

Chapter 8 Practice

Multiple Choice

1. A long-run total cost curve:
 - A) always has a constant slope.
 - B) is always upward sloping.
 - C) never has a constant slope.
 - D) is always downward sloping.
2. A firm's long-run average cost curve is comprised of:
 - A) the minimum points of each of the firm's short-run average cost curves.
 - B) the lower envelope of the firm's short-run average cost curves.
 - C) the minimum points of each of the firm's short-run marginal cost curves.
 - D) the series of points where the short-run marginal cost curves intersect the short-run average cost curves.
3. When average cost is "u-shaped" (neither always rising nor always falling), the marginal cost curve will
 - A) cross through (intersect) the average cost curve at its maximum.
 - B) not intersect with the average cost curve at all.
 - C) be a fixed distance above the average cost curve.
 - D) cross through (intersect) the average cost curve at its minimum.
4. The long-run total cost curve shows:
 - A) the various combinations of capital and labor that will produce different levels of output at the same cost.
 - B) the various combinations of capital and labor that will produce the same level of output.
 - C) the minimum total cost to produce any level of output, holding input prices fixed, and choosing all inputs to minimize cost.
 - D) for a fixed level of capital, the minimum cost to produce a given level of output.
5. A long-run total cost curve:
 - A) must be equal to zero when the level of output is zero.
 - B) may be greater than or equal to zero when the level of output is zero.
 - C) must be decreasing when the level of output is zero.
 - D) will be equal to fixed cost, which is greater than zero, when the level of output is zero.

6. Suppose for a particular production function, the cost-minimizing level of labor is $L = 2Q$ and the cost-minimizing level of capital is $K = 5Q$. If $w = 5$ and $r = 2$, the long-run total cost curve is:
- $TC = 7Q$
 - $TC = 7$
 - $TC = 20Q$
 - $TC = 20$
7. Suppose for a particular production function, the cost-minimizing levels of labor and capital are $L = \frac{Q}{10} \sqrt{\frac{r}{w}}$, $K = \frac{Q}{10} \sqrt{\frac{w}{r}}$. If $r = 5$ and $w = 20$, what is the equation for long-run total cost?
- $\frac{2Q}{5}$
 - $\frac{2Q}{10}$
 - $2Q$
 - $4Q$
8. Which of the following is *not* an accurate specification of a firm's long-run total cost curve? FC stands for fixed cost, VC stands for variable cost, and AC stands for average cost, below.
- $TC = FC + VC$, where $FC = 0$
 - $TC = FC + VC$, where $FC > 0$
 - $TC = wL + rK$, where L and K are chosen to minimize cost, and w and r are input prices.
 - $TC = AC \times Q$
9. Suppose that a firm's production function can be specified as $Q = 10KL$. Which of the following accurately describes this firm's long run total cost function?
- $\frac{Q}{10K}$
 - $\frac{Q}{10L}$
 - $2\sqrt{rwQ/10}$
 - $2\sqrt{10Q/rw}$
10. The long-run total cost curve tends to:
- rotate upward when input prices fall.
 - rotate upward when input prices rise.
 - shift vertically upward by a fixed amount.
 - shift vertically downward by a fixed amount.

11. When the price of all inputs increase by the same percentage:
- A) the firm's total cost curve will rotate upward by a higher percentage if the firm's production technology exhibits decreasing returns to scale.
 - B) the firm's total cost curve will rotate upward by the same percentage.
 - C) the firm's total cost curve will rotate upward by a higher percentage if the firm's production technology exhibits increasing returns to scale.
 - D) the firm's total cost curve will remain unchanged since the cost-minimizing combination of inputs is unchanged.
12. The output elasticity of total cost is defined as:
- A) the percentage change in output per one percent change in total cost.
 - B) the percentage change in total cost per one percent change in output.
 - C) output divided by total cost.
 - D) total cost divided by output.
13. An increase in the price of one input:
- A) will always rotate the long-run total cost curve upward.
 - B) may rotate the long-run total cost curve upward or may leave the long-run total cost unchanged.
 - C) could actually rotate the long-run total cost downward.
 - D) will have no effect on the long-run total cost curve as long as the firm is using positive amounts of both inputs.
14. When the prices of all inputs increase by a proportionate amount:
- A) the firm's total cost curve will remain unchanged since the cost-minimizing combination of inputs is unchanged.
 - B) the firm's total cost curve may rotate upward or may leave the long-run total cost curve unchanged.
 - C) will always rotate the long-run total cost curve upward.
 - D) could actually rotate the long-run total cost downward if the firm chooses to produce a lower level of output.
15. The relationship between the long-run total cost curve and the marginal and average cost curves is best described by which of the following statements?
- A) The slope of the total cost curve from the origin to a point on the total cost curve is how you derive the marginal cost curve while the average cost is given by TC/Q .
 - B) Marginal cost is MC/Q while average cost is TC/Q .
 - C) Marginal cost is derived by dividing total cost by a constant as is average cost.
 - D) The slope of the total cost curve at each point is how you derive the marginal cost curve while the slope from the origin to a point on the total cost curve is how you derive the average cost curve.

16. Suppose that a firm's long-run total cost curve can be expressed as $TC = 10Q^2 + 20Q$. This firm's long-run average total cost curve can be expressed as
- $AC = 20Q + 20$.
 - $AC = 10Q + 20$.
 - $AC = 10 + 20Q$.
 - $AC = 10Q^2$.
17. For a firm, let total cost be $TC(Q) = 160 + 10Q^2$. What is the minimum efficient scale for this firm?
- 0
 - 2
 - 4
 - Indeterminate
18. Suppose that a firm's total costs of production are 0 at an output of zero, 10 at an output of 1, 20 at an output of 2 units, 30 at an output of three units, 35 at an output of four units and 37 at an output of five units. At which number of units are marginal and average costs equal?
- The first unit.
 - The fifth unit.
 - The third unit.
 - At the first, second and third units.
19. For a firm, let total cost be $TC(Q) = 10Q^2$. Which of the following is an expression for the output elasticity of total cost?
- $\epsilon_{TC,Q} = 10Q$.
 - $\epsilon_{TC,Q} = 2Q$.
 - $\epsilon_{TC,Q} = 2$.
 - $\epsilon_{TC,Q} = 20Q$.
20. Suppose that a firm's total costs of production are 0 at an output of zero, 10 at an output of 1, 20 at an output of 2 units, 30 at an output of three units, 35 at an output of four units and 37 at an output of five units. At which number of units is average cost minimized?
- The first unit.
 - The fifth unit.
 - The third unit.
 - At the first, second and third units.
21. Suppose that a firm's long-run total cost curve can be expressed as $TC(Q) = 100Q$. This firm's long-run marginal cost curve can be expressed as:
- $MC = 100$.
 - $MC = 100Q$.
 - $MC = 100Q^2$.
 - $MC = 10$.

22. If average cost is constant for all levels of output:
- A) the marginal cost curve will intersect the average cost at a single point, the minimum of average cost.
 - B) marginal cost will be equal to average cost for all levels of output.
 - C) marginal cost will be above average cost when average cost is increasing and marginal cost will be below average cost when average cost is decreasing.
 - D) marginal cost will have a region of diminishing marginal cost.
23. Marginal cost:
- A) is equal to average cost at the minimum point of the marginal cost curve.
 - B) is equal to average cost at the maximum point of the average cost curve.
 - C) is decreasing whenever average cost is decreasing.
 - D) is equal to average cost at the minimum point of the average cost curve.
24. When the production function is given by $Q = L$, which of the following statements is true?
- A) $TC = wQ^2$, $L = Q^2$ and $AC = w$
 - B) $TC = w - Q$, $L = Q$ and $AC = w$
 - C) $TC = wQ$, $L = Q$ and $AC = w$
 - D) $TC = wQ$, $L = Q$ and $AC = L$
25. Suppose a firm's total cost curve is given by the equation $TC = Q^2 + 2Q + 100$. At what level of Q does the firm's average cost curve reach a minimum?
- A) 100
 - B) 2
 - C) 10
 - D) 20
26. Marginal cost is:
- A) the cost per unit of output.
 - B) the increase in total cost from producing an additional unit of output.
 - C) the same thing as total variable cost.
 - D) is only relevant in the long-run.
27. A firm notices that when it increases output beyond an initial level Q_1 , average total cost decreases. For this firm, the region of output beyond Q_1 is characterized by:
- A) economies of scale.
 - B) diseconomies of scale.
 - C) constant economies of scale.
 - D) the minimum efficient scale.

28. Which of the following factors *may* explain diseconomies of scale?
- A) Increasing returns to scale of inputs.
 - B) Specialization of labor.
 - C) Indivisible inputs.
 - D) Managerial diseconomies.
29. The output elasticity of total cost is equal to:
- A) the slope of the isocost line.
 - B) the ratio of marginal cost to average cost.
 - C) the ratio of average cost to marginal cost.
 - D) the ratio of average cost to total cost.
30. When the output elasticity of total cost is less than one,
- A) Marginal cost is less than average cost and average cost decreases as Q increases.
 - B) Marginal cost is less than average cost and average cost increases as Q increases.
 - C) Marginal cost is greater than average cost and average cost decreases as Q increases.
 - D) Marginal cost is greater than average cost and average cost increases as Q increases.
31. Minimum efficient scale is:
- A) the lowest level of efficiency the firm can achieve.
 - B) the highest level of output the firm can achieve.
 - C) the lowest level of long-run average cost.
 - D) the smallest quantity at which the long-run average cost achieves a minimum.
32. Economies of scale exist when firms have:
- A) increasing returns to scale.
 - B) constant returns to scale.
 - C) decreasing returns to scale.
 - D) constant marginal cost.
33. Suppose a firm's production function can be specified as $Q = 10KL$. This firm's cost function exhibits
- A) economies of scale
 - B) diseconomies of scale
 - C) neither diseconomies nor economies of scale.
 - D) economies of scale for output levels less than some level, $Q_1 = 1/4$, and diseconomies of scale thereafter.
34. Suppose a firm's total cost curve can be written $TC(Q) = Q - .5Q^2 + Q^3$. This cost function exhibits:
- A) economies of scale
 - B) diseconomies of scale
 - C) neither diseconomies nor economies of scale.
 - D) economies of scale for output levels less than some level, $Q_1 = 1/4$, and diseconomies of scale thereafter.

35. Suppose the output elasticity of total cost is 1.5. This implies the average cost curve exhibits:
- A) increasing returns to scale.
 - B) economies of scale.
 - C) neither economies nor diseconomies of scale.
 - D) diseconomies of scale.
36. If the output elasticity of total cost is less than one, then the long-run average cost curve experiences:
- A) economies of scale.
 - B) diseconomies of scale.
 - C) decreasing returns to scale.
 - D) the minimum efficient scale.
37. Diseconomies of scale exist when:
- A) the firm's total cost falls as the level of output increases.
 - B) the firm's total cost increases as the level of output increases.
 - C) the firm's average cost decreases as the level of output decreases.
 - D) the firm's average cost decreases as the level of output increases.
38. Which of the following factors *would not* explain economies of scale?
- A) Increasing returns to scale of inputs.
 - B) Specialization of labor.
 - C) Indivisible inputs.
 - D) Managerial diseconomies
39. Suppose a firm's production technology exhibits constant returns to scale. The firm's long-run *average* cost curve will:
- A) be U-shaped
 - B) exhibit economies of scale.
 - C) exhibit diseconomies of scale.
 - D) be a horizontal straight line.
40. The short-run total cost curve is the sum of which two components?
- A) Short-run and long-run
 - B) Total variable cost curve and total fixed cost curve
 - C) Average cost curve and marginal cost curve
 - D) Economies of scale and economies of scope
41. The short-run total cost curve:
- A) shows the minimized total cost of producing a given quantity of output.
 - B) shows the outputs that correspond to minimized total cost when at least one input is fixed.
 - C) shows the minimized total cost of producing a given quantity of output when at least one input is fixed.
 - D) shows the minimized total cost of producing a given quantity of output when all inputs are fixed.

42. Suppose $Q = \sqrt{\bar{K}L}$ in the short-run. The firm's short-run fixed cost curve is:
- A) $SFC = \frac{Q^2}{\bar{K}}$
 - B) $SFC = \frac{wQ^2}{\bar{K}} + r\bar{K}$
 - C) $SFC = wQ^2 / \frac{\bar{K}}{K}$
 - D) $SFC = r\bar{K}$
43. Suppose $Q = \sqrt{\bar{K}L}$ in the short-run. The firm's short-run total cost curve is:
- A) $STC = \frac{Q^2}{\bar{K}}$
 - B) $STC = \frac{w\bar{K}}{Q} + r\bar{K}$
 - C) $STC = Q^2 + \bar{K}$
 - D) $STC = \frac{wQ^2}{\bar{K}} + r\bar{K}$
44. Suppose a firm's short run total cost curve can be expressed as $STC(Q) = 50Q + 10$. This firm's short-run average total cost curve can be expressed as:
- A) $50 + \frac{10}{Q}$.
 - B) $50Q$.
 - C) 50.
 - D) 10.
45. Suppose $Q = \sqrt{\bar{K}L}$ in the short-run. The firm's short-run variable cost curve is:
- A) $SFC = \frac{Q^2}{\bar{K}}$
 - B) $SFC = \frac{wQ^2}{\bar{K}} + r\bar{K}$
 - C) $SFC = wQ^2 / \frac{\bar{K}}{K}$
 - D) $SFC = r\bar{K}$
46. Suppose a firm's short run total cost curve can be expressed as $STC(Q) = 50Q + 10$. This firm's short-run marginal cost can be expressed as:
- A) $50 + \frac{10}{Q}$.
 - B) $50Q$.
 - C) 50.
 - D) 10.

47. Suppose $STC(Q) = 2Q + 20$. Short run marginal cost is:
- A) indeterminate, since we don't know the level of Q .
 - B) 22
 - C) 20
 - D) 2

True/False

48. When average cost is “u-shaped” (neither always rising nor always falling), the marginal cost curve will cross through (intersect) the average cost curve at its maximum.
49. When average cost is “u-shaped” (neither always rising nor always falling), the marginal cost curve will not intersect with the average cost curve at all.
50. When average cost is “u-shaped” (neither always rising nor always falling), the marginal cost curve will be a fixed distance above the average cost curve.
51. When average cost is “u-shaped” (neither always rising nor always falling), the marginal cost curve will cross through (intersect) the average cost curve at its minimum.
52. When the price of all inputs increase by the same percentage, the firm's total cost curve will rotate upward by a higher percentage if the firm's production technology exhibits decreasing returns to scale.
53. When the price of all inputs increase by the same percentage, the firm's total cost curve will rotate upward by the same percentage.
54. When the price of all inputs increase by the same percentage, the firm's total cost curve will rotate upward by a higher percentage if the firm's production technology exhibits increasing returns to scale.
55. When the price of all inputs increase by the same percentage, the firm's total cost curve will remain unchanged since the cost-minimizing combination of inputs is unchanged.
56. Marginal cost can be measured as the slope of the total cost curve.
57. Average total cost can be measured as the slope of the ray from the origin to the total cost curve.
58. Consider the relationship between the long-run total cost curve and the marginal and average cost curve. The slope of the total cost curve from the origin to a point on the total cost curve is how you derive the marginal cost curve while the average cost is given by TC/Q .
59. Consider the relationship between the long-run total cost curve and the marginal and average cost curve. Marginal cost is MC/Q while average cost is TC/Q .

60. Consider the relationship between the long-run total cost curve and the marginal and average cost curve. Marginal cost is derived by dividing total cost by a constant as is average cost.
61. Consider the relationship between the long-run total cost curve and the marginal and average cost curve. The slope of the total cost curve at each point is how you derive the marginal cost curve while the slope from the origin to a point on the total cost curve is how you derive the average cost curve.
62. When marginal cost is rising, average total cost is rising.
63. When marginal cost is below average total cost, average total cost is falling.
64. When the production function is given by $Q = L$, $TC = wQ^2$, $L = Q^2$ and $AC = w$.
65. When the production function is given by $Q = L$, $TC = w - Q$, $L = Q$ and $AC = w$.
66. When the production function is given by $Q = L$, $TC = wQ$, $L = Q$ and $AC = w$.
67. When the production function is given by $Q = L$, $TC = wQ$, $L = Q$ and $AC = L$.

Answers

Multiple Choice

1. B
2. B
3. D
4. C
5. A
6. C
7. C
8. B
9. C
10. B
11. B
12. B
13. B
14. C
15. D
16. B
17. C
18. D
19. C
20. B
21. A
22. B
23. D
24. C
25. C
26. B
27. A
28. D
29. B
30. A
31. D
32. A
33. A
34. D
35. D
36. A
37. C
38. D
39. D
40. B
41. C
42. D
43. D
44. A
45. C
46. C
47. D

True and False

48. False
49. False
50. False
51. True
52. False
53. True
54. False
55. False
56. True
57. True
58. False
59. False
60. False
61. True
62. False
63. True
64. False
65. False
66. True
67. False