PS4, Ch5: 2-7, 11, 16, 18; Ch6: 1-8, 11-13

Chapter 5

Use the following table to work Problems 2 to 4.
The table gives the demand schedules for train travel for the only buyers in the market, Ann, Beth, and Cy.

Price (dollars per mile)	Quantity demanded (miles)		
	Ann	Beth	Cy
3	30	25	20
4	25	20	15
5	20	15	10
6	15	10	5
7	10	5	0
8	5	0	0
9	0	0	0

2. a. Construct the market demand schedule.

The market demand schedule shows the sum of the quantities demanded by Ann, Beth, and Cy at each price. When the price is $3 per mile, the market quantity demanded is 75 miles; when the price is $4 per mile, the market quantity demanded is 60 miles; when the price is $5 per mile, the marker quantity demanded is 45 miles; when the price is $6 per mile, the market quantity demanded is 30 miles; when the price is $7 per mile, the market quantity demanded is 15 miles; when the price is $8 per mile, the market quantity demanded is 5 miles; and when the price is $9 per mile, the market quantity demanded is 0 miles.

b. What is the maximum price that each traveler, Ann, Beth, and Cy, is willing to pay to travel 20 miles? Why?

Each person's demand schedule shows the maximum price that person is willing to pay to travel 20 miles. The maximum price Ann is willing to pay to travel 20 miles is $5 per mile, the maximum price Beth is willing to pay is $4 per mile, and the maximum price Cy is willing to pay is $3 per mile.

3. a. What is the marginal social benefit when the total distance travelled is 60 miles?

The marginal social benefit when the quantity is 60 miles is $4 per mile. The marginal social benefit is determined from the consumers' demand schedules and equals the maximum price that consumers will pay for the quantity. The demand schedule shows that the maximum price consumers will pay for 60 miles is $4 per mile and this price equals the marginal social benefit.

b. When the total distance traveled is 60 miles, how many miles does each travel and what is their marginal private benefit?

The three travel a total distance of 60 miles when the price is $4 a mile. Each person's marginal benefit is $4 per mile. At this price Ann travels 25 miles, Beth travels 20 miles, and Cy travels 15 miles.

4. a. What is each traveler's consumer surplus when the price is $4 a mile? What is the market consumer surplus when the price is $4 a mile?

Ann's consumer surplus is $62.50; Beth's consumer surplus is $40.00; and, Cy's consumer surplus is $22.50.

When the price is $4 per mile, Ann buys 25 miles. Ann's consumer surplus is the triangular area under her demand curve and above the price. The demand curve is linear, so Ann's consumer surplus is 1/2 × ($9 − $4) × 25, which equals $62.50.

When the price is $4 per mile, Beth buys 20 miles. Beth's consumer surplus is the triangular area under her demand curve and above the price. The demand curve is linear, so Beth's consumer surplus is 1/2 × ($8 − $4) × 20, which equals $40.00

When the price is $4 per mile, Cy buys 15 miles. Cy's consumer surplus is the triangular area under his demand curve and above the price. The demand curve is linear, so Cy's consumer surplus is 1/2 × ($7 − $4) × 15, which equals $22.50.

The market consumer surplus is the sum of Ann's consumer surplus, Beth's consumer surplus, and Cy's consumer surplus, or $125.00.

Use the following table to work Problems 5 to 7.
The table gives the supply schedules of hot air balloon rides for the only sellers in the market, Xavier, Yasmin, and Zack.

Price (dollars per ride)	Quantity supplied (rides per week)		
	Xavier	Yasmin	Zack
100	30	25	20
90	25	20	15
80	20	15	10
70	15	10	5
60	10	5	0
50	5	0	0
40	0	0	0

5. a. Construct the market supply schedule.

The market supply schedule shows the sum of the quantities supplied by Xavier, Yasmin, and Zack at each price. When the price is $100 per ride, the market quantity supplied is 75 rides; when the price is $90 per ride, the market quantity supplied is 60 rides; when the price is $80 per ride, the market quantity supplied is 45 rides; when the price is $70 per ride, the market quantity supplied is 30 rides; when the price is $60 per ride, the market quantity supplied is 15 rides; when the price is $50 per ride, the market quantity supplied is 5 rides; and when the price is $40 per ride, the market quantity supplied is 0 rides.

b. What are the minimum prices that Xavier, Yasmin, and Zack are willing to accept to supply 20 rides? Why?

The minimum supply-price equals the lowest price at which a producer is willing to produce the given quantity. The supply schedule tells us the minimum supply-price. Xavier's minimum supply-price for 20 rides is $80; Yasmin's minimum supply-price is $90; and, Zack's minimum supply-price is $100.

6. a. What is the marginal social cost when the total number of rides is 30?

The quantity of rides supplied is 30 when the price is $70 per ride. The marginal social cost of any quantity is equal to the price for which that quantity will be supplied, so when the total number of rides is 30, the marginal social cost equals $70 per ride.

b. What is the marginal cost for each supplier when the total number of rides is 30 and how many rides does each of the firms supply?

When the total number of rides is 30, Xavier supplies 15 rides, Yasmin supplies 10 rides, and Zack supplies 5 rides. The marginal cost for each firm is $70.

7. When the price is $70 a ride, what is each firm's producer surplus? What is the market producer surplus?

Xavier's producer surplus is $225; Yasmin's is $100; and, Zack's is $25.
When the price is $70 per ride, Xavier supplies 15 rides. Xavier's producer surplus is the triangular area under the price and above his supply curve. The supply curve is linear, so Xavier's producer surplus is 1/2 × ($70 − $40) × 15, which equals $225.
When the price is $70 per ride, Yasmin supplies 10 rides. Yasmin's producer surplus is the triangular area under the price and above his supply curve. The supply curve is linear, so Yasmin's producer surplus is 1/2 × ($70 − $50) × 10, which equals $100.
When the price is $70 per ride, Zack supplies 5 rides. Zack's producer surplus is the triangular area under the price and above his supply curve. The supply curve is linear, so Zack's producer surplus is 1/2 × ($70 − $60) × 5, which equals $25.
The market producer surplus is equal to the sum of Xavier's producer surplus, Yasmin's producer surplus, and Zack's producer surplus, which is $225 + $100 + $25 or $350.

11. At McDonald's, no reservations are accepted; at Panorama at St. Louis Art Museum, reservations are accepted; at the Bissell Mansion restaurant, reservations are essential. Describe the method of allocating tables in these three restaurants. Why do restaurants have different reservations policies?

All these restaurants use a first-come, first-serve system. McDonald's uses this system directly. Bissell Mansion uses a first-come, first-serve because the first person to call to make a reservation at a particular time is allocated the table at that time. Puck's uses a combination of the immediate first-come, first-serve system and the reservation based first-come, first-serve system.

The speed with which tables turn over at the different restaurants probably is quite different and the customers probably have quite different values of time. Bissell Mansion has a low turnover rate—only 1 or 2 groups of customers can use a table each night—and its customers have a high value of time. If Bissell Mansion refused to take reservations, its customers would need to wait an inefficiently long time and would go elsewhere so that Bissell Mansion profits would be lower. At McDonald's, the tables have a high turnover rate (indeed, many customers do not use the tables at all, buying their food to go) and the customers have a lower value of time. Allowing reservations would be costly for McDonald's and would spare its customers only a slight wait at most so that allowing reservations would decrease McDonald's profits. At Puck's, the turnover rate of the tables is between that at Bissell Mansion and McDonald's, so it uses a combination of phone reservation first-come, first-serve and appear in person first-come, first-serve.

16. The table gives the demand and supply schedules for sandwiches.

Price (dollars per sandwich)	Quantity demanded (sandwiches per hour)	Quantity supplied (sandwiches per hour)
0	300	0
1	250	50
2	200	100
3	150	150
4	100	200
5	50	250
6	0	300

a. What is the maximum price that consumers are willing to pay for the 200th sandwich?

The demand schedule shows the maximum price that consumers will pay for each sandwich. The maximum price consumers will pay for the 200th sandwich is $2.

b. What is the minimum price that producers are willing to accept for the 200th sandwich?

The supply schedule shows the minimum price that producers will accept for each sandwich. The minimum price that producers are willing to accept for the 200th sandwich is $4.

c. If 200 sandwiches a day are available, what is the total surplus?

200 sandwiches a day are more than the efficient quantity because the marginal social benefit (the maximum price consumers will pay) is less than the marginal social cost (the minimum price suppliers will accept). Because production is inefficient, there is a deadweight loss, equal to the sum of the consumer surplus and producer surplus lost because the quantity produced is not the efficient quantity. The deadweight loss equals the quantity (200 − 150) multiplied by ($4 − $2)/2, which is $50. This deadweight loss must be subtracted from the surplus that would be obtained if the market was efficient to calculate the total surplus when 200 sandwiches are produced. When the market produces the efficient quantity, 150 sandwiches are produced. The total surplus at this efficient quantity equals the area of the triangle under the demand curve and above the supply curve to the quantity of 150. This area is ½ × ($6 − $0) × 150, which is $450. So the total surplus when 200 sandwiches are produced equals $450 − $50, which is $400.

18. Use the data in the table in Problem 16.

a. If the sandwich market is efficient, what is the consumer surplus, what is the producer surplus, and what is the total surplus?

150 sandwiches is the efficient quantity and the equilibrium price is $3. The consumer surplus is the area of the triangle under the demand curve above the price. The area of the consumer surplus triangle is ½ × ($6 − $3) × 150, which is $225. The producer surplus is the area of the triangle above the supply curve below the price. The price is $3 and the quantity is 150. The area of the triangle is 1/2 × ($3 − $0) × 150, which is $225. The total surplus is the sum of the consumer surplus plus the producer surplus, which is $450.

b. If the demand for sandwiches increases and sandwich makers produce the efficient quantity, what happens to producer surplus and deadweight loss?

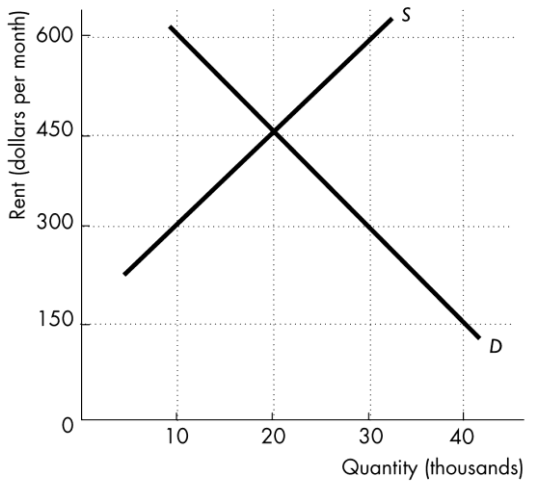
If the demand for sandwiches increases, the price and quantity of sandwiches both rise. The producer surplus definitely increases. There is no deadweight loss because sandwich makers are producing the efficient quantity.

Chapter 6

Use Figure 6.1, which shows the market for rental housing in Townsville, to work Problems 1 and 2.

FIGURE **6.1**

Problems 1 and 2



1. a. What are the equilibrium rent and equilibrium quantity of rental housing?

The equilibrium rent is $450 a month and the equilibrium quantity is 20,000 housing units.

b. If a rent ceiling is set at $600 a month, what is the rent paid? What is the shortage of housing?

If the rent ceiling is set at $600 per month, it is above the equilibrium rent and so is ineffective because renters still pay the equilibrium rent, $450 per month. There is no shortage of housing units: The quantity of housing demanded, 20,000 units, equals the quantity of units supplied.

2. If the rent ceiling is $300 a month, what is the quantity rented, the shortage of housing, and the maximum price that someone is willing to pay for the last unit of housing available?

The quantity rented is 10,000 housing units. The quantity of housing rented is equal to the quantity supplied at the rent ceiling. The shortage of housing is 20,000 housing units. At the rent ceiling, the quantity of housing demanded is 30,000, but the quantity supplied is 10,000, so there is a shortage of 20,000 housing units. The maximum price that someone is willing to pay for the 10,000th unit available is $600 a month. The demand curve tells us the maximum price that someone is willing to pay for the 10,000th unit.

Use the following data on the demand and supply schedules of teenage labor to work Problems 3 and4.

Wage rate (dollars per hour)	Quantity demanded (hours per month)	Quantity supplied (hours per month)
5	2,500	1,500
6	2,000	2,000
7	1,500	2,500
8	1,000	3,000

3. Calculate the equilibrium wage rate, the hours worked, and the quantity of unemployment.

The equilibrium wage rate is $6 an hour and

2,000 hours a month are worked. Unemployment is zero. Everyone who wants to work for $6 an hour is employed.

4. The minimum wage for teenagers is $7 an hour,
   a. How many hours are unemployed?
      At $7 an hour, 1,500 hours a month are employed and 1,000 hours a month are unemployed. The quantity of labor employed equals the quantity demanded at $7 an hour. Unemployment is equal to the quantity of labor supplied at $7 an hour minus the quantity of labor demanded at $7 an hour. The quantity supplied is 2,500 hours a month and the quantity demanded is 1,500 hours a month, so 1,000 hours a month are unemployed.
   b. If the demand for teenage labor increases by 500 hours a month, what is the wage rate and how many hours are unemployed?
      The wage rate is $7 an hour, and unemployment is 500 hours a month. At the minimum wage of $7 an hour, the quantity demanded is 2,000 hours a month and the quantity supplied is 2,500 hours a month so 500 hours a month are unemployed.

5. The table sets out the demand and supply schedules for chocolate brownies.

Price (cents per brownie)	Quantity demanded (millions per day)	Quantity supplied (millions per day)
50	5	3
60	4	4
70	3	5
80	2	6

   a. If sellers are taxed 20¢ a brownie, what is the price and who pays the tax?
      The price paid by buyers, including the tax, is 70 cents a brownie. The price received by sellers, excluding the tax, is 50 cents a brownie. If there is no tax, the price is 60 cents a brownie, so consumers and sellers each pay 10 cents of the tax on a brownie.
   b. If buyers are taxed 20¢ a brownie, what is the price and who pays the tax?
      The price received by sellers, excluding the tax, is 50 cents a brownie, and 3 million brownies a day are consumed. The price paid by buyers, including the tax, is 70 cents a brownie. Consumers and sellers each pay 10 cents of the tax.

Use the following data to work Problems 6 and 7.
The demand and supply schedules for rice are in the table.

Price (dollars per box)	Quantity demanded (boxes per week)	Quantity supplied (boxes per week)
1.20	3,000	1,500
1.30	2,750	2,000
1.40	2,500	2,500
1.50	2,250	3,000
1.60	2,000	3,500

Calculate the price, the marginal cost of rice, and the quantity produced if the government

6. Sets a production quota of 2,000 boxes a week.
   With a production quota of 2,000 boxes a week, the price is $1.60 a box, the marginal cost $1.30 a box, and the quantity produced is 2,000 boxes a week. The production quota decreases the quantity supplied to 2,000 boxes a week. The marginal cost of producing 2,000 boxes of rice is given by the supply schedule and is $1.30 a box.

7. Introduces a subsidy of $0.30 a box.
   With a subsidy of $0.30 a box for rice, the price is $1.20 a box, the marginal cost $1.50 a box, and the quantity produced is 3,000 boxes a week. The subsidy of $0.30 lowers the price at which each quantity in the table is supplied. For example, rice farmers will supply 3,000 boxes a week if the price is $1.50 minus $0.30, which is $1.20. With a subsidy, the market equilibrium occurs at a price of $1.20 a box. At

this price, the quantity demanded is 3,000 boxes and the quantity supplied is 3,000 boxes. The marginal cost of producing rice is given by the supply schedule and is $1.50 a box.

8. Figure 6.2 shows the market for an illegal good. Calculate the market price and the quantity bought if a penalty of $20 a unit is imposed on

a. Sellers only or buyers only.

With a penalty of $20 a unit on sellers, the price is $70 a unit and the quantity consumed is 100 units. The $20 penalty on sellers decreases the supply. The supply curve shifts leftward so that the vertical distance between the initial supply curve and the new supply curve is $20. In Figure 6.3, the supply curve shifts to S_1 and the demand curve remains D. With this new supply curve, the equilibrium is at point A in Figure 6.3, with an equilibrium price of $70 a unit and an equilibrium quantity of 100 units. If the penalty is imposed on only buyers, the price is $50 a unit and the quantity consumed is 100 units. The $20 penalty on buyers decreases the demand. The demand curve shifts leftward so that the vertical distance between the initial demand curve and the new demand curve is $20. In Figure 6.3, the demand curve shifts to D_1 and the supply curve remains S. With this new demand curve, the equilibrium is at point B in Figure 6.3, with an equilibrium price of $50 a unit and an equilibrium quantity of 100 units.

b. Both sellers and buyers.

With a penalty of $20 a unit on sellers and on buyers, the price is $60 a unit and the quantity consumed is 90 units. The $20 penalty on sellers decreases the supply. The supply curve shifts leftward so that the vertical distance between the initial supply curve and the new supply curve is $20. The $20 penalty on buyers decreases the demand. The demand curve shifts leftward so that the vertical distance between the initial demand curve and the new demand curve is $20. In Figure 6.3, the supply curve shifts to S_1 and the demand curve shifts to D_1. With these new supply and demands curves, the equilibrium is at point C in Figure 6.3, with an equilibrium price of $60 a unit and an equilibrium quantity of 90 units.

FIGURE **6.2**
Problem 8

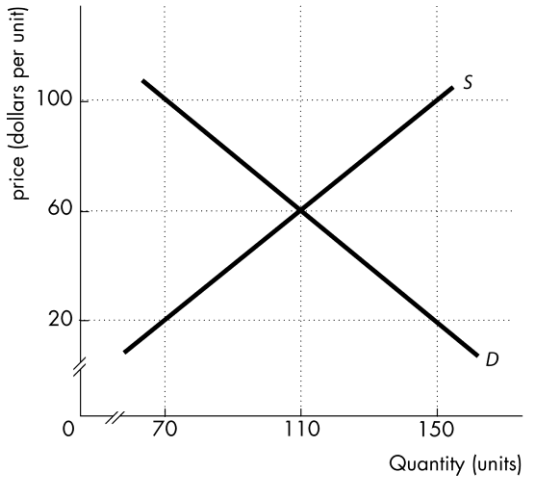


FIGURE **6.3**
Problem 8

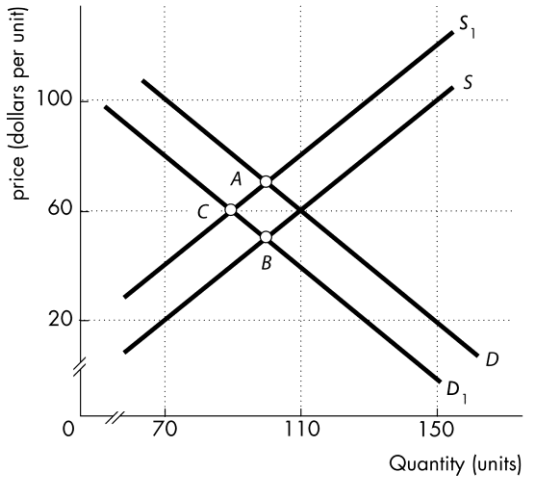
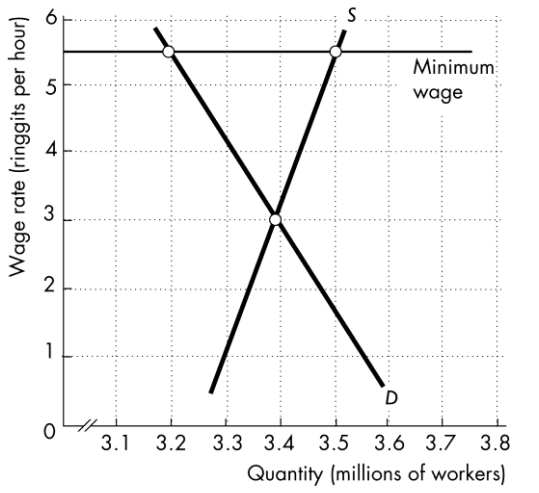


FIGURE **6.4**
Problem 11



Use the following news clip to work Problems 11 and 12.

Malaysia Passes Its First Minimum Wage Law

About 3.2 million low-income workers across Malaysia

are expected to benefit from the country's first minimum wage, which the government says will transform Malaysia into a high-income nation. Employer groups argue that paying the minimum wage, which is not based on productivity or performance, would raise their costs and reduce business profits.

Source: *The New York Times*, May 1, 2012

11. On a graph of the market for low-skilled labor, show the effect of the minimum wage on the quantity of labor employed.

    Figure 6.4 shows the effect in the labor market. Before the hike in the minimum wage, the equilibrium wage rate was 3 ringgits per hour and equilibrium employment was 3.4 million workers. After the imposition of the minimum wage, assumed to 5.5 ringgits an hour, employment falls to 3.2 million and unemployment equals 0.3 million workers (the difference between 3.5 million workers, the quantity of labor supplied at a wage rate of 5.5 ringgits an hour, and quantity of labor demanded at the same wage rate.)

12. Explain the effects of the minimum wage on the workers' surplus, the firms' surplus, and the efficiency of the market for low-skilled workers.

    Taking account of the cost of job search, workers' surplus decreases. Firms' surplus also decreases because they must pay a higher wage rate. The labor market becomes less efficient and a deadweight loss is created.

13. Use the news clip in Problem 11.

    a. If the Malaysian government cut the tax on business profits, would it offset the effect of the minimum wage on employment? Explain.

       The tax cut on small businesses would offset some of the harm imposed on small businesses but it would not offset much of the decrease in employment. The higher wage rate leads firms to decrease the quantity of labor they demand. If a tax cut increases firms' profitability and they respond by increasing their production, then the demand for labor increases. This increase would offset some of the initial fall in employment. But the offset likely would be small because the cut in taxes will be shared between the businesses and the consumers.

    b. Would a cut in the Social Security tax that small businesses pay offset the effect of the higher minimum wage on employment? Explain.

       A cut in the Social Security tax imposed on small businesses could offset the effect the minimum wage hike had on decreasing employment. If Social Security taxes are cut, firms' demand for labor would increase which would result in an increase in employment. Of course the size of the offset would depend on the size of the cut in the Social Security tax and the elasticity of demand for labor and the elasticity supply of labor. Because the supply of labor is probably quite inelastic, most of the benefit of the cut in Social Security tax would be received by workers, which also makes the potential offset small.