

ECONOMICS 1101 §56 – FALL 2008
MIDTERM #2
Answer Key

INSTRUCTIONS: Write your name on the back of the exam. Answer all parts of all questions. Show work on questions 11-17. Exactly 75 minutes will be provided to complete the exam. Notes, books, computers, cell phone, or communications devices may not be used. Calculators may be used. Communication with other students is not permitted. The test has 170 points possible.

Questions 1 – 10 are worth 5 points each. Select the choice that best answers the question.

- C 1. What is a cartel?
- (a) a group of sellers of a product that compete against each other by choosing production quantities
 - (b) a regulatory agency that investigates anti-competitive behavior
 - (c) a group of sellers of a product that collude to produce the monopoly quantity and charge the monopoly price
 - (d) the largest firm in an industry
- D 2. What barrier to entry has preserved the DeBeers/DTC rough cut diamond monopoly?
- (a) technological superiority in production
 - (b) large sunk costs
 - (c) exercise of patent power
 - (d) control of critical resources
 - (e) export restrictions
- C 3. Why might regulators be reluctant to split up natural monopolies?
- (a) introducing competition reduces incentive to design new products
 - (b) breaking up the monopoly would decrease consumer surplus
 - (c) the firms created by the split will have higher marginal costs
 - (d) having more firms in the industry will increase entry barriers to new firms
- B 4. Which of the following is necessary to a firm's ability to price discriminate?
- (a) zero transaction costs
 - (b) the firm must have some market power
 - (c) buyers must be able to resell the product
 - (d) all buyers must have identical demand
- A 5. Which of the following is a characteristic of monopolistic competition?
- (a) no barriers to exit or entry
 - (b) imperfect information
 - (c) only one seller
 - (d) homogeneous product

D 6. What does a Herfindahl-Hirschman Index value near 10,000 imply about a market?

- (a) a shortage
- (b) binding price controls
- (c) perfect competition
- (d) monopoly

B 7. Which government policy would most promote economic efficiency?

- (a) never interfere with firms' price setting powers
- (b) allow the market to set low prices for abundant goods and high prices for scarce goods
- (c) keep all prices as high as feasible
- (d) keep all prices as low as feasible

A 8. Which of the following equations is always true at the quantity selected by a sales maximizing firm?

- (a) Marginal Revenue = 0
- (b) Marginal Revenue = Average Total Cost
- (c) Marginal Revenue = Marginal Cost
- (d) Total Revenue = Total Cost

Question 9 and 10 are worth 7 points each. Answer each in fewer than forty words.

9. The only two firms in an industry both have constant marginal costs. Firm A's marginal cost is 10 and firm B's is 12. If demand is inelastic over the relevant range of prices, what would be the market price if the firms engage in Bertrand price competition?

The market price would be slightly under 12. Each firm has incentive to price lower than the other, but firm B would prefer producing nothing to pricing below marginal cost.

10. Why do governments regulate corporate mergers?

Governments want to prevent monopolies, oligopolies, and cartels from forming. Mergers reduce the number of firms in an industry, and too few firms lead to market power.

11. (15 points) In the payoff matrix below, the numbers before commas are firm 1's profits and the numbers after commas are firm 2's profits.

		Firm 2		
		Low output	Medium output	High output
Firm 1	Low output	250, 200	225, 350	200, <u>450</u>
	Medium output	450, 175	400, 300	350, <u>375</u>
	High output	<u>600</u> , 150	<u>525</u> , 250	<u>450</u> , <u>300</u>

(a) Find all Nash equilibria.

The only pure strategy Nash equilibrium is (High output, High output).

(b) Are there any dominate strategies? If so, list them.

Yes, high output is a dominate strategy for both firm 1 and firm 2.

12. (15 points) Jacek Rothert presented the following payoff matrix in his guest lecture. The numbers before commas are the USA's payoffs and the numbers after commas are USSR's profits.

		USSR	
		Retreat	Deploy more missiles
USA	Do nothing	0, 0	<u>-1</u> , <u>+1</u>
	Blockade	<u>+1</u> , <u>-1</u>	-10, -10

(a) Find the Nash equilibria.

(Blockade, Retreat); (Do nothing, deploy more missilies)

(b) According to the guest lecture, what information not in the payoff matrix helped determine which outcome was played?

The timing of the game was important. The USA moved first, removing the possibility of one of the Nash equilibria.

13. (10 points) Suppose an industry has two firms. Firm 1 must decide between producing 20 units or 25 units. Econometricians tell the firm that market demand is described by $P=80-q_1-q_2$. Managers tell the firm that its total cost curve is $TC(q)=50+10q$. Industrial spies tell firm one that firm 2 will produce 20 units. Given this information, what quantity will maximize profits for firm 1?

Since $q_2=20$, $P=60-q_1$.

If $q_1=20$:

$$TR = PQ = 20(60-20) = 800$$

$$TC = 50+10(20) = 250$$

$$\Pi = TR - TC = 800-250 = 550$$

If $q_1=25$:

$$TR = PQ = 25(60-25) = 875$$

$$TC = 50+10(25) = 300$$

$$\Pi = TR - TC = 875-300 = 575$$

Firm 1 should produce 25, since $575 > 550$.

14. (20 points) An outdoor concert venue has a monopoly on a local live music market. Suppose the market demand is given by $P=120-0.2Q$, and thus $MR=120-0.4Q$. Suppose that marginal cost is constant and equal to 20. Suppose the fixed cost is 6,000. (When marginal cost is constant, it is also equal to average variable cost.)

(a) Calculate the price and quantity the profit-maximizing monopolist selects if no price discrimination is possible.

$$\begin{aligned} MC &= MR \\ 20 &= 120 - 0.4Q \\ 20 + 0.4Q &= 120 \\ 0.4Q &= 100 \\ Q &= 250 \end{aligned}$$

$$\begin{aligned} P &= 120 - 0.2(250) \\ P &= 120 - 50 \\ P &= 70 \end{aligned}$$

(b) Calculate the monopolist's profit if no price discrimination is possible.

$$\begin{aligned} TR &= PQ = 70(250) = 17500 \\ TC &= 6000 + 20Q = 6000 + 20(250) = 11000 \\ \Pi &= TR - TC \\ \Pi &= 17500 - 11000 = 6500 \end{aligned}$$

15. (20 points) Suppose the market for touring canoes has demand given by $P=700-2Q$ and supply given by $P=100+3Q$.

(a) Calculate the competitive equilibrium price and quantity.

$$\begin{aligned} 700-2Q &= 100+3Q \\ 600-2Q &= 3Q \\ 600 &= 5Q \\ Q &= 120 \end{aligned}$$

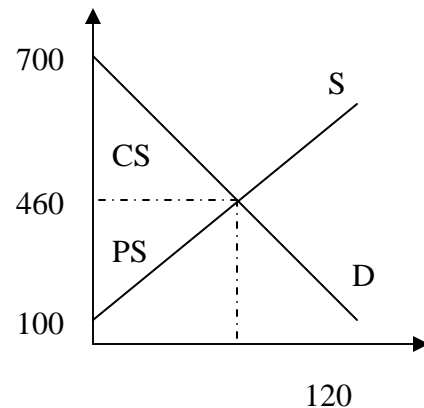
$$\begin{aligned} P &= 100+3(120) \\ P &= 460 \end{aligned}$$

(b) Calculate the consumer surplus, the producer surplus, and the total surplus for a competitive equilibrium.

$$\begin{aligned} CS &= (1/2)(120)(700-460) \\ CS &= 14400 \end{aligned}$$

$$\begin{aligned} PS &= (1/2)(120)(460-100) \\ PS &= 21600 \end{aligned}$$

$$\begin{aligned} TS &= CS + PS \\ TS &= 36000 \end{aligned}$$



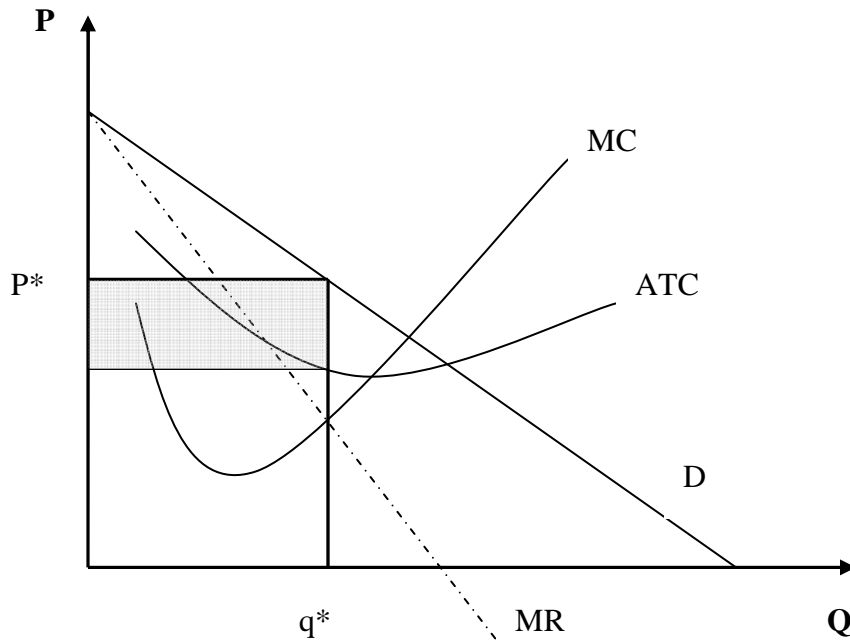
(c) Suppose canoe suppliers secretly collude and set industry production at 100 and set price at 500. Calculate the consumer surplus, the producer surplus, and the total surplus.

$$\begin{aligned} CS &= (1/2)(100)(700-500) \\ CS &= 10000 \end{aligned}$$

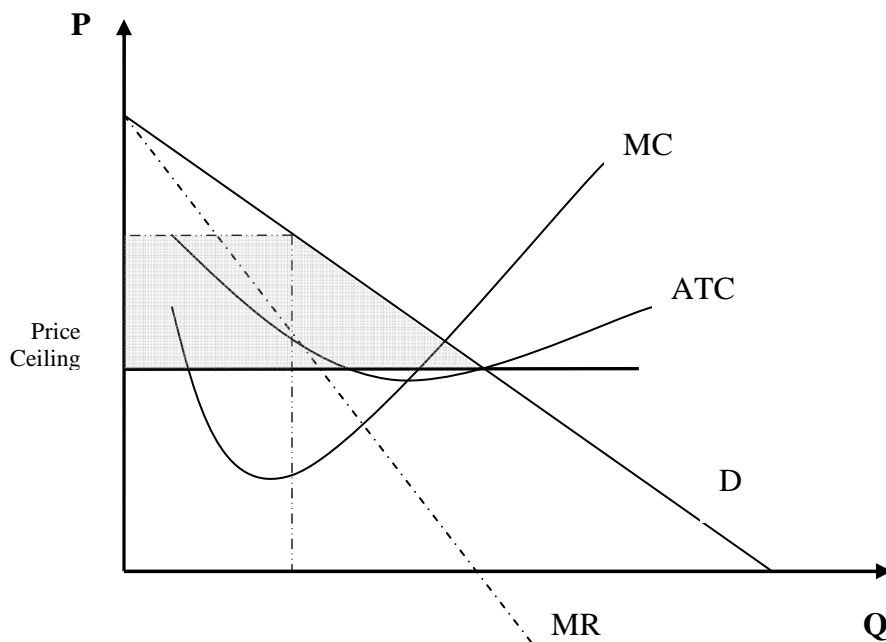
$$\begin{aligned} PS &= (1/2)(100)(500-100) \\ PS &= 20000 \end{aligned}$$

$$\begin{aligned} TS &= CS + PS \\ TS &= 30000 \end{aligned}$$

16. (16 points) (a) On the graph below, label the quantity and price that a profit maximizing monopolist would select. Shade the area representing total profits.



(b) On the graph below, draw a price ceiling that would give the firm nonnegative profits, but otherwise result in the maximum production quantity. Shade the area representing the increase in consumer surplus generated by the price ceiling.



17. (20 points) A combination of copyright restrictions and high sunk costs give a company a monopoly in the market for a specific database. Suppose the market demand is given by $P=700-Q$, and thus $MR=700-2Q$. Suppose that marginal cost is zero, because an additional user costs the database company nothing. Suppose the fixed cost is 20,000.

(a) Calculate the quantity and price the monopolist selects if no price discrimination is possible.

$$\begin{aligned} MC &= MR \\ 0 &= 700 - 2Q \\ 2Q &= 700 \\ Q &= 350 \end{aligned}$$

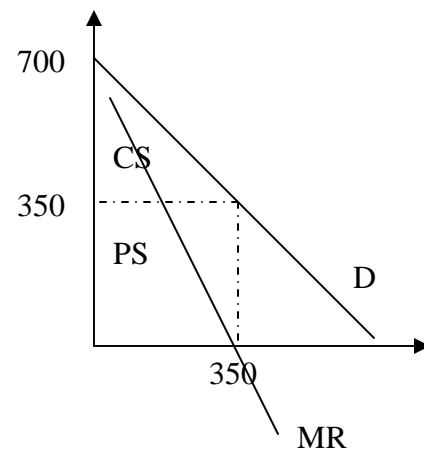
$$\begin{aligned} P &= 700 - 350 \\ P &= 350 \end{aligned}$$

(b) Calculate the consumer surplus, producer surplus, total surplus, and monopolist profit if no price discrimination is possible. (In this special case where marginal costs are always zero, producer surplus is the same as total revenue.)

$$\begin{aligned} CS &= (1/2)(350)(700-350) \\ CS &= 61250 \end{aligned}$$

$$\begin{aligned} PS &= (350)(350) \\ PS &= 122500 \end{aligned}$$

$$\begin{aligned} TS &= CS + PS \\ TS &= 61250 + 122500 \\ TS &= 183750 \end{aligned}$$



(c) Calculate the consumer surplus, producer surplus, total surplus, and monopolist profit if price discrimination is possible.

In perfect price discrimination, the monopolist charges all consumers their maximum willingness to pay. Thus, consumer surplus is zero.

$$\begin{aligned} CS &= 0 \\ PS &= (1/2)(700)(700) \\ PS &= 245000 \end{aligned}$$

$$\begin{aligned} TR &= TS = CS + PS \\ TR &= TS = 245000 \end{aligned}$$

$$\begin{aligned} \Pi &= TR - (TVC + TFC) \\ \Pi &= 245000 - 20000 \\ \Pi &= 225000 \end{aligned}$$