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AP® Microeconomics Practice Exam

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AP® Microeconomics Exam

SECTION I: Multiple Choice

2016

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At a Glance

Total Time
1 hour, 10 minutes
Number of Questions
60
Percent of Total Score
66.67%
Writing Instrument
Pencil required
Electronic Device
None allowed

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.

Form I
Form Code 4MBP4-S

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.

1. Two alternative production possibility frontiers for apples and wheat are shown in the figures below.

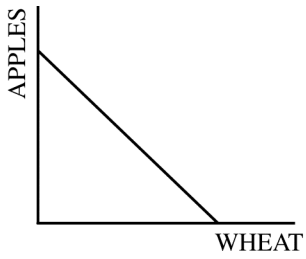

Figure 1

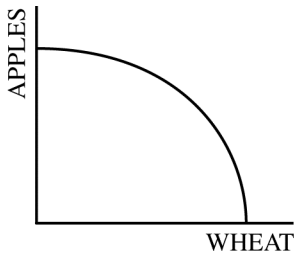

Figure 2

As more wheat is produced, how will the opportunity cost of producing wheat, as represented in Figures 1 and 2, be affected?

	Figure 1	Figure 2
(A)	Decrease	Increase
(B)	Increase	Decrease
(C)	No change	Increase
(D)	No change	Decrease
(E)	Increase	No change

2. If an effective rent ceiling is eliminated, which of the following is most likely to occur in the rental housing market?

(A) An increase in the demand for housing, resulting in a decrease in the quantity of housing supplied
(B) An increase in rents, resulting in an increase in the quantity of housing supplied
(C) An increase in the demand for housing, resulting in an increase in the quantity of housing demanded
(D) A decrease in rents, resulting in an increase in the quantity of housing supplied
(E) A decrease in the demand for housing, resulting in an increase in the quantity of housing supplied

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3. Assume that the market for lemonade is perfectly competitive and currently in equilibrium. Lemons are key ingredients in lemonade. If the price of lemons decreases, how will the lemonade market be affected?

   (A) Supply will shift leftward, increasing the equilibrium price and decreasing the equilibrium quantity of lemonade.
   (B) Supply will shift rightward, increasing the equilibrium price and increasing the equilibrium quantity of lemonade.
   (C) Supply will shift rightward, decreasing the equilibrium price and increasing the equilibrium quantity of lemonade.
   (D) Demand will shift leftward, decreasing the equilibrium price and decreasing the equilibrium quantity of lemonade.
   (E) Demand will shift rightward, increasing the equilibrium price and increasing the equilibrium quantity of lemonade.

4. When marginal utility is falling but positive, total utility will

   (A) decrease at an increasing rate
   (B) decrease at a decreasing rate
   (C) remain constant
   (D) increase at an increasing rate
   (E) increase at a decreasing rate

5. The reason that firms in perfect competition earn zero economic profit in the long run is that

   (A) firms are small
   (B) there are a large number of sellers
   (C) firms cannot advertise
   (D) there are no barriers to entry or exit
   (E) the commodities produced are relatively inexpensive

6. If the output of a firm doubles when the firm doubles all of its inputs, the firm must be experiencing

   (A) economies of scale
   (B) increasing returns to scale
   (C) constant returns to scale
   (D) decreasing returns to scale
   (E) diseconomies of scale

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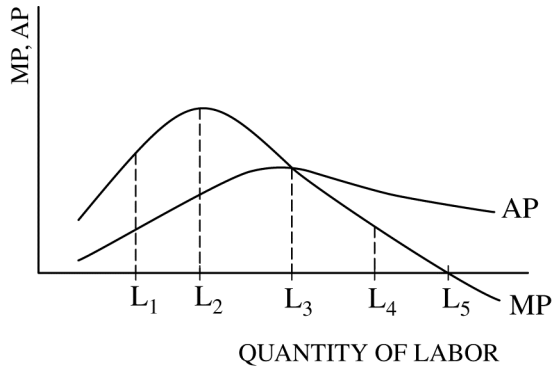

7. The graph above shows the marginal product (MP) and the average product (AP) of labor for a firm that uses labor as the only variable input and hires its labor in a perfectly competitive market. At which quantity of labor does marginal cost change from decreasing to increasing?

   (A) L_1
   (B) L_2
   (C) L_3
   (D) L_4
   (E) L_5

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8. A contractor is employing labor and capital to build an office complex. At the current mix of inputs, the marginal product of labor is 30 square feet per day, and the marginal product of capital is 90 square feet per day. The price of labor is $1,000 per day, and the price of capital is $3,000 per day. To hire inputs in a cost-minimizing way, the firm should

   (A) hire more labor and less capital
   (B) hire less labor and more capital
   (C) hire more labor and more capital
   (D) hire less labor and less capital
   (E) make no changes to the mix of inputs

9. A single-price monopolist is currently producing in the inelastic portion of its market demand curve. In order to maximize profits, the monopolist should change the price and output in which of the following ways?

	Price	Output
(A)	Increase	Increase
(B)	Increase	Decrease
(C)	Increase	Not change
(D)	Decrease	Increase
(E)	Not change	Increase

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10. Assume that a profit-maximizing, perfectly competitive firm has economic losses in the short run. If the firm continues to produce and sell its goods, then which of the following must be true?

(A) The firm is covering all of its fixed and variable costs of production.
(B) The firm is covering all of its fixed costs but not all of its variable costs of production.
(C) The firm is covering all of its variable costs but not all of its fixed costs of production.
(D) The firm is covering all of its implicit costs but not all of its explicit costs.
(E) The firm must have raised the price of its goods in order to minimize its losses.

11. The demand curve for a monopolistically competitive firm is downward sloping because

(A) there are a large number of firms
(B) the product is produced by using scarce resources
(C) the products produced by different firms are not identical
(D) it is easy for firms to enter or exit the market
(E) the marginal cost rises as output produced increases

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

(A) It produces its output at minimum average total cost.
(B) It earns positive economic profits.
(C) It will exit the industry.
(D) Its price exceeds marginal cost.
(E) Its price exceeds marginal revenue.

13. Game theory is most commonly used for analyzing the pricing behavior of firms in which market structure?

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

14. If the production of good X creates a positive externality, then from society's perspective, the industry that produces good X tends to produce

(A) less than the socially optimal amount of good X
(B) greater than the socially optimal amount of good X
(C) the socially optimal amount of good X
(D) a surplus of good X, unless subsidized
(E) a shortage of good X, unless taxed

15. If the goal of government regulators of a natural monopoly is to reduce deadweight loss without subsidizing the monopolist, government regulators would set a price equal to

(A) average variable cost
(B) average total cost
(C) average fixed cost
(D) short-run marginal cost
(E) long-run marginal cost

16. A production possibilities curve can shift inward if there is

(A) an increase in productivity
(B) an increase in unemployment
(C) an increase in the price of raw materials
(D) a misallocation of resources
(E) a natural disaster

17. A country produces computers and rice. If resources are fully employed and there is technological progress only in the production of rice, the opportunity costs of producing computers and rice will change in which of the following ways?

	Opportunity Cost of Computers	Opportunity Cost of Rice
(A)	Increase	Increase
(B)	Increase	Decrease
(C)	No change	Decrease
(D)	Decrease	Increase
(E)	Decrease	Decrease

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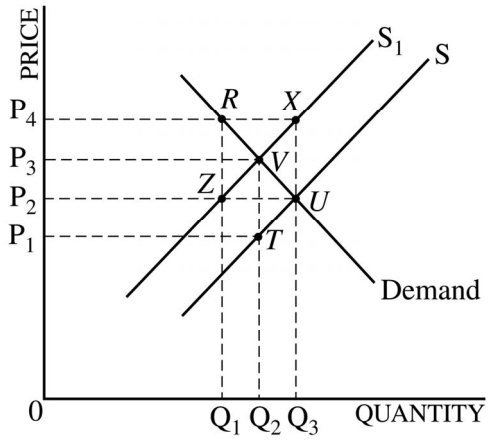

18. In the graph above, S is the original supply curve, and S_1 is the supply curve including an excise tax. The area representing the tax revenue to the government is

(A) P_1P_3VT
(B) P_2P_4RZ
(C) P_2P_4XU
(D) P_2UQ_30
(E) P_3VQ_20

19. Which of the following would cause the supply curve for notebook computers to shift to the right?

(A) An increase in the price of notebook computers
(B) An increase in the number of firms producing notebook computers
(C) An increase in the wages of workers in the notebook-computer industry
(D) A decrease in the price of notebook computers
(E) A decrease in the supply of notebook computers

20. A perfectly competitive market in equilibrium is allocatively efficient and it maximizes

(A) total consumer surplus
(B) total producer surplus
(C) the sum of total consumer surplus and total producer surplus
(D) total revenue
(E) total external benefits

Daily Output	Total Variable Cost
0	$0
1	20
2	30
3	48
4	72
5	100

21. Based on the cost and output data in the table above, a perfectly competitive firm will shut down if price falls below

(A) $30
(B) $20
(C) $18
(D) $16
(E) $15

22. Shelby is an entrepreneur who has decided to open a small advertising firm. She rents office space at a cost of $25,000 per year, she has employed an assistant at a salary of $30,000 per year, and she incurs annual utility and office supply expenses of $20,000. Her best alternative is to work elsewhere and to earn a salary of $50,000 per year. How much annual revenue must her firm receive so that Shelby earns zero economic profit?

(A) $50,000
(B) $75,000
(C) $100,000
(D) $125,000
(E) $150,000

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23. A firm produces 400 books and sells each book for $15. If the explicit cost of producing the books is $4,500 and the implicit cost is $1,000, the firm's economic profit is

(A) $0
(B) $500
(C) $1,000
(D) $1,500
(E) $5,000

24. For a perfectly competitive firm producing the profit-maximizing quantity, the average total cost is $10 and the average variable cost is $8. If the market price for its product is $10, which of the following is true for the firm?

(A) It is sustaining a loss and should shut down.
(B) It is earning zero economic profit and will remain in business.
(C) Its accounting profits exceed implicit costs.
(D) It will temporarily shut down until price rises.
(E) It is making an economic profit that will attract other firms to the industry.

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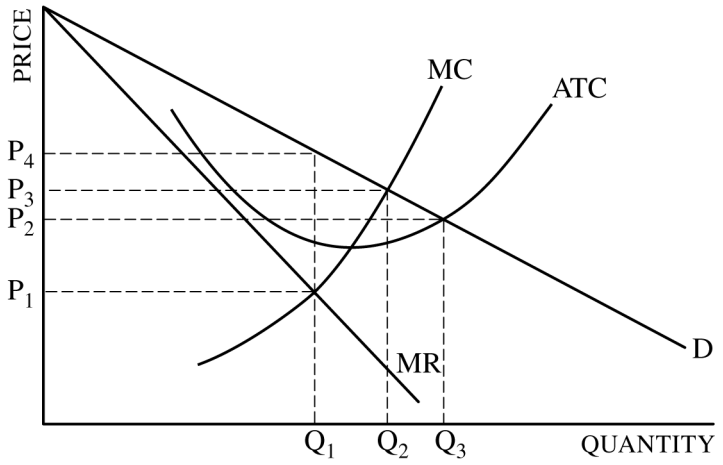
Questions 25-26 refer to the monopoly graph below, where MC = marginal cost, ATC = average total cost, D = demand, and MR = marginal revenue.



25. The profit-maximizing combination of output and price for a single-price monopoly is

(A) Q_1 and P_1
(B) Q_1 and P_2
(C) Q_1 and P_4
(D) Q_2 and P_3
(E) Q_3 and P_2

26. If the monopolist could engage in perfect price discrimination, the monopolist's total output and the price charged for the last unit of output sold would be

(A) Q_1 and P_1
(B) Q_1 and P_2
(C) Q_1 and P_4
(D) Q_2 and P_3
(E) Q_3 and P_2

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27. If a large number of unskilled workers enter the labor market, which of the following is most likely to occur in the labor market for unskilled workers?

(A) The supply curve will shift to the right and the wage rate will decrease.
(B) The supply curve will shift to the left and the wage rate will increase.
(C) The demand curve will shift to the right and the wage rate will increase.
(D) The demand curve will shift to the left and the wage rate will decrease.
(E) There will be a movement up along the demand curve and the wage rate will increase.

28. Assume that a profit-maximizing, perfectly competitive firm hires labor in a perfectly competitive labor market. If the market wage is $12 per hour and the price of the product is $3 per unit, the firm will

(A) hire more workers if each worker can produce 3 units per hour
(B) hire another worker if the output per hour of the additional worker exceeds 4 units
(C) hire fewer workers, since the hourly wage exceeds the cost of producing one unit of output
(D) not hire any workers, since the cost of labor is greater than the price of the output
(E) continue to operate in the short run but not in the long run

29. Antitrust policy seeks to prevent or eliminate which of the following practices?

(A) Firing of workers
(B) Collusion and price fixing
(C) Pollution of rivers
(D) Monopolistic competition
(E) Discrimination in the labor market

30. National defense is a good example of a pure public good because it is

(A) nonrival and nonexcludable
(B) nonrival and excludable
(C) rival and nonexcludable
(D) rival and excludable
(E) free and provided at zero cost

	Palm Leaves	Coconuts
Robert	8	2
Frank	10	5

31. The table above shows the maximum number of palm leaves or coconuts that Robert and Frank can pick respectively in a single day. Which of the following is true?

(A) Robert has a comparative advantage in picking coconuts.
(B) Frank has a comparative advantage in picking palm leaves.
(C) Robert and Frank can both benefit from trade with each other if 1 coconut is traded for 1 palm leaf.
(D) Robert and Frank can both benefit from trade with each other if 1 coconut is traded for 3 palm leaves.
(E) Robert and Frank can both benefit from trade with each other if 1 coconut is traded for 5 palm leaves.

32. Relative to a command economy, resources in a market economy are more commonly allocated by

(A) democratic elections
(B) government planning
(C) the price system
(D) established traditions
(E) a system of checks and balances

33. If a 10 percent increase in the price of a good leads to a 25 percent decrease in the quantity demanded of the good, demand is

(A) relatively inelastic
(B) relatively elastic
(C) unit elastic
(D) perfectly elastic
(E) perfectly inelastic

34. For an inferior good, an increase in consumer income will cause

(A) the demand curve to shift to the left
(B) the demand curve to shift to the right
(C) the short-run supply curve to shift to the right
(D) the long-run supply curve to shift to the right
(E) new firms to enter the market in the long run

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35. Which of the following will cause the demand curve for good X to shift to the right?

(A) An increase in the price of good Z, a complement to good X
(B) An increase in the price of good Y, a substitute for good X
(C) An increase in the consumer's income, if good X is an inferior good
(D) A decrease in the price of good X
(E) An increase in the supply of good X

36. One reason consumers typically increase the quantity of a good they purchase when the price of the good decreases is that

(A) the marginal utility of the good increases
(B) consumers' purchasing power increases
(C) consumers increase their purchases of substitute items
(D) consumers increase their purchases of complementary items
(E) the demand for the good increases

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

(A) The firm produces the allocatively efficient level of output.
(B) The firm is allocatively inefficient, because it produces an output level at which price is greater than marginal cost.
(C) The firm produces an output level that minimizes average total cost.
(D) The firm produces in the inelastic range of its demand curve.
(E) The firm earns positive economic profits but zero accounting profits.

38. Assume that a firm uses labor and capital to produce a product. The firm hires labor at a wage rate of $4 per unit and rents capital at $5 per unit. At its current output level, the marginal physical products of labor and capital are 20 and 30 units, respectively. To minimize its cost of production without changing the level of output, the firm should

(A) make no changes
(B) hire more labor and rent more capital
(C) hire less labor and rent more capital
(D) hire more labor and rent less capital
(E) hire less labor and rent less capital

39. E Soda and R Soda are the only two firms in the soft-drink industry. The companies cannot cooperate. Each firm can follow a high-price strategy or a low-price strategy for pricing its product. In the payoff matrix below, the first entry in each cell shows the profits to E Soda and the second entry shows the profits to R Soda.

		R Soda: Low Price	R Soda: High Price
E Soda	Low Price	$25, $25	$90, $15
	High Price	$15, $90	$75, $75

Given the information in the payoff matrix, it can be concluded that

(A) neither E Soda nor R Soda has a dominant strategy
(B) E Soda has a dominant strategy but R Soda does not
(C) R Soda has a dominant strategy but E Soda does not
(D) both firms will choose the high-price strategy
(E) both firms will choose the low-price strategy

40. A firm with market power engages in price discrimination to

(A) earn a higher profit
(B) increase consumer surplus
(C) decrease deadweight loss
(D) make its demand more elastic
(E) make its demand more inelastic

41. Reff Corp is a firm with total revenue of $1,000, marginal cost of $5, and average variable cost of $4. Both the output and the input markets are perfectly competitive, and Reff Corp is currently in long-run equilibrium. Reff Corp's output and total fixed cost of production must be equal to which of the following?

	Output	Fixed Cost
(A)	250	$ 800
(B)	250	$ 400
(C)	200	$ 200
(D)	200	$ 400
(E)	200	$ 800

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Quantity of Labor	Marginal Product	Marginal Revenue Product
0	---	---
1	20	$40
2	14	28
3	12	24
4	8	16
5	6	12
6	4	8

42. Based on the table for a perfectly competitive firm above, if the wage rate for labor is $15, how many units of labor should the firm hire?

(A) 2
(B) 3
(C) 4
(D) 5
(E) 6

43. Assume labor and capital are substitute inputs. A manufacturer will employ more labor if

(A) the price of labor increases
(B) the marginal product of labor decreases
(C) the price of capital increases
(D) the marginal product of capital increases
(E) the product's demand decreases

44. Assume that the firms in an industry pollute a river. If there is no government intervention, the firms will

(A) produce more output than is socially efficient
(B) pay production costs that are higher than actual social costs
(C) charge a lower price than is necessary to maximize profit
(D) charge a higher price to pay for the pollution
(E) increase production to achieve allocative efficiency

45. The following table shows Kent's annual income over two years and the income taxes paid in each year.

	Annual Income	Income Taxes
Year 1	$100,000	$20,000
Year 2	$120,000	$30,000

With no changes in the marginal tax-rate schedule, which of the following is true about the tax rates?

(A) The marginal tax rate was equal to the average tax rate for both incomes.
(B) The marginal tax rate on the last $20,000 earned was greater than the marginal tax rate at $100,000 income, but the average tax rate decreased with the increase in income.
(C) The average tax rate when Kent earned $120,000 was less than the marginal tax rate on the last $20,000 he earned.
(D) The amount paid in income tax increased as income increased, so the tax is proportional.
(E) The amount paid in income tax increased as income increased, so the tax is regressive.

46. Dana and Robin produce smoothies and pizza. In one hour Dana can make 20 smoothies or 10 pizzas. In one hour Robin can make 18 smoothies or 6 pizzas. Which of the following statements is true?

(A) Robin has an absolute advantage in making smoothies and a comparative advantage in making pizzas.
(B) Robin has both an absolute advantage and a comparative advantage in making pizzas.
(C) Dana has a comparative advantage in making both smoothies and pizzas.
(D) Dana has a comparative advantage in making pizzas, and Robin has a comparative advantage in making smoothies.
(E) Dana has a comparative advantage in making smoothies, and Robin has a comparative advantage in making pizzas.

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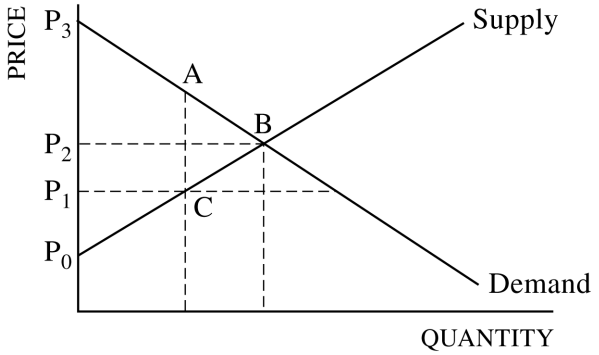
47. In which of the following cases would a firm's total revenue increase?

(A) Price increases and demand is elastic.
(B) Price decreases and supply is inelastic.
(C) Price decreases and demand is elastic.
(D) Price decreases and supply is elastic.
(E) Price decreases and demand is inelastic.



48. In the diagram above, if there is a price ceiling set at P_1, consumer surplus will be represented by the area

(A) ABC
(B) $P_2 BP_0$
(C) $P_3 BP_2$
(D) $P_3 ACP_1$
(E) P_3BCP_1

49. Consumer surplus in a market for a good exists because

(A) binding price floors encourage producers to increase the supply of the good
(B) some consumers would be willing to pay more than the equilibrium price of the good
(C) when the price of the good decreases, most consumers increase their demand for the good
(D) producers do not have market power to set their own price
(E) some producers charge different prices for the good in different markets

50. Assume Pat spends all of her allowance to purchase 4 apples and 4 candy bars. Pat's marginal utility of the fourth apple is 20 utils, and her marginal utility of the fourth candy bar is 40 utils. If an apple costs $1.00 and a candy bar $0.50, to maximize utility Pat should

(A) purchase more apples and more candy bars
(B) maintain the current purchase of 4 apples and 4 candy bars
(C) purchase more apples and fewer candy bars
(D) purchase fewer apples and more candy bars
(E) purchase fewer apples and fewer candy bars

51. A firm is producing 100 units of output at a total cost of $400. The firm's average variable cost is $3 per unit. What is the firm's total fixed cost?

(A) $1
(B) $50
(C) $100
(D) $300
(E) $400

52. A profit-maximizing firm will shut down in the short run any time the firm's total revenue is less than its

(A) total cost
(B) fixed cost
(C) total variable cost
(D) explicit cost
(E) implicit cost

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Quantity of Output (units)	Total Variable Cost
0	$0
1	$40
2	$50
3	$65
4	$90

53. Assume that the fixed cost is $50. Based on the cost and output data in the table above, what is the marginal cost when the firm increases its output from three to four units and the average total cost of producing 4 units?

	Marginal Cost	Average Total Cost
(A)	$35	$40
(B)	$35	$35
(C)	$25	$35
(D)	$25	$25
(E)	$10	$25

		Nature View: Bids High	Nature View: Bids Low
Evergreen: Bids High		$600, $300	$520, $400
Evergreen: Bids Low		$720, $100	$500, $200

54. Evergreen and Nature View are bidding for a landscaping contract. The payoff matrix above shows what each firm's total weekly profits from all its operations will be for each combination of bids. The first entry in each cell shows Evergreen's profit, and the second entry in each cell shows Nature View's profit. A Nash equilibrium results under which of the following conditions?

(A) When Evergreen bids low, no matter what Nature View's bid is
(B) When both firms bid high and when both firms bid low
(C) When Evergreen bids high and Nature View bids low
(D) When both firms bid low
(E) When both firms bid high

55. Suppose that the demand for soft drinks is price elastic and the supply is price inelastic. If the government imposes a sales tax on soft drinks, which of the following will occur in the short run?

(A) The tax burden will fall equally on both consumers and producers.
(B) The tax burden will fall more on producers.
(C) The tax burden will fall more on consumers.
(D) The percentage increase in the price of soft drinks will be greater than the percentage increase in the quantity demanded.
(E) The percentage decrease in total revenue will be greater than the percentage decrease in the quantity demanded.

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56. If both supply and demand for wheat increase, the equilibrium price and quantity of wheat will most likely change in which of the following ways?

	Price	Quantity
(A)	Decrease	Decrease
(B)	Decrease	Increase
(C)	Indeterminate	Increase
(D)	Increase	Decrease
(E)	Increase	Indeterminate

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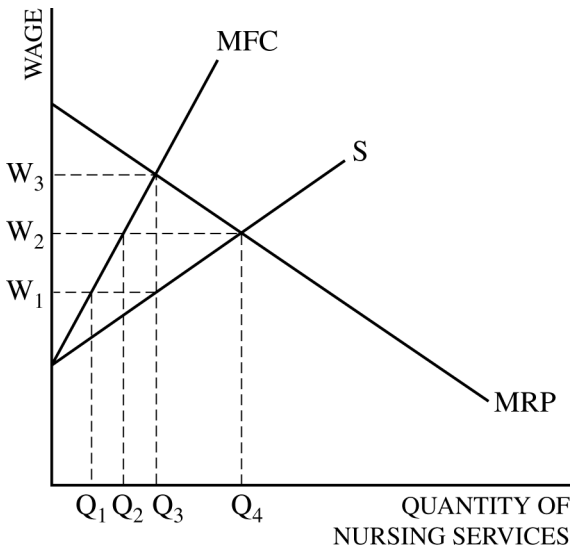
57. The last worker currently employed by a firm has a marginal product of 3 units per hour and is paid $20 per hour. Assuming that both the labor market and product market are perfectly competitive and that the product's price is $5 per unit, the firm should do which of the following?

(A) Decrease wages
(B) Increase wages
(C) Employ more workers
(D) Employ fewer workers
(E) Increase the product's price



58. Hope Hospital is a monopsonistic employer of nurses. The marginal revenue product of nursing services, the marginal factor (resource) cost of nursing services, and the market supply curve of nursing services are depicted in the figure above by MRP, MFC, and S, respectively. What wage-quantity combination does Hope Hospital choose in order to maximize its profits?

(A) W_1 and Q_1
(B) W_1 and Q_3
(C) W_2 and Q_2
(D) W_2 and Q_4
(E) W_3 and Q_3

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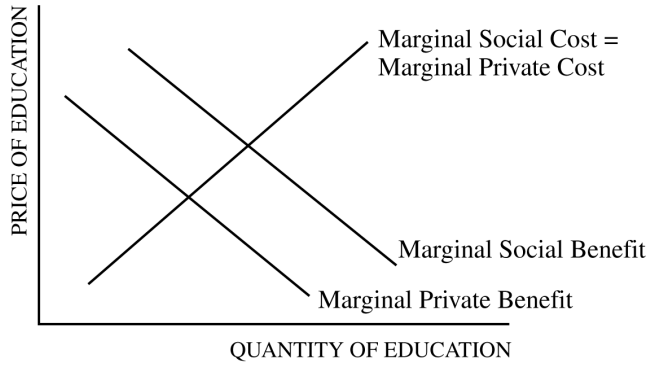
Number of Workers	Total Product
1	15
2	20
3	24
4	27
5	29

59. The table above shows the short-run output for a perfectly competitive firm. If the price of the product is $10, what is the marginal revenue product of the third worker hired?

(A) $24
(B) $27
(C) $40
(D) $240
(E) $300



60. Which of the following is true based on the graph above?

(A) Quantity of education in the private market is more than the socially optimal quantity.
(B) Consumers of education could be subsidized in order to achieve the socially optimal quantity.
(C) Producers of education could be taxed in order to achieve the socially optimal quantity.
(D) Consumers of education could be taxed in order to achieve the socially optimal quantity.
(E) Consumption of education has a negative externality.

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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

Total Time—60 minutes

Reading Period—10 minutes

Writing Period—50 minutes

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. 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.

1. Kohelis Mining is a monopoly and is currently operating at a loss.

   (a) Draw a correctly labeled graph and show each of the following.

      (i) The profit-maximizing quantity, labeled Q_M

      (ii) The profit-maximizing price, labeled P_M

      (iii) The average total cost curve, labeled ATC

      (iv) The allocatively efficient quantity, labeled Q_A

   (b) Suppose the government grants Kohelis Mining a lump-sum subsidy such that the firm earns zero economic profit.

      (i) On your graph from part (a), shade the area of the subsidy.

      (ii) Will the profit-maximizing quantity increase, decrease, or remain the same? Explain.

   (c) Suppose instead the government provides Kohelis Mining a per-unit subsidy such that the firm earns zero economic profit.

      (i) Will the profit-maximizing quantity increase, decrease, or remain the same? Explain.

      (ii) Will the price paid by consumers increase, decrease, or remain the same?

   (d) In this market, will the lump-sum or the per-unit subsidy lead to an increase in the total consumer surplus, or is the change indeterminate? Explain.

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

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ANSWER PAGE FOR QUESTION 1

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Question 1 is reprinted for your convenience.

1. Kohelis Mining is a monopoly and is currently operating at a loss.
   (a) Draw a correctly labeled graph and show each of the following.
      (i) The profit-maximizing quantity, labeled Q_M
      (ii) The profit-maximizing price, labeled P_M
      (iii) The average total cost curve, labeled ATC
      (iv) The allocatively efficient quantity, labeled Q_A
   (b) Suppose the government grants Kohelis Mining a lump-sum subsidy such that the firm earns zero economic profit.
      (i) On your graph from part (a), shade the area of the subsidy.
      (ii) Will the profit-maximizing quantity increase, decrease, or remain the same? Explain.
   (c) Suppose instead the government provides Kohelis Mining a per-unit subsidy such that the firm earns zero economic profit.
      (i) Will the profit-maximizing quantity increase, decrease, or remain the same? Explain.
      (ii) Will the price paid by consumers increase, decrease, or remain the same?
   (d) In this market, will the lump-sum or the per-unit subsidy lead to an increase in the total consumer surplus, or is the change indeterminate? Explain.

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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.

ADDITIONAL PAGE FOR ANSWERING QUESTION 1

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2. Kerri goes shopping for volleyballs. The table below shows the dollar value of the total benefit she receives from buying various quantities of volleyballs.

Volleyballs	Total Benefit
0	$0
1	$50
2	$95
3	$125
4	$146
5	$156
6	$160
7	$161

(a) Calculate the marginal benefit Kerri receives from buying the third volleyball.

(b) Assume the price of each volleyball is $9.

(i) Calculate Kerri's total consumer surplus if she buys two volleyballs. Show your work.

(ii) How many volleyballs should Kerri buy to maximize her total consumer surplus from volleyballs? Explain using marginal analysis.

(c) Assume that the market for volleyballs is perfectly competitive and that soccer balls are a substitute for volleyballs.

(i) Draw a correctly labeled graph of the market for volleyballs, and label the equilibrium price as P_1 and the equilibrium quantity as Q_1.

(ii) If the price of soccer balls decreases, show the effect on the equilibrium price and quantity of volleyballs on your graph in part c(i).

(d) Assume instead that a 10 percent increase in income causes the demand for volleyballs to fall by 5 percent.

(i) Calculate the income elasticity of demand for volleyballs.

(ii) Does the value of the income elasticity indicate that volleyballs are a normal good or an inferior good? Explain.

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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. CleanIt is a perfectly competitive, profit-maximizing trash collection firm. CleanIt hires workers in a perfectly competitive labor market.

   (a) Draw side-by-side graphs for the labor market and for CleanIt and show each of the following.

      (i) The market wage, labeled W_M, and the quantity of workers hired in the market, labeled L_M

      (ii) The marginal factor (resource) cost curve, labeled MFC

      (iii) The marginal revenue product curve, labeled MRP

      (iv) The wage paid by the firm, labeled W_F, and the quantity of workers hired by the firm, labeled L_F

   (b) Assume that CleanIt is the only firm in the industry to adopt a new technology. The new technology increases the productivity of CleanIt's workers.

      (i) In the short run, will the wage paid by CleanIt be higher than, lower than, or equal to W_F? Explain.

      (ii) In the short run, will the number of workers hired by CleanIt increase, decrease, or stay the same? Explain.

   (c) CleanIt uses capital in the form of trucks, which it rents for $10,000 each. The marginal product of the last truck used is 100,000 units. If CleanIt is minimizing its costs and the marginal product of the last worker hired is 500 units, calculate the wage. Show your work.

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GO ON TO THE NEXT PAGE.

ANSWER PAGE FOR QUESTION 3

GO ON TO THE NEXT PAGE.

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

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.**