Unit 3.1 Production Function 生产函数

AP Microeconomics Homework — 44 Questions (35 Bank + 9 Exam)

QUESTION BANK — Production Function MCQ

1. 题库 Production Function Q5

Which of the following is true for a firm that uses labor as a variable input and capital as a fixed input in the short run?

(A) If the marginal product of labor is negative, the average product of labor must also be negative.

(B) If the marginal product of labor is rising, the average product of labor must be greater than the marginal product of labor.

(C) If the average product of labor is rising, the marginal product of labor must be rising.

(D) If the average product of labor is falling, the marginal product of labor must be less than the average product of labor.

(E) The average product of labor can never be equal to the marginal product of labor.

2. 题库 Production Function Q9

Which of the following is true about a firm's average variable cost?

(A) It will rise if marginal cost is less than average variable cost.

(B) It will never equal the firm's marginal cost.

(C) It will decline when the firm's marginal product declines.

(D) It will be negative if marginal revenue declines.

(E) It will equal average total cost when fixed costs are zero.

3. 题库 Production Function Q22

The following question is based on the output and cost data in the table below.

Quantity of Output Produced (units)	Total Variable Cost ($)	Total Cost ($)
1	100	200
2	190	290
3	270	370
4	340	440
5	420	520
6	510	610
7	610	710

If there is only one variable input, diminishing marginal returns first occur with the production of which unit of output?

(A) 7th

(B) 6th

(C) 5th

(D) 4th

(E) 3rd

4. 题库 Production Function Q26

The table below shows a production function for a firm.

Units of Variable Input	Total Product
1	10
2	22
3	40
4	60
5	68
6	74
7	76
8	68
9	50
10	20

All of the following can be concluded from the information in the table EXCEPT:

(A) Diminishing marginal returns set in after the fourth unit of the variable input.

(B) Marginal product is positive if total product is increasing.

(C) This is a production function for a perfectly competitive firm.

(D) A profit-maximizing firm would never voluntarily employ the eighth unit of the variable input.

(E) Total product starts to decrease when marginal product changes from positive to negative.

5. 题库 Production Function Q29

With capital held constant, when Zane employs one additional worker, the marginal product of labor decreases by units. Which economic concept best characterizes Zane's production process?

(A) Diminishing marginal returns

(B) Increasing marginal returns

(C) Constant returns to scale

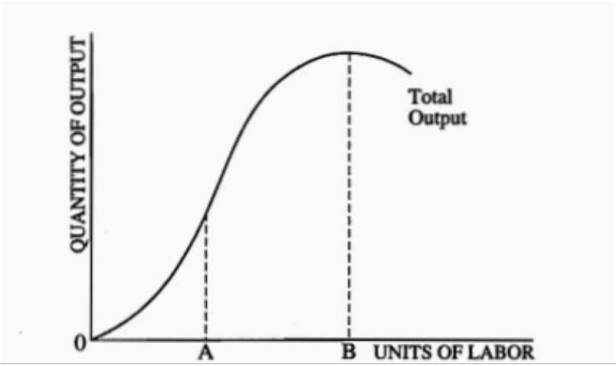
(D) Economies of scale

(E) Diseconomies of scale

6. 题库 Production Function Q32

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The relationship in the graph above best illustrates the economic concept of

(A) opportunity cost
(B) diminishing marginal utility in consumption
(C) diminishing marginal returns in production
(D) production possibilities
(E) comparative advantage

7. 题库 Production Function Q33

If a firm's production function exhibits diminishing marginal product of the variable input in the short run, which of the following about the firm's short-run marginal cost (MC) curve must be true?

(A) As output increases, the MC curve slopes upward.
(B) As output increases, the MC curve slopes downward and becomes flatter.
(C) As output increases, the MC curve slopes downward and becomes steeper.
(D) The MC curve is horizontal.
(E) The MC curve is vertical.

8. 题库 Production Function Q34

Short-run marginal costs eventually increase because of the effects of

(A) increasing marginal product
(B) diminishing marginal product
(C) diseconomies of scale
(D) economies of scale
(E) increasing fixed costs

9. 题库 Production Function Q35

For a firm where labor is the only variable input, which of the following happens when diminishing returns set in?

(A) Average variable cost begins to increase.
(B) Average product of labor begins to decline.
(C) Total product begins to decline.
(D) Marginal cost begins to increase.
(E) Average total cost begins to increase.

10. 题库 Production Function Q36

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.

11. 题库 Production Function Q43

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

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.

12. 题库 Production Function Q44

Suppose that a firm begins to hire workers for a newly completed plant with a fixed amount of machinery. As the firm hires additional workers, one would expect the marginal product to

(A) fall initially, but eventually rise
(B) rise initially, but eventually fall
(C) rise consistently due to diminishing returns
(D) rise consistently due to the advantages of specialization
(E) rise consistently due to economies of scale

13. 题库 Production Function Q49

Which of the following provides an example of the law of diminishing returns?

(A) A farm doubles all its inputs and observes that output less than doubles.
(B) A textile producer's output increases by 5 units when adding a fourth worker and by 7 units when adding a fifth worker.
(C) If a fixed input increases, fewer additional units of a variable input will be needed to increase output by one unit.
(D) As more of a variable input—for example, labor—is used with a fixed number of machines, output increases but at a diminishing rate.
(E) More cooks in a single kitchen will increase the number of meals produced by increasing amounts.

14. 题库 Production Function Q50

In the short run, assume diminishing marginal product of labor sets in with the hiring of the second worker. Which of the following will remain constant as a firm produces more output?

(A) Average product of labor
(B) Total cost
(C) Total fixed cost
(D) Total variable cost
(E) Marginal cost

15. 题库 Production Function Q61

Assume that the short-run marginal cost curve initially falls, and it then rises as quantity of output increases. Which of the following must be true?

(A) The marginal product of labor is always falling.
(B) At every output level, the short-run marginal cost curve is always above the average variable cost curve.
(C) As output increases, the unit price of labor (the wage rate) is first falling and then rising.
(D) Initially the marginal product of labor increases but eventually marginal product of labor decreases.
(E) The average variable cost curve must always be rising.

16. 题库 Production Function Q64

The chart below gives a firm's total cost of producing different levels of output.

Output	Total Cost
0	$13
1	$20
2	$25
3	$28
4	$32
5	$43
6	$60

The total variable cost of producing five units of output is

(A) $6
(B) $11
(C) $30
(D) $43
(E) impossible to determine from the information given

17. 题库 Production Function Q65

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.

18. 题库 Production Function Q66

The table below is partially filled in with the different types of costs for a firm. Based on the information in the table, what is the marginal cost of producing the second unit?

Quantity	Variable Cost	Fixed Cost	Total Cost	Average Total Cost
0	$0	$60		
1			$130	
2				$90

(A) $50
(B) $60
(C) $70
(D) $90
(E) $180

19. 题库 Production Function Q70

Assume the marginal product of labor first rises, reaches a maximum, and then falls. If the average product of labor is falling, which of the following is true?

(A) The marginal product of labor is greater than the average product of labor.

(B) The level of output produced must be at its maximum.

(C) The marginal product of labor must be falling.

(D) The marginal product of labor must be negative.

(E) The average product of labor has not yet reached its maximum.

20. 题库 Production Function Q71

A perfectly competitive firm operates with a fixed amount of capital that costs $1,000 per day. Labor is the only variable input. The firm hires labor in a perfectly competitive labor market at $100 per day per worker. The table below shows the firm's production function.

Number of Workers Hired	Quantity of Output (units)
0	0
1	10
2	30
3	54
4	75
5	85
6	90

What is the marginal product of the third worker?

(A) 5

(B) 10

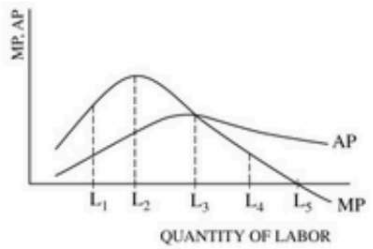
(C) 20

(D) 24

(E) It cannot be determined from the information given.

21. 题库 Production Function Q72

annot be determined from the information given.



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

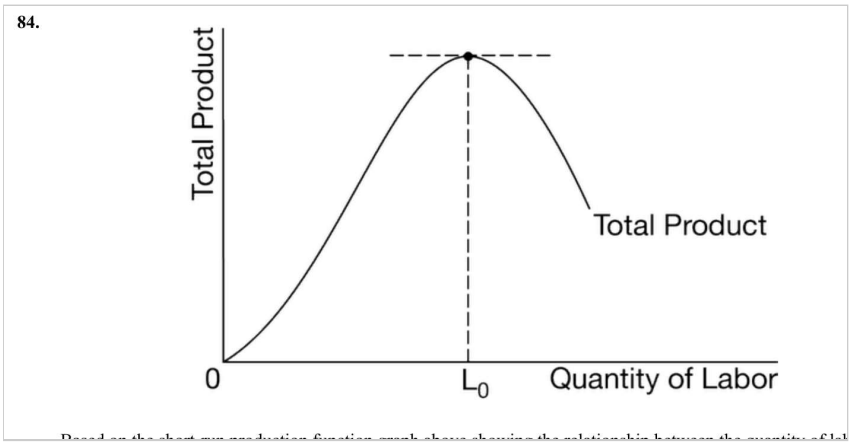
22. 题库 Production Function Q82

In the short run, which of the following costs must continuously decrease as output produced increases?

(A) Total variable cost
(B) Total fixed cost
(C) Average variable cost
(D) Average fixed cost
(E) Average total cost

23. 题库 Production Function Q84

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Based on the short-run production function graph above showing the relationship between the quantity of labor and total product, which of the following statements is true?

(A) The marginal product of labor is always increasing.
(B) At L_0 the marginal product of labor is at its maximum.
(C) Total product is maximized when marginal product is zero.
(D) At L_0 the marginal product of labor exceeds the average product of labor.
(E) The marginal product of labor is always positive.

24. 题库 Production Function Q85

The following questions refer to the diagram 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

After which worker does diminishing marginal product first occur?

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

25. 题库 Production Function Q86

As its output increases, a firm's short-run marginal cost will eventually increase because of

(A) diseconomies of scale
(B) a lower product price
(C) inefficient production
(D) the firm's need to break even
(E) diminishing returns

26. 题库 Production Function Q88

Which of the following best describes the relationship between the average total cost curve and the marginal cost curve in the short run?

(A) If the average total cost curve is rising, the marginal cost curve is above the average total cost curve.
(B) If the average total cost curve is rising, the marginal cost curve is below the average total cost curve.
(C) If the average total cost curve is above the marginal cost curve, the marginal cost curve is rising.
(D) If the average total cost curve is below the marginal cost curve, the marginal cost curve is falling.
(E) If the average and marginal cost curves intersect, the marginal cost curve is at a minimum.

27. 题库 Production Function Q90

Assume a firm doubles its usage of each input, resulting in a doubling of the firm's output. Which of the following describes this result?

(A) Increasing total cost
(B) Diminishing marginal returns
(C) Decreasing returns to scale
(D) Constant returns to scale
(E) Increasing returns to scale

28. 题库 Production Function Q94

A short-run production function shows the relationship between a firm's inputs and the output it produces when the firm

(A) does not vary any of its inputs
(B) has at least one fixed input
(C) varies all of its inputs
(D) has constant marginal cost
(E) has no fixed costs

29. 题库 Production Function Q95

When total physical product is at its maximum, marginal physical product must be

(A) greater than one
(B) equal to one
(C) equal to zero
(D) less than zero
(E) constant

30. 题库 Production Function Q97

If a single firm can produce and supply an entire market at a lower unit cost than many small firms can, the long-run average total cost must be

(A) increasing as firm size increases
(B) remaining constant as firm size increases
(C) decreasing as the firm's output increases
(D) inelastic due to specialization
(E) constant and equal to marginal cost

31. 题库 Production Function Q68

A firm's short-run production function uses capital and labor as inputs. Assume the quantity of capital is fixed in the short run. The marginal product of labor will decrease as more labor is used in the short run because each unit of labor will have

(A) zero units of capital to work with
(B) fewer units of capital to work with
(C) an increase in the capital-to-labor ratio
(D) more units of capital to work with
(E) an infinite number of units of capital to work with

32. 题库 Production Function Q99

When marginal product exceeds average product, which of the following must be true?

(A) Average product is increasing.
(B) Average product is decreasing.
(C) Marginal product is increasing.
(D) Total product is decreasing.
(E) Total product is at its maximum.

33. 题库 Production Function Q103

Use the production schedule below to answer the question.

Number of Workers	Quantity of Output
0	0
1	10
2	25
3	35
4	40
5	42

Given the production schedule above, what is the maximum number of workers the firm can hire before the effects of diminishing marginal returns set in?

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

34. 题库 Unit 3 Production Function Q77

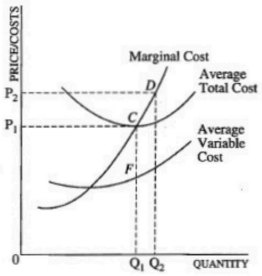
In the short run, a profit-maximizing firm, faced with U-shaped average cost curves, is producing a level of output at which the average total cost of production is minimized. At this level of output, which of the following is true for the firm?

(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.

35. 题库 Unit 3 Production Function Q46

The following graph shows the cost curves for a profit maximizing, perfectly competitive firm.

The following questions refer to the graph below, which shows the cost curves for a profit maximizing, perfectly competitive firm.



The vertical distance CF represents the

(A) total cost of producing Q_1 units of output

(B) average total cost of producing Q_1 units of output

(C) average fixed cost of producing Q_1 units of output

(D) average variable cost of producing Q_1 units of output

(E) amount of the firm's loss resulting from producing Q_1 units of output

AP EXAM QUESTIONS — 2021–2025

36. 2021 AP Micro MCQ Q28

A firm's short-run production function uses capital and labor as inputs. Assume the quantity of capital is fixed in the short run. The marginal product of labor will decrease as more labor is used in the short run because each unit of labor will have

(A) zero units of capital to work with

(B) fewer units of capital to work with

(C) an increase in the capital-to-labor ratio

(D) more units of capital to work with

(E) an infinite number of units of capital to work with

37. 2022 AP Micro MCQ Q9

Assume that capital and labor are the only two inputs used by a clinic. The table shows the hourly marginal product and the hourly price of capital and labor at the current output level. To minimize costs at the current output level, the clinic should change the hiring of capital and labor in which of the following ways?

Input	Marginal Product	Hourly Price
Capital	25 units	$200
Labor	5 units	$50

(A) The amount of capital hired should decrease, and the amount of labor hired should increase.

(B) The amount of capital hired should decrease, and the amount of labor hired should decrease.

(C) The amount of capital hired should increase, and the amount of labor hired should decrease.

(D) The amount of capital hired should increase, and the amount of labor hired should increase.

(E) There should be no change to the quantity of capital or labor hired.

38. 2022 AP Micro MCQ Q20

Heggood, Inc., a perfectly competitive firm, produces hats using capital and labor purchased in competitive factor markets. If the demand for hats increases, Heggood, Inc. will

(A) decrease the price of hats
(B) decrease its demand for labor
(C) decrease the quantity of labor demanded
(D) increase its demand for capital
(E) increase the rental price of capital

39. 2022 AP Micro MCQ Q49

Which of the following is true of production in the long run?

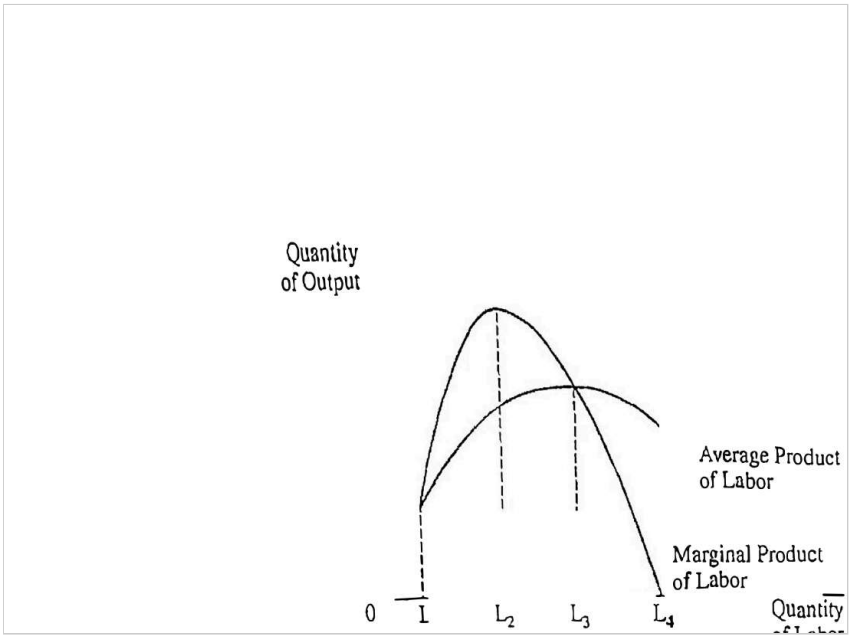
(A) At least one factor of production is fixed.
(B) Only one factor of production is fixed.
(C) Some factors of production are fixed while others are variable.
(D) All factors of production are variable.
(E) All factors of production, except technology, are fixed.

40. 2023 AP Micro MCQ Q20

FormalWear is a clothing factory that hires workers as a variable input and rents sewing machines as a fixed input. Which of the following will happen when the marginal product of workers decreases?

(A) Total variable cost will decrease.
(B) Total fixed cost will increase.
(C) Short-run average total cost will decrease.
(D) Marginal cost will increase.
(E) Marginal cost will equal average total cost.

41. 2024 AP Micro MCQ Q12



Labor is the only variable input for a firm whose production function is depicted in the graph provided. How many units of labor would maximize total product?

(A) L_1
(B) L_2
(C) L_3
(D) L_4
(E) Cannot be determined from the graph

42. 2024 AP Micro MCQ Q43

The market for cauliflower is currently in equilibrium. Which of the following would result in an increase in the supply of cauliflower in the short run?

(A) A government-imposed per-unit tax on cauliflower producers
(B) An increase in consumers' incomes, and cauliflower is a normal good
(C) An increase in the wages of farm workers in cauliflower fields
(D) A decrease in the price of broccoli, a substitute product farmers can produce instead of cauliflower
(E) A decrease in the price of tomatoes, a complement in consumption for cauliflower

43. 2025 AP Micro MCQ Q37

The table shows the total cost schedule for FineSeat Company.

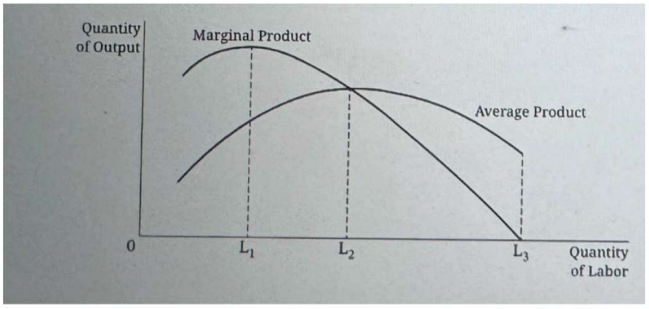
Output	Total Cost ($)
0	120
1	200
2	270
3	375
4	480
5	620
6	780

FineSeat Company produces chairs. How many chairs will FineSeat Company produce to minimize average variable cost?

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

44. 2025 AP Micro MCQ Q48

The graph shows the marginal product and average product curves for a firm.



48. Which of the following is true about the production function as labor usage increases to L3 when all other inputs are held constant?

A. There are increasing marginal returns.

Which of the following is true about the production function as labor usage increases from L_1 to L_3 when all other inputs are held constant?

(A) There are increasing marginal returns.
(B) There are diminishing marginal returns.
(C) There are decreasing returns to scale.
(D) Total product is maximized when the firm hires L_1 units of labor.
(E) Total product is maximized when the firm hires L_2 units of labor.