

NAME:

SECTION (mark yours): 05 06

**EC 131 - Principles of Microeconomics
Fall 2011**

MIDTERM #2

All questions should be answered in the following pages. Nothing here requires a very long answer. Graphs many times help, as does neatness.

You have 75 minutes to complete this exam. Mark **clearly** your answers for the multiple choice questions in their respective letters. If more than one alternative is marked you will not get any point from that question. You can use pencil, though if you do so you won't be able to dispute the grading for that question afterwards. **You MUST return this exam.** Each question clearly states how many points it is worth. The exam is worth 140 points.

The following definitions are used throughout the exam:

AFC - Average Fixed Cost
AVC - Average Variable Cost
MC - Marginal Cost
MR - Marginal Revenue
Q - Quantity

Use your time wisely.

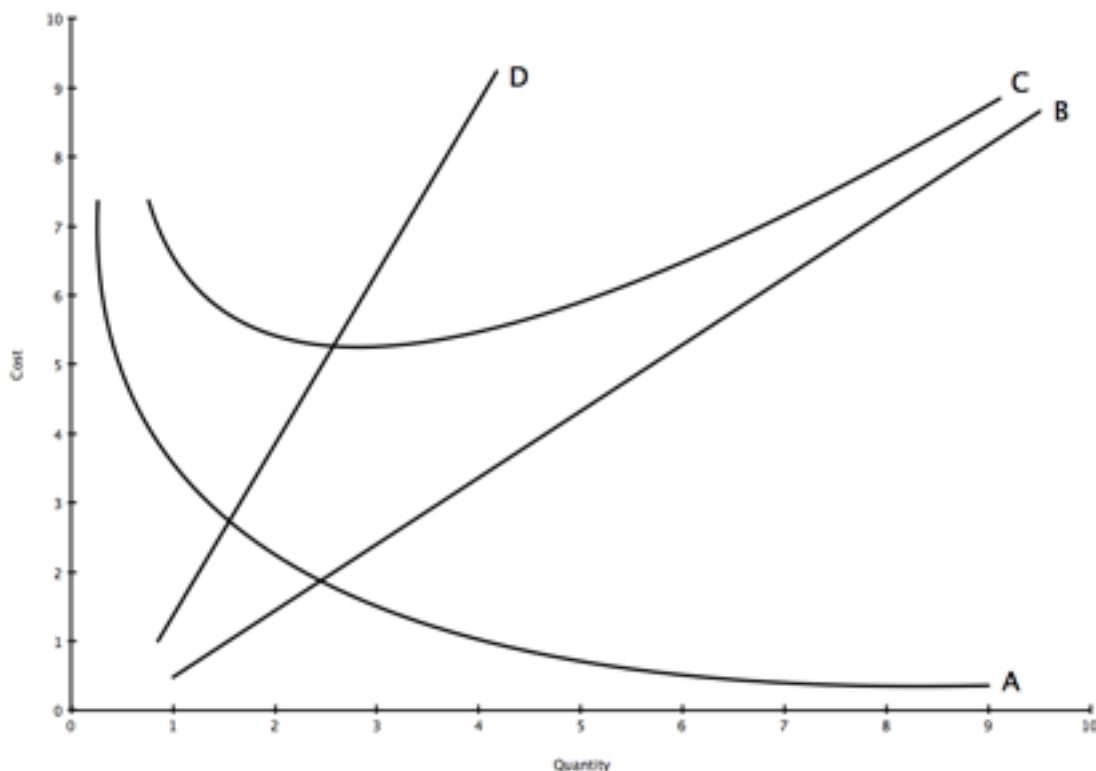
Question 1 - (5 points) Suppose that a firm has a production technology that presents decreasing marginal product on its input. Then, we should expect that: (Mark the **correct** alternative)

- The AFC curve is increasing in Q
- The AFC curve is decreasing in Q
- The MC curve is decreasing in Q
- The MC curve is increasing in Q**

Question 2 - (5 points) John has decided to start his own lawn-mowing business. To purchase the mowers and the trailer to transport the mowers, John withdrew \$1,000 out of the \$10,000 available in his savings account, which earns 3% interest per year, and borrowed an additional \$2,000 from the bank at an interest rate of 7% per year. What is John's opportunity cost of the financial capital that has been invested in the business in the first year? (Mark the **correct** alternative)

- \$ 140
- \$ 170**
- \$ 410
- \$ 440

Consider the graph below for questions 3 and 4:



Question 3 - (5 points) Curve A is always declining because of: (Mark the **correct** alternative)

- a. Diminishing marginal product
- b. **Dividing fixed cost by higher and higher levels of output**
- c. The fact that increasing marginal cost follows decreasing marginal product
- d. The fact that decreasing marginal cost follows increasing marginal product

Question 4 - (5 points) Curve D intersects curve C at a point where we can always say that: (Mark the **correct** alternative)

- a. Is where MR equals MC
- b. **Is at the quantity chosen by a firm in a competitive market in the long-run**
- c. Fixed costs equal variable costs
- d. The line tangent to curve C have a negative slope

Question 5 - (5 points) A firm in a competitive market presents production technology with decreasing returns in its input. The firm hires a business consultant to analyze its financial records. The consultant recommends that the firm reduces its production. The consultant must have concluded that the firm's: (Mark the **correct** alternative)

- a. Total revenues exceed its total accounting costs
- b. MR exceeds its total costs
- c. MR exceeds its MC
- d. **MC exceeds its MR**

Question 6 - (5 points) A profit-maximizing firm with increasing MC is currently producing 200 units of output. It has an average revenue of \$9 and ATC of \$7. Mark the **incorrect** item:

- a. The ATC curve intersects the MC curve at an output level of less than 200 units
- b. The ATC would increase if the firm increases production to 201 units
- c. Profit is of \$400
- d. **AVC is some value between \$7 and \$9**

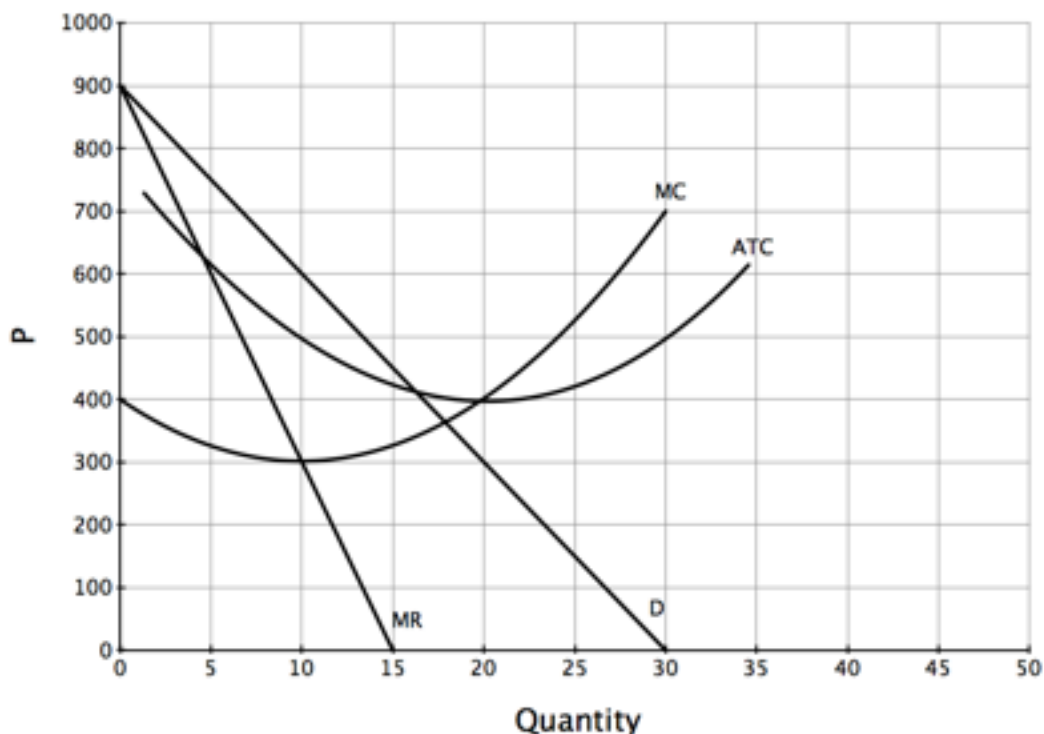
Question 7 - (5 points) The profit-maximizing problem for a monopolist differs from that of a competitive firm in which of the following ways? (Mark the **correct** alternative):

- A competitive firm maximizes profit at the point where marginal revenue equals marginal cost; a monopolist maximizes profit at the point where marginal revenue exceeds marginal cost.
- A competitive firm maximizes profit at the point where price equals marginal cost; a monopolist maximizes profit at the point where price exceeds marginal cost**
- For a competitive firm, marginal revenue at the profit-maximizing level of output is equal to marginal revenue at all other levels of output; for a monopolist, marginal revenue at the profit-maximizing level of output is smaller than it is for larger levels of output.
- For a profit-maximizing competitive firm, thinking at the margin is much more important than it is for a profit-maximizing monopolist.

Question 8 - (5 points) Which of the following conditions is characteristic of a monopolistically competitive in both the short-run and the long-run? (Mark the **correct** alternative):

- $P > MC$**
- $MC = ATC$
- $P < MR$
- All of the above are correct

Use the following graph for questions 9 and 10:



Question 9 - (5 points) Suppose that the firm in the figure is in a monopolistically competitive market. This situation illustrates: (Mark the **correct** alternative)

- a. the shut-down case
- b. a long-run economic profit
- c. **a short-run economic profit**
- d. a short-run loss

Question 10 - (5 points) The maximum total short-run economic profit for the monopolistically competitive firm in this figure is: (Mark the **correct** alternative)

- a. **\$1,000**
- b. \$2,000
- c. \$3,000
- d. \$5,000

Question 11 - (5 points) If a certain market were a monopoly, then the monopolist (which has constant marginal cost of production) would maximize its profit by producing 1,000 units of output. If, instead, that market were a duopoly (an oligopoly with only two firms), then which of the following outcomes would be most likely if the duopolists successfully collude (i.e. form a successful cartel)? Mark the **correct** alternative:

- a. Each firm produces 1,000 units of output
- b. Each firm produces 600 units of output
- c. **Each firm produces 500 units of output**
- d. There isn't enough information

		Wife (W)	
		Football	Opera
Husband (H)	Football	H - 3 W - 2	H - 0 W - 0
	Opera	H - 0 W - 0	H - 2 W - 3

Question 12 - (5 points) Consider the game represented by the payoff matrix above (called “Battle of the Sexes” in the literature). The situation represented goes as follows: Husband and Wife have to choose whether they are going to the football game or to the Opera. The husband prefers the football game, and the wife the opera, but they surely prefer to be together in the same place than alone in either place. Their cell phone is broken and so each one has to choose one without knowing where the other is going.

Mark the **correct** alternative:

- Going to the Football game is a dominant strategy for the husband
- This game has a unique Nash Equilibrium
- This game is an example of how using Nash Equilibrium as the solution for a game allows us to point out exactly what we expect to happen
- None of the above**

Use the following demand function for questions 13, 14 and 15:

Price	Quantity
\$6	10
\$5	20
\$4	30
\$3	40
\$2	50
\$1	60

Question 13 - (15 points) Suppose that a monopolist faces the demand curve above, has a **fixed cost of \$20** and a **variable cost of \$2 per unit** produced. Fill the table below with the values of TR (total revenue), FC (fixed cost), VC (variable cost), TC (total cost) and Profit (if profits are negative, indicate with a minus sign. Ex: -\$200):

Price	Quantity	TR	FC	VC	TC	Profit
\$6	10	60	20	20	40	20
\$5	20	100	20	40	60	40
\$4	30	120	20	60	80	40
\$3	40	120	20	80	100	20
\$2	50	100	20	100	120	-20
\$1	60	60	20	120	140	-80

Question 14 - (15 points) Suppose now that there are two firms in this same market: Firm 1 and Firm 2. Both have **ZERO fixed and marginal costs**. Suppose that they can, each, produce 10 or 20 units of the good. Let Q1 be the quantity produced by firm 1 and Q2 the quantity produced by firm 2. Fill the following table with the resulting market price (P), profit for firm 1 (Profit1) and profit for firm 2 (Profit2) (*Hint: remember that the market price depends on the **total** quantity in the market*):

Q1	Q2	P	Profit1	Profit2
10	10	5	50	50
10	20	4	40	80
20	10	4	80	40
20	20	3	60	60

Question 15 - (10 points) Using the results obtained in question 14, fill the following payoff matrix with the profits obtained by each firm for each combination of quantities produced by each firm, and indicate **clearly** which combination is the Nash Equilibrium with an asterisk (*):

Firm 2

Firm 1

	10	20
10	Firm 1 - 50 Firm 2 - 50	Firm 1 - 40 Firm 2 - 80
20	Firm 1 - 80 Firm 2 - 40	Firm 1 - 60 Firm 2 - 60 *

Question 16 - (40 points) Michael wants to start a new business, and for that he purchased a bookbinding machine. He is not sure, though, if he should use the machine for printing a novel he wrote a couple of years ago or if he should use it to make school notebooks. The bookbinding machine can be configured for only one of these two choices, and thus he asks for your advice.

After some market analysis, you conclude that the school notebooks market is perfectly competitive, and that the **current price for a notebook is \$18 each**.

Because of copyright laws, Michael can be sure that he will be the only one selling his novel if he chooses to do so. The cost structure resulting from the bookbinding machine is the following:

$$TC = 500 + 2Q + 0.02Q^2$$

$$MC = 2 + 0.04Q$$

*For the following items, put both your calculations and result in the boxes below. SHOW YOUR DERIVATIONS (how you got that result). **Answers without them will not be considered correct!***

a) What is the expression for the Average Variable Cost (AVC) for that machine?

Hints: variable cost (VC) is the part of the total cost (TC) that depends on Q, and $AVC=VC/Q$

$$AVC = (500+2Q + 0.02 Q^2)/Q = \mathbf{2+0.02Q}$$

b) What is the minimum price P for which Michael should decide not to produce any school notebook? (That is, what is the short-run shutdown price?)

Hint: remember what is the short-run shutdown condition that relates P and AVC

Shutdown condition: $P < AVC$. Thus, shutdown if $P < 2 + 0.02Q$.

The value of AVC is obtained when $Q=0$, and thus if $P < \$2$ the firm will shutdown.

Short-run shutdown price: \$2

c) Determine what is the **number of school notebooks (Q)** that Michael will produce to maximize its profits if he decides to enter the market of school notebooks:

$$\begin{aligned} MC &= P \\ 2 + 0.04Q &= 18 \\ 0.04Q &= 16 \\ Q &= 16 / (0.04) = 1600 / 4 = \mathbf{400} \end{aligned}$$

d) Determine what is the **profit** that Michael will have if he decides to enter the market for school notebooks:

$$\begin{aligned} \text{Profit} &= TR - TC \\ \text{Profit} &= 18 * 400 - (500 + 2 * 400 + 0.02 * (400)^2) = \\ &= 7200 - 500 - 800 - 3200 = \mathbf{\$ 2,700} \end{aligned}$$

Suppose now that after some research, you find that the demand curve and marginal revenue (MR) for Michael's novel are the following:

$$P=14-0.01Q$$

$$MR=14-0.02Q$$

e) Determine what is the **number novels (Q)** that Michael will produce to maximize its profits if he decides to enter the market of books with its novel:

$$MR=MC$$

$$14-0.02Q=2+0.04Q$$

$$12=0.06Q$$

$$Q=12/(0.06)=1200/6=200$$

f) Determine the resulting **price** and **profit** obtained by Michael if he decides to enter the market of books with its novel:

$$P = 14 - 0.01 * 200 = \$12$$

$$\text{Profit} = 12 * 200 - (500 + 2 * 200 + 0.02 * (200)^2) = 2400 - 500 - 400 - 800 = \text{\$ } \mathbf{700}$$

f) Suppose that Michael only cares about **short-run profits**. Which market should he choose to enter? **Explain.**

Michael should enter the market for school notebooks.

At the current price of \$18 each notebook, the profit he can earn of \$2700 is significantly higher than the profit of \$700 obtained from selling his novel.

Since in the short-run there isn't entry or exit of firms, he can reasonably expect those profits to keep as such during that time.

g) Suppose that Michael only cares about **long-run profits**. Which market should he choose to enter? **Explain.**

Michael should enter the market with his novel.

Due to the barriers to entry generated by copyright laws, he can expect to keep his profit of \$700 both in the short and in the long-run.

The market for school notebooks, however, has free-entry. Those high profits of \$2700 will lead to the entry of more firms, pushing prices down until profits are zero in the long-run. Thus, if Michael enters that market, he should expect to have zero economic profits in the long-run.