# Solutions to End of Chapter Problems

## Farnham, *Economics for Managers, 3/e, Global Edition*

## Chapter 1

### Technical Questions

1. Microeconomics focuses on the behavior of individual consumers, firms, and industries as they operate in a market economy. It analyzes how these various groups respond to changes in prices that affect their consumption, production, and selling decisions. It also describes how firms and consumers interact in various types of markets and can be used as a basis for determining competitive strategies. Macroeconomics focuses on the overall economic environment in which businesses operate. It analyzes the spending decisions of different sectors of the economy—the household, business, government, and foreign sectors. Macroeconomic policy deals with the issues of inflation, unemployment, and economic growth. Changes in the macroeconomic environment influence firms through the microeconomic issues of demand, cost, revenues, and profits.
2. It is because output prices influence a firm's revenue, while input prices influence its costs of production. The difference between its total revenue and total cost determines its profit.
3. The four major types of markets are perfect competition, monopolistic competition, oligopoly, and monopoly. The key characteristics that distinguish these markets are (1) the number of firms competing with each other, (2) whether the products sold in the markets are differentiated or undifferentiated, (3) whether entry into the market by other firms is easy or difficult, and (4) the amount of information available to market participants.
4. No, even if a monopolist is the only firm in a market, it cannot sell any amount of its product at a given market price. If a monopolist raises the price of their product, consumers will buy less. Therefore, their revenue might decrease.
5. In macroeconomics, the five major categories of spending are consumption ($C$), investment ($I$), government ($G$), export ($X$), and import ($M$). $GDP = C + I + G + X - M$. The first four categories are added together, while import spending is subtracted because it represents a flow of expenditure out of the domestic economy to the rest of the world.

6. Fiscal policies are implemented by the national government and involve changing taxes (*T*) and government expenditure (*G*) to stimulate or slow the economy. These decisions are made by the political institutions in the country. Monetary policies are implemented by a country's central bank—the Federal Reserve in the United States. These policies focus on changing the money supply in order to influence interest rates, which then affect real consumption, in-vestment spending, and the resulting level of income and output.

**Application Questions**

1. Microeconomic factors facing the global automobile industry include consumer demand for increased automobile quality and additional features, the increased preferences for sport utility vehicles, the differing preferences of Chinese versus U.S. consumers, and the continued need to redesign production processes to lower production costs. Macroeconomic factors include the continuing weak recovery in global economic activity especially in Europe and the fluctuations in currency exchange rates.

2.
   a. This is a description of a perfectly competitive market. It discusses factors influencing the demand and supply of corn, where the focus is on the price and quantity in the entire market, not the decisions of individual producers. The drought decreased the supply of corn in the U.S., which caused prices to increase. Countries such as China, Japan, and South Korea then turned to find substitute sources of corn in Argentina and Brazil.

   b. Staples, OfficeMax, and Office Depot operate in an oligopoly market with interdependent behavior. All three companies have been forced to close stores, downsize their existing stores, and increase their online operations.

   c. This discussion describes the attempt by the U.S. wireless telecommunications industry to gain monopoly or market power through mergers of independent firms. The federal government prohibited T-Mobile from merging with AT&T, given concerns over the market power of that combined firm. T-Mobile then announced a merger with its smaller rival, MetroPCS, that would still allow it to cut costs and expand its operations.

   d. Chinese restaurants represent monopolistic competition. There are 36,000 Chinese restaurants, most of them small, family operations. No national chain dominates these restaurants, largely due to the use of the wok for cooking.

Specialized stoves and chefs are required for this type of cooking, which has limited the expansion of these firms into large-scale production.

3. No. Profit is the difference between a firm's total revenue and its total cost. If the decrease in HSBC's cost in 2013 is larger than the decrease in its revenue, it could still have made a higher profit in 2013 than in 2012.

4. When the US economy recovers, consumers in the US will increase their spending on both domestic and imported goods and services. This will translate into an increase in the export of my home country. This will make for higher revenue for firms and increased consumer income in my country. With higher income, consumers will both consume as well as save more. The increase in savings will raise the amount of funds available for business investment.

   Higher consumer income and higher revenue of firms will increase government revenue received from personal and business taxes, allowing the government to increase its spending. Finally, due to the increase in consumption spending, investment spending and government spending, the import of my home country will increase as well. However, the change in net export spending remains uncertain.

## Chapter 2

### Technical Questions

1.
   a. Demand increases (assuming that computers are a normal good).
   b. There is a decrease in the quantity demanded of computers (and no change in the demand curve).
   c. Demand increases, as the price of a complementary good has fallen.
   d. There is no change in demand, as semiconductors are an input to computer production and thus a determinant of supply.
   e. Demand decreases in October, as consumers wait to buy at a lower price in December.

2.
   a. Supply increases.
   b. Supply decreases.
   c. There is a decrease in the quantity supplied of computers (and no change in the supply curve).

d. Supply decreases (because costs of production have increased).

e. There is no change in supply, as consumer incomes are a determinant of demand.

3.

a. $X$ is a normal good. We know this because there is a positive relationship between income and the quantity demanded of good $X$.

b. $X$ and $Y$ are substitutes. We know this because there is a positive relationship between the price of good $Y$ and the demand for good $X$ (thus, as the price of $Y$ rises, consumers buy more $X$).

c. $X$ and $Z$ are complements. We know this because there is a negative relationship between the price of good $Z$ and the demand for good $X$ (thus, as the price of $Z$ rises, consumers buy less $X$).

d. $Q_D = 500 - 5P_X + 0.5I + 10P_Y - 2P_Z$
$= 500 - 5P_X + 0.5(30) + 10(10) - 2(20)$
$= 575 - 5P_X$

e. Price intercept = \$115; Quantity intercept = 575; Slope = –0.2.

f. The quantity demanded is 500.

g. The equation of the demand curve is $Q_D = 625 - 5P_X$
Price intercept = \$125; Quantity intercept = 625; Slope = –0.2.

4.

a. $X$ and $Z$ are complements in production. We know this because there is a positive relationship between the price of good $Z$ and the supply of good $X$ (thus, as the price of $Z$ rises, producers produce more $X$).

b. $Q_S = -200 + 20P_X - 5P_I + 0.5P_Z$
$= -200 + 20P_X - 5(10) + 0.5(20)$
$= -240 + 20P_X$

c. Price intercept = \$12; Slope = 0.05. See text answers for graph.

d. Set $Q_S = 0$. The minimum price is \$12.00.

e. $Q_S = -240 + 20(25) = 260$.

f. $Q_S = -200 + 20P_X - 5(5) + 0.5(20) = -215 + 20P_X$; Price intercept = \$10.75; Slope = 0.05.

5.

a. $Q_D = 240 - 2P$

b. $Q_S = -150 + 3P$

c. For the equilibrium price:
$Q_D = Q_S$
$240 - 2P = -150 + 3P$
$5P = 390$
$P = 78$.

For the equilibrium quantity:
$Q = 240 - 2P$
$= 240 - 2(78)$
$= 84$

d. $Q_D - Q_S = 40$
$(240 - 2P) - (-150 + 3P) = 40$
$240 - 2P + 150 - 3P = 40$
$240 + 150 - 40 = 5P$
$5P = 350$
$P = 70$

e. $Q_S - Q_D = 60$
$(-150 + 3P) - (240 - 2P) = 60$
$-150 + 3P - 240 + 2P = 60$
$5P = 60 + 390$
$5P = 450$
$P = 90$.

6.

a. Demand increases (the price of a substitute has risen); equilibrium price and quantity rise. See text answers for graphs

b. Supply decreases (the price of an input has risen); equilibrium price rises and quantity falls

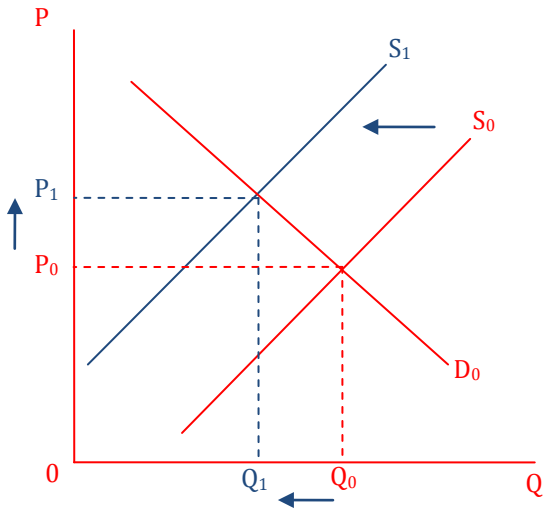
c. Demand increases; equilibrium price and quantity rise

d. Supply increases; equilibrium price falls and quantity rises

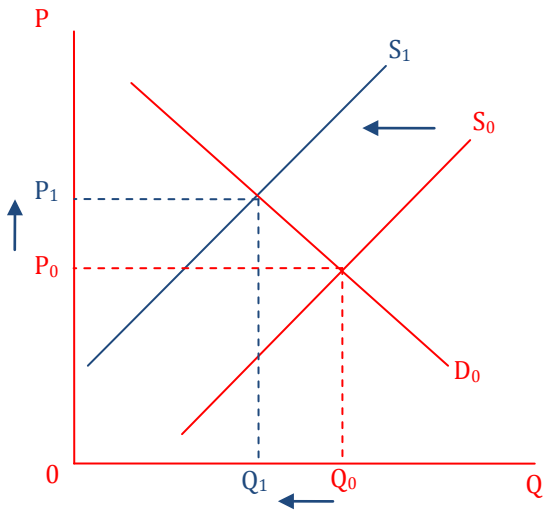
e. Demand decreases; equilibrium price and quantity fall.

7.

a. The supply of coffee beans will decrease due to bad weather. This will shift the supply curve leftward from $S_0$ to $S_1$. The equilibrium price will increase from $P_0$ to $P_1$, and the equilibrium quantity will decrease from $Q_0$ to $Q_1$.

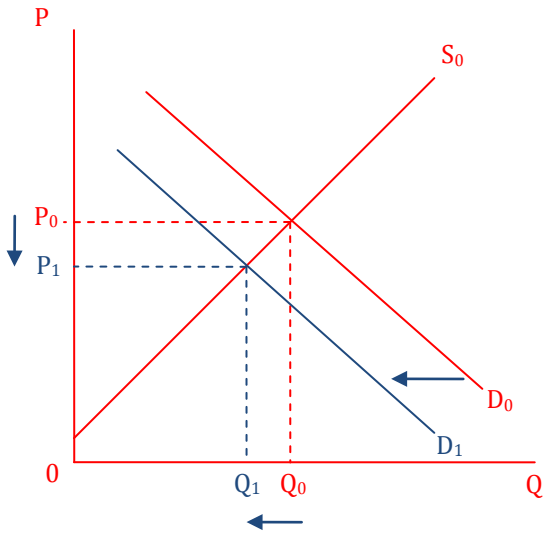



b. Coffee beans are the input of producing coffee. An increase in the price of coffee beans means an increase in the cost of producing coffee. Therefore, the supply of coffee decreases, which shifts the supply curve leftward from $S_0$ to $S_1$. The equilibrium price increases from $P_0$ to $P_1$, and the equilibrium quantity decreases from $Q_0$ to $Q_1$.

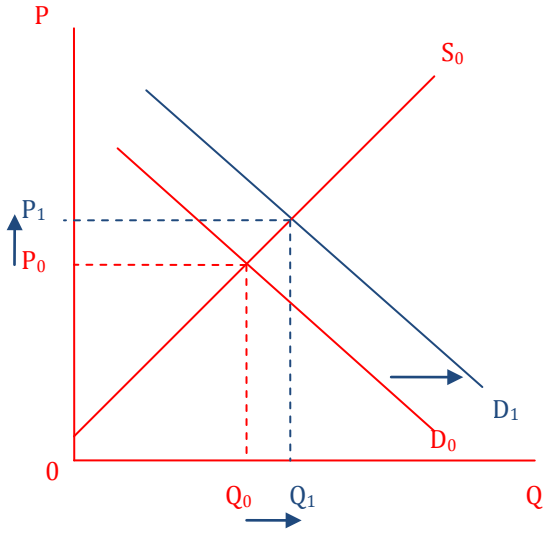



c. Coffee and a powdered non-dairy creamer are complementary goods. As the price of coffee increases, people drink less coffee and need fewer creamers. Therefore, the demand for creamer decreases, which shifts the demand curve

leftward from $D_0$ to $D_1$. The equilibrium price decreases from $P_0$ to $P_1$, and the equilibrium quantity decreases from $Q_0$ to $Q_1$.




d. Coffee and tea are substitutes. As the price of coffee increases, people drink less coffee but more tea. Therefore, the demand for tea increases, which shifts the demand curve rightward from $D_0$ to $D_1$. The equilibrium price increases from $P_0$ to $P_1$, and the equilibrium quantity increases from $Q_0$ to $Q_1$.




8.

a. Because hamburger is an inferior good, demand will increase as incomes decrease, causing the price to rise (rightward shift of demand curve). The improvement in technology that lowers production costs causes supply to increase and tends to lower price (rightward shift of supply curve). With no further information, we know that the equilibrium quantity will rise, but the effect on price cannot be determined. See text answers for graphs.

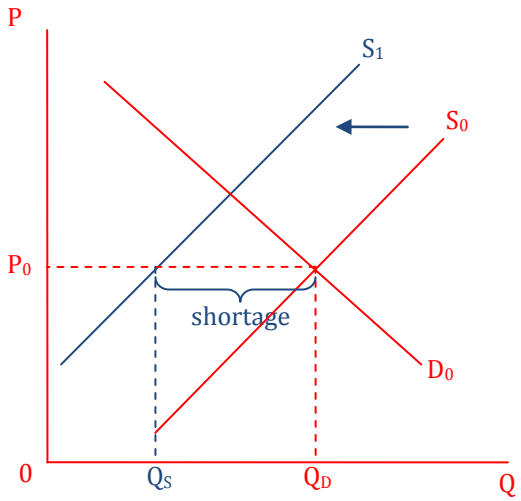
b. The fall in consumer incomes will cause demand to increase (for an inferior good), which will cause the price to rise, all other things held constant. If this effect is smaller than the effect of the improvement in technology (which will increase supply and cause the price to fall), then we may now be able to conclude that the equilibrium price of hamburger is likely to fall. See text answers for graphs.

**Application Questions**

1. Although copper prices reached an all-time high in February 2011, there was concern that the demand from China would not continue, causing a leftward shift in the demand curve and lowering prices. The worldwide economic downturn in 2010 and 2011 also caused demand to decrease, putting downward pressure on copper prices. The supply curve could shift to the left from severe winter weather in Chile, a major copper producer. However, there were also previously unknown stockpiles of copper in China which could be released and cause the supply to increase. Increases in copper prices had caused consumers to decrease the quantity demanded (movement along the demand curve) and to substitute cheaper alternative materials, such as aluminum and plastic. The extreme volatility of prices in the copper market was illustrated in the case for the chapter.

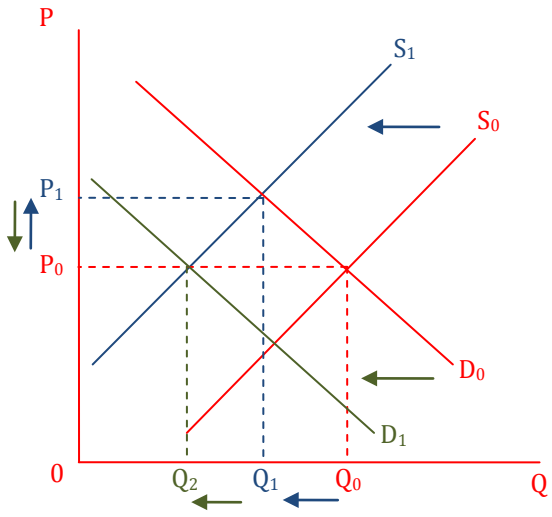
2. In February 2013 copper futures prices were at their highest level in nearly four months. This change was another sign that the U.S. economy was growing stronger. Increased manufacturing and construction activity appeared to be increasing the demand for copper and supporting higher prices. Consumers were also demanding more phones, laptops, and air conditioners, all of which use copper as an input.
   See: Tatyana Shumsky, "Copper Settles 1.4% Higher," *Wall Street Journal (Online)*, February 1, 2013.

3.
   a. Brazil's declining coffee production leads to a decrease in the supply of coffee beans in the global market, which shifts the supply curve leftward from $S_0$ to $S_1$. At the price $P_0$, the quantity demanded for coffee beans is $Q_D$, while the quantity supplied decreases to $Q_S$. The shortage of coffee beans is the difference between $Q_D$ and $Q_S$.



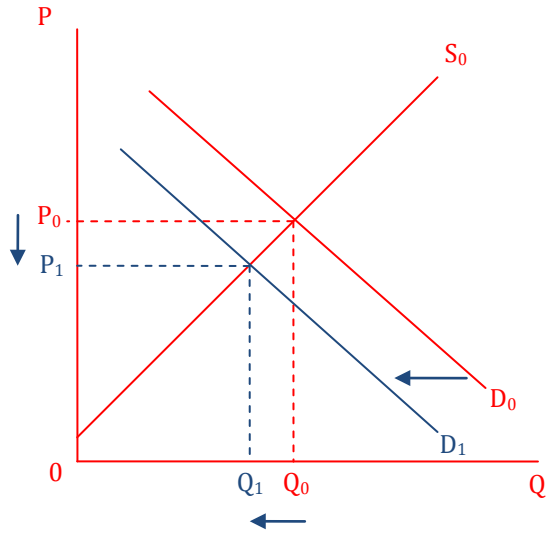

b. As the quantity demanded ($Q_D$) for coffee beans is larger than the quantity supplied ($Q_S$), some individuals will be willing to pay more than the price $P_0$, so the price will begin to go up. A higher price will cause the $Q_D$ to fall and the $Q_S$ to rise until they are equal and a new equilibrium price has been reached.

c. Suppose the 2013 equilibrium price and quantity are at $P_0$ and $Q_0$ respectively. As mentioned in questions (a) and (b), Brazil's declining coffee production shifts the supply leftward from $S_0$ to $S_1$ and causes the equilibrium price to increase from $P_0$ to $P_1$ and the equilibrium quantity to decrease from $Q_0$ to $Q_1$. If the demand for coffee beans decreases in 2014, the demand curve will shift leftward from $D_0$ to $D_1$ and cause the equilibrium quantity to decrease further from $Q_1$ to $Q_2$ and the equilibrium price to decrease. However, compared to the 2013 equilibrium price $P_0$, the change in the equilibrium price is uncertain. If the decrease in demand is larger than the decrease in supply, the 2014 equilibrium price will be lower than $P_0$. If the decrease in supply is larger than the decrease in demand, the 2014 equilibrium price will be lower than $P_1$ but higher than $P_0$.

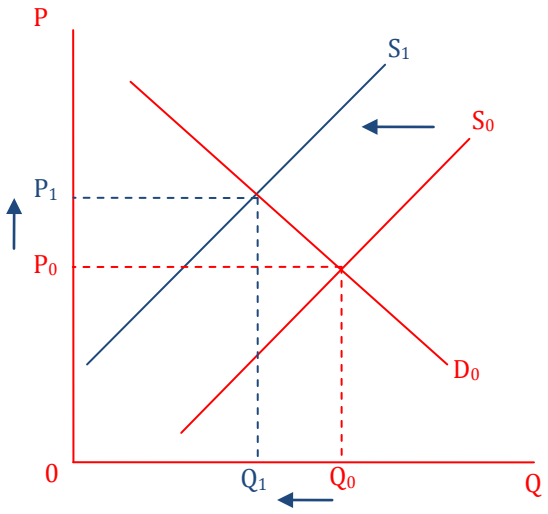



4.

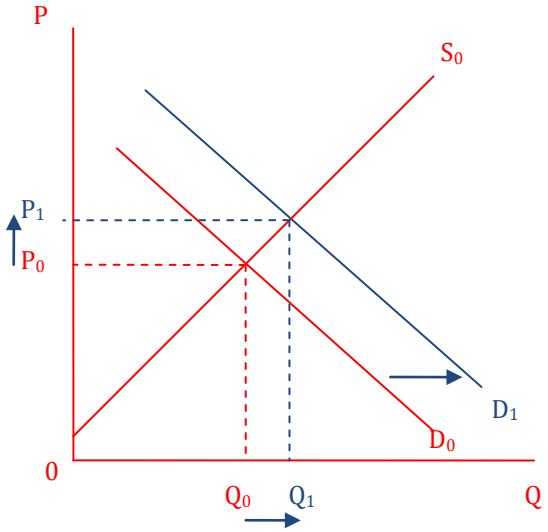
a. The cancellation of the import contract will decrease the demand for rice in Thailand, which will shift the demand curve leftward from $D_0$ to $D_1$. The equilibrium price will decrease from $P_0$ to $P_1$, and the equilibrium quantity will decrease from $Q_0$ to $Q_1$.




b. The cancellation of the import contract will decrease the supply of rice in China, which will shift the supply curve leftward from $S_0$ to $S_1$. The equilibrium price will increase from $P_0$ to $P_1$, and the equilibrium quantity will decrease from $Q_0$ to $Q_1$.

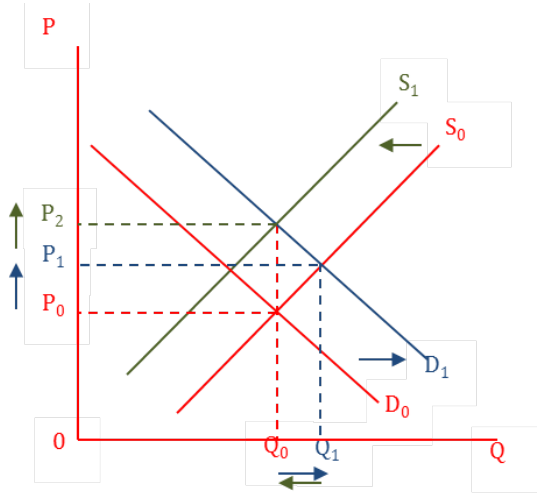



c. If China increases the import of rice from Vietnam, the demand for rice will increase in Vietnam, which will shift the demand curve rightward from $D_0$ to $D_1$. The equilibrium price will increase from $P_0$ to $P_1$, and the equilibrium quantity will increase from $Q_0$ to $Q_1$.




d. Suppose that before China increases the import of rice from Vietnam, the equilibrium price and quantity are at $P_0$ and $Q_0$ respectively. As mentioned in question (c), the increase in the demand for rice will cause the equilibrium price to increase from $P_0$ to $P_1$ and the equilibrium quantity to increase from $Q_0$ to $Q_1$. If the rice producers store their harvest and expect the future price of rice to increase, the current supply of rice will fall, which will shift the supply curve leftward from $S_0$ to $S_1$ and cause the equilibrium price to increase further from $P_1$ to $P_2$ and the equilibrium quantity to decrease. However, compared to $Q_0$, the change in the equilibrium quantity is uncertain. If the decrease in

supply is larger than the increase in demand, the equilibrium quantity will be smaller than $Q_0$. If the increase in demand is larger than the decrease in supply, the equilibrium quantity will be smaller than $Q_1$ but larger than $Q_0$.




5.

a. Prices in the chicken market had been low relative to the costs of production. The increased costs of production have caused a decrease in supply (leftward shift of the supply curve). This change, combined with increased seasonal demand for chicken (rightward shift of the demand curve) has caused chicken prices to rise.

b. The diversion of corn to make ethanol has increased the price of corn. This increase combined with soybean-meal price increases led to higher production costs for chickens. Higher production costs caused a decrease in the supply of chickens and chicken prices to increase.

## Chapter 3

### Technical Questions

1.

a. Price elasticity = –1 (unitary elasticity)

b. Price elasticity = –5.4 (elastic)

c. Price elasticity = –0.54 (inelastic

2.

a. Price elasticity = –1 (unitary elasticity)

b. Price elasticity = –3.0 (elastic)

c. Price elasticity = –0.33 (inelastic)

3.

a. Revenue will rise because demand is inelastic. A 10 percent price increase will cause the quantity demanded to fall by 5 percent, but that will be more than offset by the 10 percent increase in price on the units that are still sold.

b. Revenue will rise because demand is elastic. A 5 percent price decrease will cause the quantity demanded to rise by 12.5 percent, and that will more than offset the lower price on the original units.

c. Revenues will not change. Because elasticity is –1, a 1 percent increase in price will result in a 1 percent decrease in quantity demanded, and thus revenue will not change.

d. Revenues will rise. Because demand is perfectly inelastic, there will be no change in the quantity demanded when price increases, and, thus, revenues will increase.

4.

a. $P_X = 250 – 1/2Q$

b. $TR = PQ = (250 – 1/2Q)Q = 250Q – 1/2Q^2$

c. See text answers for graphs.

d. At $Q = 250$, $MR = 0$, and, thus, revenue is maximized. At that point, $P = \$125$, and, thus, $TR = \$31{,}250$.

e. The midpoint of the demand curve is at $Q = 250$, $P = \$125$. Above that point, demand is elastic, and below that point, demand is inelastic.

5. Demand is elastic (and, thus, revenues will fall if you increase the price and rise if you lower it). Your good is a normal good and is income elastic (or a luxury good). The related good is a complement because a rise in the price of the other good causes a decrease in demand for your product; the goods are fairly strong complements, as the demand for your product is elastic with respect to the price of the other good.

6.

a. From the information provided, the price elasticity of demand for Good X is $0.2/-0.22 = -0.91$, which means that I have an inelastic demand for Good X.

b. From the information provided, Good X and Good Y have a cross-price elasticity of demand of $0.2/0.1 = 2$, which means they are substitute goods.

c. From the information provided, the income elasticity of demand for Good X is $0.2/0.25 = 0.8$, which means it is a necessity for me.

**Application Questions**

1.

a. The percent change in price from the discounting policy is –32.6% calculated as follows using the arc elasticity formula:

[1.00 – 1.39] / [(1.39 + 1.00) / 2] = –.39 / 1.195 = –0.326

Therefore, the quantity demanded would have to increase by at least 32.6% for the demand to be elastic and total revenue to increase.

b. The implied cross-price elasticity is positive, assuming that drinks at McDonald's and its competitors are substitute goods. A decrease in the price of drinks at McDonald's will decrease the demand for drinks at Burger King and Taco Bell.

c. Although the drink discount is designed to increase revenues from the sale of drinks at McDonald's, the company and its franchisees have to consider other effects of the policy. Revenue from drinks typically compensates for discounts and lost revenue on other products. Discounting drinks might encourage customers to purchase more items from the Dollar Menu and less from the regular menu. Sales of the pricier espresso beverages had been hurt in previous years by the discounted drink policy. However, McDonald's hopes that the discount policy combined with its new beverages will attract enough customers from its competitors to offset any negative effects on its own menu.

2. We can use the facts in the question to make inferences about the price elasticity of demand for walk-up, unrestricted business airfares.

a. On the Cleveland–Los Angeles route, the decrease in fare resulted in about the same revenue as the higher fare. This implies a consumer price elasticity of demand around –1.00. At unit elasticity, any change in price results in no change in total revenue. On the Cleveland–Houston route, the decrease in price resulted in less revenue, but greater market share. Demand was inelastic on this route because quantity demanded increased as the price was lowered, but total revenue decreased. Demand was price elastic on the Houston–Oakland route because the lower airfares resulted in increased total revenue for Continental on this route.

b. Consumer behavior differs on the three routes, but is also different from prior expectations. As discussed in the chapter, the airlines typically assumed that demand for business travel was inelastic, while demand for leisure travel was elastic. Under this assumption, airline companies did not decrease business fares because they believed they would have lost revenue in doing so.

c. Many businesses have gotten tired of paying the high, unrestricted fares for their business travelers. Employees began searching for lower restricted fares that would meet their schedules or using videoconferencing or driving as a substitute for air travel. The terrorist attacks on September 11, 2001, also had a major impact on the airline industry, with many employees refusing to fly in the months following the attacks and with business only slowly recovering in the following years. All of these factors resulted in major changes in business traveler behavior and a probable increase in their price elasticity of demand. The above market tests show that business demand is actually price elastic in certain markets.

3. Public health officials advocate the use of cigarette taxes to reduce teenage smoking because the data in Table 3.7 show that the teenage price elasticity of demand for cigarettes is approximately 1 or higher in absolute value. Thus, demand is unit or even price elastic. Teenagers are sensitive to the price of cigarettes and will reduce or quit smoking in response to the taxes imposed on cigarettes. Cigarette taxes are a good source of revenue for state and local governments, given that the price elasticity of demand for adults is inelastic. This means that an increase in price results in an increase in total revenue, given that the percentage change in quantity is less than the percentage change.

4.

a. The above information implies that the consumers in Singapore have a high degree of responsiveness to the change in the price of Redmi phones. It means that the consumers have an elastic demand for Redmi phones.

b. Since the price elasticity of demand for Redmi phones is elastic, the online sale will lead to a higher percentage increase in quantity demanded than the percentage decrease in price. Xiaomi will receive higher total revenue.

c. As more Chinese smartphone markers expand their business to Singapore, the number of substitutes will increase, and the demand for Xiaomi phones will become more elastic.

5. Information for case studies can be found in sources such as the following: Butscher, Stephan A. *Consumer Loyalty Programmes and Clubs*, Aldershot, UK and Burlington, VT: Gower, 2002; Basso LJ, Clements MT, Ross TW. Moral Hazard and Consumer Loyalty Programs. *American Economic Journal: Microeconomics* 2009; 1 (1): 101–123.