CHAPTER 3 The Demand for Labor

In addition to the multiple choice and quantitative problems listed here, you should answer review questions 2, 4, 6, 7, 9; problems 1, 2, 3, 4.

Multiple-Choice

Choose the one alternative that BEST completes the statement or answers the question.

1. The marginal product of labor tells us
   A) which employee is the most productive.
   B) the average output produced by each employee.
   C) the additional output produced by the last employee hired.
   D) how much money the firm can make from hiring each employee.

2. Diminishing marginal returns occur because
   A) hiring more employees means that each has less capital with which to work.
   B) it is more difficult to manage a firm as the size of the workforce and capital stock both grow.
   C) the best employees will always be hired first.
   D) hiring more employees means that they will subdivide tasks and therefore become more efficient.

TABLE 3-1

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Total # of Pots Produced Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>

3. Referring to Table 3-1, diminishing marginal returns begins with the _____ employee.
   A) first
   B) second
   C) third
   D) sixth
4. Referring to Table 3-1, which is **INCORRECT**. If pots sell for $20 each then
   A) the marginal revenue product of labor of the second worker is $260.
   B) the marginal product of the third worker is five pots.
   C) the marginal revenue from selling the eighteenth pot is $20.
   D) the marginal revenue product of labor equals the marginal product of labor
      multiplied by the additional revenue that is received per unit of output.

5. Referring to Table 3-1, if wages are $50.00 per day and pots sell for $20.00 each, how
   many potters will the firm hire?
   A) two
   B) three
   C) four
   D) five

6. If the firm hires to a point where the marginal expense of labor is greater than the
   marginal revenue product of labor, then
   A) profits could be increased by increasing employment.
   B) profits could be increased by reducing employment.
   C) profits are maximized.
   D) total cost must be greater than total revenue.

7. When deciding the salary of a sports star,
   A) the team must consider how much money the sports star should earn.
   B) the team must consider how much the sports star will cause revenues to increase.
   C) the team estimates the sports star's marginal product; because this is a guess, sports
      stars are generally underpaid.
   D) the team will hire the sports star if doing so will increase the team's revenues.

8. The firm's labor demand curve in the short run
   A) is upward sloping.
   B) is horizontal.
   C) is the downward sloping segment of the marginal revenue schedule.
   D) is the downward sloping segment of the marginal product of labor schedule.

9. If a tax is placed on an employer
   A) workers will not have to pay the tax.
   B) both wages and employment levels will usually decrease.
   C) customers will not have to pay the tax.
   D) wages will decrease but employment levels will increase.

10. An employer who is a monopolist in the product market will probably
    A) hire more employees than a perfect competitor would.
    B) hire fewer employees than a perfect competitor would.
    C) hire the same number of employees as a perfect competitor, due to
        competitiveness in the labor market.
D) hire fewer workers at a higher wage than a perfect competitor would.

11. An employer who is a monopsonist will probably
   A) hire more workers at a higher wage than a perfect competitor.
   B) hire fewer workers at a higher wage than a perfect competitor.
   C) hire more workers at a lower wage than a perfect competitor.
   D) hire fewer workers at a lower wage than a perfect competitor.

12. Monopsony
   A) implies that the marginal expense of hiring labor exceeds the wage.
   B) is very common in the United States labor market.
   C) exists if a large state university is the only firm in town which hires people with
      Ph.D.'s in economics.
   D) implies that a firm can cut the wage as it expands its work force.

13. For two substitutes in production, if the scale effect dominates
   A) then the inputs are gross complements.
   B) then the inputs are gross substitutes.
   C) then the inputs could be either gross complements or gross substitutes.
   D) then the inputs can not be used at the same time.

14. For two substitutes in production, if the substitution effect dominates
   A) then the inputs are gross complements.
   B) then the inputs are gross substitutes.
   C) then the inputs could be either gross complements or gross substitutes.
   D) then the inputs can not be used at the same time.

15. If two inputs are complements in production
   A) then the inputs can not be used at the same time.
   B) then the inputs can be either gross complements or gross substitutes.
   C) then the inputs are gross complements.
   D) then the inputs are gross substitutes.

16. In the long run a profit-maximizing firm will select capital and labor so that
    A) the marginal product of labor equals the marginal product of capital.
    B) the wage divided by the marginal product of labor equals the rental cost of a unit
       of capital divided by the marginal product of capital.
    C) labor equals capital.
    D) the wage equals the rental cost of a unit of capital.
17. If two inputs are substitutes in production and an increase in the price of one input shifts the demand curve for the other input to the left then
   A) the scale effect is greater than the substitution effect and the two are gross complements.
   B) the scale effect is less than the substitution effect and the two are gross complements.
   C) the scale effect is greater than the substitution effect and the two are gross substitutes.
   D) the scale effect is less than the substitution effect and the two are gross substitutes.

18. Most of a payroll tax is eventually paid by
   A) employers if the supply of labor curve is very inelastic.
   B) employers if the labor demand curve is very elastic.
   C) workers if the supply of labor curve is very inelastic.
   D) workers if the supply of labor curve is very elastic.

19. A leftward shift in a monopsonist's supply of labor curve
   A) will cause the monopsonist to move along its marginal revenue product curve and will result in a higher wage and lower employment.
   B) will cause a shift in the monopsonist's labor demand curve and will result in a higher wage and lower employment.
   C) will cause the monopsonist to move along its marginal expenditure curve and will result in a higher wage and lower employment.
   D) will cause the monopsonist to increase its wage but not to cut its employment level.

20. When the price of capital increases, a firm will
   A) employ more labor because labor has become relatively cheaper.
   B) employ less labor due to the increase in costs.
   C) employ the same amount of labor.
   D) employ more, less, or the same amount of labor.

21. If an increase in the cost of labor causes the firm to use less capital, then
   A) the scale effect has dominated over the substitution effect.
   B) the substitution effect has dominated over the scale effect.
   C) the firm has moved along an isoquant curve.
   D) the firm has moved onto a higher isoquant.

22. If employers are paid a subsidy of $.75 per hour for hiring teenage workers, then
   A) the teenagers' wage rate will usually increase by less than $.75 per hour.
   B) the teenagers' wage rate will usually increase by more than $.75 per hour.
   C) the teenagers' wage rate will usually increase by exactly $.75 per hour.
   D) the teenagers' wage rate will usually decrease.
23. In the short run
   A) a firm can not hire new workers.
   B) wage rates and product prices cannot change.
   C) a firm can not add on to an assembly line or introduce new machines to the production process.
   D) employment levels cannot change.
Answers to Ch. 3 questions:

Multiple choice: 1c, 2a, 3c, 4a, 5c, 6b, 7b, 8d, 9b, 10b, 11d, 12a, 13a, 14b, 15c, 16b, 17a, 18c, 19a, 20d, 21a, 22a, 23c

Answers to odd numbered questions and problems are at back of text.

■ Answers to Even-Numbered Review Questions

2. Assume that wages for keyboarders (data entry clerks) are lower in India than in the United States. Does this mean that keyboarding jobs in the United States will be lost to India? Explain.

Answer: Indian data entry clerks will be substituted for American ones only if the ratio of their wage to their marginal productivity is lower. Thus, it is not wage alone that affects the incentives to substitute; marginal productivity is also critical.

4. Suppose that prisons historically have required inmates to perform, without pay, various cleaning and food preparation jobs within the prison. Now suppose that prisoners are offered paid work in factory jobs within the prison walls, and that the cleaning and food preparation tasks are now performed by non-prisoners hired to do them. Would you expect to see any differences in the technologies used to perform these tasks? Explain.

Answer: When inmates were required to work without pay, their wage was essentially zero—and we would expect that prisons to have adopted labor-intensive technologies (using the argument inherent in Equation 3.8c). When wages rise, the cost of expanding output using labor becomes greater, and we expect prisons to adopt the use of more capital in the production process.
6. Suppose the government were to subsidize the wages of all women in the population by paying their employers 50 cents for every hour they worked. What would be the effect on the wage rate women received? What would be the effect on the net wage employers paid? (The net wage would be the wage women received less 50 cents.)

**Answer:** Consider a simple competitive labor market in which the demand and supply of women are both expressed in terms of the wage received by women (which, in the absence of any subsidy, is assumed to be equal to the wage paid by employers). Given the demand curve, $D_0$, and the supply curve, $S_0$, market clearing wage and employment levels will be $W_0$ and $E_0$, respectively.

Suppose the government now subsidizes employers by paying them 50 cents for every hour women work. Viewed in terms of the wage received by women, the employers’ demand curve will shift up by exactly 50 cents (reflecting the fact that this amount will be paid by the government). At the old market clearing wage received by women, $W_0$, the number of women employers want to hire, $E_2$, exceeds the number who are willing to work, $E_0$. This puts upward pressure on the wage received by women, and this wage rises until the excess demand for labor is eliminated. This equilibrium occurs at the wage rate $W_1$, and the employment level $E_1$.

It is clear from the figure that the wage received by women increases by less than 50 cents as long as the supply of labor curve is not vertical (i.e., as long as labor supply is responsive to wages). Indeed, the more responsive labor supply is to the wage rate, the less the women’s wage will rise. Since the wage paid by employers now equals the wage women receive less the 50-cent subsidy, it is also clear that the wage paid by employers declines (by 50 cents minus the increase in the wage women receive).

It is important to stress to students that one would reach identical conclusions if one analyzed the subsidy in terms of the wage employers pay. If supply and demand curves are drawn in terms of this variable, a 50-cent-an-hour subsidy for women would shift the female labor supply curve down by 50 cents. At the old wage paid by employers, the supply of female labor would now exceed the demand. Downward pressure would be placed on the wage paid by employers and it would fall by less than 50 cents (as long as labor supply was responsive to the wage). As a result, the wage received by women would rise by 50 cents less the fall in the wage paid by employers.
 Answers to Even-Numbered Problems

2. The marginal revenue product of labor in the local saw mill is $\text{MRP}_L = 20 - 0.5L$, where $L =$ the number of workers. If the wage of saw mill workers is $10$ per hour, then how many workers will the mill hire?

**Answer:** The mill will hire workers until $\text{MRP}_L = W \cdot 20 - 0.5L = 10$ when $L = 20$ workers.

4. The output of workers at a factory depends on the number of supervisors hired (see below). The factory sells its output for $0.50$ each, it hires 50 production workers at a wage of $100$ per day, and needs to decide how many supervisors to hire. The daily wage of supervisors is $500$ but output rises as more supervisors are hired, as shown below. How many supervisors should it hire?

<table>
<thead>
<tr>
<th>Supervisors</th>
<th>Output (units per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11,000</td>
</tr>
<tr>
<td>1</td>
<td>14,800</td>
</tr>
<tr>
<td>2</td>
<td>18,000</td>
</tr>
<tr>
<td>3</td>
<td>19,500</td>
</tr>
<tr>
<td>4</td>
<td>20,200</td>
</tr>
<tr>
<td>5</td>
<td>20,600</td>
</tr>
</tbody>
</table>

**Answer:** The firm needs to compare the marginal cost to the marginal revenue of hiring an additional supervisor. The marginal cost is always $500$ for each extra supervisor. The marginal revenue is the number of additional units produced times the price of output.

<table>
<thead>
<tr>
<th>Number of Supervisors</th>
<th>MC</th>
<th>MR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$500$</td>
<td>$0.50 \times 3800 = 1900$</td>
</tr>
<tr>
<td>2</td>
<td>$500$</td>
<td>$0.50 \times 3200 = 1600$</td>
</tr>
<tr>
<td>3</td>
<td>$500$</td>
<td>$0.50 \times 1500 = 750$</td>
</tr>
<tr>
<td>4</td>
<td>$500$</td>
<td>$0.50 \times 700 = 350$</td>
</tr>
<tr>
<td>5</td>
<td>$500$</td>
<td>$0.50 \times 400 = 200$</td>
</tr>
</tbody>
</table>

The firm will hire three supervisors since the marginal revenue generated from hiring the third supervisor exceeds $500$ but the marginal revenue generated from hiring the fourth supervisor is less than $500$. 