Practice Problems #10 Answers  
E201 Fall  2015

1. There are many different types of costs discussed in Chapter 13: in alphabetical order, they are average total cost, explicit cost, fixed cost, implicit cost, marginal cost, opportunity cost, total cost, and variable cost. Fill in the type of cost that best completes the statements below:

a. The true cost of taking some action is its ________.  **Opportunity cost**
b. ________ is falling when marginal cost is below it, and rising when marginal cost is above it.  **Average Total Cost**
c. A cost that does not depend on quantity of output is a ________.  **Fixed Cost**
d. In the ice-cream industry in the short run, ________ includes the cost of cream and sugar, whereas ________ includes the cost of the factory.  **Variable Cost; Fixed Cost**
e. Profits equal total revenue minus ________.  **Total Cost (for Econ Profit)**
f. The cost of producing an extra unit of output is ________.  **Marginal Cost**
g. The cost of an owner-supplied resource is ________.  **Implicit Cost**

2. a. If accounting profit is $45,000 and economic profit is $20,000, what is the $25,000 difference between the two called?  **Implicit costs.**

b. What items might be included in the difference between accounting and economic profit.  
**Cost of owner-supplied resources, e.g. owner’s labor, owners financial capital, etc.**

3. a. How does the long run differ from the short run in terms of inputs? In terms of costs?  
**LR: all inputs variable, so all costs are variable. SR: at least one input fixed, so sunk costs exist.**

b. State an example of a short-run decision and an example of a long run decision for a firm.  
**For IU: close dorm in summer (SR decision), build a new dorm (LR decision).**

4. Hazel’s daughter Hattie is thinking about opening a hardware store. She estimates that it would cost $500,000 per year to rent the store and stock it with inventory. In addition, Hattie would have to quit her $50,000 per year job as a hatter. Hattie doesn’t hate being a hatter; she just wonders if she might not be happier as a profitable purveyor of high-quality hardware. Help her.

a. What are Hattie’s explicit costs of running the hardware store for a year?  **$500,000.**
b. What are her implicit costs, if any, of running the store for a year?  
$50,000.

c. If Hattie could sell $545,000 worth of hardware in a year, what are her estimated accounting profits?  Her economic profits?  
$45,000  -$5,000

d. Would you advise Hattie to open the store?  Explain.  
No, unless psychic (non-monetary) benefits of ownership exceed $5,000.

5. Consider the following cost information for Hazel’s New Age Pizzeria:

<table>
<thead>
<tr>
<th>Q  (dozens)</th>
<th>Total Cost ($)</th>
<th>Variable Cost ($)</th>
<th>MC</th>
<th>AFC</th>
<th>ATC</th>
<th>AVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>300</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>350</td>
<td>50</td>
<td>50</td>
<td>300</td>
<td>350</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>390</td>
<td>90</td>
<td>40</td>
<td>150</td>
<td>195</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>420</td>
<td>120</td>
<td>30</td>
<td>100</td>
<td>140</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>450</td>
<td>150</td>
<td>30</td>
<td>75</td>
<td>112.50</td>
<td>37.50</td>
</tr>
<tr>
<td>5</td>
<td>490</td>
<td>190</td>
<td>40</td>
<td>60</td>
<td>98</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>540</td>
<td>240</td>
<td>50</td>
<td>50</td>
<td>90</td>
<td>40</td>
</tr>
</tbody>
</table>

a.  What is the pizzeria’s fixed cost.  $300.

b. Construct a table in which you calculate the marginal cost (per dozen pizzas) using the information of total cost.  Also calculate the marginal cost (per dozen pizzas) using the information on variable cost.  What is the relationship between these numbers?  Comment.  
Equal.  Change in total cost equals change in variable cost, since fixed costs don’t change as output changes.

c. Now calculate the average fixed cost, the average total cost and the average variable cost for each quantity (measured in dozens of pizzas), and add these to your table.  
Note.  These numbers are a little weird--caused by MC being less than ATC for all levels of output, so ATC falls throughout the range of output shown.  (This is actually the definition of natural monopoly.)

6. What does it cost you to sleep through one of 30 lectures in a course for which you paid $600 in tuition?  
The opportunity cost of sleeping is attending the lecture missed, perhaps some idea you or skill you may have learned, and the amount by which your grade is reduced by not attending.  In terms of lecture attendance, tuition is a sunk cost.
7. Do students put more effort into courses for which they have to pay higher tuition to take the course? Explain.

It is likely true that there is a direct relationship between higher tuition and student effort: the greater the prestige of the college, greater the tuition paid, and the more time spent studying by the average student. But that effort is not the result of the higher tuition. Think about the market value of a degree from a prestigious college and an “open-admission” college. Students are willing to work harder when the payoff (as the see it) is greater. Once tuition is paid, it is a sunk cost and, as we know, sunk costs are irrelevant at the margin. So the amount a student spends studying a given night depends on the costs and benefits of studying on that night.

An interesting quirk of the market for higher education is that the students sometimes try to reduce grading standards. Such efforts amount to an attempt by buyers to reduce the quality of the product they are purchasing. Chapter 11 provides an explanation for this behavior—what’s the concept?

8. Nimbus, Inc. makes brooms and sells them door-to-door. Below is the relationship between the number of workers and Nimbus’s output in a given day:

<table>
<thead>
<tr>
<th>Workers</th>
<th>Output</th>
<th>Marginal Product</th>
<th>Total Cost</th>
<th>Average Total Cost</th>
<th>Marginal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>---</td>
<td>200</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>20</td>
<td>300</td>
<td>15.00</td>
<td>5.00</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>30</td>
<td>400</td>
<td>8.00</td>
<td>3.33</td>
</tr>
<tr>
<td>3</td>
<td>90</td>
<td>40</td>
<td>500</td>
<td>5.56</td>
<td>2.50</td>
</tr>
<tr>
<td>4</td>
<td>120</td>
<td>30</td>
<td>600</td>
<td>5.00</td>
<td>3.33</td>
</tr>
<tr>
<td>5</td>
<td>140</td>
<td>20</td>
<td>700</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td>6</td>
<td>150</td>
<td>10</td>
<td>800</td>
<td>5.33</td>
<td>10.00</td>
</tr>
<tr>
<td>7</td>
<td>155</td>
<td>5</td>
<td>900</td>
<td>5.81</td>
<td>20.00</td>
</tr>
</tbody>
</table>

a. Fill in the marginal product column. What pattern do you see? How do you explain it?

MP rises at first, and then declines because of diminishing marginal returns.

b. A worker costs $100 a day, and the firm has fixed costs of $200. Use this information to fill in the total cost column.

See TC column.

c. Fill in the average total cost column. (Recall that ATC = TC / Q.) What pattern do you see?

ATC is U-shaped: at lower rates of output ATC declines as output expands; at higher rates of output, ATC rises as output expands.

d. Now fill in the marginal cost column. (Recall that MC = ΔTC / ΔQ.) What pattern do you see?
MC falls but then rises, and it rises sooner and faster than ATC.

e. Compare the column for marginal product and the column for marginal cost. Explain the relationship.  
When MP is rising, MC is falling; when MP is falling, MC is rising.

f. Compare the column for average total cost and the column for marginal cost. Explain the relationship.  
When the marginal cost is below the average cost, the average cost is falling.  
When the marginal cost is above the average cost, the average cost is rising.  
A sneaky way to get people to miss this relationship on an exam question is to say something like this: When marginal cost is falling, average cost is necessarily falling; or, when marginal cost is rising, average cost is rising.  
See the difference?  
Below is not the same as falling; above is not the same as rising.

9. Tomas has spent $1000 building a tortilla stand based on estimated sales of $3000. The stand is nearly completed when Tomas discovers that total sales will only be $2500. What is the maximum cost Tomas would be willing to incur to complete the stand? Explain.  
The $1000 already committed is a sunk cost, which is irrelevant to the decision to complete the stand. Tomas’ expected gain from completion is $2500, so he would be willing to incur completion costs of up to $2500.

10. Alex has spent $12,000 to buy and restore a 1974 BMW 2002tii, which he expects to sell for $14,000 once the repairs are complete. He just discovered that an additional repair of the transmission will be required, at a cost of $5000, to complete the restoration. He can sell the BMW in its current state of restoration (without the new transmission) for $10,000. As a rational decision maker, what should Alex do? Explain.  
The $12,000 already committed is a sunk cost, which is irrelevant to the choice of finishing the restoration. If he completes the restoration, he can sell the car for $4000 more than if he sells in its current condition. Since the $5000 cost of the transmission repair exceeds the $4000 gain, Alex should sell the car as is and not fix the transmission.
11. Suppose that there are two different firms, X and Y, who employ workers with identical skills. Firm Y has a more dangerous work environment than X, and there is a 0.001 increase in the probability of a fatal injury for a worker at Firm Y. Workers at both firms understand these risk differences. If Firm Y pays its workers $7600 more than Firm X, what is the value of life for workers at Firm Y?

Each worker at Y accepts $7600 for a 1/1000 increase in the probability of death. Put differently, each worker would accept a $7600 pay cut for a 1/000 decrease in the probability of dying on the job. If 1000 workers are hired, one dies. These 1000 workers, as a group, would be willing to pay $7,600,000 to save one life. So the value of life is $7,600,000.

Or maybe this formulation of the problem makes more sense to you:

\[ 0.001 \times \text{Value of Life} = 7600 \]

\[ \text{Value of Life} = \frac{7600}{0.001} \]

\[ = 7,600,000 \]