

Econ 001: Midterm 2
March 22, 2006

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!

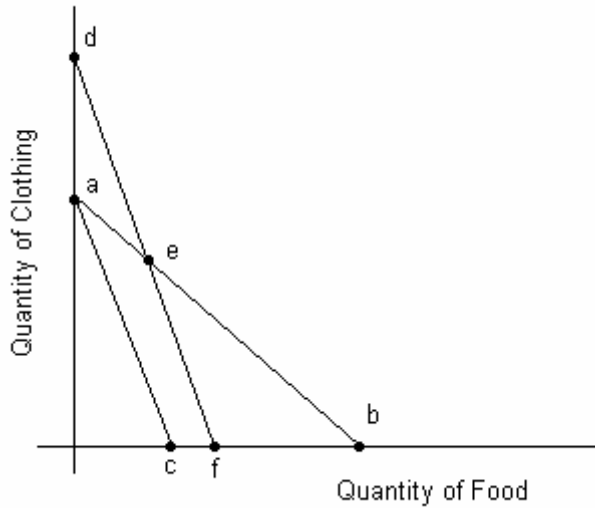
The Midterm has 2 parts.

Part 1 consists of 11 multiple-choice questions. Please write your 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/maximum 40 points):

The following three questions refer to the graph below, which depicts several budget lines for food and clothing. The individual is initially on budget line ab and consuming at point e . The price of food then increases.

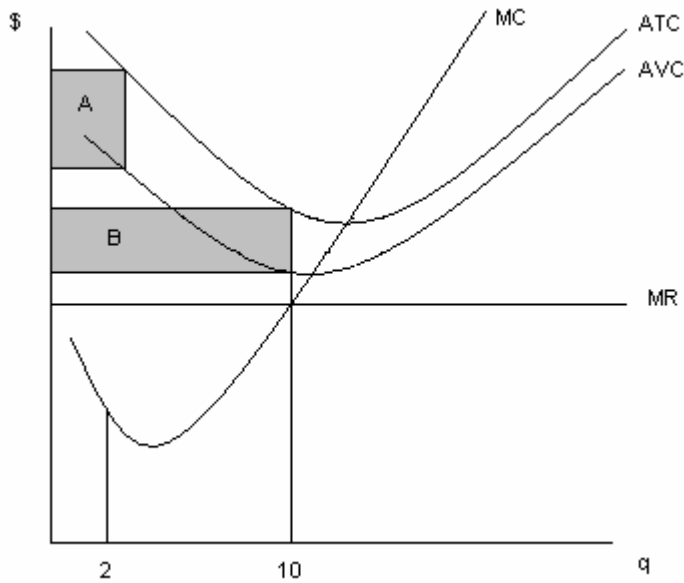


1. After the price increase, the individual selects a new consumption bundle somewhere on the line segment
 - a. eb
 - b. ac
 - c. de
 - d. ef

2. The substitution effect of this price increase induces the individual to choose a consumption bundle somewhere in the region:
 - a. ade
 - b. feb
 - c. $ae fc$
 - d. ac and the origin.

3. If an individual chooses bundle e when confronted with budget line ab and selects a bundle between e and f when confronted with budget line df , then
 - a. food is a normal good
 - b. clothing is an inferior good
 - c. real income has decreased
 - d. this individual would not be behaving in a consistent manner

Use the following graph to answer questions 4 & 5



4. Given the graph above for a particular firm, which of the following statements is true?
 - a. Marginal Productivity is increasing at $q=2$
 - b. Marginal Productivity is decreasing at $q=2$
 - c. Marginal Productivity is increasing at $q=10$
 - d. Both a. and c.

5. Using the same graph, what is the relationship between the area of A and the area of B? Note: Graph is not drawn to scale.
 - a. area A > area B
 - b. area A < area B
 - c. area A = area B
 - d. There is not enough information.

6. A typical perfectly competitive firm's total cost function is $TC(Q)=100+q^2$ and $MC=2q$. What is the **incorrect** statement?
 - a. The firm's fixed cost is 100.
 - b. When the price is 100, the firm will produce 50 units of output.
 - c. The long run equilibrium price is 20.
 - d. Even when the fixed cost increases to 200, the long run equilibrium price does not change.

7. In a perfectly competitive market, prices have dropped in the short-run. Which of the following is **not** a possible explanation?
- The price of a substitute has gone down.
 - New firms have entered the industry.
 - Firms have lower variable costs.
 - Firms have lower fixed costs.
8. Suppose that there is only one firm which produce the goods and that there are two different types of people A and B. People A and people B values the foods differently.
The demand of people A is $P=60-Q$. The demand of people B is $P=40-Q$.
The total cost for the firm is $TC=30+Q^2/2$.
The firm can either change the same price in both markets or set different prices in each. Which of the followings is correct?
- The producer surplus is smaller under the single price setting.
 - The producer surplus is the same regardless of the price settings.
 - The producer surplus is larger under the single price setting.
 - The consumer surplus is the same regardless of the price settings.
9. A perfectly price discriminating monopolist is:
- Not maximizing profits.
 - Creating dead weight loss.
 - Selling all units that are valued at more than marginal cost.
 - Maximizing consumer surplus.
10. In a monopolistically competitive market, firms are making negative profits in the short-run. In the long-run what will happen?
- Firms will exit the industry, moving every firm's supply curve inward until profits are 0.
 - Firms will change from price-takers to price-setters.
 - Fixed costs will fall until profits are 0.
 - Firms will exit the industry, until every firm's demand curve shifts outward enough that profits are 0.

11. Amy wants to go to concert with Sam, and Sam wants to go to baseball game with Amy. They value the time spent together but they have different preferences. They measured their happiness of events in dollar terms:

		Sam	
		Concert	Baseball
Amy	Concert	Amy: \$50 Sam: \$50	Amy: \$40 Sam: \$60
	Baseball	Amy: \$10 Sam: \$10	Amy: \$30 Sam: \$80

Which is the **incorrect** statement?

- Amy will go to concert whether Sam joins her or not.
- Sam will go to baseball game whether Amy joins him or not.
- Going to baseball game together is the Nash equilibrium since it generates the highest joint happiness.
- Amy will go to concert and Sam will go to baseball game.

Answers:

- b**
- a**
- d**
- a**
- c**
- d**
- d or b**
- a**
- c**
- d**
- c**

Note: Maximum number of points is 40.

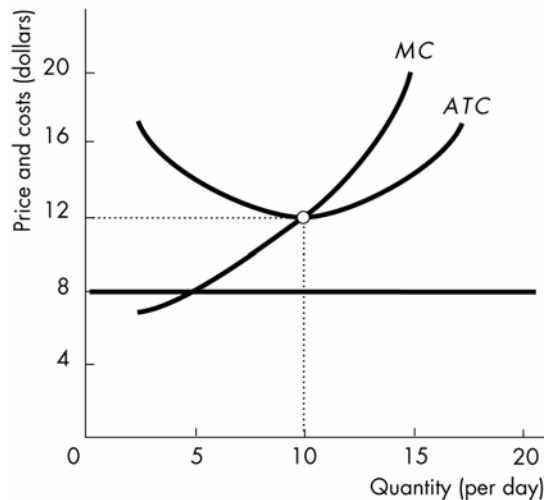
Part II: Short Answer Questions:

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

Q1. (30 points)

Mr. Potato is a small farmer in Idaho. The graph below depicts his marginal cost and average total cost curves (per ton) of growing potatoes.

Use the graph to answer the following questions. You will want to copy the graph into your blue book to do this.



The aggregate demand curve in the potato market is:

$$Q = 5,000 - 50P$$

- a. Mr. Potato knows he can sell as many potatoes as he wants at the going price of \$8 a ton. What type of market structure characterizes this market? Explain.

Answer:

Perfect competition – Mr. Potato is facing a horizontal demand curve (“he can sell as many potatoes as he wants at the going price”) this means that sellers are price takers and too small to affect the market price.

Points: 5

2 for perfect competition

3 for relating to price takers/horizontal demand curve.

- b. If Mr. Potato produces at a price of \$8 a ton, how many potatoes will he choose to sell? Show graphically his profits/losses in this case.

Answer:

If he chooses to sell it would be where $MR=P=MC$ or $MC=8$, so 5 (tons of) potatoes.

Losses are the area $(ATC-P)*q$ at $q=5$.

Points: 6

Quantity: 3 (2 for 5, 1 for explanation)

Profits: 3 (either graphical or numerical)

- c. What additional information does Mr. Potato need before he decides whether or not to produce the quantity you found in part b? Add this information to the graph in a way that is consistent with his decision to produce.

Answer:

Mr. Potatoe needs to check that P is greater than AVC . So one needs to add an AVC curve. This should be added as an AVC curve which is below 8 at $q=5$. The AVC curve intersects MC at the min of AVC and get closet to ATC as quantity increases.

Points: 6

Need to Check $P > AVC$: 2 points

Add AVC : 1 point

$AVC > P$ at $q=5$: 1 point

Intersect at minimum: 1 point

Gets closer to ATC : 1 point

- d. If all farmers are identical to Mr. Potato, how many farmers will be active in this market in the long run? How many tons will each farmer produce?

Answer:

In the long run, they'll produce at the minimum of ATC , which is where $P=12$, $q=10$. From the aggregate demand curve, if $P=12$, we get $Q=4400$. Each farmer makes 10, which means we have 440 farmers.

Points: 8

Understanding that we will be at min ATC : 2 points

$Q=10$: 2 points

$N=440$: 4 points. (2 for method)

Note: if you plugged in the wrong q but got a consistent Q & N you get 4 points.

- e. Mr. Potato, like other farmers, has the option of working at Wal-Mart instead of on the farm. Therefore, for every ton of potatoes picked, Mr. Potato is losing \$2 in wages. Does this affect your answer to part d? Explain.

Answer:

The cost curves are supposed to account for this (opportunity cost), so it wouldn't affect the answer.

Points: 5

Understanding that this is an opportunity cost: 2 points

Already taken into account: 3 points.

Note: Students who just shifted MC will get 2 points.

Q2. (30 points)

Philadelphia is considering setting up a city-wide wireless network. In this question you will analyze some of the considerations of how to implement such a plan.

Suppose that the fixed cost of setting up the network is \$1,000. Once the network is set up the cost of adding a user to the network, the marginal cost, is \$1 per user.

Suppose further that the demand for wireless network is downward sloping and given by:

$$P=1,001 -2Q$$

Which implies marginal revenue =1,001-4Q

Please answer the following questions showing your work.

- a) If the rights to provide wireless service were given to one firm that then has a monopoly on the market, what quantity will they choose to produce? What will be the total surplus generated by this market?

Answer:

To maximize profits the firm will produce where $MR=MC$, or $Q=250$. From the demand curve, we get $P=501$.

The total surplus will be $(1,001-501)*250/2+(501-1)*250=187,500$.

Points: 8

MC=MR: 2 point

Q=250: 2 points

Total surplus: 4 points (3 for method, 1 for answer)

- b) What is the efficient quantity? What will be the total surplus generated by this market if the efficient quantity is produced?

Answer:

The efficient quantity is where $MB=MC$ or where $D=MB=P=MC$. At this point $Q=500$.

Then the total surplus by the market is $500*(1001-1)/2=250,000$.

Points: 8

MC=MB (or similar): 2 point

Q=500: 2 points

Total surplus: 4 points (3 for method, 1 for answer)

- c) City Councilman A suggests allowing two firms to enter the market. He suggests that the competition will drive down the price to marginal cost. Do you support this recommendation? Explain your answer.

Answer:

No. This is a case of a natural monopoly. If $P=MC$, then it won't be worth it for the firms to undertake the fixed cost of setting up the network. They'll have $P=MC=AVC$, and $P<ATC$

Points: 6

Need to explain that if $P=MC$ the firm loses money. This is a natural monopoly.

Note: students who suggested this is a monopolistically competitive market and explained implication correctly get 3 points.

d) Jay Lee, a recent graduate of Penn, suggests the city pay for installation of the network and then allow two firms to compete on providing the service. Do you support this recommendation? Explain your answer.

Answer:

This scheme will work – now $FC=0$ for the firms (as the city builds the infrastructure), so $ATC=AVC$, and as we noted, $P=ATC=MC$, so we'll be producing at the efficient point.

Points: 8

Need to understand that now $FC=zero$ and firms will indeed produce where $P=MC=AVC$ and we get efficiency.

6 for profits=zero and therefore produce.

2 for efficiency.

Note: Students who talked about oligopoly and Nash Equilibrium etc. get partial credit.