



Chapter 6 Production

1. A production function defines the output that can be produced
 - a. at the lowest cost, given the inputs available.
 - b. with the fewest amount of inputs.
 - c. **if the firm is technically efficient.**
 - d. in a given time period if no additional inputs are hired.
 - e. as technology changes over time.
2. A function that indicates the maximum output per unit of time that a firm can produce, for every combination of inputs with a given technology, is called
 - a. an isoquant.
 - b. a production possibility curve.
 - c. **a production function.**
 - d. an isocost function.
3. The short run is
 - a. less than a year.
 - b. three years.
 - c. however long it takes to produce the planned output.
 - d. **a time period in which at least one input is fixed.**
 - e. a time period in which at least one set of outputs has been decided upon.
4. The slope of the total product curve is the
 - a. average product.
 - b. slope of a line from the origin to the point.
 - c. **marginal product.**
 - d. marginal rate of technical substitution.
5. The law of diminishing returns refers to diminishing
 - a. total returns.
 - b. **marginal returns.**
 - c. average returns.
 - d. all of these.
6. When labor usage is at 12 units, output is 36 units. From this we may infer that
 - a. the marginal product of labor is 3.
 - b. the total product of labor is 1/3.
 - c. **the average product of labor is 3.**
 - d. none of the above.
7. The marginal product of an input is
 - a. total product divided by the amount of the input used to produce this amount of output.
 - b. the addition to total output that adds nothing to total revenue.
 - c. the addition to total output that adds nothing to profit.
 - d. the addition to total output due to the addition of one unit of all other inputs.
 - e. **the addition to total output due to the addition of the last unit of an input, holding all other inputs constant.**
8. When the average product is decreasing, marginal product
 - a. equals average product.
 - b. is increasing.
 - c. exceeds average product.
 - d. is decreasing.
 - e. **is less than average product.**
9. The law of diminishing returns assumes that
 - a. **there is at least one fixed input.**
 - b. all inputs are changed by the same percentage.
 - c. additional inputs are added in smaller and smaller increments.
 - d. all inputs are held constant.
10. According to the law of diminishing returns
 - a. the total product of an input will eventually be negative.
 - b. the total product of an input will eventually decline.
 - c. the marginal product of an input will eventually be negative.
 - d. **the marginal product of an input will eventually decline.**
11. The law of diminishing returns applies to
 - a. **the short run only.**
 - b. the long run only.
 - c. both the short and the long run.
 - d. neither the short nor the long run.

all inputs, with no reference to the time period.
12. An isoquant
 - a. must be linear.
 - b. cannot have a negative slope.
 - c. **is a curve that shows all the combinations of inputs that yield the same total output.**
 - d. is a curve that shows the maximum total output as a function of the level of labor input.
 - e. is a curve that shows all possible output levels that can be produced at the same cost.

13. A firm uses two factors of production. Irrespective of how much of each factor is used, both factors always have positive marginal products which imply that

- a. isoquants are relevant only in the long run
- b. **isoquants have negative slope**
- c. isoquants are convex
- d. isoquants can become vertical or horizontal
- e. none of the above

14. An upward sloping isoquant

- a. can be derived from a production function with one input
- b. can be derived from a production function that uses more than one input where reductions in the use of any input always reduces output
- c. **cannot be derived from a production function when a firm is assumed to maximize profits**
- d. can be derived whenever one input to production is available at zero cost to the firm
- e. none of the above

15. The marginal rate of technical substitution is equal to the

- a. slope of the total product curve.
- b. change in output minus the change in labor.
- c. change in output divided by the change in labor.
- d. **ratio of the marginal products of the inputs.**

16. If the isoquants are straight lines, then

- a. inputs have fixed costs at all use rates.
- b. **the marginal rate of technical substitution of inputs is constant.**
- c. only one combination of inputs is possible.
- d. there are constant returns to scale.

17. In a production process, all inputs are increased by 10%; but output increases less than 10%. This means that the firm experiences

- a. **decreasing returns to scale.**
- b. constant returns to scale.
- c. increasing returns to scale.
- d. negative returns to scale.

18. If input prices are constant, a firm with increasing returns to scale can expect

- a. costs to double as output doubles.
- b. costs to more than double as output doubles.
- c. **costs to go up less than double as output doubles.**
- d. to hire more and more labor for a given amount of capital, since marginal product increases.

19. A farmer uses M units of machinery and L hours of labor to produce C tons of corn, with the following production function $C = L^{0.5}M^{0.75}$. This production function exhibits

- a. decreasing returns to scale for all output levels
- b. constant returns to scale for all output levels
- c. **increasing returns to scale for all output levels**
- d. no clear pattern of returns to scale

20. Increasing returns to scale in production means

- a. more than 10% as much of all inputs are required to increase output 10%.
- b. **less than twice as much of all inputs are required to double output.**
- c. more than twice as much of only one input is required to double output.
- d. isoquants must be linear.

21. A straight-line isoquant

- a. is impossible.
- b. would indicate that the firm could switch from one output to another costlessly.
- c. would indicate that the firm could not switch from one output to another.
- d. would indicate that capital and labor cannot be substituted for each other in production.
- e. **would indicate that capital and labor are perfect substitutes in production.**

22. An L-shaped isoquant

- a. is impossible.
- b. would indicate that the firm could switch from one output to another costlessly.
- c. would indicate that the firm could not switch from one output to another.
- d. **would indicate that capital and labor cannot be substituted for each other in production.**
- e. would indicate that capital and labor are perfect substitutes in production.

23. A production function in which the inputs are perfectly substitutable would have isoquants that are

- a. convex to the origin.
- b. L-shaped.
- c. **linear.**
- d. concave to the origin.

24. Which would not increase the productivity of labor?

- a. **An increase in the size of the labor force.**
- b. An increase in the quality of capital.
- c. An increase in the quantity of capital.
- d. An increase in technology.
- e. An increase in the efficiency of energy.