If the quantity stretches a great deal in response to a change in price or income, it is considered elastic. This mental picture should also help you remember how to calculate an elasticity—in the numerator, you will always find the percentage change in quantity, and in the denominator, you will always find the percentage change in the variable that is the source of the change in quantity.

Terms and Definitions

Choose a definition for each key term.

Key Terms

_____ Elasticity

_____ Price elasticity of demand

_____ Elastic

_____ Inelastic

_____ Total revenue

_____ Income elasticity of demand

_____ Cross-price elasticity of demand

_____ Price elasticity of supply

_____ Normal good

_____ Inferior good

Definitions

1. A measure of how much the quantity demanded of a good responds to a change in consumers' income
2. When the quantity demanded or supplied responds substantially to a change in one of its determinants
3. A good characterized by a negative income elasticity
4. A measure of the responsiveness of the quantity demanded or quantity supplied to a change in one of its determinants
5. A good characterized by a positive income elasticity
6. A measure of how much the quantity supplied of a good responds to a change in the price of that good
7. When the quantity demanded or supplied responds only slightly to a change in one of its determinants
8. The amount paid by buyers and received by sellers of a good computed as $P \times Q$
9. A measure of how much the quantity demanded of a good responds to a change in the price of that good
10. A measure of how much the quantity demanded of one good responds to a change in the price of another good

Problems and Short-Answer Questions

Practice Problems

1. For each pair of goods listed below, which good would you expect to have the more elastic demand? Why?
   a. cigarettes; a trip to Florida over spring break

____

____

b. an AIDS vaccine over the next month; an AIDS vaccine over the next five years

c. beer; Budweiser

d. insulin; aspirin

2. Suppose the *Daily Newspaper* estimates that if it raises the price of its newspaper from $1.00 to $1.50 then the number of subscribers will fall from 50,000 to 40,000.
   a. What is the price elasticity of demand for the *Daily Newspaper* when elasticity is calculated using the midpoint method?

   b. What is the advantage of using the midpoint method?

   c. If the *Daily Newspaper*'s only concern is to maximize total revenue, should it raise the price of a newspaper from $1.00 to $1.50? Why or why not?

3. The table below provides the demand schedule for motel rooms at Small Town Motel. Use the information provided to complete the table. Answer the following questions based on your responses in the table. Use the midpoint method to calculate the percentage changes used to generate the elasticities.

Price	Quantity Demanded	Total Revenue	% Change in Price	% Change in Quantity	Elasticity
$ 20	24				
40	20				
60	16				
80	12				
100	8				
120	4				

a. Over what range of prices is the demand for motel rooms elastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

b. Over what range of prices is the demand for motel rooms inelastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

c. Over what range of prices is the demand for motel rooms unit elastic? To maximize total revenue, should Small Town Motel raise or lower the price within this range?

4. The demand schedule from question 3 above is reproduced below along with another demand schedule when consumer incomes have risen to $60,000 from $50,000. Use this information to answer the following questions. Use the midpoint method to calculate the percentage changes used to generate the elasticities.

Price	Quantity Demanded When Income Is $50,000	Quantity Demanded When Income Is $60,000
$ 20	24	34
40	20	30
60	16	26
80	12	22
100	8	18
120	4	14

a. What is the income elasticity of demand when motel rooms rent for $40?

b. What is the income elasticity of demand when motel rooms rent for $100?

c. Are motel rooms normal or inferior goods? Why?

d. Are motel rooms likely to be necessities or luxuries? Why?

5. For each pair of goods listed below, which good would you expect to have the more elastic supply? Why?
   a. televisions; beachfront property

   b. crude oil over the next week; crude oil over the next year

   c. a painting by van Gogh; a print of the same painting by van Gogh

Short-Answer Questions

1. What are the four major determinants of the price elasticity of demand?

2. If demand is inelastic, will an increase in price raise or lower total revenue? Why?

3. If the price of soda doubles from $1.00 per can to $2.00 per can and you buy the same amount, what is your price elasticity of demand for soda, and is it considered elastic or inelastic?

4. If the price of Pepsi increases by one cent and this induces you to stop buying Pepsi altogether and switch to Coca-Cola, what is your price elasticity of demand for Pepsi, and is it considered elastic or inelastic?

5. Suppose your income rises by 20 percent and your quantity demanded of eggs falls by 10 percent. What is the value of your income elasticity of demand for eggs? Are eggs normal or inferior goods to you?

6. Suppose a firm is operating at half capacity. Is its supply curve for output likely to be relatively elastic or inelastic? Why?

7. Is the price elasticity of supply for fresh fish likely to be elastic or inelastic when measured over the time period of one day? Why?

8. If a demand curve is linear, is the elasticity constant along the demand curve? Which part tends to be elastic and which part tends to be inelastic? Why?

9. Suppose that at a price of $2.00 per bushel, the quantity supplied of corn is 25 million metric tons. At a price of $3.00 per bushel, the quantity supplied is 30 million metric tons. What is the elasticity of supply for corn? Is supply elastic or inelastic?

10. Suppose that when the price of apples rises by 20 percent, the quantity demanded of oranges rises by 6 percent. What is the cross-price elasticity of demand between apples and oranges? Are these two goods substitutes or complements?

Self-Test

True/False Questions

____ 1. If the quantity demanded of a good is sensitive to a change in the price of that good, demand is said to be price inelastic.

____ 2. Using the midpoint method to calculate elasticity, if an increase in the price of pencils from 10 cents to 20 cents reduces the quantity demanded from 1,000 pencils to 500 pencils, then the demand for pencils is unit price elastic.

____ 3. The demand for tires should be more inelastic than the demand for Goodyear brand tires.

____ 4. The demand for aspirin this month should be more elastic than the demand for aspirin this year.

____ 5. The price elasticity of demand is defined as the percentage change in the price of that good divided by the percentage change in quantity demanded of that good.

____ 6. If the cross-price elasticity of demand between two goods is positive, the goods are likely to be complements.

____ 7. If the demand for a good is price inelastic, an increase in its price will increase total revenue in that market.

____ 8. The demand for a necessity such as insulin tends to be elastic.

____ 9. If a demand curve is linear, the price elasticity of demand is constant along it.

____ 10. If the income elasticity of demand for a bus ride is negative, then a bus ride is an inferior good.

____ 11. The supply of automobiles for this week is likely to be more price inelastic than the supply of automobiles for this year.

____ 12. If the price elasticity of supply for blue jeans is 1.3, an increase of 10 percent in the price of blue jeans would increase the quantity supplied of blue jeans by 13 percent.

____ 13. The price elasticity of supply tends to be more inelastic as the firm's production facility reaches maximum capacity.

____ 14. An advance in technology that shifts the market supply curve to the right always increases total revenue received by producers.

____ 15. The income elasticity of demand for luxury items, such as diamonds, tends to be large (greater than 1).

Multiple-Choice Questions

1. If a small percentage increase in the price of a good greatly reduces the quantity demanded for that good, the demand for that good is
   a. price inelastic.
   b. price elastic.
   c. unit price elastic.
   d. income inelastic.
   e. income elastic.

2. The price elasticity of demand is defined as
   a. the percentage change in price of a good divided by the percentage change in the quantity demanded of that good.
   b. the percentage change in income divided by the percentage change in the quantity demanded.
   c. the percentage change in the quantity demanded of a good divided by the percentage change in the price of that good.
   d. the percentage change in the quantity demanded divided by the percentage change in income.
   e. none of the above.

3. In general, a flatter demand curve is more likely to be
   a. price elastic.
   b. price inelastic.
   c. unit price elastic.
   d. none of the above.

4. In general, a steeper supply curve is more likely to be
   a. price elastic.
   b. price inelastic.
   c. unit price elastic.
   d. none of the above.

5. Which of the following would cause a demand curve for a good to be price inelastic?
   a. There are a great number of substitutes for the good.
   b. The good is inferior.
   c. The good is a luxury.
   d. The good is a necessity.

6. The demand for which of the following is likely to be the most price inelastic?
   a. airline tickets
   b. bus tickets
   c. taxi rides
   d. transportation

7. If the cross-price elasticity between two goods is negative, the two goods are likely to be
   a. luxuries.
   b. necessities.
   c. complements.
   d. substitutes.

8. If a supply curve for a good is price elastic, then
   a. the quantity supplied is sensitive to changes in the price of that good.
   b. the quantity supplied is insensitive to changes in the price of that good.
   c. the quantity demanded is sensitive to changes in the price of that good.
   d. the quantity demanded is insensitive to changes in the price of that good.
   e. none of the above.

9. If a fisherman must sell all of his daily catch before it spoils for whatever price he is offered, once the fish are caught, the fisherman's price elasticity of supply for fresh fish is
   a. zero.
   b. one.
   c. infinite.
   d. unable to be determined from this information.

10. A decrease in supply (shift to the left) will increase total revenue in that market if
    a. supply is price elastic.
    b. supply is price inelastic.
    c. demand is price elastic.
    d. demand is price inelastic.

11. If an increase in the price of a good has no impact on the total revenue in that market, demand must be
    a. price inelastic.
    b. price elastic.
    c. unit price elastic.
    d. all of the above.

12. If consumers always spend 15 percent of their income on food, then the income elasticity of demand for food is
    a. 0.15.
    b. 1.00.
    c. 1.15.
    d. 1.50.
    e. none of the above.

13. Technological improvements in agriculture that shift the supply of agricultural commodities to the right tend to
    a. reduce total revenue to farmers as a whole because the demand for food is inelastic.
    b. reduce total revenue to farmers as a whole because the demand for food is elastic.
    c. increase total revenue to farmers as a whole because the demand for food is inelastic.
    d. increase total revenue to farmers as a whole because the demand for food is elastic.

14. If supply is price inelastic, the value of the price elasticity of supply must be
    a. zero.
    b. less than 1.
    c. greater than 1.
    d. infinite.
    e. none of the above.

15. If there is excess capacity in a production facility, it is likely that the firm's supply curve is
    a. price inelastic.
    b. price elastic.
    c. unit price elastic.
    d. none of the above.

Use the following information to answer questions 16 and 17. Suppose that at a price of $30 per month, there are 30,000 subscribers to cable television in Small Town. If Small Town Cablevision raises its price to $40 per month, the number of subscribers will fall to 20,000.

16. Using the midpoint method for calculating the elasticity, what is the price elasticity of demand for cable television in Small Town?
    a. 0.66
    b. 0.75
    c. 1.0
    d. 1.4
    e. 2.0

17. At which of the following prices does Small Town Cablevision earn the greatest total revenue?
    a. either $30 or $40 per month because the price elasticity of demand is 1.0
    b. $30 per month
    c. $40 per month
    d. $0 per month

18. If demand is linear (a straight line), then price elasticity of demand is
    a. constant along the demand curve.
    b. inelastic in the upper portion and elastic in the lower portion.
    c. elastic in the upper portion and inelastic in the lower portion.
    d. elastic throughout.
    e. inelastic throughout.

19. If the income elasticity of demand for a good is negative, it must be
    a. a luxury good.
    b. a normal good.
    c. an inferior good.
    d. an elastic good.

20. If consumers think that there are very few substitutes for a good, then
    a. supply would tend to be price elastic.
    b. supply would tend to be price inelastic.
    c. demand would tend to be price elastic.
    d. demand would tend to be price inelastic.
    e. none of the above is true.

Advanced Critical Thinking

In order to reduce teen smoking, the government places a $2 per pack tax on cigarettes. After one month, while the price to the consumer has increased a great deal, the quantity demanded of cigarettes has been reduced only slightly.

1. Is the demand for cigarettes over the period of one month elastic or inelastic?

2. Suppose you are in charge of pricing for a tobacco firm. The president of your firm suggests that the evidence received over the last month demonstrates that the cigarette industry should get together and raise the price of cigarettes further because total revenue to the tobacco industry will certainly rise. Is the president of your firm correct? Why or why not?

3. As an alternative, suppose the president of your tobacco firm suggests that your firm raise the price of your cigarettes independent of the other tobacco firms because the evidence clearly shows that smokers are insensitive to changes in the price of cigarettes. Is the president of your firm correct if it is his desire to maximize total revenue? Why or why not?