
 - (d) Yes, \$5

- (e) No
5. Natch.com is an internet dating site that helps people meet partners by showing them profiles of potential matches. When a person signs up, she or he fills out a profile, then pays money to view profiles of others. The company has hundreds of profiles in the computer system and it costs nothing to email profiles to customers (so $MC = 0$). Suppose that there are two types of customers: *desperate* customers have an inverse demand for profiles given by $p_d = 40 - 2q_d$ and *not-desperate* customers have inverse demand $p_n = 20 - 2q_n$. The company has exactly one of each type of customer. If the profile that the customers fill out has enough information in it to allow Natch.com to *perfectly price-discriminate*, what will the company's profits be?
- (a) 0
 (b) 100
 (c) 400
 (d) 500
6. Suppose Natch.com *can't* identify the desperate customer. It knows, however, that the desperate customer demands more profiles and the company takes advantage of this by selling two kinds of packages of profiles, instead of a uniform price. It offers a large package of 20 profiles and a small package of 10. The small package is priced to capture all of the consumer surplus of the non-desperate customer. What price should Natch.com charge for the large package to maximize profits and guarantee that the desperate customer buys the large package and not the small one.
- (a) $p_l = 400$
 (b) $p_l = 300$
 (c) $p_l = 200$
 (d) $p_l = 100$

Note: *The first blue-book question is directly related to the above multiple-choice questions (5,6) about Natch.com. You may wish to do the first blue-book question now and return to the multiple choice when you are done.*

7. Firms 1 and 2 are Bertrand duopolists. Firm 1 has $MC_1 = 1$ and Firm 2 has $MC_2 = 2$. The demand for their product is $Q = 6 - p$, where Q is the total quantity demanded. What price will each firm charge in equilibrium? Prices can only be set to the nearest cent (e.g. \$5.68 is allowed, but \$5.6873723 is not).
- (a) $p_1 = 1.99$ and $p_2 = 2$
 (b) $p_1 = p_2 = 1$
 (c) $p_1 = 1$ and $p_2 = 2$
 (d) $p_1 = p_2 = 4$
8. Competing duopolists both have $MC = 1$ (and no fixed costs) and face inverse demand $p = 2 - 2Q$, where $Q = q_1 + q_2$ is the total output of both firms. What is Firm 2's Cournot reaction function, $q_2^*(q_1)$?
- (a) $q_2^*(q_1) = \frac{1-q_1}{3}$
 (b) $q_2^*(q_1) = \frac{1-2q_1}{4}$
 (c) $q_2^*(q_1) = \frac{1-2q_1}{3}$
 (d) $q_2^*(q_1) = \frac{1-2q_1}{2}$

Note: *The second blue-book question is directly related to the above multiple-choice question (8) about the Cournot duopolists.*

Blue-book – 25 out of 50 pts. (2 qns., 12 pts. each + 1)

Answer these questions in your blue-book. Show your work and intermediate steps for partial credit. Points are split equally across all sub-parts. Your score will **only** be based on the marks in your blue-book. You will not receive any credit for anything written on your exam paper. You will receive 1 point for correctly writing your name, perm number, version (A,B,C, or D), and TA's name on your blue-book.

1. Recall Natch.com from the multiple choice part, specifically
 - The desperate customer's demand for profiles is $p_d = 40 - 2q_d$
 - The not-desperate customer's demand is $p_n = 20 - 2q_n$
 - There is exactly one of each kind of customer
 - The marginal cost of providing a profile is zero
 - (a) Under the pricing scheme from multiple-choice question 6—where the company sells the two packages of profiles—what are the company's profits?
 - (b) What would the company's profits be if it engaged in uniform pricing (charged a single, per unit price)? How does this compare to your answer from part (a)?
 - (c) Now suppose that the information that the customers provide in their profile does provide the company with some information. Specifically, it is not enough to allow the company to perfectly price discriminate, but it does allow the company to observe whether or not the customer is desperate. What will its profits be if it sells profiles individually, but charges different prices to the desperate and non-desperate customers (that is, it engages in multi-market price discrimination)?
 - (d) Which of the two non-uniform pricing schemes is better for Natch.com?
Why is this surprising? (Hint: What is the role of information?)
What is the explanation for this? (Hint: How is this similar to a two-part tariff?)
2. Recall the duopolists with $MC = 1$ (and no fixed costs) and demand $p = 2 - 2Q$ from multiple-choice question 8.
 - (a) Find the Cournot equilibrium quantity for each firm, the resulting market price, and the profits for each firm..
 - (b) Find the Stackelberg equilibrium quantities for each firm, and the price, and the profits for each firm supposing that Firm 1 is the industry leader.
 - (c) Suppose that Firm 2 figures out a way lower its marginal cost to $MC_2 = 0$. How does this affect the Cournot equilibrium quantities, price, and profits?
 - (d) How does this affect the Stackelberg equilibrium (with Firm 1 still as the leader) quantities, price, and profits?