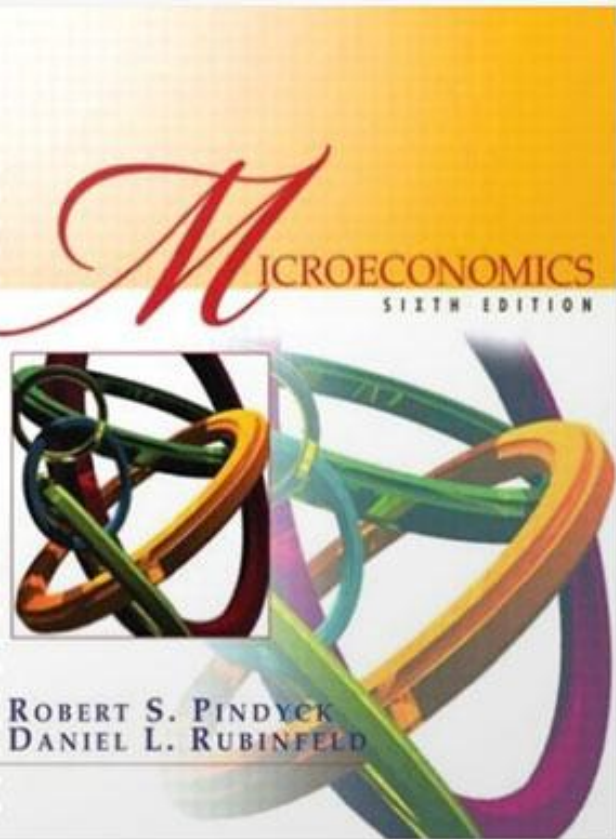


TEST BANK



ROBERT S. PINDYCK
DANIEL L. RUBINFELD

CHAPTER 2

The Basics of Supply and Demand

MULTIPLE CHOICE

Section 2.1

- easy 1. Which of the following is NOT an application of supply and demand analysis?
- Understanding changing world economic conditions and their effects on prices.
 - Evaluating the effects of government price controls on the agricultural industry.
 - Determining how taxes affect consumers' spending patterns.
 - all of the above.
 - none of the above.***
- easy 2. A supply curve reveals
- the quantity of output consumers are willing to purchase at each possible market price.
 - the difference between quantity demanded and quantity supplied at each price.
 - the maximum level of output an industry can produce, regardless of price.
 - the quantity of output that producers are willing to produce and sell at each possible market price.***
- easy 3. Plastic and steel are substitutes in the production of body panels for certain automobiles. If the price of plastic increases, with other things remaining the same, we would expect
- the price of steel to fall.
 - the demand curve for steel to shift to the right.***
 - the demand curve for plastic to shift to the left.
 - nothing to happen to steel because it is only a substitute for plastic.
 - the demand curve for steel to shift to the left.
- easy 4. Coffee and cream:
- are both luxury goods.
 - are complements.***
 - are both more inelastic in demand in the long run than in the short run.
 - have a positive cross price elasticity of demand.
- easy 5. Which of the following would shift the demand curve for new textbooks to the right?
- A fall in the price of paper used in publishing texts.
 - A fall in the price of equivalent used text books.
 - An increase in the number of students attending college.***
 - A fall in the price of new text books.
- easy 6. When an industry's raw material costs increase, other things remaining the same,
- the supply curve shifts to the left.***
 - the supply curve shifts to the right.
 - output increases regardless of the market price and the supply curve shifts upward.
 - output decreases and the market price also decreases.
- easy 7. Sugar can be refined from sugar beets. When the price of those beets falls,
- The demand curve for sugar would shift right.
 - The demand curve for sugar would shift left.
 - The supply curve for sugar would shift right.***
 - The supply curve for sugar would shift left.

- easy 8. Assume that steak and potatoes are complements. When the price of steak goes up, the demand curve for potatoes
- shifts to the left.**
 - shifts to the right.
 - remains constant.
 - shifts to the right initially and then returns to its original position.
- easy 9. Which of the following will cause a shift to the left in the supply curve of gasoline?
- A decrease in the price of gasoline.
 - An increase in the wage rate of refinery workers.**
 - Decrease in the price of crude oil.
 - An improvement in oil refining technology.
 - All of the above.
- easy 10. Which of the following will NOT cause a shift in the supply of gasoline?
- An increase in the wage rate of refinery workers.
 - A decrease in the price of gasoline.**
 - An improvement in oil refining technology.
 - A decrease in the price of crude oil.
- moderate 11. Which of the following would cause a shift to the right of the supply curve for gasoline?
- A large increase in the price of public transportation.
 - A large decrease in the price of automobiles.
 - A large reduction in the costs of producing gasoline.
- I only.
 - II only.
 - III only.**
 - II and III only.
- easy 12. You are analyzing the demand for good X. Which of the following will result in a shift to the right of the demand curve for X?
- A decrease in the price of X.
 - An increase in the price of a good that is a complement to good X.
 - An increase in the price of a good that is a substitute for X.**
 - All of the above.
- moderate 13. The price of good A goes up. As a result the demand for good B shifts to the left. From this we can infer that:
- good A is used to produce good B.
 - good B is used to produce good A.
 - goods A and B are substitutes.
 - goods A and B are complements.**
 - none of the above.

- easy 14. Which of the following will cause the demand curve for Beatles' compact discs to shift to the right?
- An increase in the price of the discs.
 - A decrease in consumers' incomes.
 - An increase in the price of Phil Collins' latest compact disc (a substitute).**
 - All of the above.
 - None of the above.
- easy 15. Which of the following will NOT cause a shift to the right in the demand curve for beer?
- A change in the price of beer.**
 - A health study indicating positive health benefits of moderate beer consumption.
 - An increase in the price of French wine (a substitute).
 - A decrease in the price of potato chips (a complement).
 - none of the above.
- moderate 16. Which of the following would cause a shift to the right of the demand curve for gasoline?
- A large increase in the price of public transportation.
 - A large decrease in the price of automobiles.
 - A large reduction in the costs of producing gasoline.
- 1 only.
 - 2 only.
 - 1 and 2 only.**
 - 2 and 3 only.
 - 1, 2 and 3.

Section 2.2

- easy 17. When the current price is above the market-clearing level we would expect
- quantity demanded to exceed quantity supplied.
 - quantity supplied to exceed quantity demanded.**
 - a shortage.
 - greater production to occur during the next period.
- easy 18. Assume that the current market price is below the market clearing level. We would expect
- a surplus to accumulate.
 - downward pressure on the current market price.
 - upward pressure on the current market price.**
 - lower production during the next time period.
- easy 19. So long as the actual market price exceeds the equilibrium market price, there will be
- downward pressure on the market price.**
 - upward pressure on the market price.
 - no purchases made.
 - both (a) and (c) are correct.
 - both (b) and (c) are correct.

- easy 20. If the actual price were below the equilibrium price in the market for bread, a
- a. surplus would develop that cannot be eliminated over time.
 - b. shortage would develop, which market forces would eliminate over time.**
 - c. surplus would develop, which market forces would eliminate over time.
 - d. shortage would develop which market forces would tend to exacerbate.
- easy 21. Suppose that the quantity of nursing services demanded exceeds the quantity of nursing services supplied. The nursing wage rate will:
- a. decrease.
 - b. increase.**
 - c. not change.
 - d. none of the above.

Scenario 1:

The demand for books is: $Q_d = 120 - P$

The supply of books is: $Q_s = 5P$

- easy 22. Refer to Scenario 1. What is the equilibrium price of books?
- a. 5
 - b. 10
 - c. 15
 - d. 20**
 - e. none of the above
- easy 23. Refer to Scenario 1. What is the equilibrium quantity of books sold?
- a. 25
 - b. 50
 - c. 75
 - d. 100**
 - e. none of the above
- moderate 24. Refer to Scenario 1. If $P = \$15$, which of the following is true?
- a. There is a surplus equal to 30.
 - b. There is a shortage equal to 30.**
 - c. There is a surplus, but it is impossible to determine how large.
 - d. There is a shortage, but it is impossible to determine how large.
- easy 25. Refer to Scenario 1. If $P = \$15$, which of the following is true?
- a. Quantity supplied is greater than quantity demanded.
 - b. Quantity supplied is less than quantity demanded.**
 - c. Quantity supplied equals quantity demanded.
 - d. There is a surplus.

- moderate 26. Refer to Scenario 1. If $P = \$25$, which of the following is true?
- a. ***There is a surplus equal to 30.***
 - b. There is a shortage equal to 30.
 - c. There is a shortage, but it is impossible to determine how large.
 - d. There is a surplus, but it is impossible to determine how large.

- easy 27. Refer to Scenario 1. If $P = \$25$, which of the following is true?
- a. ***Quantity supplied is greater than quantity demanded.***
 - b. Quantity supplied is less than quantity demanded.
 - c. Quantity supplied equals quantity demanded.
 - d. There is a shortage.

Section 2.3

- moderate 28. Which of the following would cause an *unambiguous* decrease in the real price of DVD players?
- a. A shift to the right in the supply curve for DVD players and a shift to the right in the demand curve for DVD players.
 - b. ***A shift to the right in the supply curve for DVD players and a shift to the left in the demand curve for DVD players.***
 - c. A shift to the left in the supply curve for DVD players and a shift to the right in the demand curve for DVD players.
 - d. A shift to the left in the supply curve for DVD players and a shift to the left in the demand curve for DVD players.
- difficult 29. From 1970 to 1993, the real price of a college education increased, and total enrollment increased. Which of the following *could* have caused this increase in price and enrollment?
- a. A shift to the right in the supply curve for college education and a shift to the left in the demand curve for college education.
 - b. ***A shift to the left in the supply curve for college education and a shift to the right in the demand curve for college education.***
 - c. A shift to the left in the supply curve for college education and a shift to the left in the demand curve for college education.
 - d. None of the above.
- moderate 30. From 1970 to 1993, the real price of eggs decreased. Which of the following would cause an *unambiguous* decrease in the real price of eggs?
- a. A shift to the right in the supply curve for eggs and a shift to the right in the demand curve for eggs.
 - b. ***A shift to the right in the supply curve for eggs and a shift to the left in the demand curve for eggs.***
 - c. A shift to the left in the supply curve for eggs and a shift to the right in the demand curve for eggs.
 - d. A shift to the left in the supply curve for eggs and a shift to the left in the demand curve for eggs.

- difficult 31. From 1970 to 1993, the real price of eggs decreased and the total annual consumption of eggs decreased. Which of the following would cause an unambiguous decrease in the real price of eggs and an unambiguous decrease in the quantity of eggs consumed?
- A shift to the right in the supply curve for eggs and a shift to the right in the demand curve for eggs.
 - A shift to the left in the supply curve for eggs and a shift to the right in the demand curve for eggs.
 - A shift to the left in the supply curve for eggs and a shift to the left in the demand curve for eggs.
 - None of the above.**
- difficult 32. We observe that both the price of and quantity sold of golf balls are rising over time. This is due to:
- continual improvements in the technology used to produce golf balls.
 - increases in the price of golf clubs over time.
 - decreases in membership fees for country clubs with golf facilities.**
 - more stringent professional requirements on the quality of golf balls requiring producers to use more expensive raw materials.
- easy 33. Which of the following will cause the price of beer to rise?
- A shift to the right in the demand curve for beer.
 - A shift to the left in the supply curve of beer.
 - both (a) and (b).**
 - none of the above.

Scenario 2:

In 1992, the Occupational Safety and Health Authority passed the Bloodborne Pathogens Standard (BBP), which regulates dental office procedures. This regulation is designed to minimize the transmission of infectious disease from patient to dental worker. The effect of this regulation was both to increase the cost of providing dental care and to ease the fear of going to the dentist as the risk of contracting an infectious disease.

- easy 34. Refer to Scenario 2. What is the effect of the BBP on the market for dental care?
- Only the supply curve shifts.
 - Only the demand curve shifts.
 - Both the demand and supply curves shift.**
 - Neither the demand nor supply curve shifts.
- easy 35. Refer to Scenario 2. What is the effect of the BBP on the market for dental care?
- Both supply and demand shift to the right.
 - Both supply and demand shift to the left.
 - Supply shifts to the right, and demand shifts to the left.
 - Supply shifts to the left, and demand shifts to the right.**
 - None of the above.

- moderate 36. Refer to Scenario 2. What is the effect of the BBP on the equilibrium price of dental care?
- It unambiguously increases.***
 - It unambiguously decreases.
 - It increases only if supply shifts more than demand.
 - It increases only if demand shifts more than supply.
- moderate 37. Refer to Scenario 2. Under what circumstances will the equilibrium level of output of dental care remain the same?
- If supply shifts more than demand.
 - If demand shifts more than supply.
 - If both demand and supply shift by the same magnitude.***
 - If supply and demand shift in the same direction.
- moderate 38. Refer to Scenario 2. Under what circumstances will the equilibrium level of output of dental care increase?
- If supply shifts more than demand.
 - If demand shifts more than supply.***
 - If both demand and supply shift by the same magnitude.
 - If supply and demand both decrease.
- easy 39. After the September 11, 2001 attacks on the World Trade Center, the supply of downtown office space in Manhattan was dramatically reduced. Forecasters predicted that the equilibrium price would rise, but in fact the price fell. What are some factors that could explain the fall in the equilibrium price, which the forecasters failed to take into account?
- Demand for office space fell due to quality-of-life concerns.
 - The economic slowdown caused demand for office space to fall.
 - Both (a) and (b).***
 - None of the above.
- moderate 40. The effect of the September 11 attacks on the World Trade Center on the market for office space in downtown Manhattan was that both the equilibrium price and the equilibrium quantity fell. What is the most likely explanation for this?
- Supply and demand both shifted left, and the magnitude of the demand shift was greater.***
 - Supply and demand both shifted left, and the magnitude of the supply shift was greater.
 - Supply shifted left, demand shifted right, and the magnitude of the demand shift was greater.
 - Supply shifted left, demand shifted right, and the magnitude of the supply shift was greater.

Section 2.4

- easy 41. The income elasticity of demand is the
- absolute change in quantity demanded resulting from a one-unit increase in income.
 - percent change in quantity demanded resulting from the absolute increase in income.
 - percent change in quantity demanded resulting from a one percent increase in income.***
 - percent change in income resulting from a one percent increase in quantity demanded.
 - percent change in income resulting from a one percent increase in price.

- easy 42. The price elasticity of demand for a demand curve that has a zero slope is
- a. zero.
 - b. one.
 - c. negative but approaches zero as consumption increases.
 - d. ***infinity.***

- easy 43. Elasticity measures
- a. the slope of a demand curve.
 - b. the inverse of the slope of a demand curve.
 - c. ***the percentage change in one variable in response to a one percent increase in another variable.***
 - d. sensitivity of price to a change in quantity.

- moderate 44. Which of the following represents the price elasticity of demand?

- a. $\frac{\left(\frac{\Delta Q}{P}\right)}{\left(\frac{\Delta P}{Q}\right)}$
- b. $\left(\frac{\Delta Q}{P}\right) + \left(\frac{\Delta P}{Q}\right)$
- c. $\left(\frac{\Delta Q}{\Delta P}\right) \times \left(\frac{P}{Q}\right)$
- d. $\left(\frac{\Delta Q}{P}\right) - \left(\frac{\Delta P}{Q}\right)$

- easy 45. A vertical demand curve is
- a. ***completely inelastic.***
 - b. infinitely elastic.
 - c. highly (but not infinitely) elastic.
 - d. highly (but not completely) inelastic.

- easy 46. Which of these measures the responsiveness of the quantity of one good demanded to an increase in the price of another good?
- a. price elasticity.
 - b. income elasticity.
 - c. ***cross-price elasticity.***
 - d. cross-substitution elasticity.

- easy 47. The cross-price elasticity between a pair of complementary goods will be
- a. positive.
 - b. ***negative.***
 - c. zero.
 - d. positive or zero depending upon the strength of the relationship.

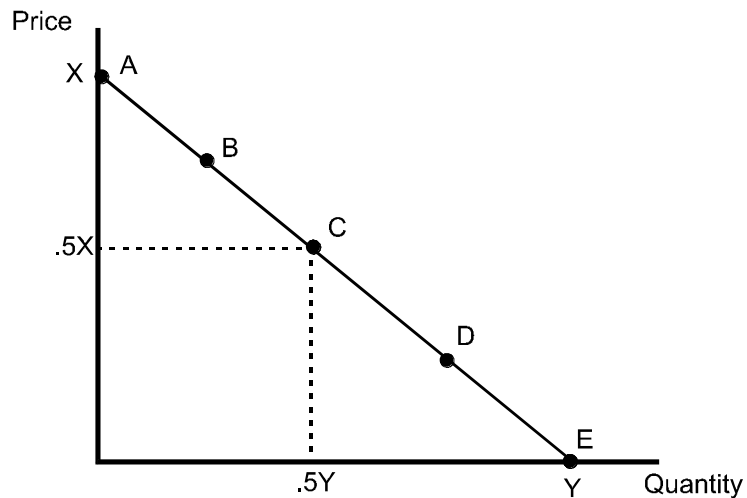


Figure 2.1

moderate 48. Refer to Figure 2.1. At point A, demand is:

- a. universally elastic.
- b. inelastic, but not completely inelastic.
- c. unit elastic.
- d. elastic, but not infinitely elastic.
- e. ***infinitely elastic.***

easy 49. Refer to Figure 2.1. At point B, demand is:

- a. small.
- b. inelastic, but not completely inelastic.
- c. unit elastic.
- d. ***elastic, but not infinitely elastic.***
- e. infinitely elastic.

moderate 50. Refer to Figure 2.1. At point C, demand is:

- a. completely inelastic.
- b. inelastic, but not completely inelastic.
- c. ***unit elastic.***
- d. elastic, but not infinitely elastic.
- e. infinitely elastic.

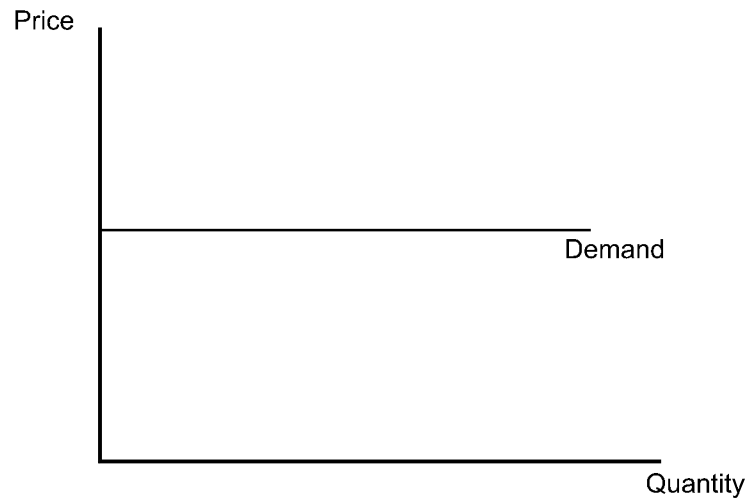
easy 51. Refer to Figure 2.1. At point D, demand is:

- a. completely inelastic.
- b. ***inelastic, but not completely inelastic.***
- c. unit elastic.
- d. elastic, but not infinitely elastic.
- e. infinitely elastic.

moderate 52. Refer to Figure 2.1. At point E, demand is:

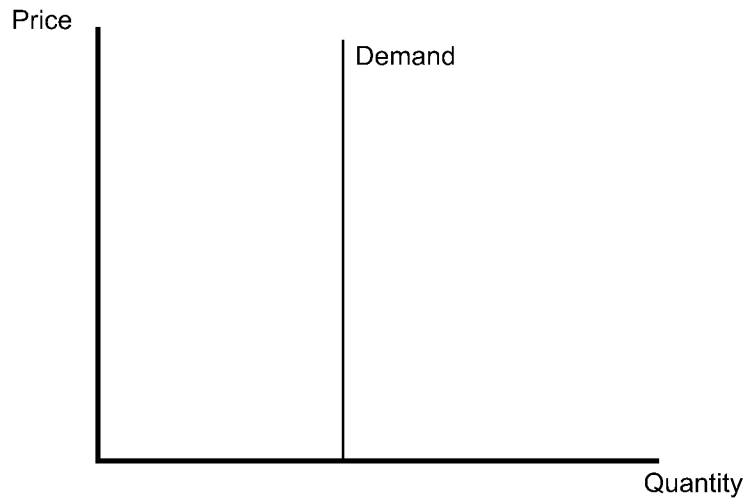
- a. ***completely inelastic.***
- b. inelastic, but not completely inelastic.
- c. unit elastic.
- d. elastic, but not infinitely elastic.
- e. infinitely elastic.

easy 53. Which of the following statements about the diagram below is true?



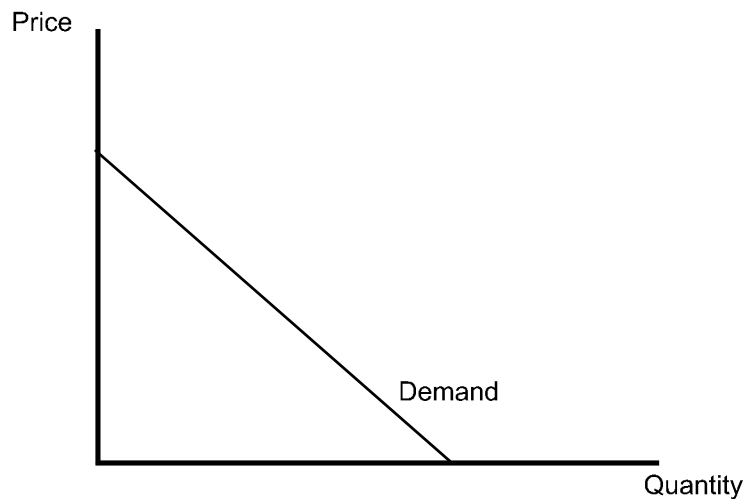
- a. ***Demand is infinitely elastic.***
- b. Demand is completely inelastic.
- c. Demand becomes more inelastic the lower the price.
- d. Demand becomes more elastic the lower the price.

easy 54. Which of the following statements about the diagram below is true?



- a. Demand is infinitely elastic.
- b. ***Demand is completely inelastic.***
- c. Demand becomes more inelastic the lower the price.
- d. Demand becomes more elastic the lower the price.

easy 55. Which of the following statements about the diagram below is true?



- a. Demand is infinitely elastic.
- b. Demand is completely inelastic.
- c. ***Demand becomes more inelastic the lower the price.***
- d. Demand becomes more elastic the lower the price.

- moderate 56. Along any downward sloping straight-line demand curve:
- both the price elasticity and slope vary.
 - the price elasticity varies, but the slope is constant.***
 - the slope varies, but the price elasticity is constant.
 - both the price elasticity and slope are constant.
- easy 57. Which of the following pairs of goods are most likely to have a negative cross price elasticity of demand?
- hotdogs and hotdog buns.***
 - Coke and Pepsi.
 - rail tickets and plane tickets.
 - a Luciano Pavarotti compact disc and a Placido Domingo compact disc (both Pavarotti and Domingo are opera stars).
- moderate 58. Consider the demand curve of the form $Q = a - bP$. If a is a positive real number, and $b = 0$, then demand is
- completely inelastic.***
 - inelastic, but not completely.
 - unit elastic.
 - elastic, but not infinitely.
- easy 59. For most consumer goods the own price elasticity of demand is
- negative only when price decreases.
 - negative regardless of the direction of the price change.***
 - positive only when price decreases.
 - positive regardless of the direction of the price change.
- easy 60. If two goods are substitutes, the cross price elasticity of demand must be
- negative.
 - positive.***
 - zero.
 - infinite.
- difficult 61. Suppose the demand for gourmet coffee can be represented by a linear demand curve. At the prevailing market price the income elasticity of demand for gourmet coffee is 2. When income rises the demand curve for gourmet coffee:
- becomes less elastic at every price.***
 - becomes less elastic at the price that prevailed before the change in income
 - becomes more elastic at every price
 - becomes more elastic at the price that prevailed before the change in income

Section 2.5

- difficult 62. Ice cream can be frozen. In the short run the magnitude of the own price elasticity of demand for ice cream:
- is higher than in the long run.*
 - is lower than in the short run.
 - is the same as in the long run.
 - does not depend on the fact that ice cream can be frozen.
- difficult 63. The introduction of refrigerators into American homes:
- decreased the magnitude of the short run own price elasticity of demand for raw meat.
 - did not affect the short run own price elasticity of demand for raw meat.
 - increased the magnitude of the short run own price elasticity of demand for raw meat.*
 - decreased the magnitude of the short run own price elasticity of demand for smoked meats.
- difficult 64. Use the following statements to answer this question.
- Even though people need water to survive, the price of water is less than the price of diamonds because water is in greater supply than diamonds.
 - Suppose that the demand for corn is highly price inelastic. If every corn farmer's harvesting technologies become more efficient, the total revenue received by all corn farmers would fall.
- I and II are true.*
 - I is true, and II is false.
 - II is true, and I is false.
 - I and II are false.
- easy 65. Due to capacity constraints, the price elasticity of supply for most products is:
- the same in the long-run and the short-run.
 - greater in the long-run than the short-run.*
 - greater in the short-run than in the long-run.
 - too uncertain to be estimated.
- easy 66. In the long run, new firms can enter an industry and so the supply elasticity tends to be
- more elastic than in the short-run.*
 - less elastic than in the short-run.
 - perfectly elastic.
 - perfectly inelastic.
- moderate 67. A freeze in Florida's orange growing regions will:
- result in a sharp increase in the price of oranges in the short run because demand and supply are highly inelastic.*
 - result in a sharp increase in the price of oranges in the short run because demand and supply are highly elastic.
 - result in a sharp decrease in the price of oranges in the short run because demand is highly inelastic and supply is highly elastic.
 - result in little change in the price of oranges in the short run because supply is infinitely elastic.

- difficult 68. Use the following two statements to answer this question:
- I. The supply of newly mined copper is more elastic in the long run than in the short run.
 - II. The supply of scrap copper is more elastic in the short run than in the long run.
- a. **Both I and II are true.**
 - b. I is true, and II is false.
 - c. I is false, and II is true.
 - d. Both I and II are false.
- difficult 69. This year a new oil field with substantial reserves has been discovered. Such discoveries are not made every year. Therefore an increase in the demand for oil will:
- a. increase the long run price of oil more than the short run price of oil.
 - b. **increase the long run price of oil less than the short run price of oil.**
 - c. ensure the long run price of oil and short run price of oil increase by the same amount.
 - d. ensure that the short run price of oil falls.
 - e. ensure that the short run price of oil remains unchanged.
- difficult 70. An important determinant of the amount of grains harvested next year by Ethiopian farmers is the amount of seeds planted this year. Given that Western nations have guaranteed to donate five hundred tons of grain next year, this year the Ethiopian farmers will:
- a. plant more seeds as the food aid establishes a minimum price for grain.
 - b. plant more seeds as the farmers' confidence is restored.
 - c. plant the same amount of seeds as they would have without the food aid.
 - d. plant fewer seeds as consumers demand for grain is completely price elastic.
 - e. **plant fewer seeds as the price of grain will be lower with the food aid.**
- moderate 71. There are two techniques of egg production: free range (where hens roam around the farm) or factory (where hens are fed and watered in wire cages). The free range technique has a much more elastic supply curve than the factory technique. When the demand for eggs falls:
- a. **egg production using the factory technique falls less than with the free range technique.**
 - b. egg production using the factory technique falls more than with the free range technique.
 - c. the production using both techniques falls by the same amount
 - d. the factory egg producers supply curve shifts inward.
 - e. the free range egg producers supply curve shifts inward.
- moderate 72. A demand curve of the form: $Q = a - bP$, where a and b are positive real numbers,:
- a. is an upward sloping straight line.
 - b. has a constant price elasticity of demand.
 - c. **is a downward sloping straight line.**
 - d. is parabolic.
- moderate 73. Consider a supply curve of the form: $Q = c + dP$. If d equals zero then supply is:
- a. **completely inelastic.**
 - b. inelastic, but not completely inelastic.
 - c. elastic, but not infinitely elastic.
 - d. infinitely elastic

- difficult 74. Consider a linear, upward sloping supply curve. Moving up the supply curve:
- the price elasticity of supply will increase.
 - the price elasticity of supply will increase if the supply curve's slope is greater than one.
 - the price elasticity of supply will increase if the supply curve's slope is greater than one and the lowest price needed to induce firms to supply anything is positive.***
 - the price elasticity of supply will be constant.
 - none of the above.

Section 2.7

- easy 75. When the government controls the price of a product, causing the market price to be above the free market equilibrium price,
- only producers gain.
 - both producers and consumers gain.
 - only consumers gain.
 - some, but not all, sellers can find buyers for their goods.***
- easy 76. When the government controls the price of a product, causing the market price to be below the free market equilibrium price,
- some consumers gain from the price controls and other consumers lose.***
 - all people gain from the price controls.
 - both producers and consumers gain.
 - most consumers are better-off.
- moderate 77. Suppose that, at the market clearing price of natural gas, the price elasticity of demand is -1.2 and the price elasticity of supply is 0.6. What will result from a price ceiling that is 10 percent below the market clearing price?
- A shortage equal to 1.8 percent of the market clearing quantity.
 - A shortage equal to 0.6 percent of the market clearing quantity.
 - A shortage equal to 18 percent of the market clearing quantity.***
 - A shortage equal to 6 percent of the market clearing quantity.
 - More information is needed.
- easy 78. What happens if price falls below the market clearing price?
- Demand shifts out.
 - Supply shifts in.
 - Quantity demanded decreases, quantity supplied increases, and price falls.
 - Quantity demanded increases, quantity supplied decreases, and price rises.***
- easy 79. Which of the following results from a binding price floor?
- Equilibrium.
 - Excess demand.
 - Excess supply.***
 - Shortage.

- moderate 80. Other things being equal, the increase in rents that occur after rent controls are abolished is smaller when
- the own price elasticity of demand for rental homes is price inelastic.
 - the own price elasticity of demand for rental homes is price elastic.***
 - the own price elasticity of demand for rental homes has unitary price elasticity.
 - rented homes and owned homes are complements.
 - rented homes and owned homes are substitutes.

SHORT ANSWER PROBLEMS

Section 2.2

- moderate 81. The inverse demand curve for product X is given by:

$$P_X = 25 - 0.005Q + 0.15P_Y,$$

where P_X represents price in dollars per unit, Q represents rate of sales in pounds per week, and P_Y represents selling price of another product Y in dollars per unit. The inverse supply curve of product X is given by:

$$P_X = 5 + 0.004Q.$$

- Determine the equilibrium price and sales of X. Let $P_Y = \$10$.
- Determine whether X and Y are substitutes or complements.

Solution:

- Equate supply to demand to calculate Q .

$$25 - 0.005Q + 0.15(10) = 5 + 0.004Q$$

$$21.5 = 0.009Q$$

$$Q = 2,388.9 \text{ units per week}$$

$$\text{At } Q = 2,388.9, \quad P = 25 - .005(2,388.9) + 0.15(10)$$

$$= \$14.56 \text{ per unit.}$$

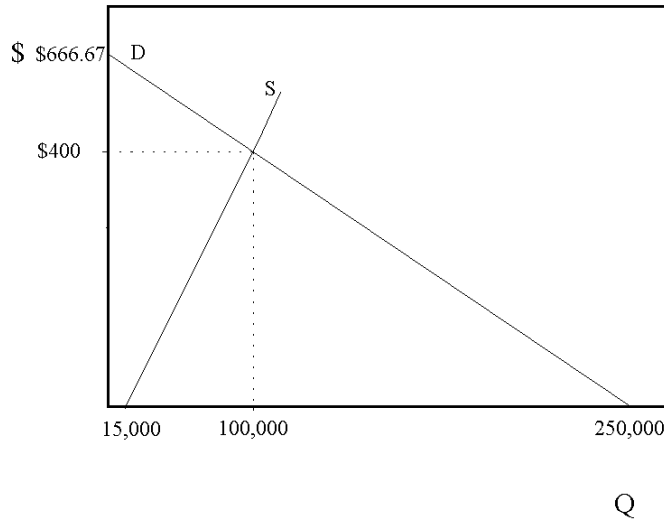
- Since we can solve for quantity demanded as a function of prices,

$$Q = \frac{25 + 0.15P_Y - P_X}{0.005}$$

we see that there is a direct, positive relationship between Q and P_Y .

Increases in the price of good Y raise the [demand for good X DEL][ADD quantity demanded for good X at any value of P_X]. This implies that goods Y and X are substitutes.

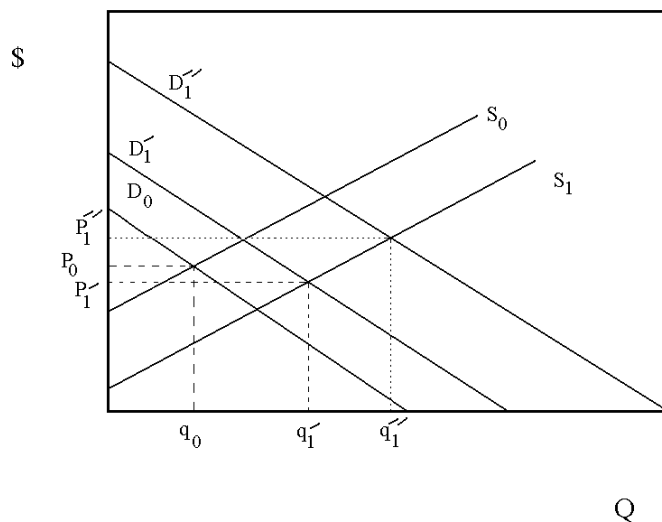
- easy 82. The daily demand for hotel rooms on Manhattan Island in New York is given by the equation $Q_D = 250,000 - 375P$. The daily supply of hotel rooms on Manhattan Island is given by the equation $Q_S = 15,000 + 212.5P$. Diagram these demand and supply curves in price and quantity space. What is the equilibrium price and quantity of hotel rooms on Manhattan Island?



Solution: The equilibrium price can be found by equating Demand and Supply (graphically, this is where the Demand and Supply curves intersect). $Q_D = 250,000 - 375P = 15,000 + 212.5P = Q_S$. We can then solve for equilibrium Price. $P = \frac{235,000}{587.5} = 400$. At a price of \$400, quantity supplied and quantity demanded are 100,000.

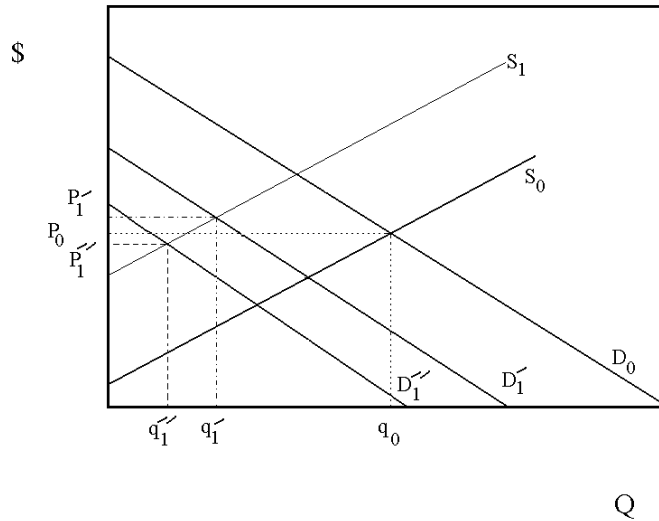
Section 2.3

- moderate 83. Suppose a new discovery in computer manufacturing has just made computer production cheaper. Also, the popularity and usefulness of computers continues to grow. Use Supply and Demand analysis to predict how these shocks will affect equilibrium price and quantity of computers. Is there enough information to determine if market prices will rise or fall? Why?



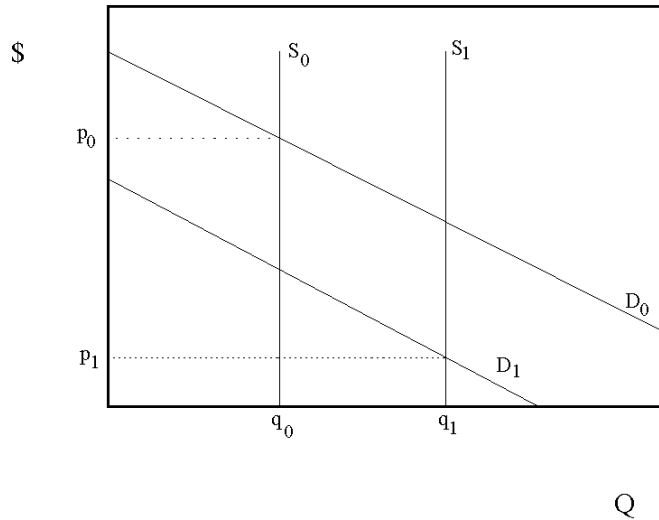
Solution: The increase in demand due to the usefulness of computers will shift the demand curve to the right. This effect alone on the market will influence the market price and quantity to rise. This is shown above by a movement from the original demand curve D_0 to a new demand curve such as D_1' or D_1'' . The reduction in the cost of producing computers will result in an increase in supply (a rightward shift of the supply curve). This effect alone on the market will influence the price of computers to fall while the quantity will increase. Note that the supply and demand effects on price work in opposite directions. If the supply effect dominates the demand effect, the equilibrium prices will fall. This is exhibited by the increase in demand to only D_1' . On this demand curve, the net effect is for prices to fall from P_0 to P_1' . On the other hand if the demand effect dominates, equilibrium prices will rise. This is exhibited by the increase in demand to D_1'' . On this demand curve, the net effect is for prices to rise from P_0 to P_1'' . As we don't know given the current information which effect dominates, we can't perfectly predict the change in price. The change in quantity is unambiguously increased.

- moderate 84. Suppose that due to more stringent environmental regulation it becomes more expensive for steel production firms to operate. Also, recent technological advances in plastics has reduced the demand for steel products. Use Supply and Demand analysis to predict how these shocks will affect equilibrium price and quantity of steel. Can we say with certainty that the market price for steel will fall? Why?



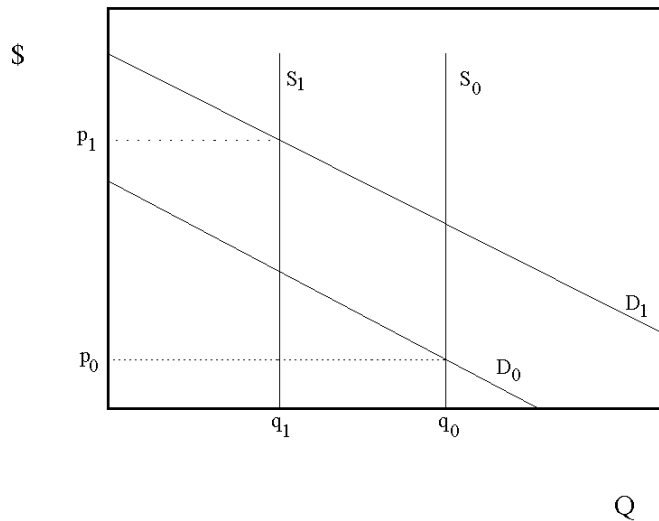
Solution: The increase in the cost of production of steel will shift the supply curve to the left. This effect alone on the market will influence the market price to rise while the market quantity will fall. This is shown above by a movement from the original supply curve S_0 to a new supply curve such as S_1 . The decrease in demand will cause the demand curve to shift to the left. This effect alone on the market will influence the market price and quantity of steel to fall. Note that the supply and demand effects on price work in opposite directions. If the supply effect dominates the demand effect, the equilibrium prices will rise. This is exhibited by the decrease in demand to D_1' . On this demand curve, the net effect is for prices to rise from P_0 to P_1' . On the other hand if the demand effect dominates, equilibrium prices will fall. This is exhibited by the decrease in demand to D_1'' . On this demand curve, the net effect is for prices to fall from P_0 to P_1'' . As we don't know given the current information which effect dominates, we can't perfectly predict the change in price. The change in quantity is unambiguously decreased.

- moderate 85. Historically, investors have considered gold commodities to be a good investment to preserve wealth in times of inflation. If investors are no longer worried about inflation and gold demand decreases, what do you expect will happen to gold prices? How would your answer change if you learn that a recent gold mine discovery will increase the supply of gold?



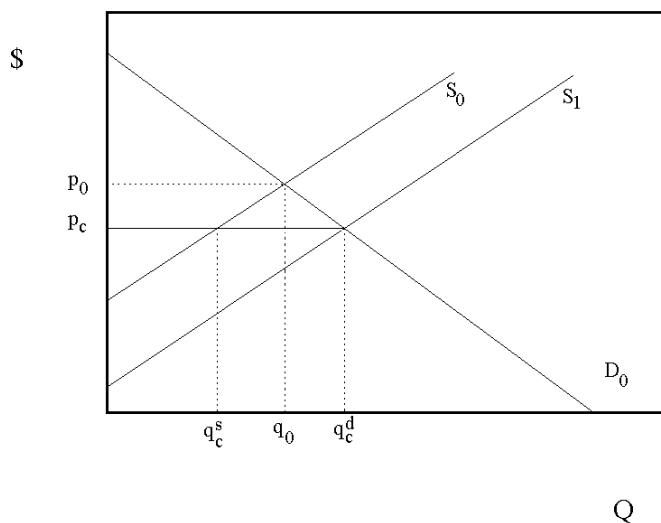
Solution: The decrease in gold demand due to reduced fears of inflation will shift the demand curve to the left. This is indicated above by a movement from D_0 to D_1 . The effect on gold prices is negative. If new gold discoveries increase the supply of gold, the supply curve will shift to the right. This effect will also exert downward pressure on gold prices. This effect is diagrammed above as a movement from S_0 to S_1 . Since both effects cause gold prices to become lower, we can say unambiguously that gold prices will decline.

- moderate 86. The currency used by the Confederate States of America during its brief existence from 1861 to 1865 has become a collector's item today. The Confederate Currency supply is perfectly inelastic. As the demand for the collectible increases and some of the old currency is destroyed or no longer of value as a collectible, what happens to the market price?



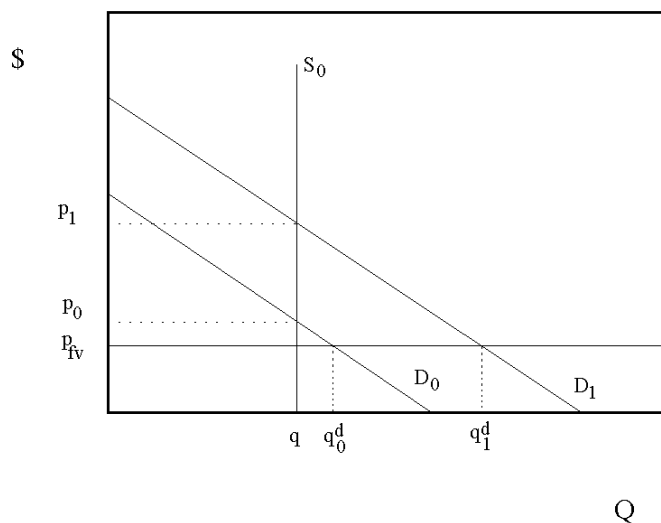
Solution: The increase in demand for Confederate currency will result in a rightward shift of demand from D_0 to D_1 . This demand effect will put upward pressure on the price of Confederate currency. As some of the collectibles deteriorate and become worthless, the supply curve shifts back to the left as indicated above by the movement from S_0 to S_1 . The supply effect places upward pressure on prices. Both effects put upward pressure on prices, so we can say unambiguously that prices for Confederate currency will rise.

- moderate 87. Suppose the cable TV industry is currently unregulated. However, due to complaints from consumers that the price of cable TV is too high, the legislature is considering placing a price ceiling on cable TV below the current equilibrium price. If the government does make this price ceiling law, diagram and explain the effects with supply and demand analysis. If the cable TV company is worried about disgruntling customers, suppose that the company may introduce a different type of programming that is cheaper for the company to provide yet is equally appealing to customers. What would be the effects of this action?



Solution: Before implementation of the price ceiling, the equilibrium price and quantity is given by the intersection of demand and supply. This is illustrated above as p_0 and q_0 . A price ceiling below the initial equilibrium price will cause a shortage. That is quantity demanded (q_c^d) at the price ceiling (p_c) exceeds quantity supplied (q_c^s). To avoid upsetting consumers, the company may provide a lower quality cable TV subscription. This cheaper package would increase the supply of cable TV. The supply curve will rightward. This action will move towards eliminating the cable TV shortage as the quantity supplied of the modified package increases.

- difficult 88. Suppose that the resale of tickets to professional football games is illegal in Missouri. Due to the high demand for Chiefs (who play in Kansas City, Missouri) tickets there is a shortage of tickets at the current ticket price. Given that the Chiefs will not raise the price at which they sell the tickets, what would be the result of allowing tickets to be resold in a secondary market at whatever price the market would support? If speculators entered the market and began buying tickets directly from the Chiefs in hopes of reselling the tickets later, what would happen to the line outside of the ticket offices when the tickets are initially sold?



Solution: Initially, there is a shortage due to the prohibition of resale of tickets above face value. That is quantity demanded (q^d_0) exceeds quantity supplied (q) at the face value price (p_{fv}). If resale of tickets is allowed, the shortage will disappear as market forces will bid the price of Chief tickets to the price at which quantity demanded and supplied are equal. If the Chiefs organization continues to sell tickets at p_0 , speculators may begin purchasing the tickets directly in hopes of reselling the tickets on the secondary market for higher prices. The influx of speculative demand will shift the demand curve to the right. This implies that at face value, there is even a greater shortage for tickets.

Section 2.4

- moderate 89. Harding Enterprises has developed a new product called the Gillooly Shillelagh. The market demand for this product is given as follows:

$$Q = 240 - 4P$$

- At what price is the price elasticity of demand equal to zero?
- At what price is demand infinitely elastic?
- At what price is the price elasticity of demand equal to one?
- If the shillelagh is priced at \$40, what is the point price elasticity of demand?

Solution:

The demand curve given in this problem is linear. The intercepts of the inverse demand curve on the price and quantity axes are \$60 and 240 respectively. The price elasticity of demand varies along the length of this demand curve. Demand is infinitely elastic at the intercept on the price axis. Demand is completely inelastic at the intercept on the quantity axis. Demand is unit elastic

at the half-way point between these two extremes. Thus, the price elasticity of demand equals zero (is completely inelastic) at a price of zero.

- Demand is infinitely elastic at a price of \$60.
- The price elasticity of demand equals one at a price of \$30.
- The price elasticity of demand equals $\left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right)$. If P equals \$40, Q equals 80. $\left(\frac{\Delta Q}{\Delta P}\right)$ is constant along a linear demand curve. In this case it equals -4. Therefore, the price elasticity of demand equals $(40/80)(-4) = -2$.

- moderate 90. The demand for a bushel of wheat in 1981 was given by the equation $Q_D = 3550 - 266P$. At a price of \$3.46 per bushel, what is the price elasticity of demand? If the price of wheat falls to \$3.27 per bushel, what happens to the revenue generated from the sale of wheat?

Solution: At a price of \$3.46 per bushel, the quantity demanded for wheat is 2,629.64 bushels of wheat. At a price of \$3.27 per bushel, the quantity demanded for wheat is 2,680.18. The price elasticity of demand at \$3.46 is $E_D = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{3.46}{2,629.64}\right)\left(\frac{50.54}{-0.19}\right) = -0.35$. At a price of \$3.46 per bushel, the revenue generated from the sale of wheat is \$12,558.554. At a price of \$3.27 per bushel, the revenue generated from the sale of wheat is \$8,764.1886. Wheat revenue drops by \$3,794.366 when price decreases from \$3.46 to \$3.27 per bushel.

- easy 91. The demand for packs of Pokemon cards is given by the equation $Q_D = 500,000 - 45,000P$. At a price of \$2.50 per pack, what is the quantity demanded? At \$5.00 per pack, what is the price elasticity of demand?

Solution: At a price of \$2.50 per pack, the quantity demanded is 387,500 packs of cards. At a price of \$5.00 per pack, the quantity demanded is 275,000. At \$5.00 per pack, the price elasticity of demand is $E_D = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{5}{275,000}\right)\left(\frac{-112,500}{2.50}\right) = -0.818$.

- easy 92. The monthly supply of desktop personal computers is given by the equation $Q_S = 15,000 + 43.75P$. At a price of \$800, what is the price elasticity of supply?

Solution: At a price of \$800, the quantity supplied is 50,000. The price elasticity of supply is $E_S = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{800}{50,000}\right)(43.75) = 0.7$.

- moderate 93. The demand for tickets to the Daytona 500 NASCAR event is given by the equation $Q_D = 350,000 - 800P$. The supply of tickets to the event is given by the capacity of the Daytona track, which is 150,000. What is the equilibrium price of tickets to the event? What is the price elasticity of demand at the equilibrium price? What is the price elasticity of supply at the equilibrium price?

Solution: Consumers are willing to pay $P = \frac{200,000}{800} = \250 per ticket. The price elasticity of demand at

$$\$250 \text{ is } E_D = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{250}{150,000}\right)(-800) = -1\frac{1}{3}. \text{ The price elasticity of supply is}$$

$$E_S = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{250}{150,000}\right)(0) = 0.$$

Section 2.6

- difficult 94. Midcontinent Plastics makes 80 fiberglass truck hoods per day for large truck manufacturers. Each hood sells for \$500.00. Midcontinent sells all of its product to the large truck manufacturers. If the own price elasticity of demand for hoods is -0.4 and the price elasticity of supply is 1.5.
- Compute the supply and demand for truck hoods.
 - If the local county government imposed a per unit tax of \$25.00 per hood manufactured, what would be the new equilibrium price of hoods to the truck manufacturer?
 - Would a per unit tax on hoods change the revenue received by Midcontinent?

Solution:

Given: $P^* = \$500$ $Q^* = 80$ hoods per day

$E_d = -0.40$ $E_s = 1.5$

a. Demand: $Q_d = a_0 + a_1P$ Supply: $Q_s = b_0 + b_1P$

Use: $E = \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$ to compute a_1 and b_1 .

$$-0.4 = \frac{500}{80} a_1 \qquad 1.5 = \frac{500}{80} b_1$$

$$a_1 = -0.064 \qquad b_1 = 0.24$$

Solve for a_0 and b_0

$$Q_d = a_0 + a_1P \qquad Q_s = b_0 + b_1P$$

$$80 = a_0 + -0.064(500) \qquad 80 = b_0 + 0.24(500)$$

$$a_0 = 112 \qquad b_0 = -40$$

$$Q_d = 112 - 0.064P \qquad Q_s = -40 + 0.24P$$

- b. The tax represents a price increase to the purchaser regardless of the current price. Thus, the supply curve will be adjusted vertically upward by \$25.

$$Q_s = -40 + 0.24P \text{ or}$$

$$P = 166.67 + 4.17 Q_s, \text{ then}$$

$$P_t = P + \$25 = 166.67 + 25 + 4.17Q_s$$

$$P_t = 191.67 + 4.17Q_s \text{ or}$$

$$Q_s = -45.96 + 0.24P$$

The new equilibrium price will be:

$$\text{New Supply} = \text{Demand}$$

$$Q_s = -45.96 + 0.24P = 112 - 0.064P = Q_d$$

$$\text{Solving yields } P = \$519.60 \text{ per truck hood}$$

- c. Since the new selling price in (c) is \$519.60 and the tax is \$25 per hood, Midcontinent would receive only \$494.6 per hood. As quantity sold has fallen too, revenues would fall.

- moderate 95. Suppose that a small market Major League Baseball team currently charges \$12 for a ticket. At this price, they are able to sell 12,000 tickets to each game. If they raise ticket prices to \$15, they would sell 11,053 tickets to each game. What is the price elasticity of demand at \$12? If the demand curve is linear, what is the algebraic expression for demand?

Solution: The price elasticity of demand is $E = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{12}{12,000}\right)\left(\frac{-947}{3}\right) = -0.316$. If the

demand curve is linear, it is in the form of $Q_D = a + bP$. Also, we know that

$$E = b\left(\frac{P}{Q}\right) \Leftrightarrow b = E\left(\frac{Q}{P}\right) = -0.316\left(\frac{12,000}{12}\right) = -316. \text{ Rearranging the linear expression for}$$

demand allows us to solve for a as follows: $a = Q_D - bP \Rightarrow a = 12,000 + 316(12) = 15,792$. We may now write the linear expression for demand as $Q_D = 15,792 - 316P$.

- moderate 96. Suppose that the short-run world demand and supply elasticities for crude oil are -0.076 and 0.088 , respectively. The current price per barrel is $\$30$ and the short-run equilibrium quantity is 23.84 billion barrels per year. Derive the linear demand and supply equations.

Solution: If the demand curve is linear, it is in the form of $Q_D = a + bP$. Also, we know that

$$E = b \left(\frac{P}{Q} \right) \Leftrightarrow b = E \left(\frac{Q}{P} \right) = -0.076 \left(\frac{23.84}{30} \right) = -0.060. \text{ Rearranging the linear expression for}$$

demand allows us to solve for a as follows: $a = Q_D - bP \Rightarrow a = 23.84 + 0.060(30) = 25.640$. We may now write the linear expression for demand as $Q_D = 25.640 - 0.060P$. If the supply curve is linear, it is in the form of $Q_S = c + dP$. Also, we know that

$$E = d \left(\frac{P}{Q} \right) \Leftrightarrow d = E \left(\frac{Q}{P} \right) = 0.088 \left(\frac{23.84}{30} \right) = 0.070. \text{ Rearranging the linear expression for demand}$$

allows us to solve for c as follows: $c = Q_S - dP \Rightarrow c = 23.84 - 0.070(30) = 21.740$. We may now write the linear expression for supply as $Q_S = 21.740 + 0.070P$.

- difficult 97. Suppose that the long-run world demand and supply elasticities of crude oil are -0.906 and 0.515 , respectively. The current long-run equilibrium price is $\$30$ per barrel and the equilibrium quantity is 16.88 billion barrels per year. Derive the linear long-run demand and supply equations. Next, suppose the long-run supply curve you derived above consists of competitive supply and OPEC supply. If the long-run competitive supply equation is: $S_C = 7.78 + 0.29P$, what must be OPEC's level of production in this long-run equilibrium?

Solution: If the demand curve is linear, it is in the form of $Q_D = a + bP$. Also, we know that

$$E = b \left(\frac{P}{Q} \right) \Leftrightarrow b = E \left(\frac{Q}{P} \right) = -0.906 \left(\frac{16.88}{30} \right) = -0.510. \text{ Rearranging the linear expression for}$$

demand allows us to solve for a as follows: $a = Q_D - bP \Rightarrow a = 16.88 + 0.510(30) = 32.180$. We may now write the linear expression for demand as $Q_D = 32.18 - 0.510P$. If the supply curve is linear, it is in the form of $Q_S = c + dP$. Also, we know that

$$E = d \left(\frac{P}{Q} \right) \Leftrightarrow d = E \left(\frac{Q}{P} \right) = 0.515 \left(\frac{16.88}{30} \right) = 0.290. \text{ Rearranging the linear expression for demand}$$

allows us to solve for c as follows: $c = Q_S - dP \Rightarrow c = 16.88 - 0.290(30) = 8.18$. We may now write the linear expression for supply as $Q_S = 8.18 + 0.290P$. OPEC's supply is the difference between the world supply and competitive supply at $\$30$. We know that world supply at $\$30$ is 16.88 . Competitive supply at $\$30$ is $7.78 + 0.29(30) = 16.48$. This implies that OPEC's supply is 0.4 billion barrels per year at $\$30$ in this long-run equilibrium.

Section 2.7

moderate 98. The U.S. Department of Agriculture is interested in analyzing the domestic market for corn. The USDA's staff economists estimate the following equations for the demand and supply curves:

$$Q_d = 1,600 - 125P$$

$$Q_s = 440 + 165P$$

Quantities are measured in millions of bushels; prices are measured in dollars per bushel.

- Calculate the equilibrium price and quantity that will prevail under a completely free market.
- Calculate the price elasticities of supply and demand at the equilibrium values.
- The government currently has a \$4.50 bushel support price in place. What impact will this support price have on the market? Will the government be forced to purchase corn under a program that requires them to buy up any surpluses? If so, how much?

Solution:

- a. Set $Q_d = Q_s$ to determine price.

$$1600 - 125P = 440 + 165P$$

$$1160 = 290P$$

$$P = 4$$

Obtain Q by substituting into either expression.

$$Q_d = 1600 - 125(4)$$

$$Q_d = 1600 - 500$$

$$Q = 1100$$

$$P^* = \$4, Q^* = 1100$$

- b.

$$\text{For the Own Price Elasticity of Demand } E = -125 \times \frac{4}{1100} = -0.45 \text{ (approximately)}$$

$$\text{For the Own Price Elasticity of Supply } E = 165 \times \frac{4}{1100} = 0.60$$

- c. Calculate Q_d and Q_s at the \$4.50 price

$$Q_d = 1600 - 125(4.5)$$

$$Q_d = 1037.5$$

$$Q_s = 440 + 165(4.5)$$

$$Q_s = 1182.5$$

$$\text{surplus} = Q_s - Q_d = 1182.5 - 1037.5 = 145$$

The support price would create an excess supply of 145 million bushels that the government would be forced to buy.

moderate 99. The market for gravel has been estimated to have these supply and demand relationships:

$$\text{Supply } P = 10 + 0.01Q$$

$$\text{Demand } P = 100 - 0.01Q,$$

where P represents price per unit in dollars, and Q represents sales per week in tons. Determine the equilibrium price and sales. Determine the amount of shortage or surplus that would develop at P = \$40/ton.

Solution:

The equilibrium price can be found by equating S to D in terms of Q.

$$10 + 0.01Q = 100 - 0.01Q$$

$$0.02Q = 90$$

$$Q = 4,500 \text{ tons/week}$$

$$P = 10 + 0.01(4,500) = \$55/\text{ton}.$$

At P = \$40/ton, the quantity demanded is:

$$40 = 100 - 0.01Q \text{ --or-- } Q = 6,000 \text{ tons/week}$$

The quantity supplied is:

$$40 = 10 + 0.01Q \text{ --or-- } Q = 3,000 \text{ tons/week}$$

The shortage is 3,000 tons/week.

difficult 100. American Mining Company is interested in obtaining quick estimates of the supply and demand curves for coal. The firm's research department informs you that the elasticity of supply is approximately 1.7, the elasticity of demand is approximately -0.85, and the current price and quantity are \$41 and 1,206, respectively. Price is measured in dollars per ton, quantity the number of tons per week.

- Estimate linear supply and demand curves at the current price and quantity.
- What impact would a 10% increase in demand have on the equilibrium price and quantity?
- If the government refused to let American raise the price when demand increased in (b) above, what shortage is created?

Solution:

- First we estimate the demand curve

$$Q = a_0 - b_0P$$

$$\text{Elasticity of demand} = b_0 \times \frac{P}{Q}$$

$$.85 = b_0 \times \frac{41}{1206}$$

$$-1025.1 = b_0 \times 41$$

$$b_0 = 25$$

$$Q = a_0 - b_0P$$

$$1206 = a_0 - 25(41)$$

$$1206 = a_0 - 1025$$

$$a_0 = 2231$$

$$Q_o = 2231 - 25P$$

Next, we estimate the supply curve

$$Q = a_1 + b_1P$$

$$\text{Elasticity of Supply} = b_1 \times \frac{P}{Q}$$

$$1.7 = b_1 \times \frac{41}{1206}$$

$$2050.2x = b_1 \times 41$$

$$b_1 = 50$$

$$Q = a_1 + b_1P$$

$$1206 = a_1 + 50(41)$$

$$a_1 = -844$$

$$Q_s = -844 + 50P$$

Check to see if correct:

$$\text{Set } Q_s = Q_d$$

$$2231 - 25P = -844 + 50P$$

$$3075 = 75P$$

$$P = 41$$

The equations are correct.

b. Multiply demand equation by 1.10

$$1.10 (2231 - 25P)$$

$$Q_d' = Q_s \text{ and solve}$$

$$Q_s = -844 + 50P$$

$$\text{Set } Q_d' = Q_s \text{ and solve.}$$

$$2454.1 - 27.5P = -844 + 50P$$

$$3298.1 = 77.5P$$

$$P = 42.56$$

Substitute P into Q_d' to find quantity demanded

$$Q_d' = 2454.1 - 27.5(42.56)$$

$$Q_d' = 1283.7 \text{ or } 1284$$

- c. Since price cannot rise, the shortage will be the quantity demanded with the new demand minus the quantity supplied with the unchanged supply

$$\text{Quantity demanded: } Q = 2454.1 - 27.5(41) = 1326.6$$

$$\text{Quantity supplied: } Q = -844 + 50(41) = 1206.0$$

$$\text{Shortage} = 1326.6 - 1206.0 = 120.6$$

difficult 101. In a city with a medium sized population, the equilibrium price for a city bus ticket is \$1.00, and the number of riders each day is 10,800. The short-run price elasticity of demand is -0.60, and the short-run elasticity of supply is 1.0.

- Estimate the short-run linear supply and demand curves for bus tickets.
- If the demand for bus tickets increased by 10% because of a rise in the world price of oil, what would be the new equilibrium price of bus tickets?
- If the city council refused to let the bus company raise the price of bus tickets after the demand for tickets increases (see (b) above), what daily shortage of tickets would be created?
- Would the bus company have an incentive to increase the supply in the long run given the city council's decision in (c) above? Explain your answer.

Solution:

Given: $P^* = \$1.00$ per ticket $Q^* = 10,800$

$$E_d = -0.60 \qquad E_s = 1.0$$

a. Demand: $Q_d = a_0 + a_1P$ Supply: $Q_s = b_0 + b_1P$

Use: $E = \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$ to compute a_1 and b_1 .

$$E_d = \frac{1}{10,800} a_1 \qquad E_s = \frac{1}{10,800} b_1$$

$$-0.60 = \frac{1}{10,800} a_1 \qquad 1.0 = \frac{1}{10,800} b_1$$

$$a_1 = -6,480 \qquad b_1 = 10,800$$

Solve for a_0

$$Q_d = a_0 + a_1P$$

$$10,800 = a_0 - 6,480.00(1.0)$$

$$a_0 = 17,280$$

$$Q_d = 17,280 - 6,480P$$

Solve for b_0

$$Q_s = b_0 + b_1P$$

$$10,800 = b_0 + 10,800.00(1.0)$$

$$b_0 = 0.0$$

$$Q_s = 0.0 + 10,800P$$

b. New demand = $(1.10)Q_d = (17,280 - 6,480P)(1.10)$

$$Q_d' = 19,008.00 - 7,128P$$

Equate Q_d' to Q_s to get new equilibrium price.

$$19,008 - 7,128P = 0.0 + 10,800P$$

$$P^* = \$1.06 \text{ per ticket}$$

c. The shortage would be the quantity demanded at $P = \$1.00$ minus the quantity supplied at $P = \$1.00$

$$Q_d = 19,008 - 7,128(\$1.00) = 11,880$$

$$Q_s = 0.0 + 10,800(\$1.00) = 10,800$$

$$\text{Shortage} = 11,800 - 10,800 = 1,080$$

e. No. The bus company has no incentive to supply more than 10,800, as long as the price is restricted at \$1.00.

difficult 102. The current price charged by a local movie theater is \$8 per ticket. The concession stand at the theater averages \$5 in revenue for each ticket sold. At the current ticket price, the theater typically sells 300 tickets per showing. If the theater raises ticket prices to \$9, the theater will sell 270 tickets. What is the price elasticity of demand at \$8? What happens to ticket revenue if the theater increases ticket prices to \$9 from \$8? What happens to concession revenue if the theater increases ticket prices? If the theater wants to maximize the sum of ticket and concession revenue, should they raise ticket prices to \$9?

Solution: The price elasticity of demand at \$8 is $E = \left(\frac{P}{Q}\right)\left(\frac{\Delta Q}{\Delta P}\right) = \left(\frac{8}{300}\right)\left(\frac{-30}{1}\right) = -0.8$. Initially, ticket revenue is $P \cdot Q = \$8(300) = \$2,400$. If ticket prices are raised to \$9, ticket revenue becomes $P \cdot Q = \$9(270) = \$2,430$. Thus, if ticket prices are raised to \$9, ticket revenue increases by \$30. At \$8, the concession stand will average \$1,500 per movie showing. If ticket prices are raised to \$9, the concession stand will average \$1,350. Thus, concession stand revenues will fall on average by \$150. If the theater wants to maximize the sum of ticket and concession revenue, they should not raise ticket prices to \$9.