CHAPTER 11
PRICE AND OUTPUT IN MONOPOLY, MONOPOLISTIC COMPETITION, AND PERFECT COMPETITION

Chapter in a Nutshell

Now that we understand the characteristics of different market structures, we ask the question in this and the following chapter: How are prices and output levels determined for firms pursuing profit maximization in different market structures? This chapter analyzes price and output determination for firms in monopoly, monopolistic competition, and perfect competition. We leave the discussion of price and output in oligopoly for the next chapter.

A monopolist is a price-maker, since it makes its own pricing and output decisions. At the other extreme, a perfectly competitive firm must take the market-determined price as given and chooses only an output level, so it is a price-taker. Despite these differences, firms in all types of market structures maximize profits by selecting an output level where MR = MC. Monopolists and monopolistic competitive firms must then also find the price that corresponds to this output level on their demand curves. For any type of firm, if total revenue is greater than total cost (which consists of both explicit and implicit costs), there is an economic profit. If total revenue is equal to total cost, then there is a normal profit and the firm breaks even. Maximum efficiency, the production of goods at the lowest possible average total cost, can occur only with perfect competition. A monopoly could earn economic profits that persist even in the long run because of barriers to entry. However, perfectly competitive and monopolistic competitive firms can only earn normal profits in the long run, since there is free entry and exit of firms.

An important issue explored toward the end of this chapter is whether perfect competition or monopoly is more desirable. Economists in the Alfred Marshall tradition argue that small competitive firms tend to generate lower prices because with many firms pursuing innovations simultaneously, costs are driven down. However, Schumpeter, Galbraith, and others have argued that larger firms with greater monopoly power are able to realize economies of scale and spend part of their profits on research and development so that lower-cost production technology can be introduced.

After studying this chapter, you should be able to:

- Derive the monopolist’s marginal revenue curve.
- Explain how profit is derived in monopoly and why it persists.
- Discuss short-run equilibrium in monopolistic competition.
- Use a graph to show long-run equilibrium in monopolistic competition.
- Distinguish between economic profit and normal profit.
- Graphically show short-run equilibrium and long-run equilibrium in perfect competition.
- Explain maximum efficiency in perfect competition.
- Present examples of price-makers and price-takers.
- Relate the perfectly competitive firm’s supply curve to the market supply curve.
- Evaluate arguments offered to show the desirability of perfect competition versus monopoly.
Concept Check — See how you do on these multiple-choice questions.

This question asks you to consider the goal for a monopolist. Would a monopolist’s goal be different from that of other types of firms?

1. The primary goal of a monopolist is to
   a. produce at the most efficient output level to maximize profit
   b. select the highest possible price
   c. earn the maximum profit
   d. ensure corporate survival in the face of intense competition
   e. maximize market share

Given the monopolist’s goal, what output should a monopolist choose to produce?

2. The monopolist’s decision to produce where marginal revenue is equal to marginal cost generates
   a. an efficient level of production
   b. production to the left of the minimum of the average total cost curve
   c. production to the right of the minimum of the average total cost curve
   d. chronic excess demand
   e. a price that is higher than consumers are willing to pay

Is there a difference between economic profit and normal profit?

3. What is the relationship between economic profit and normal profit?
   a. They are identical
   b. Only normal profit is earned in the long run by a price-taker
   c. Normal profit is greater than economic profit
   d. Economic profit is just enough to keep a firm in the market whereas normal profit is greater
   e. A firm will earn economic profit in the long run, but no normal profit

Some firms can control the price they charge and others cannot.

4. A price-maker can ___________________ while a price-taker must ___________________ to maximize profits.
   a. raise price; lower price
   b. select price; accept the market price
   c. dictate prices to others; follows the price lead of the price-dictating firm
   d. advertise; rely on brand loyalty to control price
   e. enter new markets to control price; innovate to control price

What is the shape of the long-run average total cost curve when a firm experiences economies of scale?

5. Firms that enjoy economies of scale can
   a. increase production but suffer increasing short-run average total cost
   b. increase production and at the same time have constant average total cost
   c. avoid diseconomies of scale by increasing the size of the firm
   d. enjoy higher stock prices as more shares are issued
   e. increase production and enjoy decreasing long-run average total cost
Am I on the Right Track?

Your answers to the questions above should be c, b, b, b, and e. One technical detail that you need to learn in order to reason correctly about price and output determination is the distinction between the marginal revenue curve that a perfectly competitive firm faces compared to the marginal revenue curve for other market structures. For these firms, marginal revenue lies below the demand curve. For a perfectly competitive firm, marginal revenue and demand are the same. The graphing tutorial will explore this difference.

Key Terms Quiz — Match the terms on the left with the definitions in the column on the right.

1. economic profit  _____ a. a firm that accepts the market price as its own
2. normal profit  _____ b. a firm’s total revenue minus its total explicit and implicit costs
3. price-maker  _____ c. the entrepreneur’s opportunity cost
4. price-taker  _____ d. a firm that can choose among combinations of price and output

Graphing Tutorial

Let’s work through graphing the downward-sloping marginal revenue curve using a numerical example. Consider the local cable television service. Suppose the local cable company is the sole provider of a service with no close substitutes. This is a monopoly. The table below shows the price and quantity combinations of basic cable service that are demanded per month from the local company. The total revenue and marginal revenue are shown in the third and fourth columns of the table.

<table>
<thead>
<tr>
<th>Price ($/month)</th>
<th>Quantity (# of cable subscribers)</th>
<th>Total Revenue ($)</th>
<th>Marginal Revenue ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>500</td>
<td>17,500</td>
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<tr>
<td>30</td>
<td>1,000</td>
<td>30,000</td>
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<td>25</td>
<td>1,500</td>
<td>37,500</td>
<td>15</td>
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<td>20</td>
<td>2,000</td>
<td>40,000</td>
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<td>15</td>
<td>2,500</td>
<td>37,500</td>
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<td>10</td>
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<td>5</td>
<td>3,500</td>
<td>17,500</td>
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</tr>
</tbody>
</table>

How is the marginal revenue calculated? Between the prices $35 per month and $30 per month, the total revenue increases by $12,500, and the quantity of subscribers increases by 500. Marginal revenue is equal to $12,500/500 or $25. The demand curve and the marginal revenue curve are plotted on the graph on the next page. Note that the marginal revenue curve lies below the demand curve.
Given the demand curve and the marginal revenue curve, it is possible to superimpose on this graph the marginal cost and average total cost functions for the cable company to determine the profit-maximizing level of output and price. Then, profits can be shown on the graph.

The cable company will maximize profit by setting output where $\text{MR} = \text{MC}$ at an output level of 1,750 subscriptions. They will charge $22.50 per month, the price read from the demand curve. At 1,750 subscriptions, the average total cost is $15, read from the average total cost curve. Therefore, the economic profit this firm earns is defined by the rectangle labeled profit between $22.50 and $15 up to an output level of 1,750. The cable company’s profit is equal to $(22.50 - 15) \times 1,750 = $13,125.
Graphing Pitfalls

Suppose we have a monopolist with the demand, marginal revenue, average total cost, and marginal cost shown below. Pretend that you are an economics professor and ask one of your favorite students, Jeremy Lynch, to label the profit-maximizing price and output level with P* and Q*, respectively. Jeremy labels the points as shown below. Has he done this correctly?

Even though Jeremy is one of your prize students, he’s made a mistake this time. He read price from the marginal revenue curve after locating the intersection of marginal revenue and marginal cost. So, he has labeled the correct profit-maximizing level of output with Q*, but no self-respecting monopolist would charge such a low price. **Price should always be read from the demand curve!** After all, that is what people are willing and able to pay.

Price should be read from the demand curve, not from the point where MR = MC.

**True-False Questions** — If a statement is false, explain why.

1. A monopolist most wants to raise price. (T/F)

2. A monopolist will never lower price. (T/F)

3. A monopolist’s marginal revenue curve is constant at the market price. (T/F)

4. A monopolist can earn economic profit if the price is less than the average total cost at the profit-maximizing level of output. (T/F)

5. A monopolist will maximize both profits and efficiency. (T/F)
6. If a monopolist’s barriers to entry break down, then entering firms will cause the monopolist’s profits to decline. (T/F)

7. Only normal profits are earned by a monopolist in long-run equilibrium. (T/F)

8. In monopolistic competition, all firms in an industry produce an identical product. (T/F)

9. In long-run equilibrium, a perfectly competitive firm produces where price is equal to marginal cost, both of which are equal to the minimum average total cost. (T/F)

10. Firms in monopolistic competition earn only normal profits in the long run. (T/F)

11. In short-run equilibrium, a firm in monopolistic competition can earn economic profit. (T/F)

12. An entrepreneur will leave an industry if there is zero economic profit to be earned. (T/F)

13. A firm that earns an economic profit earns more than a normal profit. (T/F)

14. A monopolistically competitive firm produces at the minimum of its average total cost curve. (T/F)

15. Firms in perfect competition are described as price-makers. (T/F)

**Multiple-Choice Questions**

1. The demand curve for a monopolist is downward-sloping because
   a. the monopolist can charge as high a price as desired
   b. the monopolist is the market so the monopolist’s demand curve is the market demand
   c. monopolists are price takers
   d. monopolists are price makers
   e. there are barriers to entry in monopoly

2. All of the following are true about a firm in a perfectly competitive industry except that the firm
   a. will always make a profit if it follows the rule of profit maximization
   b. will never advertise to increase its market share
   c. can enter and exit the market easily
   d. faces many buyers in the market
   e. produces a good that is a perfect substitute for goods produced by other firms in the industry
3. The demand curve for an individual firm in perfect competition is horizontal because
   a. it is inelastic throughout every price range
   b. it is elastic throughout every price range
   c. competitive markets always grow so any firm can sell as much as it wants at the market price
   d. the firm can sell as much as it wants at the market price since the firm's output is small relative to
      market demand
   e. sales are very flat in a competitive market

4. One difference between a perfectly competitive firm and a monopoly is that
   a. a monopoly sets price equal to marginal revenue, while a perfectly competitive firm sets price equal to
      marginal cost
   b. a monopoly faces a downward-sloping demand curve, while a perfectly competitive firm faces a
      horizontal demand curve
   c. perfectly competitive firms advertise while a monopoly does not
   d. while neither type of firm can control price, a monopolist can control output
   e. a monopoly is always very much larger than a competitive firm

5. A monopolistically competitive firm may realize
   a. economic profit in the short run, but only a normal profit in the long run
   b. a normal profit in the short run, but economic profit in the long run
   c. a level of production at the minimum of the average cost curve
   d. economies of scale in production if barriers to entry exist
   e. that product differentiation creates long-run economic profit

6. Monopoly profit tends to persist in the long run because
   a. monopolists are more innovative than other producers
   b. monopolists' costs decrease as their outputs increase
   c. monopolists can raise price any time costs increase
   d. monopolists are the shrewdest entrepreneurs
   e. of barriers to entry

7. The demand curve for a firm in monopolistic competition is downward-sloping because
   a. the firm enjoys a degree of brand loyalty
   b. the good it produces is a perfect substitute for the goods other firms in the industry produce
   c. of product similarities
   d. consumers are unable to find close substitutes
   e. firms in monopolistic competition started out as monopolies

8. A monopolist chooses to produce at a level of output that generates less than maximum efficiency because
   a. entry can be prevented in this way
   b. the goal for the firm is profit maximization, not efficiency
   c. monopolists are wasteful in their production activities
   d. economies of scale are difficult for monopolists to achieve
   e. monopolists can charge consumers more than they are willing to pay

9. The long-run supply curve for a perfectly competitive firm is its marginal cost curve above the
   a. average variable cost curve
   b. average total cost curve
   c. average fixed cost curve
   d. total variable cost curve
   e. total cost curve
10. All of the following are conditions for long-run equilibrium in perfect competition except that
   a. all firms earn economic profits
   b. all firms earn normal profits
   c. no firms have incentive to leave the industry
   d. price is equal to marginal cost and minimum average total cost
   e. no firms have incentive to enter the industry

11. Given similar costs of production, a comparison of a perfectly competitive firm in long-run equilibrium and a monopoly shows that in perfect competition, output is ______________ and price is ______________.
   a. the same, the same
   b. higher, lower
   c. higher, higher
   d. lower, higher
   e. lower, lower

12. A firm in perfect competition in long-run equilibrium
   a. earns economic profit
   b. faces a price that is greater than average total cost
   c. produces a quantity that is less than the quantity corresponding to the minimum of the average total cost
   d. may face losses
   e. earns normal profit

13. A feature of monopoly that distinguishes it from competitive firms is that
   a. earning high long-run profit, it typically pays higher wages than do competitive firms
   b. it provides consumers with many differentiated products, rather than identical products
   c. being relatively large, it typically produces more than would be produced by competitive firms
   d. it produces unique goods that would not have been produced by competitive firms
   e. it uses resources more efficiently than a perfectly competitive market

14. Economies of scale mean that if a firm were to double its output
   a. long-run average total cost would decrease
   b. average total cost would remain unchanged
   c. average total cost would increase
   d. short-run average total cost would remain unchanged
   e. short-run average total cost would more than double

15. Entry into monopolistic competition results in a long-run equilibrium where
   a. price is equal to marginal cost at the minimum of the average total cost curve
   b. the demand curve is tangent to the average total cost curve to the left of its minimum
   c. economic profit persists
   d. consumers have few substitute goods to choose from
   e. firms find it easier to raise price without losing sales

16. An innovator firm in perfect competition will be able to
   a. raise the price of its product
   b. earn economic profit in the long run
   c. earn economic profit until other firms adopt the innovation
   d. achieve monopoly power in the market
   e. differentiate its product from those produced by other firms
17. The following graph represents a
a. monopolist earning economic profits
b. firm in monopolistic competition earning normal profit
c. very large and influential competitive firm
d. monopolist suffering a loss
e. competitive firm in disequilibrium

18. All of the following are characteristics of the monopolist's marginal revenue curve except that
a. it lies below the demand curve
b. it represents the addition to total revenue generated by producing and selling one more unit
c. it is greater than price at every output level
d. it is downward sloping
e. it eventually becomes negative

19. Firms in perfect competition are more efficient than firms in either monopolistic competition or monopoly in the long run because
a. many small firms innovate more than one large firm or several medium-sized firms
b. in the long run, perfectly competitive firms produce at close to zero marginal costs
c. monopolists and monopolistically competitive firms make profit
d. monopolists and monopolistically competitive firms have to advertise
e. perfectly competitive firms operate at minimum average total cost
20. The graphs in panels A, B, and C best represent long-run equilibrium situations for __________, __________, and __________, respectively.
   a. monopolistic competition; perfect competition; monopoly
   b. perfect competition; monopolistic competition; monopoly
   c. perfect competition; monopoly; monopolistic competition
   d. monopolistic competition; monopoly; perfect competition
   e. monopoly; monopolistic competition; perfect competition
The following questions relate to the applied, interdisciplinary, historical, and theoretical perspectives in the text.

21. One problem with the proliferation of certain brands of a product like Coca-Cola is that
   a. their cross elasticities of demand are likely to be low
   b. consumers have a difficult time comparing all the different brands in meaningful ways
   c. the increased number of brands can help to increase price competition
   d. profits do not increase as a result of marketing new brands
   e. advertising expenses increase dramatically as new brands are launched

22. In Thomas Hardy's description of Casterbridge's corn market, the problem encountered by Henchard is that
   a. Farfrae has rigged the market so that prices rise when Henchard expected them to fall
   b. Henchard expected price to fall and sold in advance of a disastrous harvest after which the price rose
   c. price floors prevented the price of corn from decreasing to levels that would have ruined Henchard
   d. the old corn he had expected to sell at elevated prices had spoiled in storage
   e. an unexpectedly large foreign crop caused price to fall when Henchard had expected it to increase

23. The situation Friedrich Winter describes in his 1686 letter about conditions in the glass engraving business most resembles
   a. perfect competition in short-run equilibrium where firms earn economic profit
   b. monopolistic competition in short-run equilibrium where firms earn economic profit
   c. perfect competition in long-run equilibrium where firms earn normal profit
   d. monopolistic competition in long-run equilibrium where firms earn normal profit
   e. perfect competition in short-run equilibrium where firms produce at a loss

24. A profit-maximizing monopolist restricts output below levels produced in a perfectly competitive market and charges a higher price, therefore monopoly
   a. increases consumer surplus without a deadweight loss
   b. cannot achieve economies of scale
   c. has no incentive to innovate
   d. prevents entry by other firms
   e. reduces consumer surplus creating a deadweight loss

**Fill in the Blanks**

1. Rather than producing where ____________________ is at its minimum, the monopolist produces where ____________________ in order to _____________________.

2. The more unique and desirable a product supplied by a monopolistically competitive firm, the more ____________________ will be its demand curve.

3. The existence of profit in a perfectly competitive industry results in ____________________, which causes the market _______________ to increase and _______________ to fall.

4. Because the ____________________ curve represents the quantities supplied at varying prices and since a perfectly competitive firm in the long run always produces where P = MR = MC, the competitive firm’s
curve is that portion of its ________________ curve that lies above the
______________ curve.

5. ________________ believed that bigness could be an advantage for an innovating firm because of
______________ and low average costs of production.

Discussion Questions

1. Why are the monopolist's and the monopolistically competitive firm's demand curves downward sloping
while the competitive firm's demand curve is horizontal?

2. Outline the various ideas that economists have proposed to explain the relationship between the size of firms
and the extent of innovation undertaken by firms. Which of these competing theories seems most reasonable
to you? Why?

3. How is long-run equilibrium different for monopolistically competitive firms compared to perfectly
competitive firms?

4. Why is a perfectly competitive firm’s long-run supply curve the same as its marginal cost curve above the
average total cost curve?

Problems

1. a. The following table shows price and quantity data for a jeans manufacturer's demand schedule.
Complete the columns for total revenue and marginal revenue; then plot the demand and marginal
revenue curves on the graph below that show the average total cost and marginal cost for the firm.

<table>
<thead>
<tr>
<th>Price ($/pair)</th>
<th>Quantity</th>
<th>Total Revenue</th>
<th>Marginal Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1,000</td>
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<tr>
<td>5</td>
<td>6,000</td>
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<td></td>
</tr>
</tbody>
</table>
b. What is the firm’s profit-maximizing level of output? Will this firm make a profit? If so, shade the area, label it profit, and calculate the size of the profit.

c. Assuming that the jeans industry is monopolistically competitive, has long-run equilibrium been achieved? Why or why not? State the condition necessary for long-run equilibrium.

2. The two graphs drawn on the following page show a perfectly competitive firm in short-run equilibrium and in long-run equilibrium. Which is which? How do you know? In each graph, label the profit-maximizing level of output with Q*, the profit maximizing price with P*, and shade the area of profit or loss. How will this market make the transition from short-run to long-run equilibrium?
3. Consider the graph of the perfectly competitive firm shown below. Does this firm make a profit or a loss? Shade the area of profit or loss. If the firm is incurring a loss, should it continue to produce in the short run? The long run? Explain.
Everyday Applications

In the last decade, we have experienced remarkable changes in our telephone service. Instead of one choice for local and long-distance service, we now have a variety of choices for long-distance service. How does the experience of the last few years with firms entering the long-distance market compare to the story told about the increasingly competitive ice market? Aside from government intervention in the market, what technological factors played a role in making the long-distance market more competitive?

Economics Online

Check the Web sites for cell phone service providers to look for evidence of competition among them. You might start with AT&T (http://www.wireless.att.com), T-mobile (http://www.t-mobile.com), and Verizon (http://www.verizonwireless.com).

Answers to Questions

Key Terms Quiz

a. 4
b. 1
c. 2
d. 3

True-False Questions

1. False. Monopolists desire to maximize profits. Price is determined at the profit-maximizing level.
2. False. A monopolist will lower price if profits increase as a result.
3. False. Marginal revenue is a downward-sloping curve below the demand curve.
4. False. If price is less than average total cost, the monopolist incurs a loss.
5. False. A monopolist typically produces to the left of the minimum of the average total cost curve.
6. True
7. False. A monopolist’s economic profit can persist in the long run due to barriers to entry.
8. False. There is product differentiation in monopolistic competition.
9. True
10. True
11. True
12. False. If economic profit is zero, an entrepreneur will stay in the market as long as he/she can earn normal profit.
13. True
14. False. The monopolistic competitive firm typically will produce to the left of the minimum of the average total cost curve.
15. False. Firms in perfect competition are price-takers.
Multiple-Choice Questions

1. b
2. a
3. d
4. b
5. a
6. e
7. a
8. b
9. b
10. a
11. b
12. e
13. b
14. a
15. b
16. c
17. a
18. c
19. e
20. e
21. b
22. b
23. c
24. e

Fill in the Blanks

1. average total cost; MR = MC; maximize profit
2. inelastic
3. entry; supply; price
4. supply; supply; marginal cost; average total cost
5. Schumpeter; economies of scale

Discussion Questions

1. The monopolist’s and the monopolistically competitive firm’s demand curves are downward sloping because, in the case of the monopolist, there is no close substitute for the product sold, and, in the case of the monopolistic competitor, there are close but not perfect substitutes for the product sold. Hence, each firm can raise price and not lose all of its sales. Alternatively, in order to sell more, both types of firms must lower price. For the perfectly competitive firm, its good is a perfect substitute for all the other firms’ goods. Furthermore, the firm is insignificant relative to the market, so its decision to sell more doesn’t affect market price. Therefore, the perfectly competitive firm can sell all it wants at the market price. If it raised price, its sales would immediately drop to zero because consumers would go to a competing firm to buy the perfect substitute. That is why the perfectly competitive firm’s demand curve is graphed horizontally.

2. Schumpeter holds that there may be advantages to monopoly and larger-sized firms in general. Specifically, these firms are able to employ modern technologies that give the firm economies of scale. Thus, even though the monopolist may earn economic profit, because of the lower average cost of production, the price it charges may be lower than what a competitive firm would charge. Moreover, the monopoly profits are a source of funds for further research and development of new technologies. The zero long-run economic profit situation faced by a competitive firm makes such innovation much more difficult. John Kenneth Galbraith shares this view. He argues that most innovation comes from large firms with the resources to support the necessary scientists and engineers.

   However, Alfred Marshall has argued that due to the sheer number of competitive firms, innovation will happen faster in perfect competition. More firms working generate more innovations. These firms have a strong incentive to innovate because it is the one sure way for them to earn economic profit in the short run.

   Which side is correct is a matter for debate. In some industries, experience indicates that larger firms do most of the innovating in our economy. However, many smaller, more competitive firms have shown innovative strength in recent years especially in the computer and pharmaceutical industries.

3. In both cases, in the long run the demand curve is tangent to the firm’s average total cost curve, so the firm earns zero economic profit. However, in the case of the perfectly competitive firm, the demand curve is horizontal, so the point of tangency occurs at its minimum average total cost. Here, price is equal to marginal revenue, marginal cost, and the minimum of average total cost. \( P = \text{MR} = \text{MC} = \text{ATC} \) gives consumers the lowest possible price. Competition results in maximum efficiency as well.
In monopolistic competition, because the demand curve is downward sloping, the point of tangency occurs to the left of the minimum average total cost, and price is greater than marginal cost at the profit-maximizing level of output. So, even though the firm earns only a normal profit, it doesn’t achieve maximum efficiency because the output level is less than that associated with the minimum of the average total cost curve.

4. A perfectly competitive firm’s long-run supply curve is that portion of its marginal cost curve that lies above the upward-sloping portion of the average total cost curve. If price falls below average total cost, the firm will shut down. In the long run, the firm will supply more if price increases, following the MR = MC rule, producing output levels that correspond to points on the marginal cost curve. Therefore, the marginal cost curve above the average cost curve traces out combinations of prices and quantities that the firm is willing to supply — the firm’s long-run supply curve.

Problems

1. a. The completed table is shown below.

<table>
<thead>
<tr>
<th>Price ($/pair)</th>
<th>Quantity</th>
<th>Total Revenue</th>
<th>Marginal Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
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<tr>
<td>5</td>
<td>6000</td>
<td>30,000</td>
<td>-20</td>
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</table>

The graph with the demand and marginal revenue curves plotted is shown below.
b. The firm’s profit-maximizing level of output can be read from the graph above as 3,000 pairs of jeans. This is the level of output that corresponds to MR = MC. The price at this level of output is read from the demand curve — $20 per pair. The firm makes a profit that is equal to the area of the rectangle labeled profit — $(20 - 15) \times 3,000 = $15,000$.

c. No, long-run equilibrium has not been achieved. As long as the firm is earning economic profit, there is incentive for new firms to enter the market. As new firms enter, the market demand is divided among a larger number of firms, and this firm’s demand curve will shift to the left until profits are erased. This occurs when the demand curve is tangent to the average total cost curve. The firm earns only normal profit, so there is no incentive for firms to enter or leave the market. Long-run equilibrium has been reached because price is equal to minimum average total cost.

2. The graph to the left shows the firm in short-run equilibrium earning economic profit. This has to be a short-run situation because the profit won’t persist in the long run. The profit will be a signal for new firms to enter the market. As entry occurs, the market supply curve will shift to the right causing the price to fall. Entry continues and price falls until economic profit is zero. This occurs when the marginal revenue curve is tangent to the average total cost curve at its minimum point, shown in the graph to the right.

3. This firm incurs a loss. The area of the loss is shown in the graph below as the rectangle labeled “loss” that is bounded on top and to the right by the dashed line. This firm should continue to produce in the short run because it has enough total revenue to cover its total variable costs and a portion of its total fixed costs. We know this is the case because the price (marginal revenue) is greater than the minimum of the average variable cost curve.
Homework Questions

True-False Questions — If a statement is false, explain why.

1. A perfectly competitive firm that takes a price from the market that is below its average total cost curve will earn an economic profit in short-run equilibrium. (T/F)

2. The demand curve for a monopolist is the market demand. (T/F)

3. A firm in monopolistic competition can earn economic profit in the long run, however, a firm in perfect competition cannot. (T/F)

4. Monopolies and firms in monopolistic competition are price takers. (T/F)

5. Joseph Schumpeter argues that monopoly prices may actually be lower than the prices charged by competitive firms because of economies of scale. (T/F)

Multiple-Choice Questions

1. Alfred Marshall believed that technological change would occur faster under conditions of perfect competition because
   a. many firms are attempting to innovate simultaneously in perfect competition
   b. profits can be used for research and development
   c. monopolistic firms have no incentive to innovate
   d. entrepreneurs in perfect competition tend to monitor production techniques more closely than do owners of monopoly firms
   e. perfectly competitive firms can realize economies of scale

2. Which of the following is true of the relationship between price and marginal cost in monopolistic competition in long-run equilibrium?
   a. P = MC at all levels of output
   b. P = MC at the profit-maximizing level of output
   c. P > MC at the profit-maximizing level of output
   d. P < MC at the profit-maximizing level of output
   e. P = MC = minimum of the ATC at the profit-maximizing level of output

3. The long-run supply curve for a firm in perfect competition is the portion of its marginal cost curve above the minimum of its average total cost curve because
   a. the firm earns an economic profit in long-run equilibrium
   b. the firm earns a normal profit in long-run equilibrium
   c. the firm always produces where marginal revenue is equal to marginal cost
   d. economies of scale are experienced in the long run
   e. entry into a perfectly competitive industry is easy
4. As entry occurs, and long-run equilibrium is achieved in monopolistic competition, we expect that a firm’s demand curve will
   a. shift to the right and become more inelastic
   b. shift to the left and become more inelastic
   c. shift to the left and become more elastic
   d. shift to the right and become more elastic
   e. decrease, but still allow for an economic profit in long-run equilibrium

5. Because an entrepreneur in perfect competition in long-run equilibrium earns his/her opportunity cost,
   a. there is no need for advertising
   b. economic profit is substantial
   c. the challenge of continued entry into the industry must be addressed
   d. there is no incentive to exit the business
   e. increasing losses are a distinct possibility

**Discussion Questions/Problems**

1. Using graphs and in words, compare the long-run equilibrium for a monopoly and a firm in monopolistic competition.

2. Using graphs and in words, explain and critique Schumpeter’s argument that monopoly can lead to higher output and lower price than can perfect competition.