Answers to End-of-Chapter Review Questions chapter 7

1. Production is the conversion of resources into useful goods and services.

2. Accounting costs include only monetary outflows, while economic costs also include opportunity costs.

3. Transaction costs, the costs of arranging economic activities, external costs, and the costs of a project that are borne by actors not directly responsible for the activity, increase the costs of a project.

4. Technical efficiency means producing a given output with a minimum of inputs (or a maximum of output with a given level of inputs). Economic efficiency means producing a given output with no unnecessary expense, or producing the maximum value of output from given inputs. Technical efficiency refers to physical quantities of inputs and outputs, while economic efficiency refers to market values of inputs and outputs.

5. (1) the producer’s opportunity costs, (2) transactions costs, and (3) external costs to society. (Also implicit in the discussion is the importance of nonmonetary costs, in any of these categories.)

6. A production function indicates the relationship between the levels of one or more inputs and the level of output. A production function can be expressed both mathematically and graphically.

7. In the short run, at least one production input cannot be varied in quantity. In the long run, all production inputs can be varied in quantity.

8. Diminishing marginal returns occur when each additional unit of a variable input produces a smaller and smaller increase in the quantity of output. Constant marginal returns mean that each additional unit of a variable input produces the same increase in the quantity of output. Increasing marginal returns are defined as each additional unit of a variable input producing a larger increase in the quantity of output. Diminishing returns tend to occur because of the existence of a limiting factor. Constant returns may occur if there is no such limiting factor. Increasing returns can come about due to factors such as learning, specialization, or other synergies.

9. The graph below shows a total product curve with possible patterns for marginal returns:
10. Fixed costs must be paid regardless of the level of production, even if production is zero. Variable costs are dependent upon the level of production. Total cost is simply the total cost (fixed and variable) of producing a given quantity of output. Marginal cost is the cost of producing one additional unit of output.

11. The graph below shows a typical total cost curve including both fixed and variable costs:

12. Figure 7.8 presents a long-run average cost curve that illustrates economies of scale, constant returns to scale, and diseconomies of scale.
Answers to End-of-Chapter Exercises

1. a. Kai’s accounting costs would include his rent, materials, wages and benefits, and interest, a total of $11,500.
   b. Kai’s economic costs would also include his opportunity costs of lost wages, for a total economic cost of $14,500.
   c. His fixed costs would include rent and interest payments, a total of $1,000. His variable costs include materials and wages and benefits. Kai’s opportunity costs would best be considered a variable cost because he can work at least part-time if he does not produce anything at his own business.

2. a. Process A is more efficient because it uses less gizmos.
   b. Process B is more efficient because it uses less gadgets and the same number of gizmos.
   c. We cannot tell which process is more efficient, because one uses less gizmos, while the other uses less gadgets.

3. If the chef’s opportunity cost was $14/hour and the assistant’s opportunity cost was $10/hour, Table 7.2 would be revised as:

<table>
<thead>
<tr>
<th>Process</th>
<th>Cost of Chef’s Time</th>
<th>Cost of Assistant’s Time</th>
<th>Total Cost for Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.5 hours * $14/hour = $21</td>
<td>1 hour * $10 hour = $10</td>
<td>$21 + $10 = $31</td>
</tr>
<tr>
<td>B</td>
<td>1 hour * $14/hour = $14</td>
<td>2 hours * $10/hour = $20</td>
<td>$14 + $20 = $34</td>
</tr>
</tbody>
</table>

As Process A costs $31 and Process B costs $34, Process A is economically efficient.

4. The organization is focused on its internal costs, such as the variable costs of building the proposed wall. However, the hospital is imposing external costs on the residents of the neighborhood. These should be included in a tally of the social costs of production. The hospital’s refusal to build a wall might, in addition, be termed a false economy, as it is likely the hospital is not taking into account the external costs, which could translate into the cost of future legal battles with neighborhood groups. A student might also suggest that there is a PPF between provision of health care, and provision of quiet, unpolluted residential housing. If the hospital builds the wall, it must also pay the opportunity cost of having less money available for health care. Health care may also be assumed to be a benefit to the community, and less health care is a cost they might want to consider in their own calculations. This issue will be of more or less relevance depending on whether the hospital offers much community-oriented care, or specializes in expensive procedures for people who mostly come from a distance. (In the latter case, some students may appropriately suggest that it is reasonable to rethink how to define the hospital’s “community.” It might be imagined as having two—or more—communities: immediate neighbors, plus potential patients. This anticipates later discussions of “stakeholder” theory.)
5. a. The total product curve would be:

![Total Product Curve]

b. The marginal return for the first chapter studied is 20 points (35–15). The marginal return for the second chapter she reads is 35 points (95–60).

c. This production function displays increasing marginal returns because the incremental addition to Tiffany’s test score increases with each chapter she studies.

6. The correct matches are a→vii, b→vi, c→v, d→iii, e→ii, f→i, g→iv.

7. a. The table showing the number of hours worked and the number of mittens produced would be:

<table>
<thead>
<tr>
<th>Number of hours</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of mittens</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

We can graph this relationship as:
A line graph showing the relationship between hours worked and mittens produced. The x-axis represents hours worked, ranging from 0 to 3, and the y-axis represents the number of mittens produced, ranging from 0 to 10. The graph indicates a positive correlation, with production increasing as hours worked increase.
b. The table relating the number of mittens produced to the labor cost would be:

<table>
<thead>
<tr>
<th>Number of mittens</th>
<th>4</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (labor) costs</td>
<td>15</td>
<td>30</td>
<td>45</td>
</tr>
</tbody>
</table>

This relationship can be graphed as:

c. The pattern of marginal returns shown in the graph for part (a) displays decreasing marginal returns—for each additional hour worked, Lynn produces fewer additional mittens. The pattern of marginal costs, shown in the graph for part (b), shows increasing marginal costs—it costs more in terms of variable costs to produce additional mittens.

d. In her second hour of work, Lynn’s marginal return is three pairs of mittens. In her third hour of work, her marginal return is only one additional mitten.

e. In her second hour of work, Lynn goes from producing four to seven total mittens, an increase of three mittens. Her labor cost is $15/hour. Thus, the marginal cost expressed in terms of dollars per mitten is $5 per mitten. It takes Lynn an entire hour (the third hour) to produce her eighth mitten. Thus, her marginal cost is $15 per mitten to produce the eighth mitten.