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AP® Microeconomics Exam

SECTION I: Multiple Choice

2015

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

At a Glance

Total Time
1 hour, 10 minutes
Number of Questions
60
Percent of Total Score
66.67%
Writing Instrument
Pencil required

Instructions

Section I of this exam contains 60 multiple-choice questions. Fill in only the circles for numbers 1 through 60 on your answer sheet.

Indicate all of your answers to the multiple-choice questions on the answer sheet. No credit will be given for anything written in this exam booklet, but you may use the booklet for notes or scratch work. After you have decided which of the suggested answers is best, completely fill in the corresponding circle on the answer sheet. Give only one answer to each question. If you change an answer, be sure that the previous mark is erased completely. Here is a sample question and answer.

Sample Question	Sample Answer
Chicago is a (A) state (B) city (C) country (D) continent (E) village	Ⓐ ● Ⓒ Ⓓ Ⓔ

Use your time effectively, working as quickly as you can without losing accuracy. Do not spend too much time on any one question. Go on to other questions and come back to the ones you have not answered if you have time. It is not expected that everyone will know the answers to all of the multiple-choice questions.

Your total score on the multiple-choice section is based only on the number of questions answered correctly. Points are not deducted for incorrect answers or unanswered questions.

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Form I
Form Code 4KBP6-S

34

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DO NOT seal answer sheet inside

MICROECONOMICS

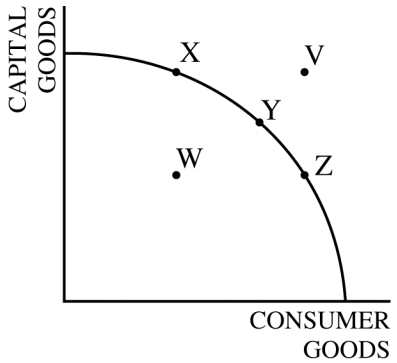
Section I

Time—70 minutes

60 Questions

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding circle on the answer sheet.

Questions 1-2 are based on the production possibilities curve depicted below.



1. Given the production possibilities curve above, which of the following represents a movement from efficiency to inefficiency?

   (A) Point X to point W
   (B) Point X to point Z
   (C) Point Y to point Z
   (D) Point W to point Z
   (E) Point V to point Y

2. Based on a comparison of points X, Y, and Z, the opportunity cost of an additional consumer good is

   (A) highest at point X
   (B) highest at point Y
   (C) highest at point Z
   (D) lowest at point Y
   (E) the same at points X, Y, and Z

Price per Gallon	Quantity Supplied	Quantity Demanded
$2.50	11,000	17,000
$2.75	12,000	16,000
$3.00	13,000	15,000
$3.25	14,000	14,000
$3.50	15,000	13,000
$3.75	16,000	12,000

3. The table above shows the quantity of gasoline supplied and demanded at various prices in a country. If the government sets a price floor of $2.75 on a gallon of gasoline, what is the price per gallon?

   (A) $2.75
   (B) $3.00
   (C) $3.25
   (D) $3.50
   (E) $3.75

4. Last year 17 million tons of beans were sold for $300 per ton. This year 17 million tons of beans were sold for $285 per ton. Which of the following changes in demand and supply could have caused this outcome?

	Demand	Supply
(A)	Increase	Increase
(B)	Increase	Decrease
(C)	Decrease	Increase
(D)	Decrease	Decrease
(E)	Increase	No change

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5. Which of the following will most likely happen in the market for good X if the price of good X decreases?

   (A) The supply of good X will decrease.
   (B) The demand for good X will increase.
   (C) The quantity demanded for good X will increase.
   (D) The demand will decrease and the supply will increase.
   (E) The quantity supplied for good X will increase.

6. Let MU_s be the marginal utility of a sandwich, MU_h be the marginal utility of a hot dog, P_s be the price of a sandwich, and P_h be the price of a hot dog. When the price of the goods is zero, Pat eats a sandwich. When Pat has to pay, she eats a hot dog. When Pat has to pay, which of the following is necessarily true?

   (A) $MU_s = MU_h = P_s = P_h$
   (B) $(MU_s / P_s) > (MU_h / P_h)$
   (C) $P_s < P_h$
   (D) $P_s > P_h$
   (E) $MU_s = 0$

7. Assume that labor is the only variable input. If a firm's short-run marginal cost is increasing as output rises, which of the following must be true?

   (A) Average product of labor is constant.
   (B) Average product of labor is increasing.
   (C) Marginal product of labor is greater than average product of labor.
   (D) Marginal product of labor is decreasing.
   (E) Total product of labor is decreasing.

8. Which of the following is most likely to occur if a single-price monopolist is replaced by a perfectly competitive market?

   (A) Prices will increase.
   (B) The deadweight loss will decrease.
   (C) Profits will increase.
   (D) Output will decrease.
   (E) The firm's cost curves will shift upward.

9. Suppose that price in a perfectly competitive industry decreases and it is now below minimum average total cost but remains above minimum average variable cost. Which of the following will occur in the short run?

   (A) New firms will enter the industry.
   (B) Firms will increase output so that marginal revenue equals the new price.
   (C) Firms will produce the output at which average total cost is at a minimum.
   (D) Firms will produce the output at which marginal cost equals the new price.
   (E) Firms will not produce at all, since they will be unable to cover all their costs.

10. Which of the following is true for both a monopolistically competitive firm and a perfectly competitive firm in long-run equilibrium?

    (A) Marginal cost is greater than marginal revenue.
    (B) Price is greater than marginal cost.
    (C) Price is equal to average total cost.
    (D) Price is equal to marginal cost.
    (E) Marginal revenue is equal to average revenue.

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11. Which of the following will most likely lead to zero economic profits?

(A) Price floors
(B) Price discrimination
(C) External costs
(D) Free entry and exit of firms
(E) External benefits

12. A perfectly competitive firm hires three workers in a perfectly competitive labor market. The marginal products of the three workers are shown in the table below.

Worker	Marginal Product
1	50
2	30
3	20

Which of the following will be true?

(A) Each worker will receive a wage based on the marginal product of the last worker hired.
(B) Each worker will receive a wage based on the marginal product of the first worker hired.
(C) Each worker will receive a wage based on the average of the marginal products of the workers.
(D) Worker 1 will receive the highest wage.
(E) Worker 3 will receive the highest wage.

13. Assume a perfectly competitive labor market. Which of the following correctly describes the individual firm's demand curve for labor and the market demand curve for labor?

	Firm's Demand Curve for Labor	Market Demand Curve for Labor
(A)	Downward sloping	Downward sloping
(B)	Downward sloping	Horizontal
(C)	Horizontal	Downward sloping
(D)	Horizontal	Horizontal
(E)	Horizontal	Upward sloping

14. When consumption of a good generates a positive externality, which of the following must be true at the market equilibrium?

(A) Marginal social benefit is less than marginal private cost.
(B) Marginal social benefit is greater than marginal private benefit.
(C) Marginal social cost is greater than marginal social benefit.
(D) Marginal social cost is less than marginal private benefit.
(E) Marginal social cost is equal to marginal external benefit.

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15. National defense is an example of a public good because

(A) it requires tax revenues to fund any production
(B) one person's use of it will decrease another person's ability to use it
(C) it is nonexcludable and nonrival
(D) the private market typically produces the socially efficient level of output
(E) the public is protected from invasion

16. The amount of product Z that must be forgone in order to obtain some amount of product Y is called

(A) factor payments
(B) opportunity cost
(C) marginal product
(D) income effect
(E) substitution effect

17. Which of the following is necessary in a well-functioning capitalist economy but not in a command economy?

(A) Centralized decision making
(B) Scarcity of resources
(C) Monopolies
(D) Protection of property rights
(E) Positive externalities

18. If an unusually cold summer destroyed a large portion of the bee population, the equilibrium price and quantity of honey produced by bees will most likely change in which of the following ways?

	Price	Quantity
(A)	Increase	Increase
(B)	Increase	Decrease
(C)	Increase	No change
(D)	Decrease	Decrease
(E)	No change	Decrease

19. If the demand for insulin is price inelastic, a 5 percent increase in the price of insulin will

(A) have no effect on the total revenue of insulin producers
(B) increase the total revenue of insulin producers
(C) decrease the total revenue of insulin producers
(D) decrease the total spending on insulin by consumers
(E) cause the demand for insulin to be less elastic

20. Which of the following would shift the short-run supply curve for strawberries?

(A) A decrease in the consumption of strawberries
(B) An increase in the price of strawberries
(C) A strike by all farmworkers
(D) An increase in household incomes
(E) An announcement of a study that shows the health benefits of eating strawberries

21. Assume that good X is a normal good. Which of the following helps to explain why a decrease in the price of good X increases the quantity demanded of good X?

(A) Good X becomes relatively less expensive than its substitutes, so consumers buy more of good X and fewer of the substitutes.
(B) The marginal utility of consuming good X increases as more of good X is consumed.
(C) The lower price of good X decreases the marginal utility per dollar; therefore, consumers buy more of good X.
(D) The demand curve for good X shifts to the left.
(E) The supply curve for good X shifts to the right.

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22. Which of the following conditions is necessary for productive efficiency?

(A) The firm is producing at the point where the marginal product of labor is greater than the average product of labor.
(B) The firm is producing a given level of output with a least-cost combination of inputs.
(C) Consumer surplus is minimized.
(D) There are external costs.
(E) There is no government regulation.

23. Which of the following indicates that a firm is experiencing economies of scale?

(A) The firm's long-run supply curve is horizontal.
(B) The firm's long-run marginal cost increases as output increases.
(C) The firm's long-run average total cost decreases as output increases.
(D) The firm's long-run total cost decreases as output increases.
(E) The firm's total revenues increase as output sold increases.

24. All of the following characterize both perfectly competitive and monopolistically competitive markets EXCEPT:

(A) Price is equal to average revenue.
(B) Individual firms produce output where marginal cost equals marginal revenue.
(C) Firms can affect the selling price of their product.
(D) The market has a large number of firms.
(E) Firms can easily enter or exit the market.

25. Which of the following is true of a monopolistically competitive firm in long-run equilibrium?

(A) Price exceeds marginal revenue, and the firm earns positive economic profits.
(B) Price equals marginal revenue, and the firm earns positive economic profits.
(C) Price equals marginal cost, and the firm earns zero economic profits.
(D) Price exceeds marginal cost, and the firm earns zero economic profits.
(E) Price exceeds marginal cost, and the firm earns positive economic profits.

26. A firm is producing the allocatively efficient level of output if

(A) total revenue is equal to total cost
(B) marginal revenue is equal to marginal cost
(C) price is equal to average total cost
(D) price is equal to marginal cost
(E) price is equal to total cost

27. Assume that labor and capital are the only two inputs a perfectly competitive firm uses to produce wheat. The firm hires its inputs in perfectly competitive input markets. The unit price of labor is $8 and of capital is $20. When the firm employs the profit-maximizing combination of these two inputs, the marginal product of labor is 2 tons of wheat and of capital is 5 tons of wheat. The price of wheat per ton must be

(A) $ 2
(B) $ 4
(C) $ 5
(D) $ 8
(E) $10

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28. A profit-maximizing firm will continue to hire workers until the marginal revenue product of labor is equal to the

(A) marginal product of labor
(B) marginal revenue product of capital
(C) demand for labor
(D) price of the good that labor is producing
(E) marginal factor cost

29. If the production of a good generates a negative externality, which of the following is true at the private market equilibrium?

(A) The private market equilibrium quantity is greater than the socially optimal quantity.
(B) The private market equilibrium quantity is equal to the socially optimal quantity.
(C) The marginal private cost is greater than the marginal social cost.
(D) The marginal social benefit is greater than the marginal social cost.
(E) The price of the product equals the marginal social cost.

30. Which of the following is most likely to make a country's income distribution more equal?

(A) Establishing a national sales tax on food and clothing
(B) Establishing a progressive income tax system
(C) Eliminating excise taxes on luxury goods
(D) Proportionally decreasing the tax rate for all income groups
(E) Reducing the subsidy to education

31. The table below shows the number of hours it takes for Kim to install a computer or to paint a garage and for Maria to install a computer or to paint a garage.

	Kim	Maria
Install computer	2 hours	4 hours
Paint garage	10 hours	12 hours

If tasks are assigned according to comparative advantage, which of the following is true?

(A) Kim should perform both tasks.
(B) Maria should perform both tasks.
(C) Kim should install computers and Maria should paint garages.
(D) Kim should paint garages and Maria should install computers.
(E) Kim and Maria should both install computers.

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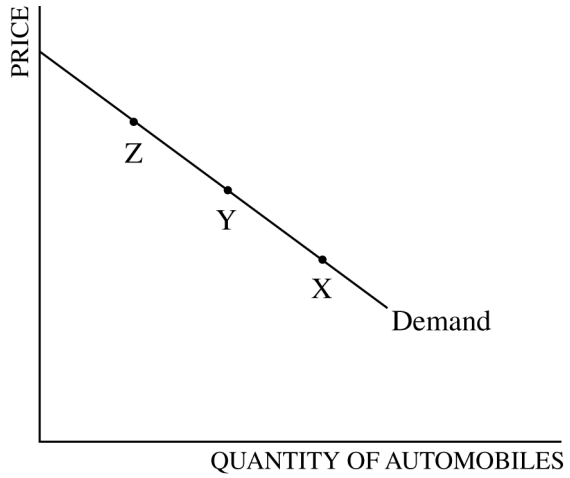

32. In the figure above, at which of the given points is demand most elastic?

(A) X
(B) Y
(C) Z
(D) The elasticity is the same for all points.
(E) The relative elasticity cannot be determined with the given information.

33. Consumer surplus exists because of the

(A) surplus of money that wealthy consumers hold
(B) surplus in marginal product that firms get when they hire an additional worker
(C) willingness of some consumers to pay a price higher than the market price for some units of a good
(D) additional utility that households obtain when the prices of substitutes fall
(E) increase in the availability of goods when income rises

34. Which of the following is a key assumption of consumer choice theory?

(A) Consumers buy goods as long as implicit costs are greater than explicit costs.
(B) Consumers maximize their utility.
(C) As income rises, consumers buy more of all goods.
(D) Marginal utility is always increasing.
(E) As more inputs are used, consumers get less and less additional output.

35. Economic profit can be calculated as accounting profit minus which of the following?

(A) Fixed costs
(B) Implicit costs
(C) Marginal costs
(D) Explicit costs
(E) Total costs

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Quantity (units)	Total Cost
0	$30
1	40
2	47
3	51
4	59

36. The table above shows a firm's total cost of producing various units of output. What is the average variable cost of producing three units?

(A) $4
(B) $7
(C) $10
(D) $17
(E) Cannot be determined from the given information

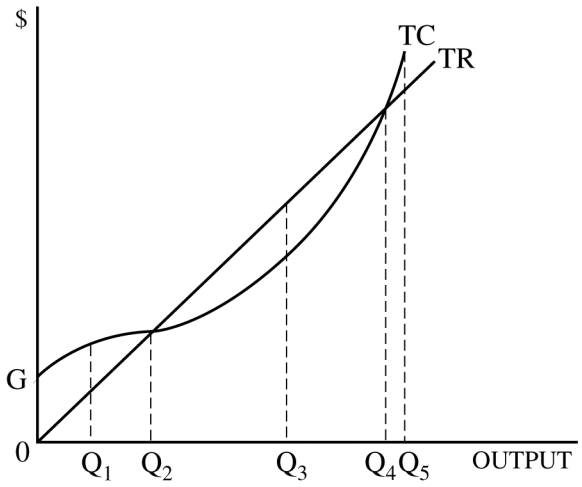
37. Assume that Alpha and Beta are the only sellers of a product and they do not cooperate. Each firm has to decide whether to raise the product price. The payoff matrix below gives the profits, in dollars, associated with each pair of pricing strategies. The first entry in each cell shows the profits to Alpha, and the second, the profits to Beta.

		Beta	
		Raise Price	Do Not Raise Price
Alpha	Raise Price	$100, $100	$30, $120
	Do Not Raise Price	$110, $20	$50, $70

Assuming both firms know the information in the matrix, which of the following correctly describes the dominant strategy of each firm?

	Alpha	Beta
(A)	Do not raise price	Do not raise price
(B)	Do not raise price	Raise price
(C)	Raise price	No dominant strategy
(D)	Raise price	Do not raise price
(E)	No dominant strategy	Raise price

38. In the graph below, TC is total cost and TR is total revenue.



At which level of output is profit maximized?

(A) Q_1
(B) Q_2
(C) Q_3
(D) Q_4
(E) Q_5

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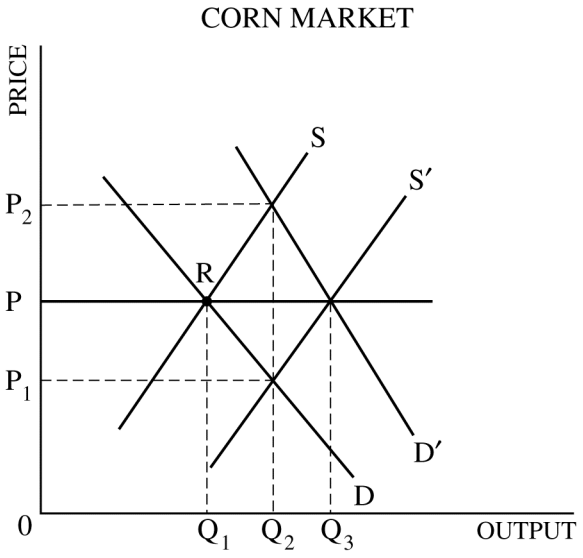
Questions 39-40 are based on the graph below showing the long-run adjustment of a constant-cost perfectly competitive industry.



39. Assume that the corn market is initially in long-run equilibrium at point R. What are the short-run and long-run prices of corn if more corn is used as a source of alternative energy?

	Short Run	Long Run
(A)	P	P_1
(B)	P	P_2
(C)	P_1	P_2
(D)	P_2	P_1
(E)	P_2	P

40. The long-run industry supply curve for corn is

(A) upward sloping
(B) downward sloping
(C) horizontal
(D) downward sloping at first and then upward sloping
(E) upward sloping at first and then downward sloping

41. Which of the following is necessarily true at a monopolist's profit-maximizing level of output?

(A) Marginal revenue is equal to marginal cost, but greater than price.
(B) Marginal revenue is equal to marginal cost, but less than price.
(C) Marginal revenue is equal to both marginal cost and price.
(D) Average total cost is minimized.
(E) Average variable cost is minimized.

42. Assume that the government imposes an effective minimum wage in a perfectly competitive labor market. What will happen to employment and total wage payments?

	Employment	Total Wage Payments
(A)	Decrease	Increase
(B)	Decrease	Decrease
(C)	Decrease	Indeterminate
(D)	Increase	Increase
(E)	Increase	Indeterminate

43. Suppose that people who work in the paint industry face a great risk of developing an incurable disease. A medical breakthrough that eliminates the risk will most likely cause which of the following shifts in the supply and demand curves for workers in the paint industry?

	Supply Curve	Demand Curve
(A)	Shift right	No shift
(B)	Shift left	No shift
(C)	Shift left	Shift left
(D)	Shift left	Shift right
(E)	No shift	Shift left

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44. Assuming that all residents of the city of Smallville prefer to have streetlights installed citywide, which of the following best explains why individual residents do not install the optimal number of streetlights?

(A) Streetlights generate negative externalities.
(B) Streetlights are nonexcludable.
(C) Installing streetlights results in diseconomies of scale.
(D) The marginal cost of installing streetlights is zero.
(E) The marginal benefit of installing streetlights is zero.

45. Antitrust policy is designed to

(A) encourage businesses to produce public goods
(B) establish trust between the government and the business community
(C) prevent businesses from earning profits
(D) maintain a competitive business environment
(E) ensure that businesses earn only zero economic profits in the long run

46. Which of the following is true of an economy's production possibilities curve?

(A) It shows the combinations of any two resources that can be used to produce an efficient level of output.
(B) It shows the alternative combinations of goods that can be produced by fully employing scarce resources.
(C) It must be a straight line when all resources are fully employed.
(D) It is bowed in (convex to the origin) because of changing levels of technology.
(E) It is bowed out (concave to the origin) when marginal opportunity costs are constant.

47. If shirts and ties are complements and if the price of shirts increases due to an increase in the price of cotton, which of the following is most likely to occur in the market for ties in the short run?

(A) The equilibrium price and quantity of ties will increase.
(B) The equilibrium price and quantity of ties will decrease.
(C) The equilibrium price of ties will increase and the equilibrium quantity will decrease.
(D) The supply of ties will increase.
(E) The demand for ties will increase.

48. Which of the following is true of the cross-price elasticity of demand?

(A) It can indicate if a good is a necessity or a luxury.
(B) It is greater than zero for two goods that are substitutes.
(C) It is close to zero if the two goods are closely related.
(D) It is always negative because demand curves are downward sloping.
(E) It increases as income increases.

49. Oscar spent his entire income on only two goods: good X and good Y. At his current consumption of the two goods, the marginal utility of X is 8 and the marginal utility of Y is 2. If the price of X is $4.00 and the price of Y is $0.50, then to maximize his total utility, Oscar should have

(A) bought more X and more Y
(B) bought more X and less Y
(C) bought less X and more Y
(D) bought less X and less Y
(E) maintained his current consumption

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50. In the short run, a profit-maximizing firm, faced with U-shaped average cost curves, is producing a level of output at which the average total cost of production is minimized. At this level of output, which of the following is true for the firm?

(A) Marginal cost equals average fixed cost.
(B) Marginal cost equals average variable cost.
(C) Marginal cost equals average total cost.
(D) Profit per unit equals average total cost.
(E) Profit per unit equals marginal cost.

51. Which of the following must be true for a firm that is a natural monopoly?

(A) It can produce and supply its product to an entire market at a lower cost than could a number of smaller firms.
(B) It produces at the minimum of its average total cost curve.
(C) It has a patent on its product.
(D) It will not be able to maximize profits unless subsidized by the government.
(E) It is productively efficient for the government to break up the monopoly into smaller firms.

52. In the short run, if a firm produces the level of output at which marginal revenue is equal to marginal cost but price is less than average total cost, the firm will

(A) always shut down production
(B) expand output to lower its average fixed cost
(C) continue to operate if price is greater than its average variable cost
(D) decrease output until price equals its average total cost
(E) increase output to increase revenue

53. Assume that a firm uses only one variable input. If a firm is experiencing diminishing returns, which of the following is true as more of the variable input is used?

(A) Marginal cost will decrease at a constant rate.
(B) Marginal cost will decrease at a diminishing rate.
(C) Marginal cost will increase.
(D) Marginal product will increase at a constant rate.
(E) Marginal product will increase at a diminishing rate.

54. Assuming a linear downward-sloping demand curve, as a monopoly firm sells additional units of output, its marginal revenue will

(A) increase at an increasing rate
(B) increase at first, then decrease
(C) decrease at first, then increase
(D) decrease continuously
(E) remain constant

55. Collusion, price leadership, and price wars are usually observed in which of the following market structures?

(A) Perfect competition
(B) Monopolistic competition
(C) Oligopoly
(D) Monopoly
(E) Natural monopoly

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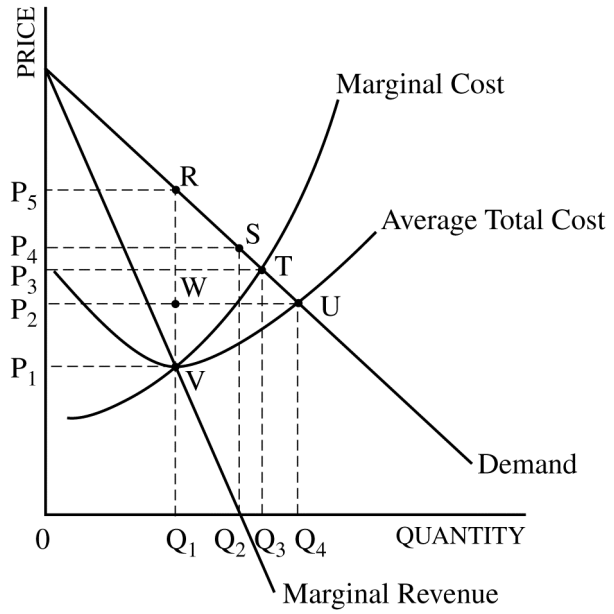
56. A firm sells its output in a perfectly competitive market and hires two inputs, capital and labor, in perfectly competitive factor markets. The product price is $15 per unit, the wage is $75 per day, and the marginal product of capital is 3. If the firm is choosing the least-cost combination of labor and capital, the firm's marginal product of labor and the price of capital must be equal to which of the following?

	Marginal Product of Labor	Price of Capital
(A)	25	$5
(B)	25	$45
(C)	5	$15
(D)	5	$25
(E)	5	$45

Questions 57-58 refer to the graph of a monopolist shown below.



57. If the monopolist is unregulated, its profit-maximizing price and output level would lead to a deadweight loss equal to area

(A) RUV
(B) RTV
(C) RTW
(D) TUV
(E) UVW

58. If the government regulates the monopolist to set price equal to average total cost, it will establish the price at

(A) P_5
(B) P_4
(C) P_3
(D) P_2
(E) P_1

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59. Which of the following about the relationship between marginal revenue (MR) and price (P) under monopolistic competition and perfect competition is correct?

	Monopolistic Competition	Perfect Competition
(A)	MR>P	MR=P
(B)	MR<P	MR=P
(C)	MR decreases when P increases.	MR increases when P decreases.
(D)	MR=P	MR=P
(E)	MR=P	MR<P

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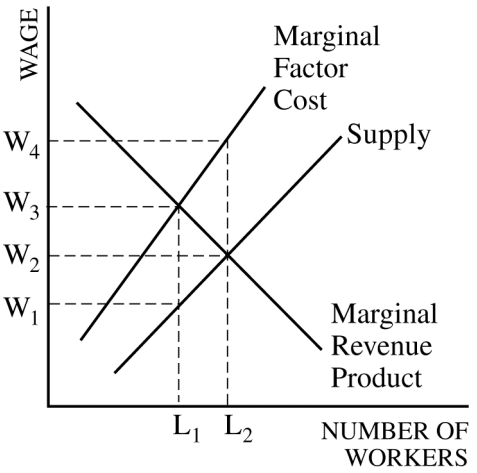

60. In the monopsonistic labor market shown in the diagram above, which of the following indicates the number of workers the firm will hire and the wage rate it will pay?

	Number of Workers	Wage Rate
(A)	L_1	W_1
(B)	L_1	W_2
(C)	L_1	W_3
(D)	L_2	W_2
(E)	L_2	W_4

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END OF SECTION I

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION.

DO NOT GO ON TO SECTION II UNTIL YOU ARE TOLD TO DO SO.

MAKE SURE YOU HAVE DONE THE FOLLOWING.

- **PLACED YOUR AP NUMBER LABEL ON YOUR ANSWER SHEET**
- **WRITTEN AND GRIDDED YOUR AP NUMBER CORRECTLY ON YOUR ANSWER SHEET**
- **TAKEN THE AP EXAM LABEL FROM THE FRONT OF THIS BOOKLET AND PLACED IT ON YOUR ANSWER SHEET**

MICROECONOMICS

Section II

Planning time—10 minutes

Writing time—50 minutes

Directions: You have 10 minutes to read all of the questions in this booklet, to sketch graphs, to make notes, and to plan your answers. You will then have 50 minutes to answer all three of the following questions. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

Question 1 begins on page 4.

Question 2 begins on page 10.

Question 3 begins on page 14.

THIS PAGE MAY BE USED FOR TAKING NOTES AND PLANNING YOUR ANSWERS.

NOTES WRITTEN ON THIS PAGE WILL NOT BE SCORED.

WRITE ALL YOUR RESPONSES ON THE LINED PAGES.

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GO ON TO THE NEXT PAGE.

1. Raphael's hair salon is a monopoly in a small town and is currently earning an economic profit.

   (a) Draw a correctly labeled graph for Raphael and include the curves that are necessary to identify the following.

      (i) The profit-maximizing price and quantity of haircuts, labeled P_m and Q_m

      (ii) The area representing economic profits, shaded completely

   (b) Does Raphael's hair salon produce the allocatively efficient quantity? Explain.

   (c) Assume that Raphael signs a new lease with an increase in rent, a fixed cost. Will the price of haircuts provided by Raphael increase, decrease, or stay the same in the short run? Explain.

   (d) Assume that new hair salons enter the market and that the market becomes monopolistically competitive. Answer each of the following.

      (i) The entry of new hair salons creates close substitutes for each individual salon's services. As a result, will the demand for Raphael's hair salon become more elastic or become less elastic, or will there be no change in the elasticity?

      (ii) Will the entry cause the demand curve for Raphael's haircuts to shift to the left, shift to the right, or stay the same?

      (iii) In long-run equilibrium, will Raphael's hair salon produce the productively efficient quantity? Explain.

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ANSWER PAGE FOR QUESTION 1

GO ON TO THE NEXT PAGE.

Question 1 is reprinted for your convenience.

1. Raphael's hair salon is a monopoly in a small town and is currently earning an economic profit.
   (a) Draw a correctly labeled graph for Raphael and include the curves that are necessary to identify the following.
      (i) The profit-maximizing price and quantity of haircuts, labeled P_m and Q_m
      (ii) The area representing economic profits, shaded completely
   (b) Does Raphael's hair salon produce the allocatively efficient quantity? Explain.
   (c) Assume that Raphael signs a new lease with an increase in rent, a fixed cost. Will the price of haircuts provided by Raphael increase, decrease, or stay the same in the short run? Explain.
   (d) Assume that new hair salons enter the market and that the market becomes monopolistically competitive. Answer each of the following.
      (i) The entry of new hair salons creates close substitutes for each individual salon's services. As a result, will the demand for Raphael's hair salon become more elastic or become less elastic, or will there be no change in the elasticity?
      (ii) Will the entry cause the demand curve for Raphael's haircuts to shift to the left, shift to the right, or stay the same?
      (iii) In long-run equilibrium, will Raphael's hair salon produce the productively efficient quantity? Explain.

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ADDITIONAL PAGE FOR ANSWERING QUESTION 1

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ADDITIONAL PAGE FOR ANSWERING QUESTION 1

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ADDITIONAL PAGE FOR ANSWERING QUESTION 1

GO ON TO THE NEXT PAGE.

2. The market for apartments in the town of Westville is currently in equilibrium, and consumers are renting 700 apartments at a price of $1,000 per apartment.

   (a) Assuming that the supply of apartments is perfectly inelastic, draw a correctly labeled graph for the apartment market and label the equilibrium price and quantity using the values above.

   (b) Now assume the government imposes a price (rent) ceiling of $800 for an apartment. On your graph in part (a), show the following.

      (i) The price ceiling at $800

      (ii) The quantity demanded, labeled as Q_d

      (iii) The quantity supplied, labeled as Q_s

   (c) On your graph, shade completely the area representing the consumer surplus after the imposition of the price ceiling.

   (d) Calculate the dollar value of the producer surplus after the imposition of the price ceiling. Show your work.

   (e) Explain why the imposition of the price ceiling does not result in a deadweight loss.

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ANSWER PAGE FOR QUESTION 2

GO ON TO THE NEXT PAGE.

ADDITIONAL PAGE FOR ANSWERING QUESTION 2

GO ON TO THE NEXT PAGE.

ADDITIONAL PAGE FOR ANSWERING QUESTION 2

GO ON TO THE NEXT PAGE.

3. Coldbox Corporation hires its workers in a perfectly competitive labor market and produces and sells frozen peas in a perfectly competitive product market. The market price for frozen peas is $4 per bag. The table below shows Coldbox' short-run production of frozen peas. Labor is the only variable input. Coldbox Corporation's fixed cost is $500.

Number of Workers	Bags of Frozen Peas
0	0
1	60
2	140
3	250
4	320
5	380
6	400

(a) When Coldbox hires the second worker, does it experience diminishing returns? Explain.

(b) Calculate the average fixed cost if Coldbox hires 3 workers. Show your work.

(c) If the wage is $200 per worker, identify the profit-maximizing number of workers for Coldbox. Explain using marginal analysis.

(d) If the price of frozen peas decreases by $2 per bag, would the number of workers hired by Coldbox be more than, less than, or equal to the number of workers you identified in part (c) ? Explain.

(e) Suppose that Coldbox hires workers from a monopsonistic labor market. Would the wage be higher, lower, or equal to the equilibrium wage in a perfectly competitive labor market?

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ANSWER PAGE FOR QUESTION 3

GO ON TO THE NEXT PAGE.

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

GO ON TO THE NEXT PAGE.

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

GO ON TO THE NEXT PAGE.

STOP

END OF EXAM

THE FOLLOWING INSTRUCTIONS APPLY TO THE COVERS OF THE SECTION II BOOKLET.

- **MAKE SURE YOU HAVE COMPLETED THE IDENTIFICATION INFORMATION AS REQUESTED ON THE FRONT AND BACK COVERS OF THE SECTION II BOOKLET.**
- **CHECK TO SEE THAT YOUR AP NUMBER LABEL APPEARS IN THE BOX ON THE COVER.**
- **MAKE SURE YOU HAVE USED THE SAME SET OF AP NUMBER LABELS ON ALL AP EXAMS YOU HAVE TAKEN THIS YEAR.**