Chapter 1

Questions for Review

1.   Examples of tradeoffs include time tradeoffs (such as studying one subject over another, or studying at all compared to engaging in social activities) and spending tradeoffs (such as whether to use your last ten dollars on pizza or on a study guide for that tough economics course).

2.   The opportunity cost of seeing a movie includes the monetary cost of admission plus the time cost of going to the theater and attending the show. The time cost depends on what else you might do with that time; if it's staying home and watching TV, the time cost may be small, but if it's working an extra three hours at your job, the time cost is the money you could have earned.

Problems and Applications

3.   If you are thinking of going skiing instead of working at your part-time job, the cost of skiing includes its monetary and time costs, which includes the opportunity cost of the wages you are giving up by not working. If the choice is between skiing and going to the library to study, then the cost of skiing is its monetary and time costs including the cost to you of getting a lower grade in your course.

Chapter 3

Questions for Review

1.   Absolute advantage reflects a comparison of the productivity of one person, firm, or nation to that of another, while comparative advantage is based on the relative opportunity costs of the persons, firms, or nations. While a person, firm, or nation may have an absolute advantage in producing every good, they can't have a comparative advantage in every good.

4.   A nation will export goods for which it has a comparative advantage because it has a smaller opportunity cost of producing those goods. As a result, citizens of all nations are able to consume quantities of goods that are outside their production possibilities frontiers.

Chapter 4

Questions for Review

10.   When the price of beer rises, the demand for pizza declines, because beer and pizza are complements and people want to buy less beer. When we say the demand for pizza declines, we mean that the demand curve for pizza shifts to the left as in Figure 5. The supply curve for pizza is not affected. With a shift to the left in the demand curve, the equilibrium price and quantity both decline, as the figure shows. Thus the quantity of pizza supplied and demanded both fall. In sum, supply is unchanged, demand is decreased, quantity supplied declines, quantity demanded declines, and the price falls.
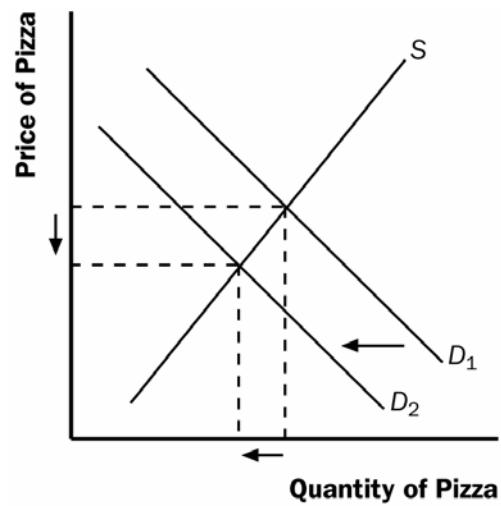

Figure 5

Problems and Applications

1. a. Cold weather damages the orange crop, reducing the supply of oranges. This can be seen in Figure 6 as a shift to the left in the supply curve for oranges. The new equilibrium price is higher than the old equilibrium price.
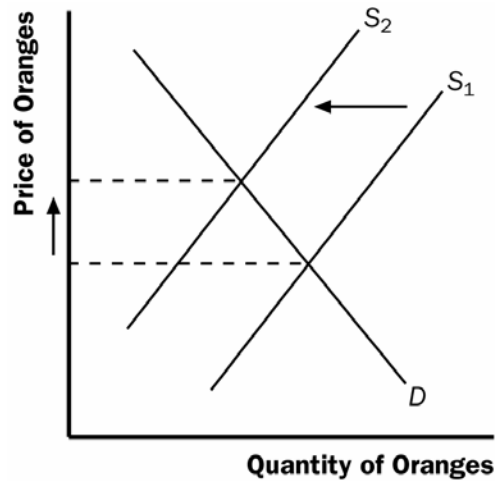

Figure 6

   b. People often travel to the Caribbean from New England to escape cold weather, so demand for Caribbean hotel rooms is high in the winter. In the summer, fewer people travel to the Caribbean, since northern climes are more pleasant. The result, as shown in Figure 7, is a shift to the left in the demand curve. The equilibrium price of Caribbean hotel rooms is thus lower in the summer than in the winter, as the figure shows.
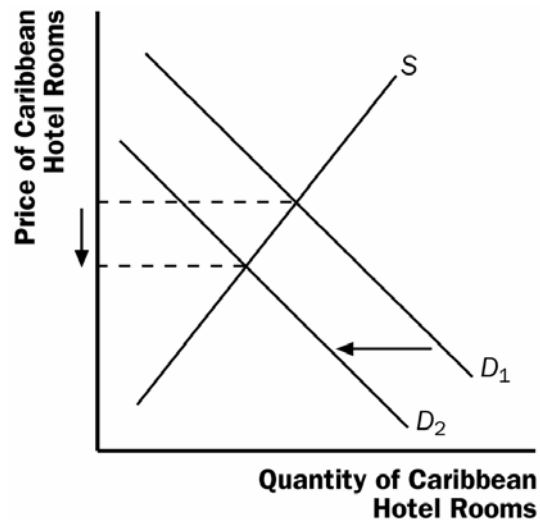

Figure 7

   c. When a war breaks out in the Middle East, many markets are affected. Since much oil production takes place there, the war disrupts oil supplies, shifting the supply curve for gasoline to the left, as shown in Figure 8. The result is a rise in the equilibrium price of gasoline. With a higher price for gasoline, the cost of operating a gas-guzzling

automobile, like a Cadillac, will increase. As a result, the demand for used Cadillacs will decline, as people in the market for cars will not find Cadillacs as attractive. In addition, some people who already own Cadillacs will try to sell them. The result is that the demand curve for used Cadillacs shifts to the left, while the supply curve shifts to the right, as shown in Figure 9. The result is a decline in the equilibrium price of used Cadillacs.
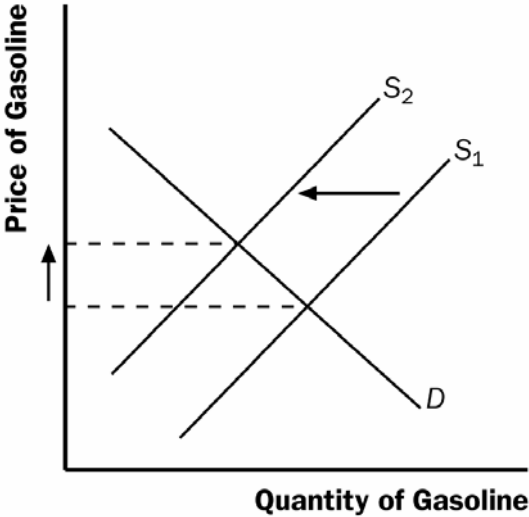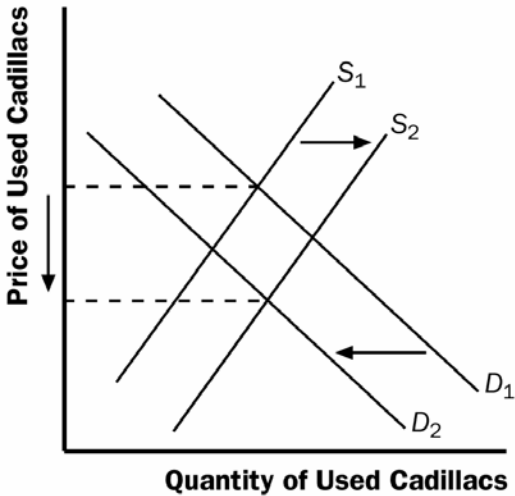

Figure 8 **Figure 9**

3. a. If people decide to have more children (a change in tastes), they will want larger vehicles for hauling their kids around, so the demand for minivans will increase. Supply won't be affected. The result is a rise in both price and quantity, as Figure 12 shows.
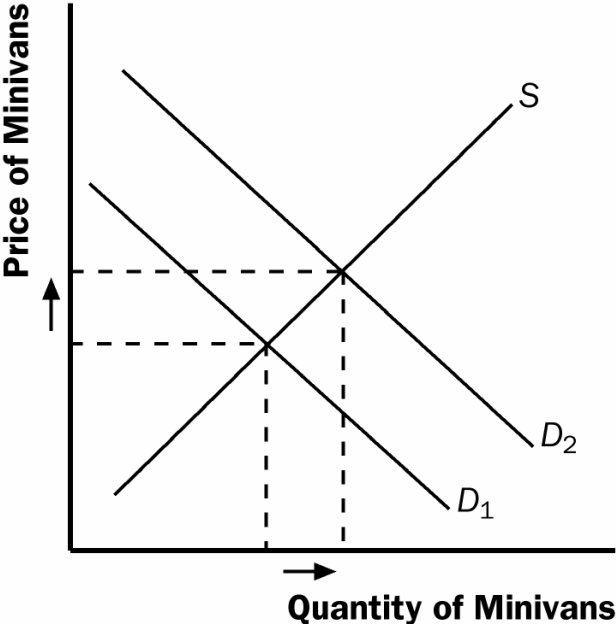

Figure 12

b. If a strike by steelworkers raises steel prices, the cost of producing a minivan rises (a rise

in input prices), so the supply of minivans decreases. Demand won't be affected. The result is a rise in the price of minivans and a decline in the quantity, as Figure 13 shows.
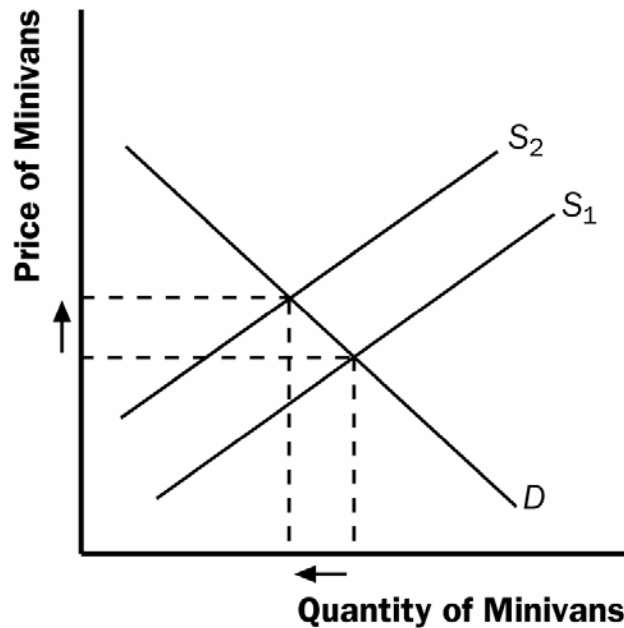

Figure 13

c.   The development of new automated machinery for the production of minivans is an improvement in technology. The reduction in firms' costs results in an increase in supply. Demand isn't affected. The result is a decline in the price of minivans and an increase in the quantity, as Figure 14 shows.
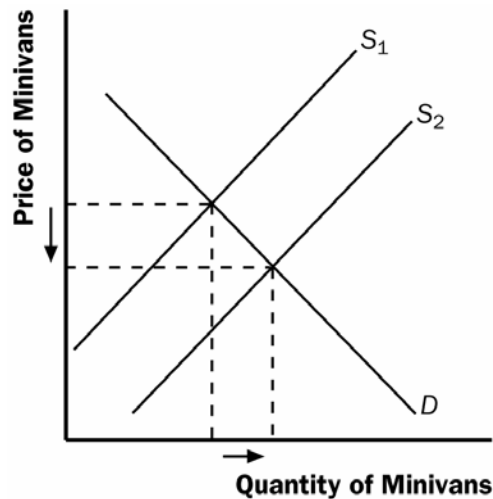

Figure 14

d.   The rise in the price of sport utility vehicles affects minivan demand because sport utility vehicles are substitutes for minivans (that is, there is a rise in the price of a related

good). The result is an increase in demand for minivans. Supply is not affected. In equilibrium, the price and quantity of minivans both rise, as Figure 12 shows.

e.   The reduction in peoples' wealth caused by a stock-market crash reduces their income, leading to a reduction in the demand for minivans, since minivans are likely a normal good. Supply isn't affected. As a result, both price and quantity decline, as Figure 15 shows.
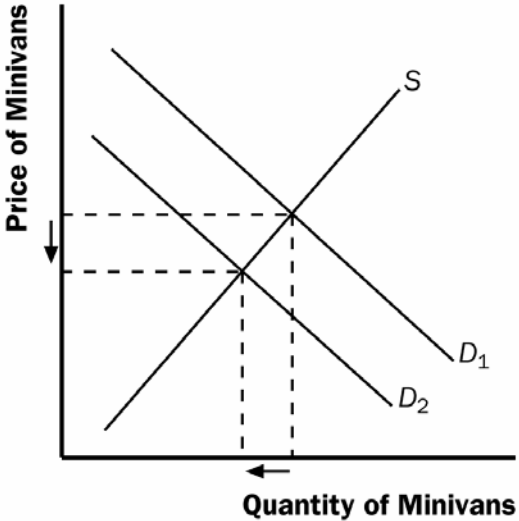

Figure 15

5.   a.   When a hurricane in South Carolina damages the cotton crop, it raises input prices for producing sweatshirts. As a result, the supply of sweatshirts shifts to the left, as shown in Figure 19. The new equilibrium has a higher price and lower quantity of sweatshirts.
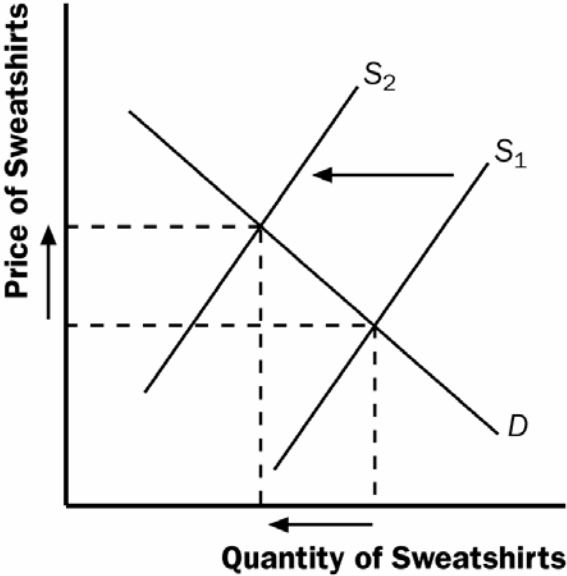
Figure 19

b.   A decline in the price of leather jackets leads more people to buy leather jackets, reducing the demand for sweatshirts. The result, shown in Figure 20, is a decline in both the equilibrium price and quantity of sweatshirts.

Price of Sweatshirts (vertical axis)

S

D_1

D_2

Quantity of Sweatshirts

Figure 20

c.   The effects of colleges requiring students to engage in morning calisthenics in appropriate attire raises the demand for sweatshirts, as shown in Figure 21. The result is an increase in both the equilibrium price and quantity of sweatshirts.

Price of Sweatshirts (vertical axis)

S

D_2

D_1

Quantity of Sweatshirts
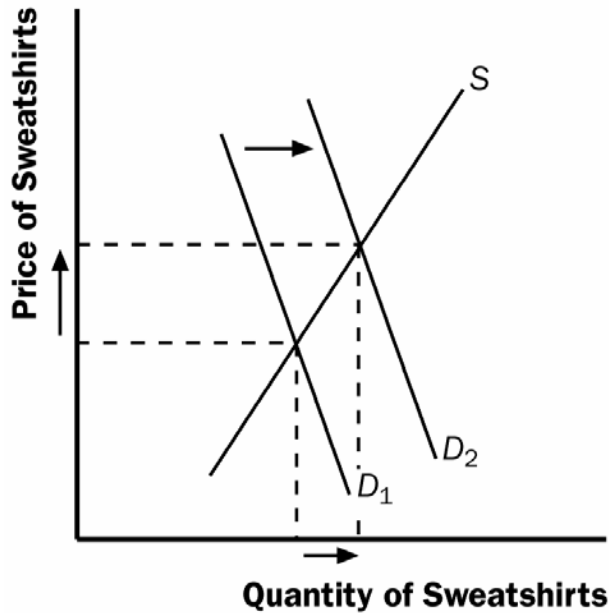
Figure 21

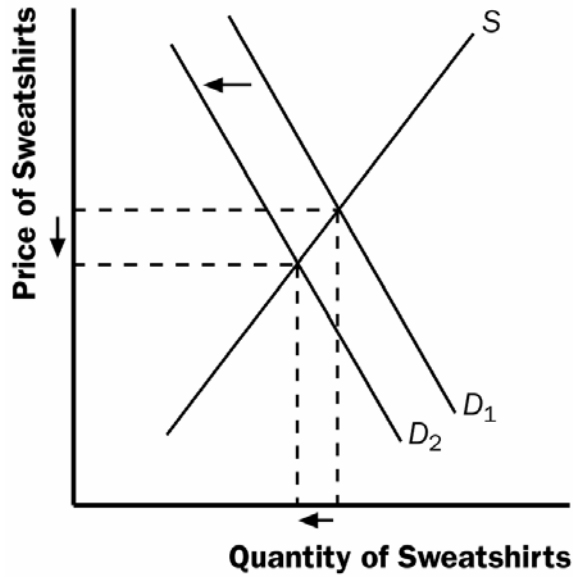d.   The invention of new knitting machines increases the supply of sweatshirts. As Figure 22 shows, the result is a reduction in the equilibrium price and an increase in the equilibrium quantity of sweatshirts.

Figure 22

Chapter 5

Questions for Review

5.   If demand is elastic, an increase in price reduces total revenue. With elastic demand, the quantity demanded falls by a greater percentage than the percentage increase in price. As a result, total revenue declines.

Chapter 13

Questions for Review

1.   The relationship between a firm's total revenue, profit, and total cost is profit equals total revenue minus total costs.

2.   An accountant would not count the owner's opportunity cost of alternative employment as an accounting cost. An 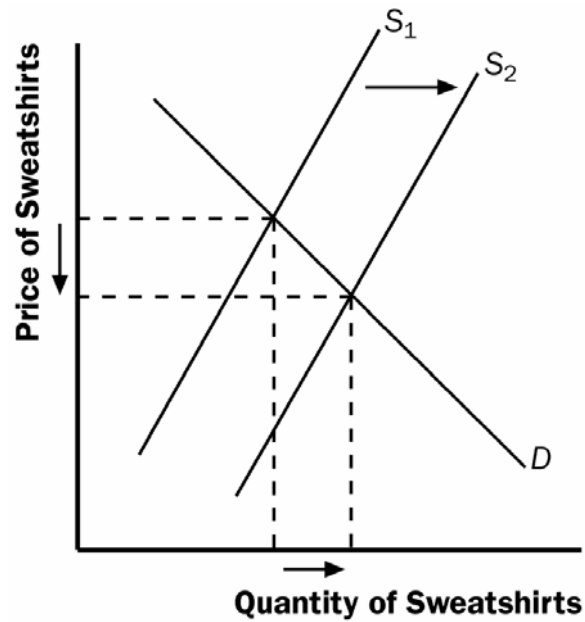example is given in the text in which Helen runs a cookie business, but she could instead work as a computer programmer. Because she's working in her cookie factory, she gives up the opportunity to earn $100 per hour as a computer programmer. The accountant ignores this opportunity cost because no money flow occurs. But the cost is relevant to Helen's decision to run the cookie factory.

3.   Marginal product is the increase in output that arises from an additional unit of input. Diminishing marginal product means that the marginal product of an input declines as the quantity of the input increases.

4.   Figure 4 shows a production function that exhibits diminishing marginal product of labor. Figure 5 shows the associated total-cost curve. The production function is concave because of diminishing marginal product, while the total-cost curve is convex for the same reason.
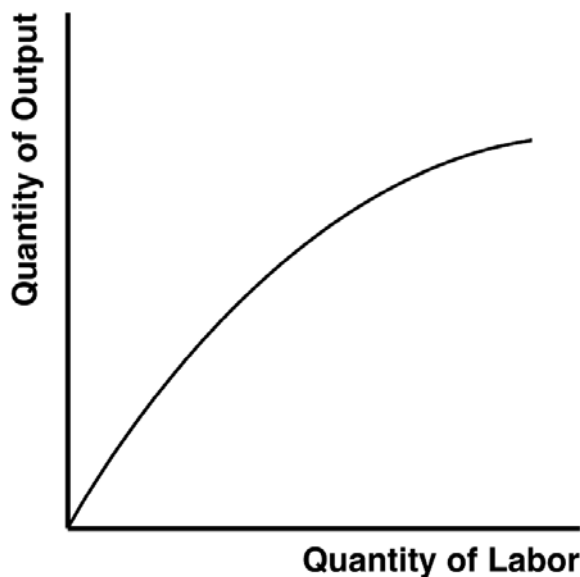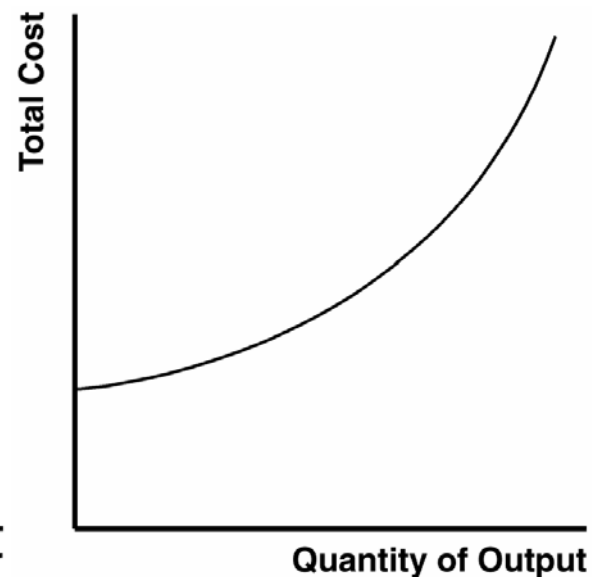
Figure 4   Figure 5

5.   Total cost consists of the costs of all inputs needed to produce a given quantity of output. It includes fixed costs and variable costs. Average total cost is the cost of a typical unit of output and is equal to total cost divided by the quantity produced. Marginal cost is the cost of producing an additional unit of output and is equal to the change in total cost divided by the change in quantity. An additional relation between average total cost and marginal cost is that whenever marginal cost is less than average total cost, average total cost is declining; whenever marginal cost is greater than average total cost, average total cost is rising.

6.   Figure 6 shows the marginal-cost curve and the average-total-cost curve for a typical firm. It has three main features: (1) marginal cost is rising; (2) average total cost is U-shaped; and (3) whenever marginal cost is less than average total cost, average total cost is declining; whenever marginal cost is greater than average total cost, average total cost is rising. Marginal cost is rising for output greater than a certain quantity because in the short run the firm must hire additional labor to produce more output without being able to buy additional equipment. The average total cost curve is U-shaped because the firm initially is able to spread out fixed costs over additional units, but as quantity increases, it costs more to increase quantity further because some important input is limited. Marginal cost and average total cost have the relationship they do because marginal cost pulls average total cost in the same direction. The marginal cost and average total cost curves intersect at the minimum of average total cost; that quantity is the efficient scale.
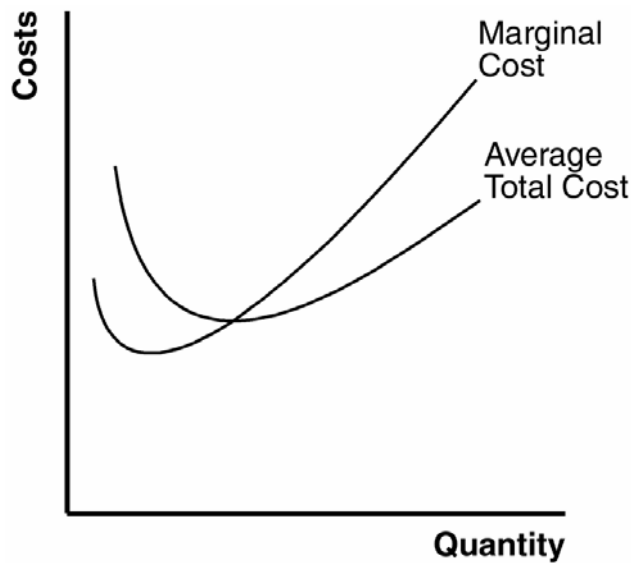
Figure 6

Problems and Applications

2.   a.   The opportunity cost of something is what must be forgone to acquire it.

        b.   The opportunity cost of running the hardware store is $550,000, consisting of $500,000 to rent the store and buy the stock and a $50,000 opportunity cost, since your aunt would quit her job as an accountant to run the store. Since the total opportunity cost of $550,000 exceeds revenue of $510,000, your aunt should not open the store, as her profit would be negative—she would lose money.

4.   a.   The following table shows the marginal product of each hour spent fishing:

Hours	Fish	Fixed Cost	Variable Cost	Total Cost	Marginal Product
0	0	$10	$0	$10	---
1	10	10	5	15	10
2	18	10	10	20	8
3	24	10	15	25	6
4	28	10	20	30	4
5	30	10	25	25	2

b.   Figure 7 graphs the fisherman's production function. The production function becomes flatter as the number of hours spent fishing increases, illustrating diminishing marginal product.
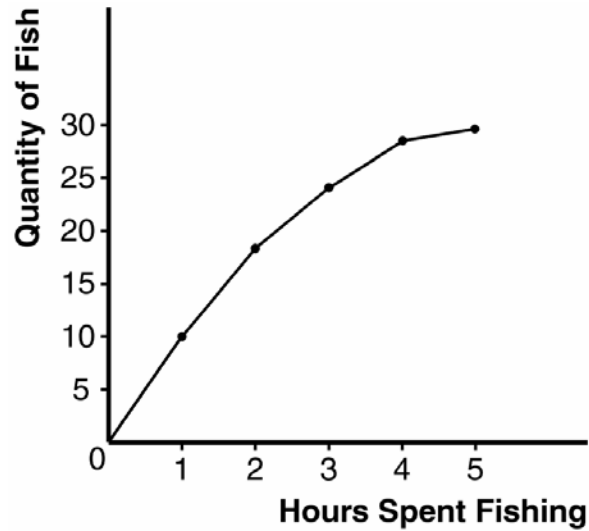
Figure 7

c.   The table shows the fixed cost, variable cost, and total cost of fishing. Figure 8 shows the fisherman's total-cost curve. It slopes up because catching additional fish takes additional time. The curve is convex because there are diminishing returns to fishing time—each additional hour spent fishing yields fewer additional fish.

Figure 8

5.   Here is the table of costs:

Workers	Output	Marginal Product	Total Cost	Average Total Cost	Marginal Cost
0	0	---	$200	---	---

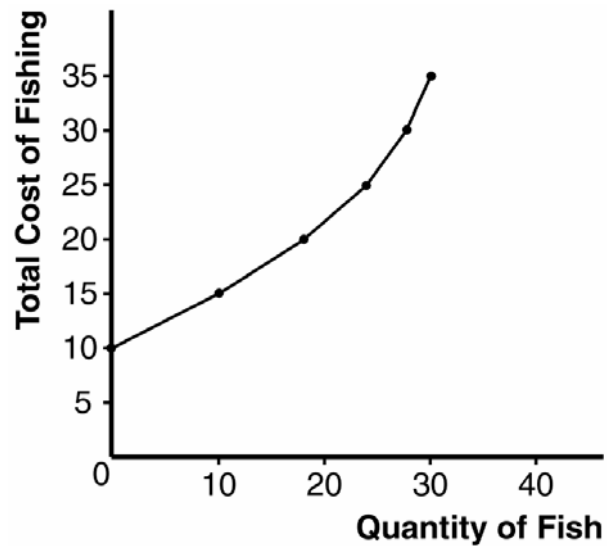|					
1	20	20	300	$15.00	$5.00
2	50	30	400	8.00	3.33
3	90	40	500	5.56	2.50
4	120	30	600	5.00	3.33
5	140	20	700	5.00	5.00
6	150	10	800	5.33	10.00
7	155	5	900	5.81	20.00

a. See table for marginal product. Marginal product rises at first, then declines because of diminishing marginal product.

b. See table for total cost.

c. See table for average total cost. Average total cost is U-shaped. When quantity is low, average total cost declines as quantity rises; when quantity is high, average total cost rises as quantity rises.

d. See table for marginal cost. Marginal cost is also U-shaped, but rises steeply as output increases. This is due to diminishing marginal product.

e. When marginal product is rising, marginal cost is falling, and vice versa.

f. When marginal cost is less than average total cost, average total cost is falling; the cost of the last unit produced pulls the average down. When marginal cost is greater than average total cost, average total cost is rising; the cost of the last unit produced pushes the average up.

7. a. The fixed cost is $300, since fixed cost equals total cost minus variable cost.

b.

Quantity	Total Cost	Variable Cost	Marginal Cost (using total cost)	Marginal Cost (using variable cost)
0	$300	$0	---	---
1	350	50	$50	$50
2	390	90	40	40
3	420	120	30	30
4	450	150	30	30
5	490	190	40	40
6	540	240	50	50

Marginal cost equals the change in total cost or the change in variable cost. That is because total cost equals variable cost plus fixed cost and fixed cost does not change as the quantity changes. So as quantity increases, the increase in total cost equals the increase in variable cost and both are equal to marginal cost.

Chapter 14

Questions for Review

1. A competitive firm is a firm in a market in which: (1) there are many buyers and many sellers in the market; (2) the goods offered by the various sellers are largely the same; and (3) usually firms can freely enter or exit the market.

2. Figure 2 shows the cost curves for a typical firm. For a given price (such as P^*), the level of output that maximizes profit is the output where marginal cost equals price (Q^*), as long as price is greater than average variable cost at that point (in the short run), or greater than average total cost (in the long run).
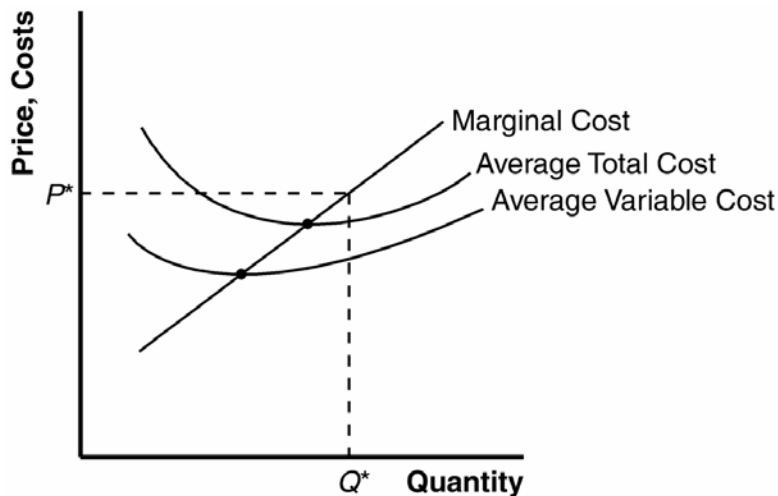
Figure 2

3. A firm will shut down temporarily if the revenue it would get from producing is less than the variable costs of production. This occurs if price is less than average variable cost.

4. A firm will exit a market if the revenue it would get if it stayed in business is less than its total cost. This occurs if price is less than average total cost.

6. The firm's price equals the minimum of average total cost only in the long run. In the short run, price may be greater than average total cost, in which case the firm is making profits, or price may be less than average total cost, in which case the firm is making losses. But the situation is different in the long run. If firms are making profits, other firms will enter the industry, which will lower the price of the good. If firms are making losses, they will exit the industry, which will raise the price of the good. Entry or exit continues until firms are making neither profits nor losses. At that point, price equals average total cost.

Problems and Applications

3. a. Remembering that price equals marginal cost when firms are maximizing profit, we know the marginal cost must be 30 cents, since that is the price.

    b. The industry is not in long-run equilibrium since price exceeds average total cost.

4. Once you have ordered the dinner, its cost is sunk, so it does not represent an opportunity cost.

As a result, the cost of the dinner should not influence your decision about stuffing yourself.

5.   Since Bob's average total cost is $280/10 = $28, which is greater than the price, he will exit the industry in the long run. Since fixed cost is $30, average variable cost is ($280 - $30)/10 = $25, which is less than price, so Bob won't shut down in the short run.

6.   Here's the table showing costs, revenues, and profits:

Quantity	Total Cost	Marginal Cost	Total Revenue	Marginal Revenue	Profit
0	$ 8	---	$ 0	---	$ -8
1	9	$ 1	8	$ 8	-1
2	10	1	16	8	6
3	11	1	24	8	13
4	13	2	32	8	19
5	19	6	40	8	21
6	27	8	48	8	21
7	37	10	56	8	19

a.   The firm should produce 5 or 6 units to maximize profit.

b.   Marginal revenue and marginal cost are graphed in Figure 3. The curves cross at a quantity between 5 and 6 units, yielding the same answer as in part (a).

c.   This industry is competitive since marginal revenue is the same for each quantity. The industry is not in long-run equilibrium, since profit is positive.
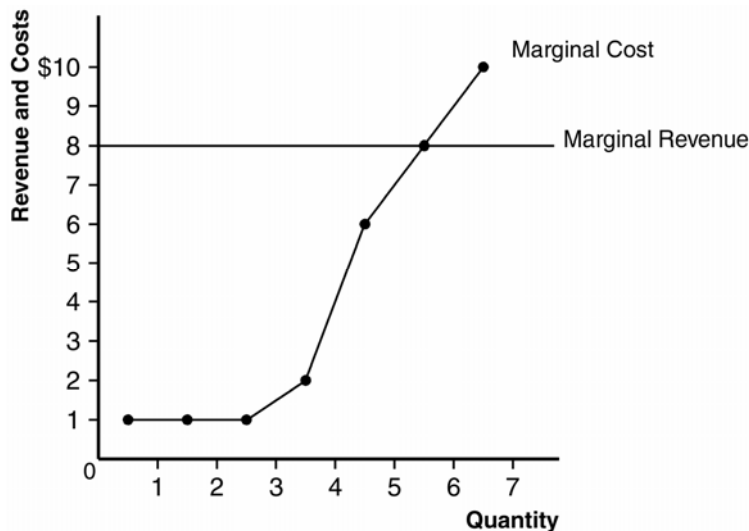

Figure 3

10.   The rise in the price of petroleum increases production costs for individual firms and thus shifts the industry supply curve up, as shown in Figure 8. The typical firm's initial marginal-cost curve is MC_1 and its average-total-cost curve is ATC_1. In the initial equilibrium, the industry supply curve, S_1, intersects the demand curve at price P_1, which is equal to the minimum average total

cost of the typical firm. Thus the typical firm earns no economic profit.

The increase in the price of oil shifts the typical firm's cost curves up to MC_2 and ATC_2, and shifts the industry supply curve up to S_2. The equilibrium price rises from P_1 to P_2, but the price does not increase by as much as the increase in marginal cost for the firm. As a result, price is less than average total cost for the firm, so profits are negative.

In the long run, the negative profits lead some firms to exit the industry. As they do so, the industry-supply curve shifts to the left. This continues until the price rises to equal the minimum point on the firm's average-total-cost curve. The long-run equilibrium occurs with supply curve S_3, equilibrium price P_3, industry output Q_3, and firm's output q_3. Thus, in the long run, profits are zero again and there are fewer firms in the industry.
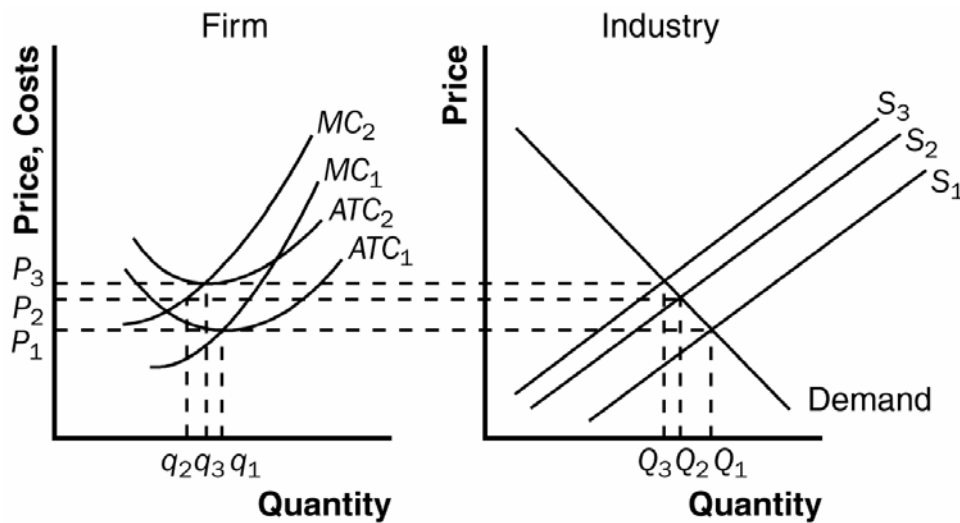

Figure 8

11.   a.   Figure 9 illustrates the situation in the U.S. textile industry. With no international trade, the market is in long-run equilibrium. Supply intersects demand at quantity Q_1 and price $30, with a typical firm producing output q_1.
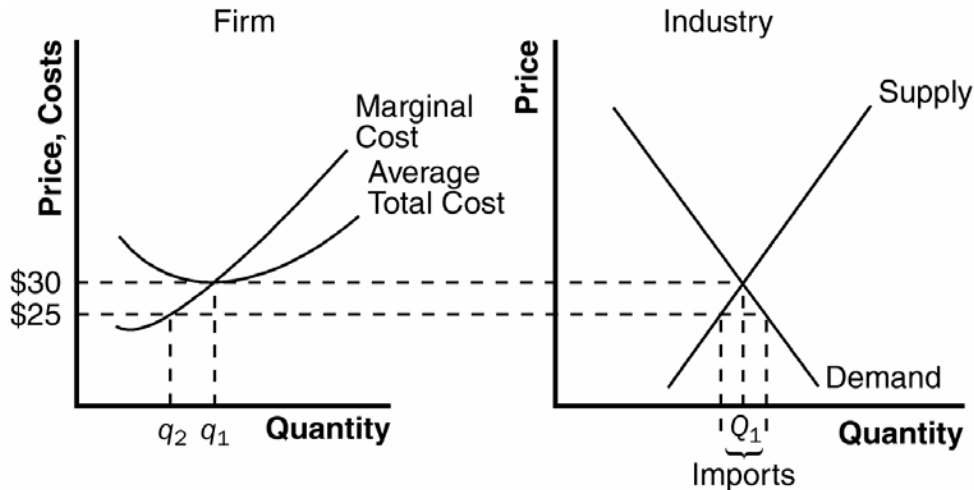
Figure 9

b.   The effect of imports at $25 is that the market supply curve follows the old supply curve up to a price of $25, then becomes horizontal at that price. As a result, demand exceeds domestic supply, so the country imports textiles from other countries. The typical domestic firm now reduces its output from q_1 to q_2, incurring losses, since the large fixed costs imply that average total cost will be much higher than the price.

c.   In the long run, domestic firms will be unable to compete with foreign firms because their costs are too high. All the domestic firms will exit the industry and other countries will supply enough to satisfy the entire domestic demand.

13.   a.   Figure 11 illustrates the gold market (industry) and a representative gold mine (firm). The demand curve, D_1, intersects the supply curve at industry quantity Q_1 and price P_1. Since the industry is in long-run equilibrium, the price equals the minimum point on the representative firm's average total cost curve, so the firm produces output q_1 and makes zero profit.

b.   The increase in jewelry demand leads to an increase in the demand for gold, shifting the demand curve to D_2. In the short run, the price rises to P_2, industry output rises to Q_2, and the representative firm's output rises to q_2. Since price now exceeds average total cost, the representative firm now earns positive profits.
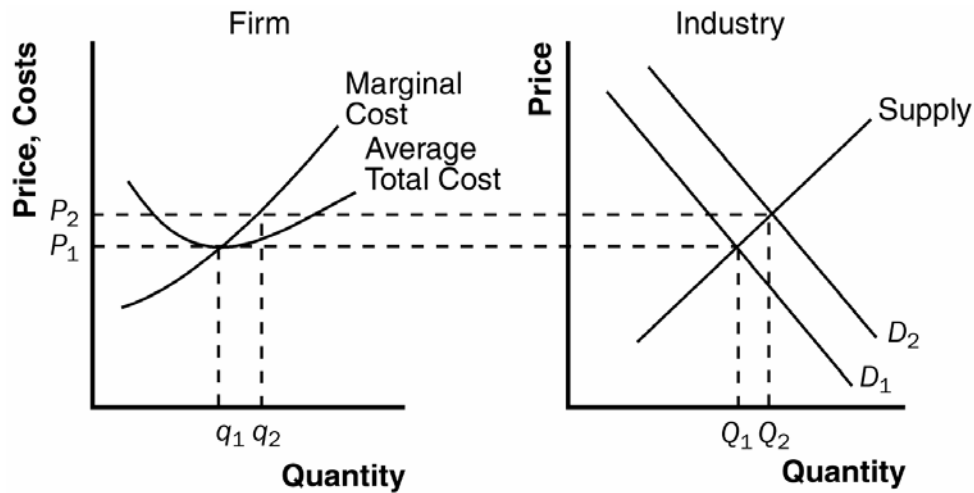

Figure 11

Chapter 15

Questions for Review

4.   Figure 1 shows the demand, marginal-revenue, and marginal-cost curves for a monopolist. The intersection of the marginal-revenue and marginal-cost curves determines the profit-maximizing level of output, Q_m. The demand curve then shows the profit-maximizing price, P_m.
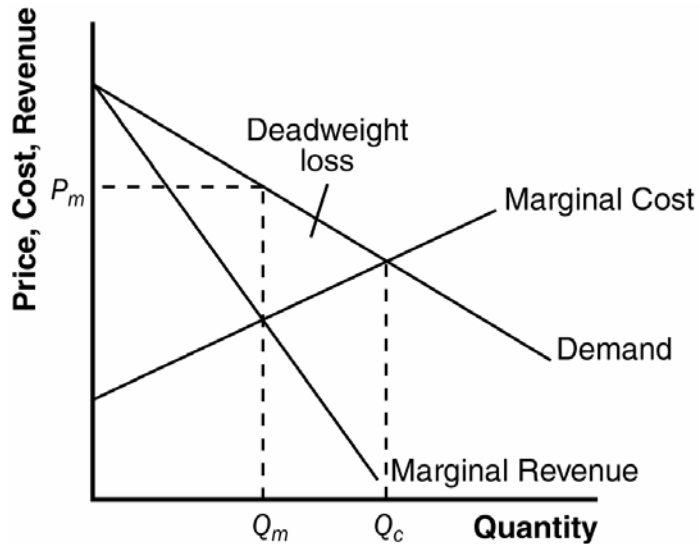
Deadweight loss

P_m

Marginal Cost

Demand

Marginal Revenue

Q_m Q_c **Quantity**

Price, Cost, Revenue

Figure 1

5.   The level of output that maximizes total surplus in Figure 1 is where the demand curve intersects the marginal-cost curve, Q_c. The deadweight loss from monopoly is the triangular area between Q_c and Q_m that is above the marginal-cost curve and below the demand curve. It represents deadweight loss, since society loses total surplus because of monopoly, equal to the value of the good (measured by the height of the demand curve) less the cost of production (given by the height of the marginal-cost curve), for the quantities between Q_m and Q_c.

Problems and Applications

14.   Though Britney Spears has a monopoly on her own singing, there are many other singers in the market. If Spears were to raise her price too much, people would substitute to other singers. So there is no need for the government to regulate the price of her concerts.

Chapter 16

Questions for Review

5. The prisoners' dilemma is a game between two people or firms that illustrates why it is difficult for opponents to cooperate even when cooperation would make them all better off. Each person or firm has a great incentive to cheat on any cooperative agreement to make himself or itself better off.

Problems and Applications

1. a. OPEC members were trying to reach an agreement to cut production so they could raise the price.

   b. They were unable to agree on cutting production because each country has an incentive to cheat on any agreement. The turmoil is a decline in the price of oil because of increased production.

   c. OPEC would like Norway and Britain to join their cartel so they could act like a monopoly.

8. a. The decision box for this game is:

		Braniff's Decision	
		Low Price	High Price
American's Decision	Low Price	Low profits for Braniff Low profits for American	Very low profits for Braniff High Profits for American
	High Price	High profits for Braniff Very low profits for American	Medium profits for Braniff Medium profits for American

   b. If Braniff sets a low price, American will set a low price. If Braniff sets a high price, American will set a low price. So American has a dominant strategy to set a low price.

      If American sets a low price, Braniff will set a low price. If American sets a high price, Braniff will set a low price. So Braniff has a dominant strategy to set a low price.

      Since both have a dominant strategy to set a low price, the Nash equilibrium is for both to set a low price.

   c. A better outcome would be for both airlines to set a high price; then they would both get higher profits. But that outcome could only be achieved by cooperation (collusion). If that happened, consumers would lose because prices would be higher and quantity would be lower.

Chapter 18

Questions for Review

2.   Events that could shift the demand for labor include changes in the output price, technological change, and changes in the supply of other factors.

3.   Events that could shift the supply of labor include changes in tastes, changes in alternative opportunities, and immigration.

3.   a.   If Congress were to buy personal computers for all American college students, the demand for computers would increase, raising the price of computers and thus increasing the value of marginal product of workers who produce computers. This is shown in Figure 4 as a shift in the demand curve for labor from D_1 to D_2. The result is an increase in the wage from w_1 to w_2 and an increase in the quantity of labor from L_1 to L_2.

      b.   If more college students major in engineering and computer science, the supply of labor in the computer industry rises. This is shown in Figure 5 as a shift in the supply curve from S_1 to S_2. The result is a decrease in the wage from w_1 to w_2 and an increase in the quantity of labor from L_1 to L_2.
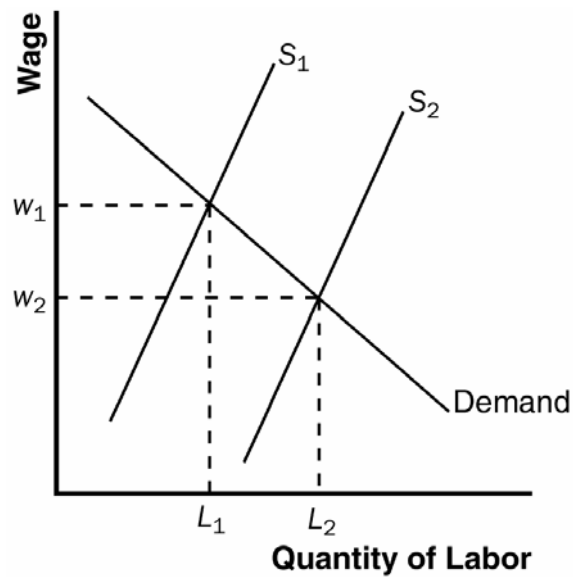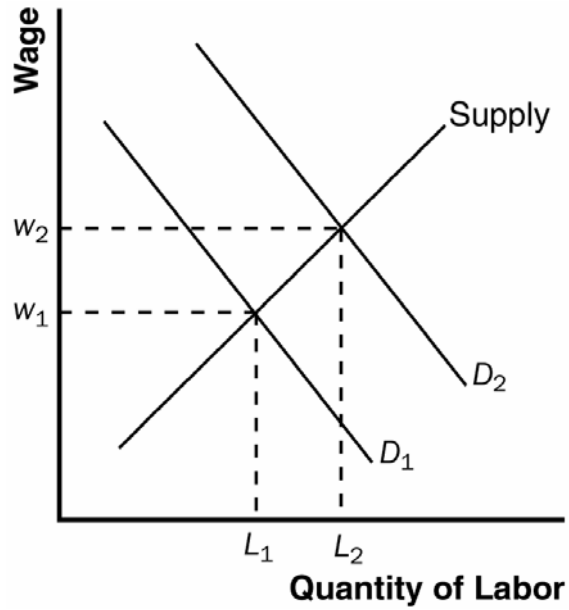

Figure 5

Figure 6

c.   If computer firms build new manufacturing plants, this increases the marginal product of labor and the value of the marginal product of labor for any given quantity of labor. This is shown in Figure 6 as a shift in the demand curve for labor from D_1 to D_2. The result is an increase in the wage from w_1 to w_2 and an increase in the quantity of labor from L_1 to L_2.

Chapter 19

Questions for Review

1. Coal miners get paid more than other workers with similar amounts of education because their higher wage compensates them for the dirty and dangerous nature of coal mining, as well as their long-term health problems. As a result, they earn a sizable compensating differential.

4. The conditions that lead to economic superstars are: (1) every customer wants to enjoy the good supplied by the best producer; and (2) the good is produced with a technology that makes it possible for the best producer to supply every customer at a low cost. Because one dentist could not supply every customer, you would not expect to see superstars in dentistry. But because copies of music can be made at low cost, you would expect to see superstars in music.

7. The forces of economic competition tend to ameliorate discrimination on the basis of race, since business owners who care only about making profit are at an advantage when competing against those who also care about discriminating.

Problems and Applications

5. Sara should take the other job if Steve's attitude problem is worth $10,000 or more to her. She should view the $10,000 difference in salary as a compensating differential for putting up with Steve. The question Sara must answer is this: Is $10,000 enough of a compensating differential? If so, she will stay in her current job. If not, she will take the new job.

8. Yes, his behavior is profit maximizing. He is hiring labor at a lower cost. You might claim that Alan is despicable because he is discriminating against men. Some might claim that Alan was admirable, though, since he is maximizing profit and giving women a better opportunity to find a job. If more employers were like Alan, the wage differential between men and women would shrink, as employers would be competing for women workers, so women would have as many job options as men. Ultimately, the wage differential could disappear. Other firms at the time may not have followed his strategy because their customers may have preferred male consultants.