CollegeBoard
Advanced Placement
Program

AP® Microeconomics

Practice Exam

The questions contained in this AP® Microeconomics Practice Exam are written to the content specifications of AP Exams for this subject. Taking this practice exam should provide students with an idea of their general areas of strengths and weaknesses in preparing for the actual AP Exam. Because this AP Microeconomics Practice Exam has never been administered as an operational AP Exam, statistical data are not available for calculating potential raw scores or conversions into AP grades.

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AP® Microeconomics
Directions for Administration

The AP Microeconomics Exam is 2 hours and 10 minutes in length and consists of a multiple-choice section and a free-response section.

- The multiple-choice section is 1 hour and 10 minutes, contains 60 questions, and accounts for two-thirds of the final grade.

- The free-response section is 60 minutes, contains 3 questions, and accounts for one-third of the final grade. Ten minutes of the Section II time are reserved for reading the questions and planning answers.

Students should be given a 10-minute warning prior to the end of each section of the exam. A 10-minute break should be provided after Section I is completed.

The actual AP Exam is administered in one session. Students will have the most realistic experience if a complete morning or afternoon is available to administer this practice exam. If a schedule does not permit one time period for the administration of the entire practice exam, it would be acceptable to administer Section I one day and Section II on a subsequent day.

Many students wonder whether or not to guess the answers to the multiple-choice questions about which they are not certain. It is improbable that mere guessing will improve a score. However, if a student has some knowledge of the question and is able to eliminate one or more answer choices as wrong, it may be to the student's advantage to answer such a question.

- The use of calculators, or any other electronic devices, is not permitted during the exam.

- It is suggested that the practice exam be completed using a pencil for Section I and a pen with black or dark blue ink for Section II to simulate an actual administration.

- Teachers will need to provide paper for the students to write their free-response answers. Teachers should give the students directions indicating how they wish the responses to be labeled so that the teacher will be able to associate the student's response with the question the student intended to answer.

- Remember that students are not allowed to remove any materials, including scratch work, from the testing site.

Section I

Multiple-Choice Questions

MICROECONOMICS
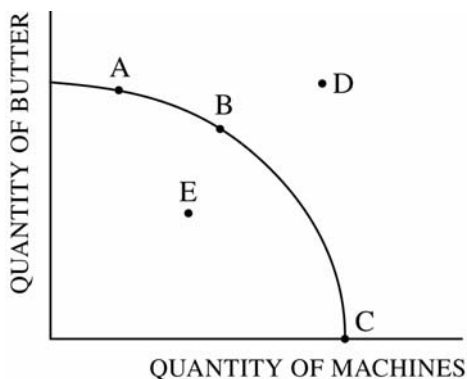## Section I
Time—70 minutes
60 Questions

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 place the letter of your choice in the corresponding box on the student answer sheet.

1. The diagram above shows the production possibilities curve for Country Y. Which of the following statements is true?

   (A) If Country Y is producing at point C, it is using all its resources efficiently.
   (B) The opportunity cost of producing more machines is constant.
   (C) Producing at point C is the most preferable, because butter is a nondurable good.
   (D) Country Y cannot produce at point E.
   (E) The economy is not producing at its potential, since it is not producing at point D.

2. Which of the following is the defining characteristic of a capitalistic economy?

   (A) Well-functioning capital markets
   (B) Private ownership and protection of property rights
   (C) Fair distribution of income and low income taxes
   (D) Equality of opportunity
   (E) Efficient allocation of resources

3. Assume that the government increases the unit excise tax on gasoline suppliers and also that people commute longer distances to work as more houses are built in city suburbs. As a result, the equilibrium price and quantity of gasoline will most likely change in which of the following ways?

	Price	Quantity
(A)	Decrease	Decrease
(B)	Increase	Decrease
(C)	Increase	Increase
(D)	Increase	Indeterminate
(E)	Indeterminate	Increase
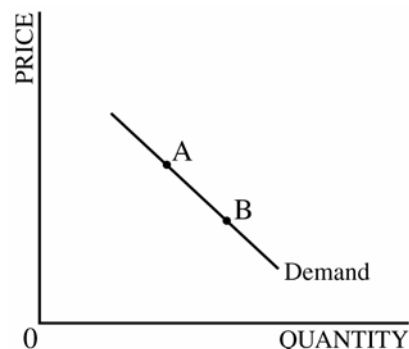
4. The graph above shows the market demand for good X. A movement from point A to point B would most likely be caused by

   (A) an increase in the price of good Z, a substitute
   (B) an increase in consumers' income
   (C) a decrease in consumers' income
   (D) a decrease in production costs for good X
   (E) a decrease in the supply of good X

GO ON TO THE NEXT PAGE.

5. To maximize utility, a consumer with a fixed budget will purchase quantities of goods so that the ratios of the marginal utility of each good to its

(A) total utility are the greatest
(B) total utility are the same
(C) price are the greatest
(D) price are equal to one
(E) price are equal

6. In the short run, which of the following is true of a firm's average total cost of production?

(A) It is equal to marginal cost plus average variable cost.
(B) It is equal to marginal cost plus average fixed cost.
(C) It is equal to average fixed cost plus average variable cost.
(D) It always increases when a firm increases production.
(E) It is zero if the firm shuts down.

7. Let W denotes the nominal wage, P the output price, and MP_L the marginal product of labor.
Which of the following relationships correctly estimates the marginal cost (MC) of production for a perfectly competitive firm in the short run?

(A) $MC = P/MP_L$
(B) $MC = P \times MP_L$
(C) $MC = W \times MP_L$
(D) $MC = W/MP_L$
(E) $MC = MP_L/W$

8. JC pizzeria has a year remaining on an unbreakable lease on its building, requiring a payment of $20,000 a year. If JC operates over the next year, it estimates that its revenues will be $200,000 and that its expenses, in addition to the lease, will be $190,000. Which of the following statements is true?

(A) JC should shut down, since it will incur a loss of $20,000.
(B) JC should shut down to break even.
(C) JC should operate, since its loss is less than its fixed cost.
(D) JC should operate, since it will earn a profit of $10,000.
(E) JC will break even, whether it operates or shuts down.

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

(A) It has excess capacity, even though its long-run profit is zero and its output price equals its marginal cost.
(B) It has excess capacity and its long-run profit is positive, even though its marginal revenue equals its marginal cost.
(C) It has excess capacity and its output price exceeds its marginal cost, even though its long-run profit is zero.
(D) It has no excess capacity and its long-run profit is zero.
(E) It has no excess capacity and its marginal revenue equals its marginal cost.

10. The cartel model of oligopoly predicts that

(A) all the firms in the industry act in unison to set a monopoly price
(B) each producer acts independently of others
(C) firms follow the low-price firm in the industry
(D) differences in cost of production discourage individual firms from cheating
(E) the markup on marginal cost should be the same for all firms

11. Which of the following is true about the marginal revenue of a firm in a perfectly competitive industry?

(A) It is constant.
(B) It increases as output sold increases.
(C) It decreases as output sold increases.
(D) It increases at first, then decreases.
(E) It decreases at first, then increases.

12. A firm produces truffles by using labor and capital. The price of labor is $10 per unit, and the price of capital is $20 per unit. At current output level, the marginal product of labor is 40 truffles and the marginal product of capital is 60 truffles. To reduce the total cost of producing the current quantity of truffles, how should the firm change its spending on labor and capital?

	Labor	Capital
(A)	No change	Increase
(B)	Decrease	No change
(C)	Decrease	Increase
(D)	Increase	No change
(E)	Increase	Decrease

13. In the current labor market, suppose that the wage rate for accountants is significantly higher than the wage rate for economists. In the long run, if you observed that the wage rate for economists rose while the wage rate for accountants fell, which of the following would best explain your observation?

(A) The supply of economists must have increased, and the supply of accountants must have decreased.
(B) The supply of economists must have decreased, and the supply of accountants must have increased.
(C) The demand for economists must have increased, and the supply of accountants must have decreased.
(D) The demand for economists must have decreased, and the supply of accountants must have increased.
(E) The demand for both economists and accountants must have decreased.

14. The primary purpose of antitrust laws is to

(A) protect consumers from fraudulent business practices
(B) protect small businesses from unfair foreign competition
(C) prevent firms from monopolizing trade and to promote competition
(D) reduce lawsuits and limit the liabilities of businesses
(E) grant the government the right to take over private property

15. A pure public good is a good that is

(A) provided efficiently by markets
(B) rivalrous and excludable in consumption
(C) nonrivalrous and excludable in consumption
(D) rivalrous and nonexcludable in consumption
(E) nonrivalrous and nonexcludable in consumption
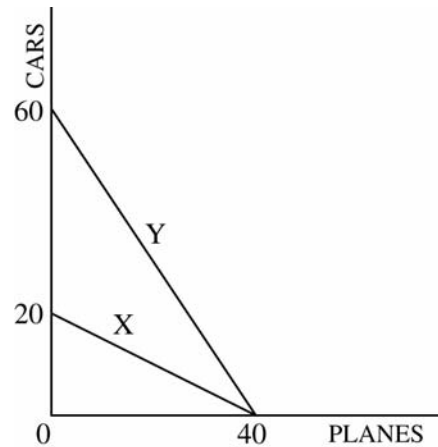
16. The diagram above shows the production possibilities curves for two countries, Country X and Country Y. Assume that both countries use equal amounts of resources in production. If the two countries engage in trade, both would be better off under which of the following conditions?

(A) Country X produced both cars and planes, because it has an absolute advantage in the production of both goods.
(B) Country Y produced both cars and planes, because it has a comparative advantage in the production of both goods.
(C) Country X specialized in the production of cars, because it has an absolute advantage in the production of cars.
(D) Country X specialized in the production of cars, because it has a comparative advantage in the production of cars.
(E) Country Y specialized in the production of cars, because it has a comparative advantage in the production of cars.

17. If resources were perfectly substitutable in all activities, which of the following would be true?

(A) Output of all goods could be increased at zero opportunity cost.
(B) The production possibilities curve would be a straight line.
(C) Specialization and mutually beneficial trade would be impossible.
(D) No country or individual would have a comparative advantage in any activity.
(E) Scarcity of resources would be eliminated.

18. Assume that the price elasticity of demand for good X is constant and equal to -0.5 and the price elasticity of demand for good Y is constant and equal to -2. Assume that goods X and Y have identical upward-sloping elastic supply curves. If a per-unit excise tax of the same amount is levied on good X and on good Y, which of the following would be true?

(A) The percentage decrease in the quantity of good X demanded would be greater than the percentage decrease in the quantity of good Y demanded.
(B) The tax share paid by consumers of good X would be relatively higher than that paid by consumers of good Y.
(C) The tax share paid by consumers of good Y would be relatively higher than that paid by consumers of good X.
(D) The tax share paid by sellers of good Y would be relatively lower than that paid by sellers of good X.
(E) The tax share paid by sellers of goods X and Y would be the same.

19. Assume that demand for bottled water is relatively price elastic. An increase in supply of bottled water will result in which of the following?

(A) A decrease in price, leading to an increase in total revenue
(B) A decrease in price, leading to a decrease in total revenue
(C) An excess supply of bottled water
(D) An excess demand for bottled water
(E) A relatively small decrease in price and no change in equilibrium quantity

20. A leftward shift in the supply curve of watches could be caused by

(A) an increase in the price of watches
(B) an increase in wages paid to workers who produce watches
(C) an improvement in the technology associated with watchmaking
(D) a decrease in the price of parts used in the production of watches
(E) an increase in population

21. If growing corn becomes more profitable than growing wheat, which of the following will occur?

(A) The supply of corn will decrease.
(B) The price of wheat will decrease.
(C) The price of corn will decrease.
(D) The demand for wheat will increase.
(E) The demand for corn will increase.

Number of Workers	Bushels of Apples Picked
0	0
1	4
2	9
3	15
4	20
5	24

22. The table above shows the short-run production function for picking apples. Based on the production data, which of the following statements about the marginal product of the fifth worker is true?

(A) It is the maximum that can be attained.
(B) It is greater than the marginal product of the first worker due to increasing returns.
(C) It is greater than the combined marginal products of all the other workers.
(D) It is less than the marginal product of the third worker due to diminishing returns.
(E) It is rising due to increasing marginal returns.

23. If a firm's average total cost decreases as the firm increases its output, the firm's marginal cost must be

(A) greater than the average variable cost
(B) less than the average fixed cost
(C) less than the average total cost
(D) decreasing
(E) negative

24. Suppose that a firm is producing the profit-maximizing output under conditions of diminishing returns. Its output price is $25, and its marginal cost of production at its current output level is $25. Based on this information, it can be concluded that this firm must

(A) be a single-price monopoly
(B) be a perfectly competitive firm
(C) decrease its output to maximize profit if it is a monopoly
(D) increase its output to maximize profit if it is a monopoly
(E) exit the industry if it is a perfectly competitive firm

25. Suppose that the two biggest producers of gold, Bmine and Gmine, form a cartel to set price. However, each has the option to cheat or to not cheat on the agreement. The table below shows the payoffs from these strategies, with the first entry in each cell representing the payoff to Bmine and the second representing the payoff to Gmine.

		Gmine	
		Cheat	Not Cheat
Bmine	Cheat	$10, $5	$25, $20
	Not Cheat	$5, $15	$20, $25

Which of the following correctly describes the dominant strategy of each firm?

(A) Neither Gmine nor Bmine has a dominant strategy.
(B) Gmine's dominant strategy is to not cheat; Bmine does not have a dominant strategy.
(C) Gmine's dominant strategy is to cheat; Bmine does not have a dominant strategy.
(D) Gmine's dominant strategy is to cheat; Bmine's dominant strategy is to not cheat.
(E) Gmine's dominant strategy is to not cheat; Bmine's dominant strategy is to cheat.

26. Assume that a firm that produces a good in a constant-cost perfectly competitive industry is in long-run equilibrium. If the demand for the good increases, the profit-maximizing output by the firm will change in which of the following ways in the short run and long run?

	Short Run	Long Run
(A)	Return to original level	Return to original level
(B)	Increase	Increase
(C)	Increase	Return to original level
(D)	Decrease	Decrease
(E)	Decrease	Return to original level

27. Which of the following is true of both monopolistically competitive and perfectly competitive firms in long-run equilibrium?

(A) Marginal revenue equals average total cost.
(B) Marginal cost equals average total cost.
(C) Price equals average total cost.
(D) Price is greater than marginal cost.
(E) Production occurs at minimum average total cost.

28. Assume that both the product and labor markets are perfectly competitive. It would be profitable for a firm to hire additional labor if the ratio of the wage to the marginal product of labor is

(A) less than the output price
(B) less than the marginal cost
(C) greater than the output price
(D) greater than the marginal cost
(E) equal to the output price

29. If positive externalities exist in the market for flu shots, which of the following is true?

(A) Taxing flu shots will lead to the socially efficient level of output.
(B) Subsidizing flu shots will lead to the socially efficient level of output.
(C) The firm making the flu shots is charging too low a price to reach the socially efficient level of output.
(D) The firm making the flu shots is producing where marginal social cost equals marginal social benefit.
(E) The firm making the flu shots is producing the socially efficient quantity if the market for flu shots is perfectly competitive.

30. Pollution abatement policies will improve efficiency if the

(A) marginal benefit of abatement is less than the marginal cost of abatement
(B) marginal cost of abatement is less than the marginal benefit of abatement
(C) marginal cost of abatement is positive
(D) marginal benefit of abatement is positive
(E) marginal cost of abatement is zero

31. Individuals in any society must make choices regarding the types of goods and services to be produced because

(A) free markets do not always allocate resources efficiently
(B) free markets only satisfy the demands of paying consumers
(C) opportunity costs increase as more of a good or service is produced
(D) resources are scarce and human wants are unlimited
(E) resources must be allocated for the benefit of the entire society
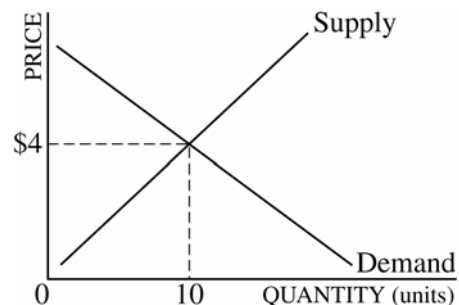
32. In the market shown in the graph above, at a price of $5, there will be

(A) a surplus and the price will eventually fall
(B) a surplus generating a decrease in demand
(C) a shortage and the price will eventually rise
(D) a shortage generating an increase in supply
(E) an increase in supply and a decrease in demand

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33. Assume that the market for tomatoes is in equilibrium at a price of $35 per bushel. If the demand for tomatoes decreases, which of the following will occur?

(A) A shortage at $35, creating an increase in price, leading to an increase in quantity supplied
(B) A shortage at $35, leading to an increase in supply and a decrease in price
(C) A surplus at $35, leading to a decrease in price and in quantity supplied
(D) A surplus at $35, leading to a decrease in supply and an increase in price
(E) A surplus at $35, leading to an increase in price and a decrease in quantity demanded

34. If the income elasticity of demand for good X is negative and the cross-price elasticity of demand between good X and good Y is negative, which of the following must be true of good X?

(A) X is a normal good and is a substitute for Y.
(B) X is a normal good and is a complement to Y.
(C) X is an inferior good and is a substitute for Y.
(D) X is an inferior good and is a complement to Y.
(E) X is a normal good and Y is an inferior good.

35. When total utility is at its maximum, marginal utility is

(A) increasing
(B) negative
(C) equal to zero
(D) at a maximum
(E) at minimum

36. If a firm's long-run average total cost increases as output increases, the firm is experiencing

(A) economies of scale
(B) diseconomies of scale
(C) increasing returns to scale
(D) efficiency in plant size
(E) maximum economic profit

37. A monopolistically competitive profit-maximizing firm is currently producing and selling 2,000 units of output. At this output level, marginal revenue is $9, average revenue is $10, and the average variable cost is $8. The product price is

(A) $8
(B) $9
(C) $10
(D) greater than $10
(E) less than $8

38. The short-run supply curve for a firm in a perfectly competitive industry is

(A) its entire marginal cost curve
(B) its average variable cost curve above its marginal cost curve
(C) its average total cost curve above its marginal cost curve
(D) its marginal cost curve above the minimum point of its average total cost curve
(E) its marginal cost curve above the minimum point of its average variable cost curve

Questions 39-40 refer to the diagram below, which shows the cost and revenue conditions of a monopolist.
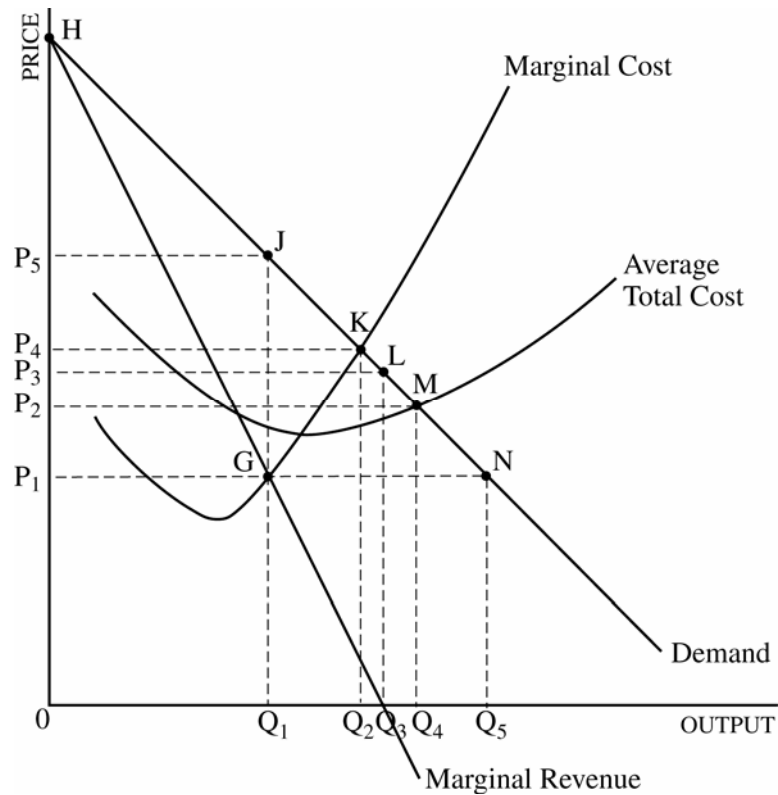
39. If the monopolist chooses to maximize total revenue rather than total profit, it will choose which combination of price and output?

	Price	Output
(A)	P_1	Q_5
(B)	p_2	Q_4
(C)	P_3	Q_3
(D	P_4	Q_4
(E)	P_5	Q_5

40. If the monopolist produces the allocatively efficient level of output rather than the profit-maximizing level of output, consumer surplus will

(A) decrease by the area P_5JKP_4
(B) decrease by the area P_5JMP_2
(C) increase by the area P_5JGP_1
(D) increase by the area P_5JKP_4
(E) increase by the area P_5JMP_2

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Questions 41-42 refer to the table below, which shows the short-run production function of a perfectly competitive firm that produces potatoes using one variable input, labor.

Number of Workers	Potatoes Harvested (pounds per hour)
0	0
1	3
2	7
3	10
4	12
5	13
6	12

41. After which worker does diminishing marginal product first occur?

(A) Second worker
(B) Third worker
(C) Fourth worker
(D) Fifth worker
(E) Sixth worker

42. If the firm can sell as many potatoes as it wants for $2 per pound and has to pay each worker $5 per hour, how many workers should the firm employ to maximize profits?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

43. Suppose that the market for low-wage labor is perfectly competitive and initially in equilibrium. If the government establishes an effective minimum wage, which of the following will occur?

(A) Employment of low-wage workers will decrease and unemployment will increase.
(B) The quantity of low-wage workers supplied will be less than the quantity demanded.
(C) The total wage payment received by all low-wage workers will increase.
(D) Economic efficiency will increase, since firms were paying workers less than the value of their marginal revenue product.
(E) Low-wage workers will be motivated to form a union.

44. Which of the following is most likely to reduce inequality in a country's distribution of income?

(A) An increase in the population growth rate
(B) Job training for low-skill workers
(C) An increase in the trade deficit
(D) A decrease in funding for training unemployed workers
(E) A regressive tax rate

45. If an industry ignores the external costs it generates in its production, which of the following will be true at the competitive market equilibrium output?

(A) Price will be greater than the marginal social cost.
(B) Price will be less than the marginal social cost.
(C) Price will be equal to the marginal social cost.
(D) Marginal private cost will be equal to marginal social cost.
(E) Marginal private cost will be greater than the marginal social cost.

46. Karen works part-time at a local convenience store and earns $10 per hour. She wants to spend next Saturday afternoon attending a music concert. The full price of a concert ticket is $75, but Karen was able to get a discounted price of $50 from a friend who purchased the ticket but has become unable to attend. If Karen took 4 hours off from her job to attend the concert, what was her opportunity cost of attending the concert?

(A) $40
(B) $50
(C) $75
(D) $90
(E) $115

47. Assume that the price of good X decreases from $10 to $9 per unit and that the quantity demanded of good X increases from 25 to 30 units. In this price range, the demand for good X is

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

48. The difference between the price a consumer would be willing to pay for a cone of ice cream and the actual market price that she pays gives a measure of her

(A) consumer surplus
(B) producer surplus
(C) marginal utility
(D) marginal cost
(E) ability to pay

49. Which of the following is true of the substitution effect of an increase in the price of a normal good?

(A) It works to offset the income effect.
(B) It works to reinforce the income effect.
(C) It is less than the income effect.
(D) It causes an increase in the quantity demanded of the good.
(E) It causes an increase in the demand for the good.
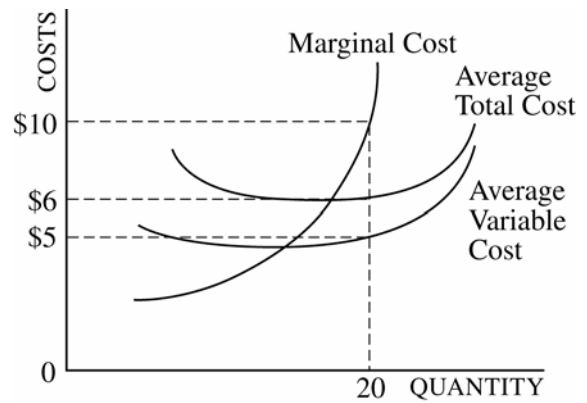
50. The graph above shows the cost curves for a competitive firm that produces 20 units of output. What are the total cost and the total fixed cost of producing 20 units of output?

	Total Cost	Total Fixed Cost
(A)	$10	$0
(B)	$120	$100
(C)	$120	$20
(D)	$200	$100
(E)	$200	$20

51. A profit-maximizing monopolist selects its output level in the

(A) inelastic region of its demand curve
(B) elastic region of its demand curve
(C) range of output where marginal revenue is rising
(D) range of output where total cost is falling
(E) range of output where marginal cost is falling

52. Which of the following enables a seller to capture the entire consumer surplus in a market?

(A) Perfect price discrimination
(B) Perfect competition
(C) An excise tax on buyers
(D) Effective price ceiling
(E) Effective price floor

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53. Which of the following is a source of monopoly power?

(A) Scarcity
(B) Elasticity of demand
(C) Barriers to entry
(D) Low profits
(E) Free markets

54. Which of the following is true for a monopoly but NOT for a perfectly competitive firm?

(A) The firm maximizes profit by equating marginal cost to marginal revenue.
(B) The firm's demand curve is the same as its average revenue curve.
(C) At the profit-maximizing output level, price is less than marginal revenue.
(D) The firm faces a downward-sloping demand curve.
(E) The firm earns zero economic profit in the long run.

55. A perfectly competitive firm is currently producing at the profit-maximizing output level. If the marginal physical product of labor is 10 units per hour and the firm pays a wage rate of $8 per hour, which of the following is true?

(A) The marginal revenue product of labor is $80.
(B) The marginal cost is $1.25.
(C) The average total cost is $0.80 per unit.
(D) The output price is $0.80 per unit.
(E) The output price is $1.25 per unit.

56. A firm's demand for labor is known as a derived demand because

(A) the firm gains utility from hiring more labor
(B) the wage rate paid to workers depends on the demand for labor
(C) the amount of labor demanded depends on the amount of capital invested
(D) the amount of labor demanded depends on the demand for the firm's product
(E) the firm will benefit from hiring additional labor

57. If the price of a good produced by a competitive firm increases, then

(A) the marginal product of labor will increase
(B) the average product of labor will increase
(C) the marginal revenue product of labor will increase
(D) the short-run demand for labor will decrease
(E) the supply of labor will increase

Questions 58-59 are based on the graph below, which shows the cost and revenue curves of a natural monopolist.
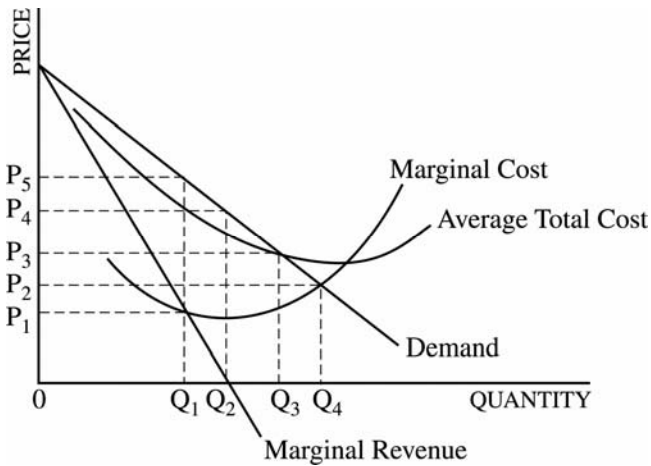
58. If the government wants to regulate this monopoly to produce the socially optimum level of output, it should set a price equal to

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

59. When the monopolist produces the socially optimal level of output, it is

(A) earning positive economic profit
(B) earning zero economic profit
(C) incurring economic losses and it requires a subsidy to continue in business
(D) maximizing its total revenue rather than profits
(E) maximizing profit

60. A governmental welfare program that taxes the labor income of the wealthy and redistributes the tax revenue to low-income citizens will

(A) increase income inequality and efficiency
(B) decrease income inequality and efficiency
(C) increase income inequality and decrease efficiency
(D) decrease income inequality and increase efficiency
(E) decrease income inequality and not affect efficiency

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.

Section II

Free-Response Questions

MICROECONOMICS
Section II
Planning time—10 minutes
Writing time—50 minutes

Directions: You have 50 minutes to answer all three of the following questions. <u>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</u>. In answering the questions, you should emphasize the line of reasoning that generated your results; it is not enough to list the results of your analysis. 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. <u>Use a pen with black or dark blue ink</u>.

1. CD&Z holds a patent on a unique medical device that is used for DNA mapping. Assume that CD&Z is a single-price profit-maximizing monopolist and is currently earning positive economic profits.

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

       (i) CD&Z's profit-maximizing price and quantity, labeled as P^* and Q^*

       (ii) The area representing CD&Z's economic profits

       (iii) The allocatively efficient level of output, labeled as Q_S

   (b) Instead of maximizing profit, assume that now CD&Z maximizes its total revenue.

       (i) On your graph in part (a), identify the output level that CD&Z would choose, labeled as Q_r.

       (ii) Explain why the output you identified maximizes total revenue.

   (c) Assume that the government imposes a set price (a price control) on CD&Z so that the allocatively efficient level of output, Q_S, is produced.

       (i) On your graph in part (a), show this set price, labeled as P_S.

       (ii) With the price control, explain whether CD&Z maximizes profit at Q_S.

   (d) Assume that now the government levies a per-unit tax of $t on CD&Z's output. Assume that now CD&Z maximizes its profit.

       (i) Compared with P^* and Q^* in part (a), how will CD&Z's profit-maximizing output and price change?

       (ii) Compared with Q^* in part (a), does the per-unit tax lead to a more allocatively efficient level of output? Explain.

2. Utility maximization is a fundamental assumption in consumer theory.

   (a) Explain what is meant by diminishing marginal utility.

   (b) Assume that a consumer buys only two goods: X and Y. What is the utility-maximizing decision rule for the consumer in allocating total income to good X and good Y?

   (c) Assume that a utility-maximizing consumer is spending all of her income on the two goods, X and Y. The price per unit of good X is $2, and the price per unit of good Y is $3. The marginal utility of the last unit of good Y consumed is 15. What is the marginal utility of the last unit of good X consumed?

   (d) Assume that good X is a normal good and good Y is an inferior good. Assume that the consumer's income does not change. Assume that the price of good X increases.

       (i) Indicate how the substitution effect of the increase in the price of good X will affect purchases of

           (1) good X
           (2) good Y

       (ii) Indicate how the income effect of the increase in the price of good X will affect purchases of

           (1) good X
           (2) good Y

3. Assume that a firm uses capital as a fixed factor of production and uses labor as a variable factor. The marginal product of labor at first increases and then decreases with the amount of labor.

   (a) Using a correctly labeled graph, draw and identify the firm's average total cost curve (ATC), average variable cost curve (AVC), and marginal cost curve (MC).

   (b) Given your graph in part (a), answer each of the following.

       (i) Why is the MC shaped as it is?

       (ii) What does the difference between the AVC and the ATC represent?

   (c) Define economies of scale.

   (d) Draw a long-run average total cost curve that has a region of economies of scale followed by a region of diseconomies of scale, as output increases.

STOP

END OF EXAM

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AP® Microeconomics
Student Answer Sheet for Multiple-Choice Section

No.	Answer		No.	Answer
1			31	
2			32	
3			33	
4			34	
5			35	
6			36	
7			37	
8			38	
9			39	
10			40	
11			41	
12			42	
13			43	
14			44	
15			45	
16			46	
17			47	
18			48	
19			49	
20			50	
21			51	
22			52	
23			53	
24			54	
25			55	
26			56	
27			57	
28			58	
29			59	
30			60	

AP® Microeconomics
Multiple-Choice Answer Key

No.	Correct Answer		No.	Correct Answer
1	A		31	D
2	B		32	A
3	D		33	C
4	D		34	D
5	E		35	C
6	C		36	B
7	D		37	C
8	C		38	E
9	C		39	C
10	A		40	D
11	A		41	A
12	E		42	C
13	B		43	A
14	C		44	B
15	E		45	B
16	E		46	D
17	B		47	B
18	B		48	A
19	A		49	B
20	B		50	C
21	C		51	B
22	D		52	A
23	C		53	C
24	B		54	D
25	E		55	D
26	C		56	D
27	C		57	C
28	A		58	B
29	B		59	C
30	B		60	B

AP® Microeconomics
Free-Response Scoring Guidelines

Question 1

12 Points (5+2+2+3)

(a) 5 points:
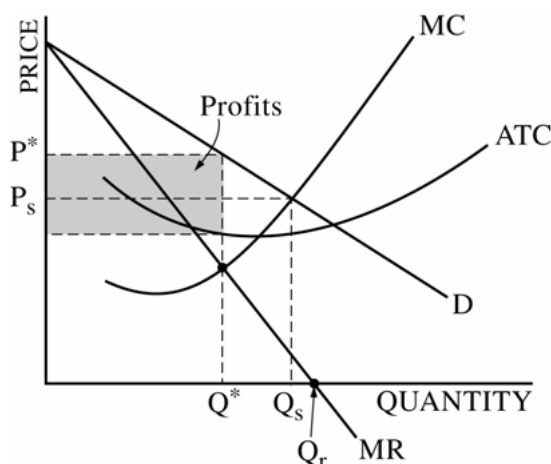
- One point is earned for drawing a correctly labeled graph of monopoly with demand and marginal revenue curves that are downward sloping and an MR curve that is below the demand curve.
- One point is earned for identifying the profit-maximizing quantity, Q^* at MC = MR.
- One point is earned for showing price, P^* on the demand curve above Q^*.
- One point is earned for showing the area of economic profits.
- One point is earned for showing the allocatively efficient output level Q_S where MC crosses D.

(b) 2 points:
- One point is earned for showing the output level where MR = 0, labeled as Q_r.
- One point is earned for the explanation that when MR is zero, total revenue reaches the maximum; going beyond that lowers total revenue as demand becomes inelastic.

(c) 2 points:
- One point is earned for identifying the price where MC crosses the demand curve, labeled as P_S.
- One point is earned for answering yes and indicating that the controlled price becomes MR (price-taking firm), so it produces where MR (controlled price) = MC.

(d) 3 points:
- One point is earned for stating that price will increase and quantity will decrease.
- One point is earned for stating that the per-unit tax does NOT lead to a more allocatively efficient level of output.
- One point is earned for explaining that the firm becomes less efficient, since output is further from the competitive ideal or allocatively efficient level.

Question 2

7 points (1+1+1+4)

(a) 1 point:
- One point is earned for stating that as more of a good is consumed, utility increases at a diminishing rate.

(b) 1 point:
- One point is earned for stating that $MU_x/P_x = MU_y/P_y$.

(c) 1 point:
- One point is earned for stating that $MU_x = 10$. ($10/\$2 = 15/\$3$)

(d) 4 points:
   (i)
- One point is earned for stating less X.
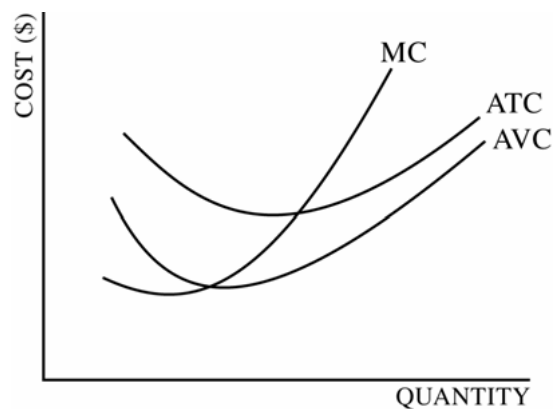- One point is earned for stating more Y.

   (ii)
- One point is earned for stating less X.
- One point is earned for stating more Y.

Question 3

7 points (3+2+1+1)

(a) 3 points:

- One point is earned for a U-shaped ATC curve.
- One point is earned for a U-shaped AVC curve that lies below the ATC curve.
- One point is earned for an MC curve that is drawn correctly given the average costs curve.

(b) 2 points:
- One point is earned for stating that the MC curve is U-shaped because there are increasing returns to labor followed by decreasing returns to labor OR because of the law of diminishing marginal returns.
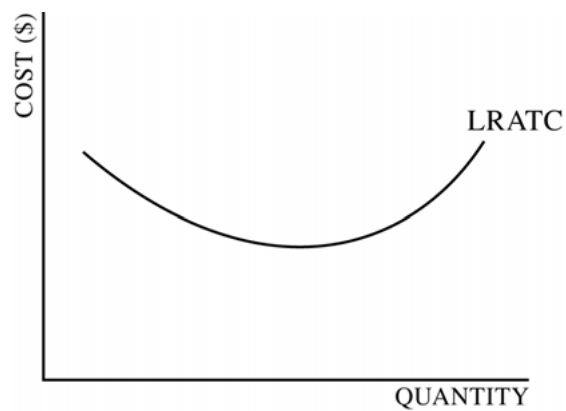- One point is earned for stating the average fixed cost.

(c) 1 point:
- One point is earned for stating that the long-run average cost curve decreases as the firm increases output.

(d) 1 point:

- One point is earned for drawing a U-shaped long-run average total cost curve.