Econ 001: Midterm 2 (Dr. Stein) Answer Key
Nov 13, 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 (Best 8 out of 9: 4 points each/32 points total):

1. Mrs. X spends all her income on Apples and Bananas. If the price of both goods rises by 10 percent, which of these statements are correct?

    I.   If we give Mrs. X 10 percent more income, she would be as happy as before the price increase.
    II.   After the price increase, she will consume goods Apples and Bananas in the same proportion as before.
    III.   After the price increase, she will consume more of the cheaper good.

a.   I only
b.   I and II
c.   I, II and III
d.   None of the above

2. Using the information above, which of the following statements is **True**?

a.   The substitution effect in this case will encourage consumption of more Apples.
b.   The substitution effect in this case will encourage consumption of more Bananas.
c.   The substitution effect in this case will encourage consumption of more Apples *and* Bananas.
d.   None of the above is correct.

3. Based on the information below, what are the Total Fixed Costs for this firm?

Quantity	ATC	AVC	MC
4	10		
5		3	5

a. 0
b. 6
c. 15
d. 30

4. See the following figure:
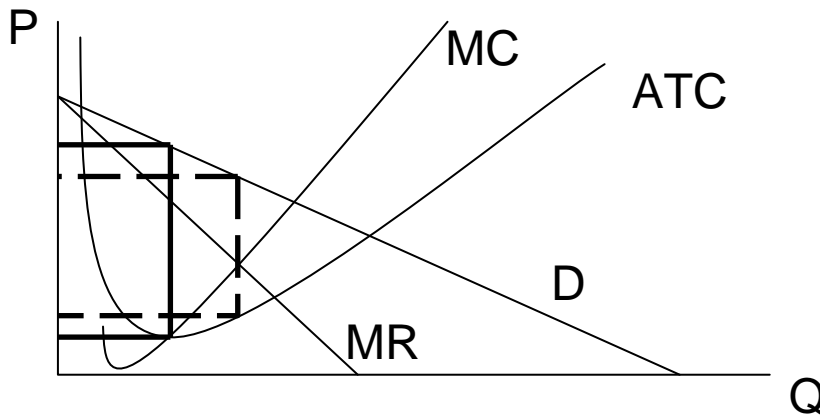
Consider a firm facing the cost curves, MR curve, and D curve as above. Let A be the area of the dotted rectangle above (note that it extends to the P-axis) and B be the area of the solid rectangle above. Note that the figure is not drawn to scale. Which of the following is true?
a.   A>B
b.   A=B
c.   A<B
d.   Not enough information

5. Consider a monopoly that can distinguish between every consumer, knows each consumer's willingness to pay and may charge different prices. Which of the following is true in this case?

a. The MR curve is below the demand curve.
b. There is DWL.
c. The rule that "MR=MC" still applies in this case.
d. The consumer will get some consumer surplus.

6. Suppose a firm can distinguish between professors and students. The firm also knows that the quantity demanded by professors at any given price is higher. The marginal cost is 1 for any quantity. Then which of the following is true?

a. There is no DWL.
b. The MR the firm gets from the last product bought by the students is 1, but the MR the firm gets from the last product bought by the professors is greater than 1.
c. The firm would get more profit if it sets a single price for all the consumers than if it sets different prices for professors & students.
d. None of the above is correct

7. Which of the following is **not** a characteristic of **both** perfectly competitive and monopolistically competitive markets?

a. Long-run profits are zero.
b. Firms maximize profits by choosing quantity such that marginal cost equals marginal revenue.
c. Market demand is downward-sloping.
d. Short-run profit-maximizing quantities are allocatively inefficient.

8. GM will stop providing health care to its retired workers this coming January. This will likely:

a. Reduce their Fixed Costs of production.
b. Increase economic profits at any positive output.
c. Make them more likely to stay in the market in the long run.
d. All of the above.

9. Both GM and Ford are facing tough times as consumers flock to hybrid cars instead of gas guzzling SUVs. Both firms are considering investing in new energy efficient hybrid technologies. The following table gives their profits (in Billions) given their decisions of whether or not to invest in the new technology.

		GM	
		Invest in Hybrid	No Investment
Ford	Invest in Hybrid	GM: -100 Ford: -100	GM: -80 Ford: + 20
	No Investment	GM: + 20 Ford: -60	GM: -60 Ford: -30

The Nash Equilibrium of this game is:
a. Both firms invest in Hybrid technology.
b. Neither firm invests in Hybrid technology.
c. Only GM invests in Hybrid technology.
d. Only Ford invests in Hybrid technology.
e. Both c & d are Nash Equilibria.

Answer Key:
1. a
2. d
3. d
4. a
5. c
6. d
7. d
8. d
9. e

Part II: Short Answer Questions:
Please use a separate Blue Book to answer each of the 2 questions.

Q1. (34 points)

a. What market structure do you think best characterizes the pizza industry? Why?
Answer:
The pizza industry can best be characterized as monopolistic competition as there are many pizza makers who make a differentiated product in a market with free entry & exit.
For full credit students must relate the good with the correct market structure.
They can get full credit for perfect competition if they state the good is homogenous, though then they must eat Pizza Hut pizza for the rest of their lives.

Points: 4
**Need to talk about differentiated product:1**
Number of firms: 1
Free entry & exit:1
Correct structure for characteristics listed: 1
Note: Maximum of 2 points if the characteristics sited conflict with market structure suggested.
Only 1 point if no explanation given: see the WHY? in the question.

For the rest of the question assume that the pizza industry is **perfectly competitive**. The following graph shows the costs facing "Mama P", a typical pizza manufacturer on Main Street.
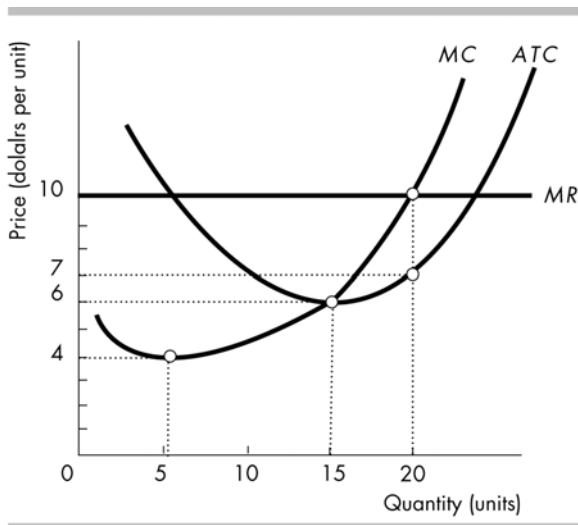
b. With this demand curve how many pizzas will this firm sell? What are the firm's profits?

Answer:

The firms will produce where MR=MC or 20 pizzas. Profits=Rev-Cost=200-140=$60

Points:4

q=20:2

Profit=60:2

c. Suppose we know that at a price of $10 a pizza consumers are interested in purchasing 2,000 pizzas. How many firms are active in this market?

Answer:

N=Q/q=2000/20=100

Points: 3

2 for set up, 1 for N=100.

d. What is the long run price in this market? In the long run how many pizzas will each firm sell?

Answer:

The long run price is where ATC=MC or P=6. Each firm in the long run will produce 15 pizzas.

Points: 5

P=6: 3 points

q^{LR}=15: 2 points

e. Suppose we know that in the long run there are 200 active firms. Is market demand downward sloping? Explain your answer.

Answer:

$Q=q^{LR}*N^{LR}$=15*200=3000

Note that as price falls from 10 to 7 the quantity demanded by the market increases from 2000 to 3000. This implies that demand is downward sloping.

Points: 6

Q: 3 points (2 for set up , 1 for answer)

Demand downward sloping: 1 for correct, 2 points for explanation.

f. Can we tell from this if pizza is a normal on an inferior good? Explain.

Answer:

We cannot tell if the good is normal or inferior. If it is normal both substitution effect and income effect of the price fall will encourage greater pizza consumption. If pizza is an inferior good the substitution effect will encourage greater consumption and the income effect of the price fall will encourage less pizza consumption, but as long as the substitution effect dominates demand will still be downward sloping.

Points:6
Need to mention substitution and income effect: 3
Understand that if the good is inferior as long as substitution effect dominates demand still downward sloping: 3

g. The long run price of pizza has been falling for the last 50 years. Give 2 *different* reasons why this could have happened.

Answer:
An improvement in technology would increase marginal productivity and lower marginal costs. A decrease in input prices would also lower costs.

Points: 6
If mention technology & input prices: 6 points
Fixed and variable inputs: 5 points
2 different variable (or fixed) costs (eg., labor & cheese): 3 points

Note: students will get credit if they relate to opportunity cost as an explanation.

Q2. (34 points)

SEPTA is an example of a regulated natural monopoly. There are large fixed costs to run the system of trains & busses, but the marginal cost of having an additional customer use the system is low and constant.

This question asks you to analyze how the government should regulate SEPTA and some consequences of such regulations.

a. Start by graphing the cost curves for SEPTA. Assume the marginal cost of each additional passenger is constant and equal to $1. Draw the MC curve. Add an Average Total Cost curve that is consistent with SEPTA having large fixed costs and with the MC curve you drew.

Answer:
Horizontal MC at $1 and ATC that always falls and asymptotically gets closer to the MC.

Points: 5
MC flat at $1: 3 points
ATC falling: 1, never crosses MC: 1 point

b. Add a downward sloping demand. Why is the demand SEPTA faces not perfectly elastic in this case?

Answer:

Though there are substitutes to SEPTA (private cars, walking, Taxis) there are no perfect substitutes. The good is differentiated and an increase in price will deter some but not all users.

Points: 4
Need to relate to differentiated product/ lack of perfect substitutes or talk about the monopolist as a price setter.

   c.   If SEPTA were an unregulated monopoly how many riders would use it? What price would they be charged? What is the dead weight loss due to this pricing? Show all graphically.

Answer:
Add MR curve. Quantity determined by MR=MC, price determined by demand curve. DWL=area between demand & MC from Q^M to Q^{eff}.

Points:6
Add MR: 2
Q^M: 1, P^M: 1, DWL: 2

   d.   What price would lead to efficient use of SEPTA? What would happen if the government regulated SEPTA to charge this price?

Answer:
Efficient use would be where MC intersects demand. This would imply a price of $1. At this price the firm is loosing money and eventually would exit the market.

Points: 4
  P=$1: 2 point
  Exit: 2 point.

   e.   What is the break even or zero profit price (show graphically)? What are the benefits of setting such a price by the government?

Answer:
The zero profit price is where ATC intersect demand. This is the lowest prices that ensures SEPTA will be active in the market in the long run and yet allows the quantity to be as close as possible to the efficient output.

Points:6
ATC intersects Demand: 2
Small DWL/Close to Q^{eff}: 2
Still in Market: 2

In the last few years the price of core inputs in making rail tracks have increased. This has affected the fixed cost of providing SEPTA services.

   f.   How would a change in fixed cost affect pricing and profits without regulation (as in part c)?

Answer:
As this is a change in Fixed Costs and not MC there would be no change in pricing but profits would be lower.

Points:4
  P stays the same:2
  Profits lower: 2
  g.   How would a change in fixed cost affect pricing and profits with regulation (as in part e)?

Answer:
ATC would be higher due to te higher Fixed Costs so the point where demand intersects ATC would be at a lower quantity and the regulated price would increase. Profits remain zero.

Points:4
P increases: 2
Profit still zero: 2

  h.   Given answers to f and g, contrast the impact of rising costs on the firm in regulated and unregulated markets.

Answer:
In a regulated market the firm is less sensitive to increased costs as there are assured zero profits in any case.
Points: 1