

Econ 001: Midterm 2 (Dr. Stein) Answer Key
Nov 14, 2007

Instructions:

- This is a 60-minute examination.
- Write all answers in the blue books provided. Show all work. Use diagrams where appropriate and label all diagrams carefully.
- Write your name and your Recitation Instructor's name in every blue book that you use.
- This exam is given under the rules of Penn's Honor system.
- All blue books, blank or filled, must be handed in at the end of this exam. No blue books may be taken from the room.
- The use of Programmable Calculators is in violation of Departmental rule. It is strictly forbidden!

The Midterm has 2 parts.

Part 1 consists of 9 multiple-choice questions. Please write you answers in blue book 1.

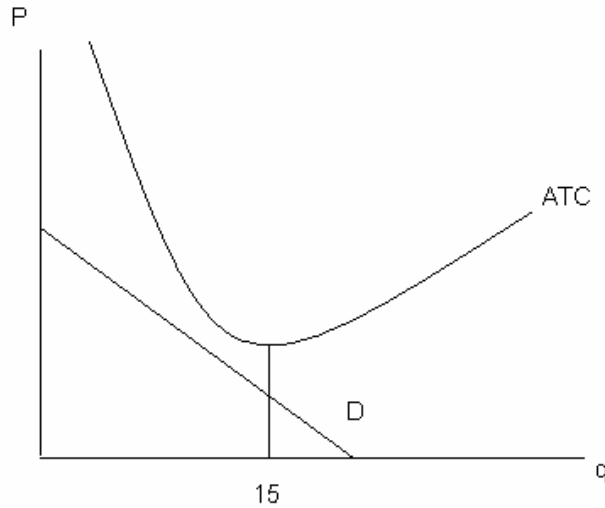
Part 2 consists of 2 short answer questions. Please use a separate blue book for each answer.

Part I: Multiple Choice Questions (4 points each/32 points total):

1. Harry spends all of his income on pizza and beer and initially consumes positive quantities of both goods. Subsequently, his income **increases** by 20 percent, price of pizza **increases** by 20 percent and price of beer remains **unchanged**. Comparing the budget lines before and after these changes, we find that his new budget line will:
 - a. Have the same slope as the old budget line.
 - b. Be shifted out on both the pizza & beer axis.
 - c. Be shifted out only on the beer axis
 - d. Both a and b are correct.
2. Using the information from the previous question, which of the following statements is **True**?
 - a. If pizza is a normal good, Harry will always purchase less pizza
 - b. If beer is a normal good, Harry will always purchase more beer.
 - c. If beer is an inferior good, Harry will always purchase more beer.
 - d. If pizza is a normal good, Harry will always purchase more pizza

3. The cost function of a firm is: $TC(q) = 6 + 4q^3 + q$
When the output is 2, which of the following is correct?
- I. Average Total Cost=20,
 - II. Average Variable Cost =17,
 - III. Average Fixed Cost=6
- a. I, II & III
 - b. I & II only
 - c. II & III only
 - d. I & III only
 - e. None of the statements is correct.
4. Rebecca decides to allow Daniel to open and operate a lemonade stand on her front lawn for a flat fee of \$3 that includes the rental of the table as well as an unlimited supply of lemonade and cups. While the lemonade stand is in business, Daniel's total revenues are \$10, and so he pockets \$7. Which of the following is true?
- I. Daniel's economic profits are \$7.
 - II. If Daniel expects the same costs & revenue next week he should open up his stand once more.
- a. Only I is true.
 - b. Only II is true.
 - c. Both I and II are true.
 - d. Neither statement is true.

5. Suppose the detergent industry is perfectly competitive and all firms are identical. The market demand for detergent is given by $P = 60 - Q/10$, and each firm faces the same cost functions: $TC = 100 + q^2$ & $MC = 2q$. What will be the price in the **long run**?
- \$10
 - \$20
 - \$100
 - In the long run no firms will produce in this industry and therefore the price is indeterminate.
6. Using the information from the previous questions, what is the number of firms N in a **long run equilibrium**?
- $N=10$
 - $N=20$
 - $N=30$
 - $N=40$
7. Which of the following statements is **true**?
- Under the average cost pricing rule, the monopoly may not produce at the efficient level but it will always break even.
 - Under the marginal cost pricing rule, if the monopoly will produce it will be at the efficient level but it may make negative profits and decide to exit the market altogether.
- I
 - II
 - I & II
 - Neither statement is true.



8. Consider the scenario above of a firm in monopolistic competition. Which of the following statements is true in the long run?
- Firms will exit and the ATC of this firm curve will shift in.
 - Firms will exit and the demand curve facing this firm will shift out.
 - The firm will be producing 15 units.
 - The profits of the firm will decrease.
9. Both PlayStation 3 (PS3) & Xbox are considering whether or not to give steep discounts for their products during the holiday season. Their respective profits from these strategies are given in the payoff matrix below:

(In terms of \$millions)		PS3	
		Discount	No Discount
X-box	Discount	PS3: 60 X-box: 60	PS3: 40 X-box: 0
	No discount	PS3: 100 X-box: 4	PS3: 50 X-box: 50

Consider the following two statements:

- The Nash Equilibrium of this game is for both firms to offer discounts.
- This outcome is efficient.

- Both statements are true.
- Only I is true.
- Only II is true.
- Both statements are false.

Answer Key

1. C
2. B
3. B
4. D
5. B
6. D
7. C
8. B
9. A (2 points for B)

Part II: Short Answer Questions:

Please use a separate Blue Book to answer each of the 2 questions.

Q1. (34 points)

George Naylor is an Iowa corn farmer. Corn is a **competitive market** and is currently **in a long-run equilibrium**.

- a. Draw a graph depicting George Naylor's marginal, average variable cost & average total costs. Show his profits assuming that the price of corn is currently \$1.45/bushel.

Answer: typical cost curve graph required here with $p = \min ATC = \$1.45$

Points: 8

Increasing MC: 1

U shaped AVC, minimum intersecting with MC: 2

U shaped ATC, minimum intersecting with MC: 2

Distance between AVC & ATC decreasing: 1

$P = \min ATC = \$1.45$: 1

Profits=zero: 1 point

- b. Draw a graph depicting the supply and demand in the corn market as a whole. Make sure this graph is consistent with the one you drew in part a.

Answer: Upward sloping supply & Downward sloping demand with equilibrium price = \$1.45

Points: 2

S & D graph: 2

$P = \$1.45$: 2

An increased demand for ethanol has increased the demand for corn, because ethanol can be made from corn.

- c. Show the effects of the increased demand for ethanol on the market supply and demand graph that you drew in part b. Explain why you shifted the curves that you shifted and clearly mark what happens to the price of corn.

Answer: Demands shifts out, Equilibrium price increases

Points: 6

Shift out of Demand: 3

Increase in Price: 3

- d. How will these changes affect Mr. Naylor? Show these effects on the graph that you drew in part a. Clearly explain why you shifted any curves that you shifted.

What happens to Mr. Naylor's profits? Is this consistent with long run equilibrium? Explain.

Answer: Price increases. q increases. Profits $>$ zero. Not consistent with long run equilibrium. We should expect entry as profits $>$ zero.

Points: 8

Price increase: 2

New q where $P_1=MC$: 2

Profits market correctly: 2

Not long run, expect entry: 2 (1 point if no explanation)

Congress is currently debating a farm bill that subsidizes corn production. Senator X claims that these subsidies should be abolished now that the demand for corn is higher since profits are expected to be larger from this point on.

- e. Using your answer from part d and the model's prediction for the long run price of corn, evaluate Senator X's statement. (Note: we are not looking for an evaluation of subsidies in general, but for a link between the senator's claims and the model's predictions).

Answer: Positive profits will draw new farmers into the market and price will drop. In the long run price will return to \$1.45 a bushel and profits will be zero. Hence a shift in demand does not suggest that subsidies should be abolished.

Points: 8

Entry will lower price: 2

Price in long run back to \$1.45: 2

Profits back to zero: 2

Demand shift has no long run effect on profits (or other correct explanation): 2

Q2. (34 points)

Apple Computers is the only producer of the iPhone. There are two kinds of consumer of iPhones, with the following demand and marginal revenue curves:

iSnob:

$$P_S = 1000 - 4 Q_S$$
$$MR_S = 1000 - 8 Q_S$$

iNoSnob:

$$P_N = 600 - Q_N$$
$$MR_N = 600 - 2 Q_N$$

In addition, you have the following information about the company's costs in selling iPhones:

Fixed Cost: 20,000.
Marginal Cost: 200 (constant)

a) Suppose that Apple can price discriminate between the two markets. What prices will it set in each market, and what quantity of iPhones will it sell (in each market)?

Answer: In each market will set $MC=MR$. Plug Q into to respective demand to get each P . We get:

iSnob:

$$200 = 1000 - 8 Q_S$$
$$Q_S = 100$$
$$P_S = \$600$$

iNoSnob:

$$200 = 600 - 2 Q_N$$
$$Q_N = 200$$
$$P_N = \$400$$

Points: 12

$MC=MR$ in each market: 4 point

$Q_S=100$: 2

$P_S = \$600$: 2

$Q_N=200$: 2

$P_N = \$400$: 2

b) Evaluate the total profit made by Apple from the sale of iPhones.

Answer:

Profits=Revenue-Costs=

$$(P_S * Q_S + P_N * Q_N) - (FC + (Q_S + Q_N) * AVC) = \\ (600 * 100 + 400 * 200) - (20,000 + (100 + 200) * 200) = 60,000$$

Points: 6

Profits=Revenue-Costs: 1 point

Rev=in both markets: 1 point

Cost correctly: 2 points (1 for MC=AVC, 1 for FC counted only once)

Profits=60,000: 2 points

c) The government has decided that iPhones are over priced and has therefore set a price ceiling of \$500 per phone. What quantity of iPhones will Apple now sell in each market, and what profit will it make? Should this profit be greater or less than the profit you found in part b? Why?

Answer:

Note that the firm is allowed to charge a price below \$500, therefore the price ceiling will only be binding in the Snob market. Apple will continue to set $P_N = 400$ & $Q_N = 200$. In the Snob market though the price ceiling is binding, Apple will therefore set $P_S = 500$ & from the demand curve we get $Q_S = 125$.

We should expect profits to be lower now that the firm isn't allowed to choose the profit maximizing output, and indeed we get:

Profits=Revenue-Costs=

$$(P_S * Q_S + P_N * Q_N) - (FC + (Q_S + Q_N) * AVC) = \\ (500 * 125 + 400 * 200) - (20,000 + (125 + 200) * 200) = 57,500 < 60,000$$

Points: 8

Price ceiling only binding in Snob market: 2 points

$P_N = 400$ & $Q_N = 200$: 1

$P_S = 500$ & $Q_S = 125$: 1

Profits=57,500: 2

Profits must be lower because the firms were maximizing profits before: 2

d) What (two) criteria should we use to evaluate price discrimination?

Answer:

Efficiency & Equity

Points: 4

2 each

If write (correctly) the two criteria for being able to price discriminate in the first place: 2 points.

e) Using these criteria how would you rank that two pricing methods of parts a & c?

Answer: T.S. in part c is greater as the firm is producing closer to where $MB=P=MC$ at least in one market (the Snobs). So by efficiency standards the price ceiling is better

From an equity stand point I think this ranks better too as I care about consumers more and with a price ceiling at least one group buys more and pays less so that C.S. is greater. But because profits are lower, you are welcome to give another answer here.

Points:4

2 each. Need to relate efficiency either to total surplus or to $MC=MB$