j

1.

Number of Workers	Hourly Wage	Marginal Factor Cost	Marginal Revenue Product
10	$5.00		
11	5.10	$6.10/hr	$8.70/hr
12	5.20	6.30/hr	7.60/hr
13	5.30	6.50/hr	6.50/hr
14	5.40	6.70/hr	5.40/hr
15	5.50	6.90/hr	4.30/hr

According to the information in the table above, the twelfth worker would increase the hourly profit by

(A) $0.20

(B) $1.10

(C) $1.30 ✓

(D) $2.40

(E) $5.20

2. 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.

3. The marginal revenue product of labor is the

(A) product price times the wage rate

(B) additional revenue a firm earns when it employs an additional unit of labor ✓

(C) increase in the average product of labor when the firm employs an additional unit of labor

(D) increase in the price of labor when the firm employs an additional unit of labor

(E) marginal revenue plus product price

4. Assume that firms providing health-care services to older people operate in a perfectly competitive market. What must happen in the market for health-care workers if there is an increase in the number of older people in a country?

j

(A) The demand for health-care workers will increase. ✓

(B) The marginal factor cost in the health-care industry will decrease.

(C) The number of health-care workers will decrease.

(D) The quality of health-care services will increase.

(E) The wages of health-care workers will decrease.

5. A perfectly competitive producer of steel rods and steel beams employs 100 workers with identical skills. If steel rods and steel beams sell for the same price, which of the following rules should the producer always follow to use the 100 workers efficiently?

I. Allocate workers so that the average cost of producing beams equals the average cost of producing rods.

II. Allocate workers so that the marginal product of labor is the same in both rod production and beam production.

III. Allocate half the workers to rod production and half the workers to beam production.

(A) I only

(B) II only ✓

(C) III only

(D) II and III only

(E) I, II, and III

6. Assume that barber shops operate in perfectly competitive product and factor markets. Which of the following will happen to working barbers if the price of haircuts decreases?

(A) The marginal product of the last barber hired will not change.

(B) The marginal product of the last barber hired will decrease.

(C) The marginal revenue product curve will shift to the right.

(D) The marginal revenue product curve will shift to the left. ✓

(E) There will be a movement upward along the marginal revenue curve.

7. If a binding minimum wage increases in a perfectly competitive labor market, then which of the following will likely occur in the labor market?

(A) The supply of workers will increase.

(B) The supply of workers will decrease.

(C) The demand for workers will increase.

(D) The demand for workers will decrease.

(E) The quantity of workers supplied will increase. ✓

j

8. A firm uses capital and labor in its production process. The marginal product for the last unit of labor is 5, the marginal product for the last unit of capital is 10, and the wage is $10. At what cost of hiring each unit of capital would the firm be minimizing the cost of the current output?

(A) $5
(B) $10
(C) $15
(D) $20 ✓
(E) $50

9. For a certain firm, the marginal revenue product for the last unit of labor is $60, and the marginal revenue product for the last unit of capital is $100. Which of the following combinations of factor prices would be necessary for the firm to maximize profits?

j

(A)

Price of Labor	Price of Capital
$2	$5

(B)

Price of Labor	Price of Capital
$3	$20

(C)

Price of Labor	Price of Capital
$10	$10

(D)

Price of Labor	Price of Capital
$2	$25

(E) ✓

Price of Labor	Price of Capital
$60	$100

10. A profit-maximizing firm hires labor in a perfectly competitive market. Labor is the only variable input, and the marginal product of the last worker hired is 10 units per hour. If the hourly wage is $20, the firm's marginal revenue

(A) is $2 ✓

(B) is $20

(C) increases as more output is produced

(D) increases first and then decreases as more output is produced

(E) decreases first and then increases as more output is produced

j

11. A firm sells its output in a perfectly competitive market and hires two inputs, capital and labor, in perfectly competitive factor markets. The product price is $15 per unit, the wage is $75 per day, and the marginal product of capital is 3. If the firm is choosing the least-cost combination of labor and capital, the firm's marginal product of labor and the price of capital must be equal to which of the following?

(A)

Marginal Product of Labor	**Price of Capital**
25	$5

(B)

Marginal Product of Labor	**Price of Capital**
25	$45

(C)

Marginal Product of Labor	Price of Capital
5	$15

(D)

Marginal Product of Labor	Price of Capital
5	$25

(E) ✓

Marginal Product of Labor	Price of Capital
5	$45

j

12.

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

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

j

The following questions are based on the following output and total revenue for a monopolist in the product market.

Output Quantity (units)	Total Revenue ($)
0	0
1	11
2	20
3	27
4	32
5	35
6	36
7	35

The marginal product of labor is constant at 1 unit for every additional unit of labor. The monopolist hires labor in a perfectly competitive market at the wage rate of $5 per hour.

13. What is the marginal revenue product of labor when the firm produces the third unit of output?

(A) $3
(B) $7 ✓
(C) $9
(D) $20
(E) $27

14. How many units of labor should the firm employ to maximize profits?

(A) 1
(B) 2
(C) 4 ✓
(D) 5
(E) 6

j

15. 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.

16. A firm is currently employing a cost-minimizing combination of labor and capital for a given level of output. The firm is employing 20 workers, and the marginal product of the last worker is 40 units of output. The firm is employing 100 units of capital, and the marginal product of the last unit of capital is 10 units of output. If the wage rate is $20 per hour, what is the price of capital?

(A) $2.5 per hour

(B) $5 per hour ✓

(C) $10 per hour

(D) $100 per hour

(E) $200 per hour

17. Which of the following will shift the demand curve for a factor of production to the left?

(A) A decrease in the price of the factor of production

(B) A decrease in the price of a substitute factor of production ✓

(C) An increase in the price of the product produced by the factor

(D) An increase in the marginal product of the factor

(E) An improvement in technology used by the factor of production

18. Marginal resource (factor) cost can be defined as

(A) the change in total resource cost caused by the production of one more unit of output

(B) the change in total revenue caused by the addition of one more unit of a resource

(C) the change in total resource cost caused by the addition of one more unit of a resource ✓

(D) the total resource cost divided by the number of inputs used

(E) total resource cost divided by output

19. Suppose the market for health-care workers is perfectly competitive. Which of the following will happen in the market for health-care workers in the short run if the demand for health care increases?

j

(A) The supply curve of health-care workers will shift to the right.

(B) The supply curve of health-care workers will shift to the left.

(C) The demand curve for health-care workers will shift to the right. ✓

(D) The demand curve for health-care workers will shift to the left.

(E) Neither the demand curve nor the supply curve of health-care workers will shift.

20. Businesses employ workers from city neighborhoods and rural areas. These workers are perfect substitutes and cannot relocate in the short run. The government offers businesses a wage subsidy if they hire workers from *city* neighborhoods. What is the effect of the subsidy on the wage rate of *rural* workers and on the total hours they work?

(A)

Wage Rate of Rural Workers	Total Hours Worked by Rural Workers
Increase	Decrease

(B)

Wage Rate of Rural Workers	Total Hours Worked by Rural Workers
No change	No change

(C)

Wage Rate of Rural Workers	Total Hours Worked by Rural Workers
No change	Decrease

(D) ✓

Wage Rate of Rural Workers	Total Hours Worked by Rural Workers
Decrease	Decrease

(E)

Wage Rate of Rural Workers	Total Hours Worked by Rural Workers
Decrease	No change

j

21. Which of the following is most likely to increase the supply of soldiers for an all-volunteer army?

(A) A decrease in the salaries paid to soldiers

(B) A decrease in the average wage rate in civilian employment ✓

(C) A reduction in college tuition benefits provided by soldiers

(D) The imposition of new restrictions on women in the military

(E) An increase in the required length of service

22. 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 ✓

23. Firm Z is producing 50 widgets using labor and capital. The marginal product of the last unit of labor employed is 500; the marginal product of the last unit of machinery (or capital) is 1000. The unit price of labor is $\$10$, and the unit price of machinery or capital is $\$100$. With competitive input markets, which of the following statements is true?

(A) The firm is minimizing the cost of producing 50 widgets with this combination of labor and capital.

(B) The marginal product of labor is 500 and the marginal product of capital is 1000, so the firm is employing too much labor and too few machines to produce the 50 widgets.

(C) The marginal product per dollar of labor exceeds the marginal product per dollar of machinery, so more labor and less capital should be used to produce the 50 widgets. ✓

(D) The firm should lower the price of machinery so that it is equal to the price of labor.

(E) The firm is producing the given quantity inefficiently and should shut down.

24. In the long run, assume a firm uses both labor and capital to produce 25 units of output. The marginal product of the last unit of labor being employed is 100; the marginal product of the last unit of capital being employed is 500. The wage rate of labor is $\$10$. If the firm is minimizing the cost of producing 25 units of output, what must be the unit price of capital?

(A) $\$5$

(B) $\$10$

(C) $\$25$

(D) $\$50$ ✓

(E) $\$500$

j

25. Mary manages a manufacturing plant. Two inputs are used to produce the product. To minimize the costs of production, Mary should continue to hire inputs up to the level at which the

(A) price of each input is equal

(B) marginal product of each input is equal

(C) (marginal product $\times$ price) of each input is equal

(D) (marginal product $\div$ price) of each input is equal ✓

(E) (marginal product $-$ price) of each input is equal

26. Pickleco, a pickle-producing firm, hires labor and capital in perfectly competitive factor markets. The firm is minimizing its costs at the current production level. The marginal product of labor is 100 units and the marginal product of capital is 60 units. If the rental price of capital is $\$12$, what is the wage Pickleco is paying its workers?

(A) $\$5.00$

(B) $\$8.33$

(C) $\$12.00$

(D) $\$20.00$ ✓

(E) $\$40.00$

27. Assume that labor and capital are the only two inputs a perfectly competitive firm uses to produce wheat. The firm hires its inputs in perfectly competitive input markets. The unit price of labor is $8 and of capital is $20. When the firm employs the profit-maximizing combination of these two inputs, the marginal product of labor is 2 tons of wheat and of capital is 5 tons of wheat. The price of wheat per ton must be

(A) $ 2

(B) $ 4 ✓

(C) $ 5

(D) $ 8

(E) $ 10

28. Which of the following would cause the wage for computer programmers to increase?

(A) A decrease in the amount of physical capital per computer programmer

(B) An improvement in the education of computer programmers ✓

(C) An increase in the social prestige associated with being a computer programmer

(D) A decrease in the value that computer programmers place on leisure

(E) A minimum wage set below the equilibrium wage in the market for computer programmers

29. As the population of a country ages, the demand for health care is projected to increase. As a result, the health care industry is likely to experience all of the following EXCEPT

j

(A) an increase in demand for health care workers
(B) an increase in demand for medicine
(C) an increase in the quantity of health care workers supplied
(D) an increase in the wages of health care workers
(E) a decrease in the prices of medicine ✓

30. ABC Limited, Inc., sells its product in a perfectly competitive market for a price of $15 per unit and hires workers at a daily wage of $75. Labor is the only factor cost, and the firm is currently earning profits. If ABC hires one more worker and output increases by 5 units per day, the firm's profits will

(A) decrease by $5
(B) decrease by $75
(C) increase by $75
(D) increase by $15
(E) remain unchanged ✓

31. At a given quantity of output of a firm, if the marginal product of capital equals the marginal product of labor and the wage rate equals the rental rate of capital, then

(A) the firm is producing that quantity at the lowest cost ✓
(B) the firm should use more capital and less labor to minimize cost
(C) the firm should use less capital and more labor to minimize cost
(D) the firm should use more of both inputs to increase quantity
(E) the firm should use less of both inputs to increase quantity

32. Which of the following tends to increase the gap in earnings between skilled and unskilled workers over time?

(A) An increase in the demand for unskilled workers relative to skilled workers
(B) An increase in the supply of skilled workers relative to unskilled workers
(C) A decrease in the demand for unskilled workers relative to skilled workers ✓
(D) A decrease in both the demand for and the supply of skilled workers
(E) An increase in both the demand for and supply of unskilled workers

33. 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

j

34. Marginal revenue product is defined as the

(A) change in income that occurs when an individual works additional hours

(B) change in total revenue that occurs when one additional unit of the good is produced

(C) change in total revenue that occurs when one additional unit of an input is employed ✓

(D) total revenue divided by the quantity of labor employed

(E) change in total cost that occurs when one additional unit of an input is employed

35. The demand curve for labor for a monopolist that faces a perfectly competitive factor market is called the

(A) average product curve

(B) marginal product curve

(C) marginal revenue curve

(D) marginal revenue product curve ✓

(E) value of the average product curve

36. A monopsonistic labor market has a

(A) single employer of labor ✓

(B) horizontal labor supply curve

(C) labor force of identically skilled workers

(D) backward bending labor supply curve

(E) demand curve for labor that is perfectly elastic

37. An increase in the demand for automobiles will cause the demand for skilled automobile workers and the wage rate of skilled automobile workers to change in which of the following ways?

j

(A)

Demand For Workers	Wage Rate
Decrease	Increase

(B)

Demand For Workers	Wage Rate
Decrease	Not change

(C)

Demand For Workers	Wage Rate
Increase	Decrease

(D) ✓

Demand For Workers	Wage Rate
Increase	Increase

(E)

Demand For Workers	Wage Rate
Not change	Increase

38. Assume the market for disposable coffee cups is in equilibrium and disposable coffee cups are inputs for serving brewed coffee. Which of the following will result in a higher short-run equilibrium price of disposable coffee cups?

(A) A decrease in the supply of coffee

(B) A decrease in the number of locations serving brewed coffee

(C) An increase in the supply of disposable coffee cups

(D) An increase in the demand for brewed coffee ✓

(E) An increase in the price of tea, a complement for coffee

39. When the demand for new homes decreases, the demand for construction workers who build homes decreases. This relationship illustrates the concept of

j

(A) derived demand ✓

(B) diminishing marginal productivity of labor

(C) substitution in production

(D) supply shock

(E) property rights

40. Economists argue that most professional athletes earn economic rent because they

(A) make additional income through commercial endorsements of products

(B) are able to participate in sports for only a limited number of years before changing occupations

(C) earn far more as professional athletes than they could earn in their next-best occupation ✓

(D) participate in sporting events only about six months during a year

(E) work less than 40 hours a week during the sport season

41. Motivated by lower import prices, United States manufacturers increase their imports of steel from other steel-producing countries. Which of the following best describes the impact of the increased steel imports on the labor market for steelworkers in the United States?

(A) Jobs in the United States steel industry will become less attractive, so wages will have to increase in this market to attract more workers to the United States steel industry.

(B) Domestic steel prices will fall, leading to an increase in sales of domestically produced steel, which increases demand and employment of steelworkers.

(C) The supply of steelworkers will increase, lowering the steelworker wage in the United States.

(D) The supply of steelworkers will decrease, increasing the steelworker wage in the United States.

(E) The demand for United States steelworkers will decline, putting downward pressure on steelworker wages. ✓

42. When labor supply in a competitive labor market increases, the equilibrium wage rate and employment will change in which of the following ways?

j

(A)

Wage Rate	Employment
Increase	Increase

(B)

Wage Rate	Employment
Increase	Decrease

(C) ✓

Wage Rate	Employment
Decrease	Increase

(D)

Wage Rate	Employment
Decrease	Decrease

(E)

Wage Rate	Employment
Decrease	No change

43. 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

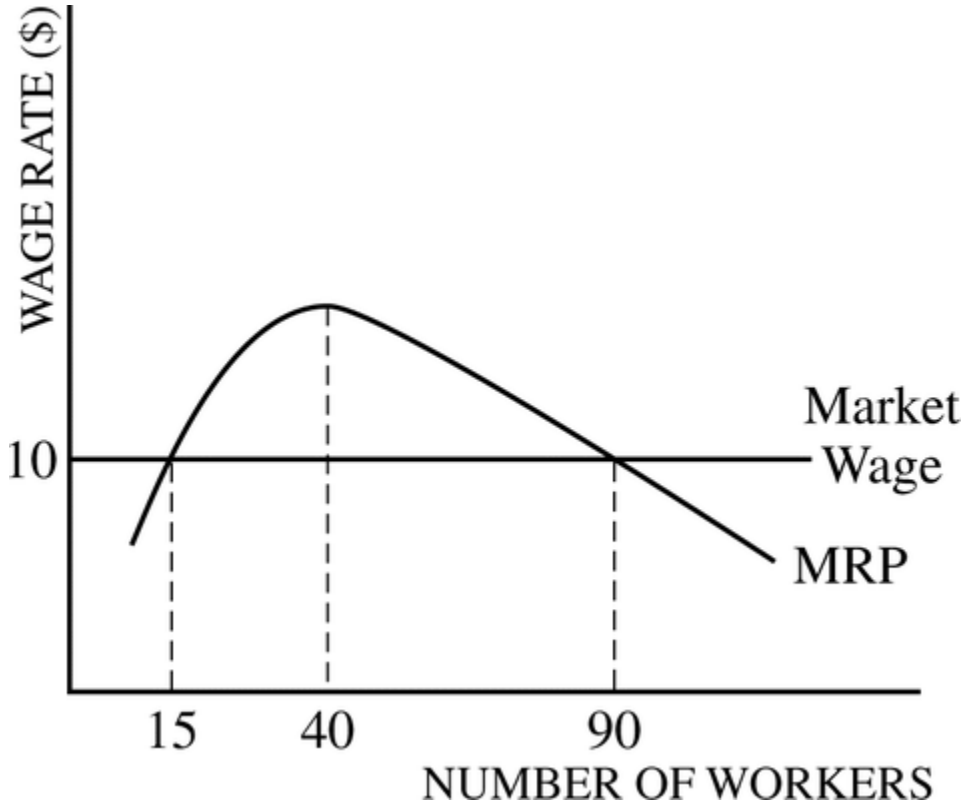
(C) Employ more workers

(D) Employ fewer workers ✓

(E) Increase the product's price

j

44.



The graph above shows the marginal revenue product (MRP) and the market wage rate for

a profit-maximizing firm. Which of the following is true of the firm's hiring of labor?

(A) It should hire 15 workers.

(B) It should hire between 15 and 40 workers.

(C) It should hire 40 workers.

(D) It should hire between 40 and 90 workers.

(E) It should hire 90 workers. ✓

45. A perfectly competitive firm currently produces 1,000 units of output and hires its resources in a perfectly competitive factor market. It uses both labor and capital as inputs. The price of labor is $40; the price of capital is $100. The marginal product of labor is 8 units, and the marginal product of capital is 10 units. Which of the following must be true?

(A) The firm is currently maximizing its profit.

(B) The firm can produce more than 1,000 units without increasing the total cost if it uses more labor and less capital. ✓

(C) The firm can produce more than 1,000 units without increasing the total cost if it uses more capital and less labor.

(D) The firm can reduce the cost of producing 1,000 units by using less capital and employing the same amount of labor.

(E) The firm can reduce the cost of producing 1,000 units by employing less labor and using the same amount of capital.

j

The following two questions refer to the data in the table below.

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

46. The firm will maximize profit in the short run if it

(A) shuts down and the price is $10

(B) produces 30 units and the price is $4

(C) produces 30 units and the price is $10

(D) produces 54 units and the price is $4

(E) produces 85 units and the price is $10 ✓

47. Which of the following will occur in a perfectly competitive labor market if Firm X's demand for labor decreases?

j

(A)

Equilibrium Market Wage Rate	Equilibrium Market Wage Rate
Increase	Increase

(B)

Equilibrium Market Wage Rate	**Employment by Firm X**
No change	No change

(C) ✓

Equilibrium Market Wage Rate	Employment by Firm X
No change	Decrease

(D)

Equilibrium Market Wage Rate	**Employment by Firm X**
Decrease	Decrease

(E)

Equilibrium Market Wage Rate	Employment by Firm X
Decrease	No change

48. Let W denotes 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?

j

(A) MC = P/MP_L

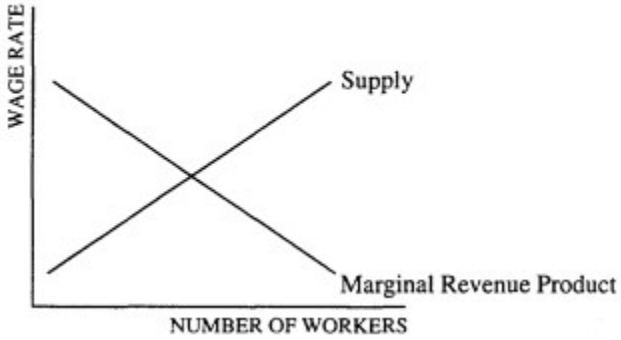
(B) MC = P x MP_L

(C) MC = W x MP_L

(D) MC = W/MP_L ✓

(E) MC = MP_L/W

49.



The graph above shows the marginal revenue product curve and supply curve of labor for a firm. The introduction of new management techniques dramatically increases workers productivity. Which of the following changes is most likely to occur?

(A) The supply curve will shift to the left, increasing the wage rate.

(B) The supply curve will shift to the right, increasing employment.

(C) The marginal revenue product curve will shift to the right, increasing wage rate. ✓

(D) The marginal revenue product curve will shift to the left, reducing employment.

(E) Neither the marginal revenue product curve nor the supply curve will shift, but the wage will increase and employment will fall.

j

50.

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

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

Question is based on the chart below for a firm that is perfectly competitive in both the labor and product markets, showing how much daily output a firm can produce using different numbers of workers.

Number of Workers	Output
1	3
2	9
3	16
4	21
5	23
6	24

51. If output sells for $20 per unit and the daily wage is $100 per worker, how many workers should the firm hire to maximize profit?

j

(A) 1
(B) 2
(C) 4 ✓
(D) 5
(E) 6

52. If output sells for $20 per unit, what is the marginal revenue product of the fifth worker?

(A) $2
(B) $40 ✓
(C) $100
(D) $115
(E) $460

53.

Number of Workers	Parts per Week
0	0
1	100
2	190
3	270
4	340
5	400
6	450
7	480

The table above describes the production function of an auto parts manufacturer. Assume that the firm can hire as many workers as it wants at the market wage rate of $600 per week per worker and sell as many auto parts as it wants at the price of $10 per part. To maximize profits, the firm should hire

(A) 0 workers
(B) 1 worker
(C) 3 workers
(D) 5 workers ✓
(E) 7 workers

54. A perfectly competitive profit-maximizing firm will continue to hire additional units of an input as long as the

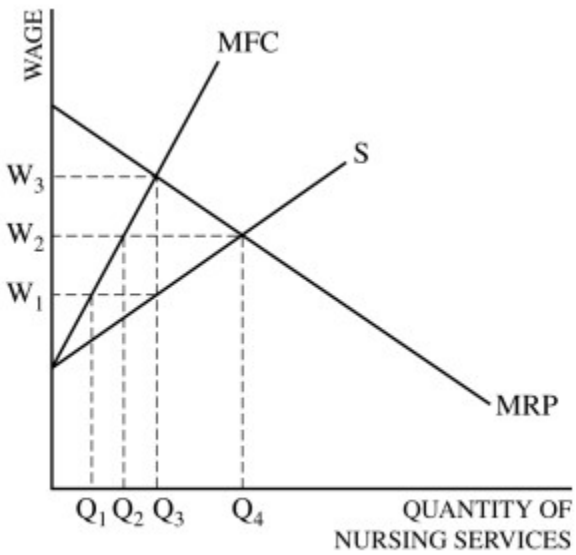
j

(A) marginal product of the input is maximized
(B) marginal cost of employing the input is maximized
(C) value of the marginal product of the input exceeds the price of the input ✓
(D) revenue associated with the employment of the last unit of the input is maximized
(E) price of the product is greater than the marginal cost of the input

55. 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

56.



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

j

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

58. A profit-maximizing firm should hire an input up to the point at which

(A) marginal physical product equals marginal revenue product

(B) marginal revenue equals marginal factor cost

(C) marginal revenue product equals marginal revenue

(D) marginal revenue product equals marginal factor cost ✓

(E) marginal physical product equals marginal factor cost

59.

- The marginal product of labor equals 250 units of output.
- The marginal product of capital equals 750 units of output.
- The price of labor is $50 per person.
- The price of capital is $100 per unit.

Given the information above, which of the following is true for a firm buying its labor and capital inputs in a perfectly competitive market?

(A) The firm is producing its current level of output with the least-cost combination of labor and capital.

(B) The firm is maximizing profits with its current combination of inputs.

(C) The firm's level of output will remain the same if 1 unit of capital is substituted for 2 units of labor.

(D) The firm's input costs will decrease if 2 units of labor are substituted for 1 unit of capital.

(E) The firm can reduce the cost of its current level of output by laying off workers and employing more capital. ✓

60. For a firm hiring labor in a perfectly competitive labor market, the marginal revenue product curve slopes downward after some point because as more of a factor is employed, which of the following declines?

(A) Marginal product ✓

(B) Marginal factor cost

(C) Marginal cost

(D) Total output

(E) Wage rates

j

The following questions are based on the following table below, which shows the relationship between the number of workers and coal output (in tons per day).

Number of Workers	Total Output of Coal
0	0
1	25
2	44
3	60
4	70
5	75

61. How many workers would the coal company want to hire if the price of coal were competitively priced at $5 per ton and the wage rate were $40 per day?

(A) 5

(B) 4 ✓

(C) 3

(D) 2

(E) 0

62. The marginal physical product of the second worker is

(A) 19 ✓

(B) 22

(C) 25

(D) 44

(E) 75

63. At its current employment level of labor and capital, a firm observes the following.

- Marginal product of labor = 30 units
- Marginal product of capital = 60 units
- Price of labor = $3 per unit
- Price of capital = $15 per unit

Which of the following actions should the firm take in order to achieve the least-cost combination of labor and capital and produce the same level of output?

j

(A)

Labor	Capital
Increase	Increase

(B) ✓

Labor	Capital
Increase	Decrease

(C)

Labor	Capital
Decrease	Increase

(D)

Labor	**Capital**
Decrease	Decrease

(E)

Labor	Capital
No change	No change

64. Suppose that a large number of unskilled workers enter a nation's labor market. If the labor market is competitive, the number of unskilled workers hired and the wage rate will most likely change in which of the following ways?

j

(A)

Number of Unskilled Workers Hired	Wage Rate
Increase	Increase

(B) ✓

Number of Unskilled Workers Hired	**Wage Rate**
Increase	Decrease

(C)

Number of Unskilled Workers Hired	Wage Rate
Increase	Not change

(D)

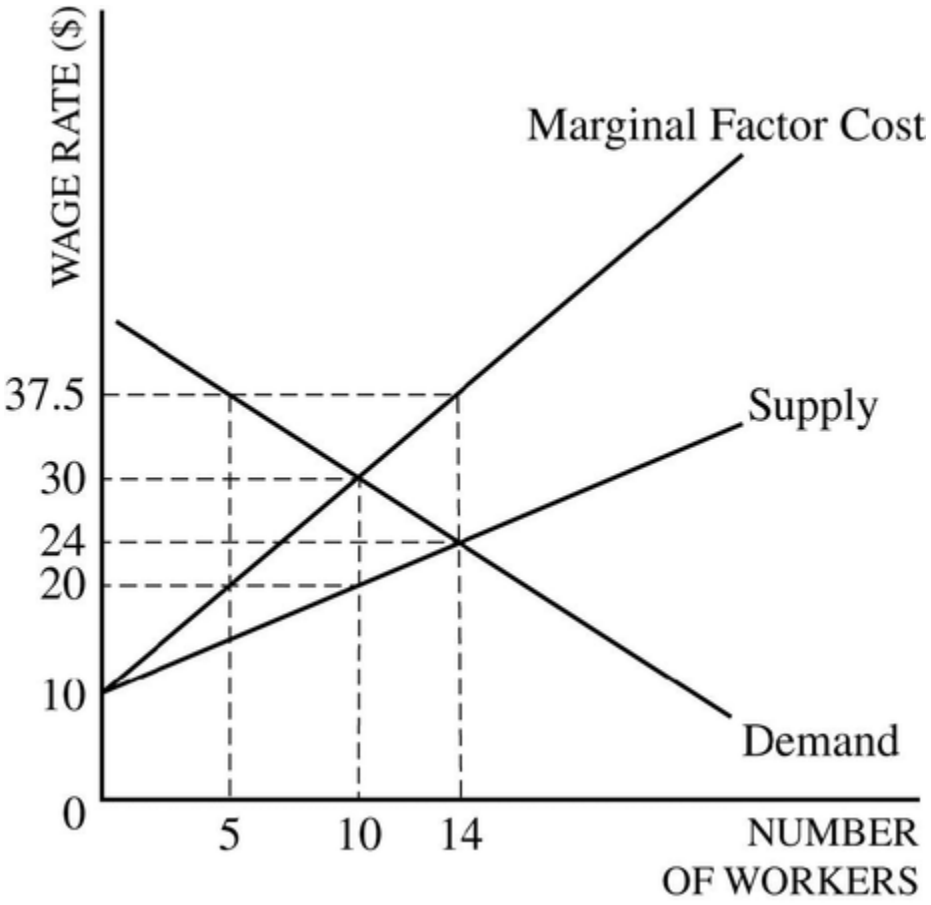
Number of Unskilled Workers Hired	Wage Rate
Decrease	Increase

(E)

Number of Unskilled Workers Hired	**Wage Rate**
Decrease	Decrease

j

65.



The graph above shows the conditions that a monopsonist faces in a labor market. How many workers would this monopsonist hire and what wage rate would it pay?

j

(A)

Number of Workers	Wage Rate
5	$37.50

(B)

Number of Workers	Wage Rate
10	$30

(C) ✓

Number of Workers	Wage Rate
10	$20

(D)

Number of Workers	Wage Rate
14	$24

(E)

Number of Workers	Wage Rate
14	$37.50

66. A profit-maximizing firm will continue to hire workers until the marginal revenue product of labor is equal to the

(A) marginal product of labor
(B) marginal revenue product of capital
(C) demand for labor
(D) price of the good that labor is producing
(E) marginal factor cost ✓

67. Which of the following statements about the relationship between the demand for apple pickers and the demand for apples is true?

j

(A) An increase in the demand for apples increases the demand for apple pickers. ✓

(B) An increase in the demand for apples increases the wage rate and decreases the demand for apple pickers.

(C) A decrease in the demand for apples decreases the wage rate and increases the demand for apple pickers.

(D) An increase in the demand for apples increases productivity and the demand for apple pickers.

(E) A decrease in the demand for apples decreases productivity and the demand for apple pickers.

68. The demand curve for labor shows which of the following?

(A) The quantity of output each worker can produce at various wage rates

(B) The number of workers required to produce a given level of output

(C) The number of workers a firm is willing and able to hire at various wage rates ✓

(D) The positive relationship between the wage rate and the number of hours people wish to work

(E) The number of workers who are willing and able to work at various wage rates

69. 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?

j

(A)

Labor	Capital
No change	Increase

(B)

Labor	Capital
Decrease	No change

(C)

Labor	Capital
Decrease	Increase

(D)

Labor	Capital
Increase	No change

(E) ✓

Labor	Capital
Increase	Decrease

70. Which of the following will occur when wage rates decrease in a given labor market?

(A) The supply of labor will decrease.

(B) The demand for labor will increase.

(C) The quantity supplied of labor will decrease. ✓

(D) The quantity demanded of labor will decrease.

(E) The supply of labor will decrease and the demand for labor will increase.

71. An individual's labor supply curve is derived from that person's preferences about the trade-off between income and

j

(A) work
(B) wealth
(C) nominal wages
(D) productivity
(E) leisure ✓

72. The wage rate is $10 per hour and the last worker hired by the firm increased output by 100 units. Computers rent for $100 per hour and the last computer rented by the firm increased output by 2,000 units. To minimize costs the firm should

(A) hire more workers and rent more computers because the marginal revenue products of both workers and computers are greater than their respective prices.
(B) hire more workers and reduce the number of computers rented because workers are cheaper than computers
(C) lay off workers and rent more computers because computers produce more output per dollar of additional expenditure ✓
(D) lay off workers and rent more computers because computers produce more output
(E) keep the same number of workers and computers because the marginal revenue products of both workers and computers are positive

73. Assume a firm uses only two inputs, capital (K) and labor (L), to produce its output. Let the marginal product of capital be MP_K , the marginal product of labor be MP_L , the price of capital be P_K , and the price of labor be P_L . The least-cost combination of capital and labor needed to produce a given level of output is given by which of the following?

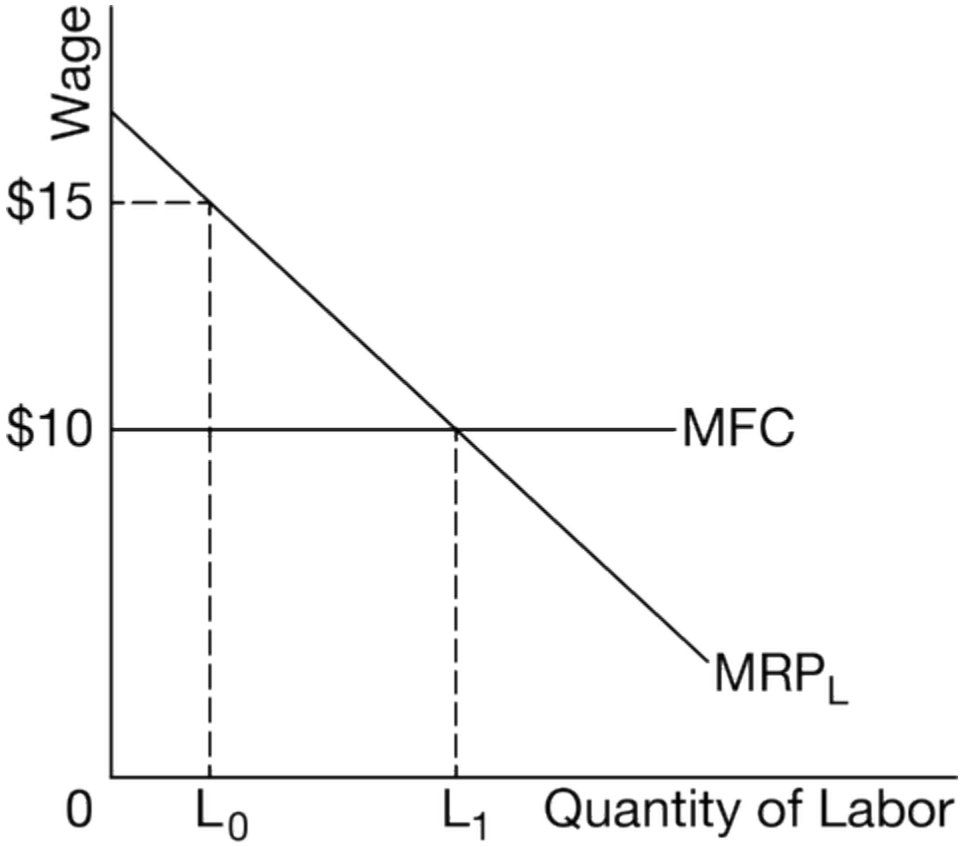
(A) $MP_L / P_L = MP_K / P_K$ ✓
(B) $MP_L / P_L > MP_K / P_K$
(C) $MP_L / P_K = MP_K / P_L$
(D) $(MP_L)P_L = (MP_K)P_K$
(E) $MP_L = MP_K$

74. If a firm employs only labor and capital in its production process, which of the following best describes the optimal combination of inputs for the firm in the long run?

(A) The marginal product per dollar spent on labor is equal to the marginal product per dollar spent on capital. ✓
(B) The marginal product of labor is equal to the marginal product of capital.
(C) The total product of labor is equal to the total product of capital.
(D) The marginal product of labor and capital are both zero.
(E) All marginal products are equal to all average products.

j

75.



Based on the graph above, which of the following statements is true?

(A) Hiring unit of labor L_0 will add $15 to a firm's economic profits.

(B) The market wage rate is $10 per unit of labor. ✓

(C) The profit-maximizing firm will hire its labor at less than $10 per unit.

(D) From 0 units of labor to L_0 units of labor, there are increasing marginal returns to labor.

(E) Along the firm's marginal revenue product of labor curve, the price of output falls as more labor is hired and more output is produced.

76. Assuming a single, profit-maximizing employer in a labor market with many workers, which of the following statements relating to this monopsony is true?

(A) This single employer will hire more labor than if the market were perfectly competitive but will pay a lower wage.

(B) This single employer is a wage taker, needing to pay the equilibrium wage for the geographic area.

(C) In increasing employment, the marginal factor cost of an additional unit of labor exceeds the wage rate paid to the laborer. ✓

(D) The profit-maximizing monopsonist will hire the quantity of labor where the marginal revenue product of labor intersects the labor supply curve.

(E) The first workers hired are paid a higher wage than any additional workers hired by the monopsonist.

j

77. Which of the following is true of a monopsony in a labor market?

(A) It faces a labor supply curve that is horizontal at the competitive market equilibrium wage.

(B) Its marginal factor (resource) cost is the same as the market supply curve.

(C) At its optimal level of employment, it pays a wage rate higher than the competitive market wage rate.

(D) The imposition of a minimum wage results in a larger reduction in employment than is true in a competitive market.

(E) Its marginal factor (resource) cost curve lies above the labor supply curve because hiring an extra worker means paying more to existing workers. ✓

78. 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

79. Assume that the last worker a firm hired produces 60 additional units of output per hour and the last machine rented produces 6,000 units of output per hour. A worker's hourly wage rate is $12, and the rental cost of a machine is $1,000 per hour. In order to minimize the cost of its current output, the firm should

(A) do nothing, because the costs of production are minimized

(B) increase the use of labor and decrease the use of capital

(C) increase the use of capital and decrease the use of labor ✓

(D) increase the use of labor and increase the use of capital

(E) decrease the use of labor and decrease the use of capital

80. The monopsonist's marginal factor (resource) cost curve for labor is

(A) above the labor supply curve because the product price is found on the demand curve above where marginal cost equals marginal revenue

(B) above the labor supply curve because to hire more workers the firm must raise the wage for all workers ✓

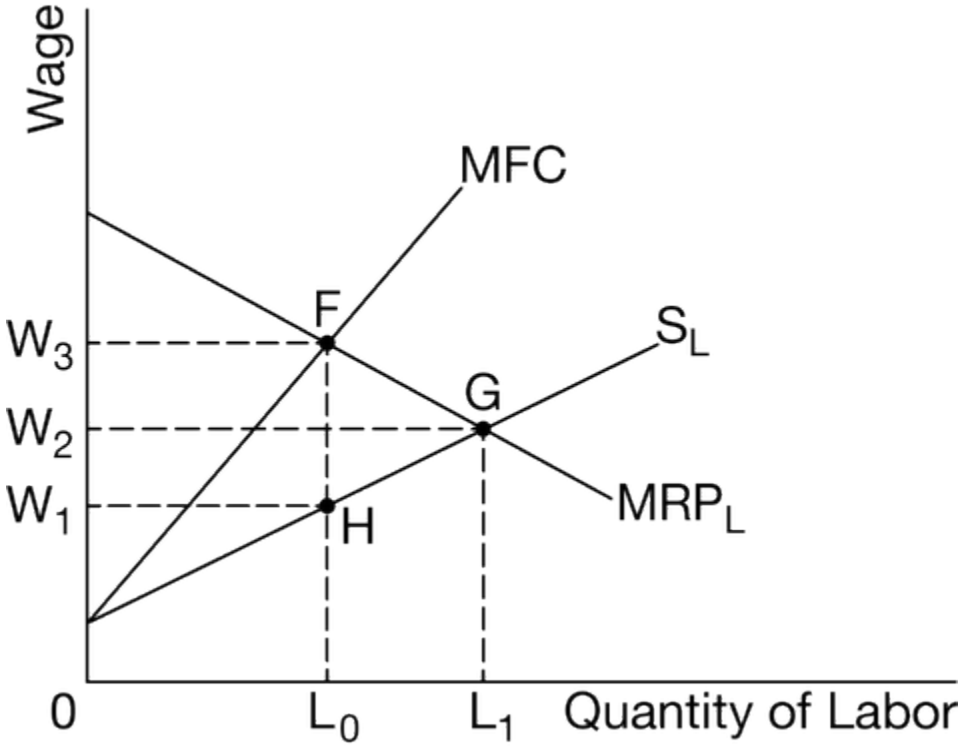
(C) below the labor supply curve because the firm is a wage taker

(D) below the labor supply curve because of diminishing marginal returns to labor

(E) below the labor supply curve because to sell additional units of output the firm must lower its product price

j

81.



Which of the following statements about the monopsonistic labor market shown in the accompanying graph is true?

(A) The single firm will hire L_1 and pay each laborer a wage of W_2.

(B) In this monopsonistic labor market when the single employer maximizes economic profits, there will be no deadweight loss.

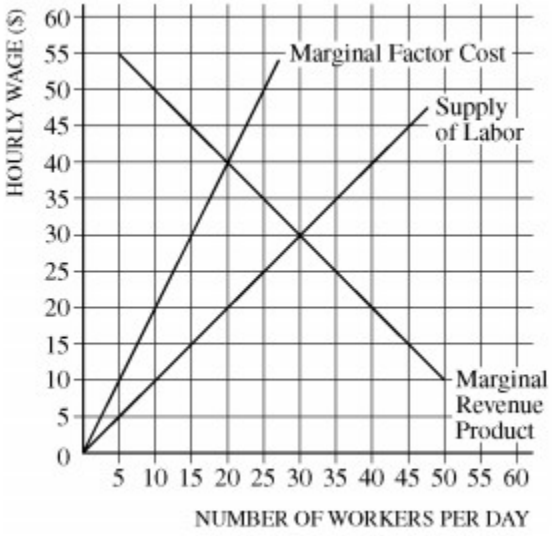
(C) The profit-maximizing monopsonist will hire L_0 labor and pay each laborer W_1. ✓

(D) When the single firm is maximizing profits, the marginal revenue product (MRP) of labor will exceed the marginal factor cost (MFC) of labor.

(E) The marginal factor cost (MFC) of labor with the competitive equilibrium exceeds the marginal factor cost of labor in monopsony.

j

82.



The graph above shows a monopsony labor market. In the absence of any regulations, which of the following represents the number of workers the firm will hire and the wage rate it will offer to those workers?

j

(A)

Number of Workers	Wage Rate
15	$30

(B) ✓

Number of Workers	Wage Rate
20	$20

(C)

Number of Workers	Wage Rate
20	$40

(D)

Number of Workers	Wage Rate
30	$30

(E)

Number of Workers	Wage Rate
40	$40

83. In a monopsonistic labor market, a firm will continue to hire workers until the marginal revenue product of labor

(A) equals marginal factor (resource) cost, resulting in more workers being hired at a lower wage compared with a perfectly competitive labor market

(B) equals marginal factor (resource) cost, resulting in fewer workers being hired at a lower wage compared with a perfectly competitive labor market ✓

(C) equals marginal factor (resource) cost, resulting in fewer workers being hired at a higher wage compared with a perfectly competitive labor market

(D) is less than marginal factor (resource) cost, resulting in more workers being hired at a lower wage compared with a perfectly competitive labor market

(E) is less than marginal factor (resource) cost, resulting in fewer workers being hired at a lower wage compared with a perfectly competitive labor market

j

84. Which of the following is always true for a firm with monopsony power?

(A) The marginal revenue product curve is upward-sloping.

(B) The marginal revenue product curve lies above the input demand curve.

(C) The marginal factor cost curve lies above the input supply curve. ✓

(D) The marginal factor cost curve lies above the input demand curve.

(E) The input demand curve lies above the marginal factor cost curve.

85. Which of the following is most likely to shift the demand for aircraft mechanics to the right?

(A) An increase in the demand for air travel ✓

(B) An increase in the price of a license necessary for aircraft mechanics

(C) A decrease in the price of a license necessary for aircraft mechanics

(D) A decrease in the demand for air travel

(E) A decrease in the marginal productivity of aircraft mechanics

86. For a competitive labor market, an increase in which of the following will lead to an increase in the demand for labor?

(A) The supply of labor

(B) The minimum wage

(C) The cost of medical benefits pro- vided to the labor hired by firms

(D) Labor union dues

(E) The demand for the good that labor produces ✓

87. Assume that firms sell their output in a perfectly competitive product market and hire labor in a perfectly competitive labor market. If all other factors remain constant, an increase in the demand for the firms' product will result in which of the following changes in the labor market?

(A) Firms will move down along the demand curve for labor and hire more workers.

(B) The supply curve for labor will shift to the right.

(C) The demand curve for labor will shift to the right. ✓

(D) The supply curve for labor will shift to the left.

(E) The demand curve for labor will shift to the left.

88. Which of the following is most likely to cause the demand curve for nurses to shift to the right?

(A) An increase in the number of nurses graduating from nursing schools

(B) An increase in nursing schools' tuition

(C) An increase in the number of hospitals that employ nurses ✓

(D) A decrease in the marginal productivity of nurses

(E) An improvement in the health of older people

j

89. Which of the following is likely to shift an industry's labor supply curve to the left?

(A) A decrease in immigration restrictions

(B) A decrease in the cost of child care

(C) An increase in the number of remote-working jobs

(D) An increase in preference for leisure ✓

(E) An increase in wages

90. In a perfectly competitive labor market for nurses, all of the following statements are true EXCEPT:

(A) The imposition of an effective minimum wage will result in unemployment.

(B) An increase in the marginal product of nurses will increase the demand for nurses and increase wages.

(C) An increase in the supply of nurses will create unemployment and leave wages unchanged. ✓

(D) An increase in the demand for health care will increase the demand for nurses and increase wages.

(E) Revoking work permits for foreign nurses will increase wages of domestic nurses.

91. Max Company produces electronic gadgets using labor and capital. If Max increases labor and decreases capital to produce the same quantity of gadgets, what will happen to the marginal product (MP) of labor and the MP of capital?

j

(A) ✓

MP of Labor	MP of Capital
Decrease	Increase

(B)

MP of Labor	MP of Capital
Decrease	No change

(C)

MP of Labor	MP of Capital
Increase	Increase

(D)

MP of Labor	MP of Capital
Increase	Decrease

(E)

MP of Labor	MP of Capital
No change	Increase

92. Max employs both labor and capital to produce toy trains. Currently the last unit of labor employed has a marginal product of 15 units. The last unit of capital employed has a marginal product of 40 units. The price of labor is $3 per unit, and the price of capital is $10 per unit. Which of the following employment decisions should Max follow to use the least-cost combination of labor and capital to produce the current quantity of toy trains?

j

(A)

Employment of Labor	Employment of Capital
Increase	No change

(B)

Employment of Labor	Employment of Capital
Decrease	Increase

(C)

Employment of Labor	Employment of Capital
Decrease	Decrease

(D)

Employment of Labor	Employment of Capital
Increase	Increase

(E) ✓

Employment of Labor	Employment of Capital
Increase	Decrease

93. If labor is the only variable input of a firm and the marginal product of labor is falling, the firm will always produce

(A) more than the profit-maximizing level of output
(B) less than the profit-maximizing level of output
(C) at a level of output where average total cost is at a minimum
(D) at a level of output where marginal costs are rising ✓
(E) at a level of output where average variable costs are falling

94. If a competitive firm pays its workers the value of the marginal product of the last worker hired, which of the following is true?

j

(A) The firm will not earn any economic profits.
(B) Workers will look for employment elsewhere.
(C) The wage will be less than the marginal product.
(D) The firm will not maximize profits.
(E) The contribution of the last worker hired to the firm's profit will be zero. ✓

95. Assume that a firm is hiring labor in a perfectly competitive labor market. If the marginal revenue product of labor is greater than the wage rate, which of the following will be true?

(A) The firm must be losing money.
(B) The firm should employ more workers. ✓
(C) The firm should replace workers with capital.
(D) The firm is maximizing its profits.
(E) The firm is experiencing diminishing marginal utility.

96. A firm's demand curve for labor is equal to a segment of its

(A) average variable cost curve
(B) total revenue curve
(C) marginal cost curve
(D) marginal revenue product curve ✓
(E) average product curve

97.

Hours of Labor	Marginal Product
0	0
1	10
2	12
3	9
4	7
5	4

The table above shows how a firm's hourly level of output changes as more of the labor input is employed. The firm sells its output and hires labor in perfectly competitive markets. The wage paid to labor is $\$10$ per hour, and the price of the firm's output is $\$2$ per unit. Based on the data in the table, the marginal revenue product of the fourth hour of labor is equal to

j

(A) $4
(B) $7
(C) $14 ✓
(D) $26
(E) $70

98. Which of the following indicates that a perfectly competitive firm has hired the profit-maximizing amount of labor?

(A) The total product of labor exceeds the total real wage payments to workers.
(B) The average product of labor exceeds the real wage paid to workers.
(C) The marginal revenue product of labor is below the wage paid to workers.
(D) The marginal revenue product of labor is above the wage paid to workers.
(E) The marginal revenue product of labor equals the wage paid to workers. ✓

99. Which of the following statements about a monopsonistic labor market is true?

(A) Compared to the wage paid in a competitive labor market, the wage paid by a monopsonist is lower and the quantity of labor hired is lower. ✓
(B) Since the single firm is a wage taker, the marginal factor cost of labor is equal to the wage rate.
(C) Since marginal revenue product equals marginal factor cost, this labor market is efficient with no deadweight loss.
(D) A legal minimum wage equal to the competitive wage would further reduce the employment of labor.
(E) As the firm hires more labor, the firm is able to pay each unit of labor a lower wage.

j

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

100. 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

101. Which of the following will happen in the labor market if the price of the good produced by the workers decreases?

(A) The marginal product of labor will increase.
(B) The marginal product of labor will decrease.
(C) The marginal revenue product of labor will increase.
(D) The marginal revenue product of labor will decrease. ✓
(E) The demand curve for labor will shift to the right.

j

102. 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

103. If the price for a product produced in a competitive market increases, which of the following is most likely to occur in the labor market for workers who produce that product?

(A) The demand for labor and the number of workers hired both increase. ✓
(B) The supply of labor and the number of workers hired both increase.
(C) The demand for labor and the number of workers hired both decrease.
(D) The supply of labor and the number of workers hired both decrease.
(E) There is a movement along the demand for labor curve, and firms hire more workers.

104. A profit-maximizing firm will continue to hire workers until the

(A) marginal factor cost of labor is equal to the marginal revenue product of labor ✓
(B) marginal factor cost of labor is equal to the price of the good produced using labor
(C) marginal product of labor is equal to the marginal revenue product of labor
(D) marginal product of labor is equal to the marginal factor cost of labor
(E) marginal product of labor is equal to the price of labor

105. 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.

106. Suppose that people who work in the paint industry face a great risk of developing an incurable disease. A medical breakthrough that eliminates the risk will most likely cause which of the following shifts in the supply and demand curves for workers in the paint industry?

j

(A)

Supply Curve	Demand Curve
Shift right	No shift

✓

(B)

Supply Curve	Demand Curve
Shift left	No shift

(C)

Supply Curve	Demand Curve
Shift right	Shift left

(D)

Supply Curve	Demand Curve
Shift left	Shift right

(E)

Supply Curve	Demand Curve
No Shift	Shift left

107. A profit-maximizing firm will hire

(A) labor until its wage rate equals its average revenue product

(B) labor until its wage rate equals its marginal revenue product ✓

(C) labor until its wage rate equals the interest rate

(D) capital until the interest rate equals the wage rate

(E) capital until the interest rate exceeds the wage rate

108. Which of the following will result in an increase in labor demand?

j

(A) An increase in the wage rate

(B) An increase in the productivity of labor ✓

(C) A decrease in the price of the product that labor is used to produce

(D) A decrease in the wage rate

(E) A decrease in the demand for the product produced by labor

109. Assume good Z is produced in a competitive output market that is in long-run equilibrium. In the short run, the variable input is unskilled labor whose wage is determined in a competitive labor market. Suppose there is an increase in consumer demand for good Z. Which of the following explains the resulting change in the labor market for unskilled workers in the short run?

(A) New firms will enter using more labor and more capital to produce good Z, lowering the price of good Z .

(B) With more output of good Z produced, the supply of labor needed to produce good Z increases, and the wage rate for unskilled workers will fall.

(C) The price of good Z increases and the labor demand curve shifts to the right along the existing labor supply curve, resulting in higher wages and employment of unskilled workers. ✓

(D) Since the market is in long-run equilibrium, economic profits are zero, and therefore the demand for labor remains unchanged.

(E) The marginal factor cost of labor will decrease, leading to more unskilled workers being hired.

110. A factor of production will NOT earn economic rent when its supply is

(A) elastic

(B) inelastic

(C) unit elastic

(D) perfectly elastic ✓

(E) perfectly inelastic

111. Assume a perfectly competitive labor market. Which of the following correctly describes the individual firm's demand curve for labor and the market demand curve for labor?

j

(A) ✓

Firm's Demand Curve for Labor	Market Demand Curve for Labor
Downward sloping	Downward sloping

(B)

Firm's Demand Curve for Labor	Market Demand Curve for Labor
Downward sloping	Horizontal

(C)

Firm's Demand Curve for Labor	Market Demand Curve for Labor
Horizontal	Downward Sloping

(D)

Firm's Demand Curve for Labor	Market Demand Curve for Labor
Horizontal	Horizontal

(E)

Firm's Demand Curve for Labor	Market Demand Curve for Labor
Horizontal	Upward Sloping

112. A change in which of the following will NOT cause a shift in the demand curve for a factor of production?

(A) Demand for the goods produced by the factor
(B) Prices of the goods produced by the factor
(C) Prices of substitute factors
(D) Supply of the factor ✓
(E) Supply of substitute factors

113. The concept of derived demand is described by which of the following?

j

(A) A decrease in the demand for theater tickets will decrease the demand for actresses and actors. ✓

(B) If the salaries of basketball players increase, the quantity of basketball players demanded will decrease.

(C) An increase in the income of consumers will increase the demand for opera tickets.

(D) An increase in the demand for movie tickets will decrease the demand for video rentals.

(E) A decrease in the price of movie tickets will increase the demand for movie tickets.

114.

Number of Workers	Number of Sandwiches Produced per Day
1	80
2	150
3	200
4	240
5	250
6	230
7	200

Given the production information in the table above, how many workers would be employed if the wage rate were $20.00 per day and if sandwiches sold for $0.50?

(A) 1

(B) 2

(C) 4 ✓

(D) 5

(E) 7

115. A profit-maximizing firm that sells its output in a perfectly competitive market hires two additional workers, calculating that the contribution to total revenue of the last worker hired just equals the extra cost of hiring that worker. Six months later, the firm finds that the last worker's contribution to total revenue is less than the extra cost of hiring that worker. Which of the following may have occurred in the interim to explain this change?

(A) The firm laid off some workers.

(B) The market supply for the firm's product decreased.

(C) The market demand for the firm's product decreased. ✓

(D) A technological advance increased the productivity of the firm's workforce.

(E) The firm negotiated new contracts with workers, lowering wages.

116. 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

j

(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

117. A perfectly competitive firm hires three workers in a perfectly competitive labor market. The marginal products of the three workers are shown in the table below.

Worker	Marginal Product
1	50
2	30
3	20

Which of the following will be true?

(A) Each worker will receive a wage based on the marginal product of the last worker hired. ✓

(B) Each worker will receive a wage based on the marginal product of the first worker hired.

(C) Each worker will receive a wage based on the average of the marginal products of the workers.

(D) Worker 1 will receive the highest wage.

(E) Worker 3 will receive the highest wage.

118. Which of the following will cause an increase in the supply of labor?

(A) An increase in the wage rate

(B) An increase in the marginal product of labor

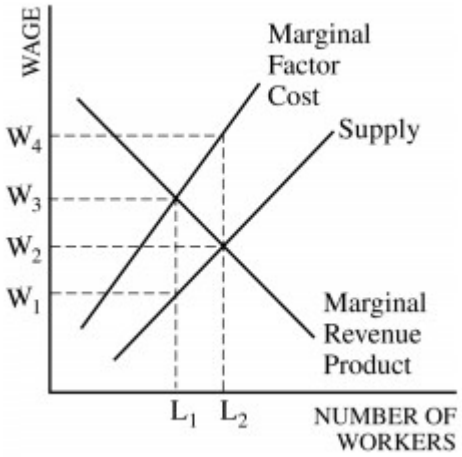
(C) An increase in the tax rates applied to labor income

(D) An increase in the desire for greater leisure time

(E) An increase in the retirement age ✓

j

119.



In the monopsonistic labor market shown in the diagram above, which of the following indicates the number of workers the firm will hire and the wage rate it will pay?

(A) **Number of Workers:** L_1 **Wage Rate:** W_1 ✓

(B) **Number of Workers:** L_1 **Wage Rate:** W_2

(C) **Number of Workers:** L_1 **Wage Rate:** W_3

(D) **Number of Workers:** L_2 **Wage Rate:** W_2

(E) **Number of Workers:** L_2 **Wage Rate:** W_4