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Demand, Supply, and Market Equilibrium

Chapter objectives:

1. Define and apply quantity demanded and quantity supplied, and state the law of demand and the law of supply.
2. Draw and interpret demand and supply graphs.
3. Identify the determinants of demand and supply and indicate how each must change for demand and supply to increase or decrease.
4. Derive market demand and market supply curves from individual demand and supply schedules.
5. Differentiate between a shift of a demand curve or supply curve and a movement along a curve, and depict these cases correctly on a graph.
6. Provide explanations for the slope of a typical demand curve.
7. Distinguish the relationship that exists between two goods that are substitutes and the relationship that exists between two goods that are complements.
8. Distinguish between a good that is normal and a good that is inferior.
9. Determine equilibrium price and quantity and detail the process by which the market moves from one equilibrium situation to another when demand or supply shifts.
10. Define excess demand (shortage) and excess supply (surplus) and predict their effects on the existing price level.

The single best piece of advice, particularly for this essential chapter, is “practice, practice, practice.” A second piece of advice must be “draw, draw, draw.” Don’t be put off by the graphs—develop a solid intuitive feel for demand and supply by talking your way through how the market should behave.

In most of the multiple-choice questions in this chapter, the *first* thing to do is to sketch a demand and supply picture. Graphs are an effective and timesaving tool for organizing your analysis.

Cultivate the habit of asking “What should happen to demand?” and “Will this make supply increase or decrease?” Predict whether price should rise or fall in a given circumstance (common sense

should carry you a long way here). Don't try to avoid graphs—they'll make your course a lot easier *and* more rewarding. If you have some initial problems, check the Appendix to Chapter 1 and the “Learning Tips” in this Guide.

BRAIN TEASER I: During the past ten years, the price of cell phones has fallen, while the numbers sold have increased. Is this a contradiction of the law of supply? How could you best explain this phenomenon, in words and graphically?

SOLUTION: The answer to this and subsequent brain teasers will be found after our discussion of the learning objectives and before the Practice Tests.

BRAIN TEASER II: Many large firms (McDonald's, for example) perform research in order to determine where best to locate new branches. Suppose you're responsible for choosing your burger company's next location. Which factors would be important in your deliberations?



OBJECTIVE 1:

Define and apply quantity demanded and quantity supplied, and state the law of demand and the law of supply.

Quantity demanded is the amount of a product that a household would buy, in a given period, if it could buy all it wanted at the current price. *Quantity supplied* is the amount of a product that a firm would be willing and able to offer for sale at a particular price during a given time period. The *law of demand* states that there is a negative relationship between the price and the quantity demanded of a product. When the price of McDonald's fries increases, we buy less. The *law of supply* states that there is a positive relationship between the price and the quantity supplied of a product. When McDonald's raises its hourly wage, it attracts more job applicants. (pages 48/57)



OBJECTIVE 2:

Draw and interpret demand and supply graphs.

A *demand schedule* is a table showing how much of a given product households would be willing and able to buy at different prices in a given time period; a *demand curve* shows this relationship graphically. Demand curves slope downward. (page 49)

A *supply schedule* is a table listing how much of a product a firm will supply at alternative prices in a given time period; a *supply curve*, shows this relationship graphically. Supply curves slope upward. (page 57)

Note: Demand and supply graphs *always* have price on the vertical axis and quantity (demanded or supplied, as appropriate) on the horizontal axis. It is a bad, though common, mistake to reverse the variables. Learn to draw the demand and supply graphs quickly! A demand curve slopes down; a supply curve slopes up. Practice to increase your speed. Label each curve as you go. In diagrams where there are several curves, clear, consistent labeling is critical.

Practice

1. At each price shown, estimate how many apples per month you might demand.

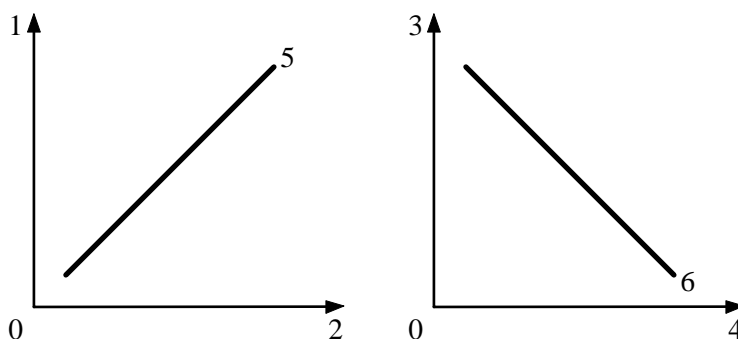
Price per Apple	Quantity Demanded
60¢	_____
50¢	_____
40¢	_____
30¢	_____
20¢	_____
10¢	_____

You have constructed a demand schedule. Now draw vertical (price) and horizontal (quantity) axes. Plot your monthly demand curve for apples. Label the curve D_1 .

ANSWER: Although this line is unlikely to be smooth like those in the textbook, but it should have a general downward slope—the lower the price, the more apples you’re likely to buy. You should have the horizontal axis labeled “quantity demanded per month” and the vertical axis labeled “price.”

2. In the following diagrams, match each of the numbers with the appropriate term to produce a correct demand or supply diagram for apples.

- (a) Price of apples
- (b) Price of apples
- (c) Quantity of apples supplied per month
- (d) Quantity of apples demanded per month
- (e) Demand curve
- (f) Supply curve



ANSWER: 1 = (a) and (b); 2 = (c); 3 = (a) and (b); 4 = (d); 5 = (f); 6 = (e) ■


OBJECTIVE 3:

Identify the determinants of demand and supply and indicate how each must change for demand and supply to increase or decrease.

The willingness and ability of a household to buy units of a good (quantity demanded) are likely to depend principally on the price of the good itself. Other factors—including the household’s income and wealth, the prices of other products, tastes and preferences, and expectations about price, income, and wealth—will influence demand.

Comment: This section of the textbook may be your most frustrating section. Be patient—time spent understanding demand/supply analysis will serve you well in future chapters.

◆◆◆ **LEARNING TIP:** When analyzing the impact of change in a determinant on demand and supply curves, a golden rule to remember is that each curve shifts no more than once for any such change. The market price is changed by shifts in the demand and supply curves, but the demand and supply curves are not changed by shifts in the market price.

Again: a change in price does not cause the demand curve or the supply curve to shift position! Analyze the following sequence of events for errors. “Demand goes up. That makes price go up, which encourages sellers to supply more. But, when more is supplied, price goes down. When price goes down, demand goes up again, and so on.”

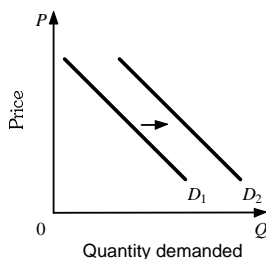
Answer: A demand increase from D_1 to D_2 will make price rise from P_1 to P_2 . Sellers will supply more from Q_1 to Q_2 —an increase in *quantity supplied*, not an increase in supply, as the statement claims. Price, therefore, will *not* go back down. The remainder of the statement is incorrect. Draw this example.

When you constructed your demand schedule and demand curve with varying price levels in Practice Question 1, you made assumptions about your income level, wealth, prices of other goods, and so on. Change the assumptions and you will change the diagram. The curve shifts position—a *change in demand*.

Factors that can cause a change in demand are:

- (a) Income
- (b) Wealth
- (c) Prices of related products
- (d) Tastes or preferences of the household
- (e) Expectations (page 51)

Increases in income and wealth, improved preferences, or expectations of a higher price, income, or wealth will increase demand for normal goods. An increase in the price of a substitute product or a decrease in the price of a complementary product will also increase demand, i.e., the entire demand curve shifts to the right. Graphically, an increase in demand (D_1 to D_2) appears as shown in the following diagram:



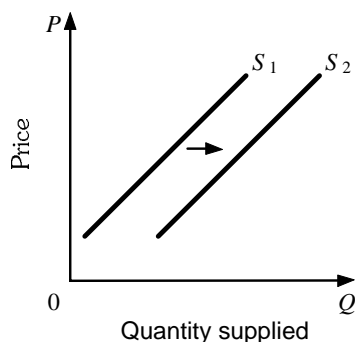
◆◆◆ **LEARNING TIP:** When shifting the demand curve, you might naturally associate “rise” and “fall” with a vertical shift. This causes no problems in the case of demand, and you’d expect to be correct in using the same approach in the case of supply—but you’d be wrong! A vertical shift up in supply is a *decrease* in supply. When shifting the demand or supply curve, think in terms of the curve sliding *left* for a decrease (demand less or supply less) and *right* for an increase (demand more or supply more), *not* up and down.

The decision to supply is affected by the ability to earn profits (the difference between revenues and costs). The willingness and ability of a firm to offer units of a good for sale (quantity supplied) are likely to depend mainly on the price of the good itself. If other factors important to producers change, then the supply curve diagram will change. The supply curve shifts position—a *change in supply*.

Factors that can cause a change in supply are:

- (a) Changes in costs of production (input prices)
- (b) New costs and market opportunities
- (c) Changes in prices of related products (page 59)

Improvements in technology, decreases in the costs of inputs and other costs of production, or increases in the price of complementary products will increase supply. Decreases in the price of substitute products will also increase supply, i.e., the entire supply curve will shift to the right. Graphically, an increase in supply (D_1 to D_2) appears as shown in the following diagram:



◆◆◆ **LEARNING TIP:** When considering if a given factor will cause supply to increase or decrease, ask “Will this change increase or decrease profits?” Producers will want to supply more if their profits are rising—so, if the answer to the question is “increase profits,” you should predict an increase (rightward shift) in supply.

Keep these lists of factors that can change demand or supply in a place very close to your heart! Write them on an index card and review them frequently.

Demand: Do “thought experiments.” Pick a good that you buy frequently (preferably a name brand), such as Exxon gasoline. How would you react if Exxon hiked the price of its gas? If your income fell? If the price of engine oil (a complement) increased? If the price of Texaco gas (a substitute) decreased?

Supply: Perhaps you have a part-time job—you supply labor. Which factors affect how many hours you would work per week? The wage (price) you earn affects the quantity of labor you supply. What other factors would make you more or less willing and able to work?

Supply will be analyzed in greater detail in Chapters 7, 8, and 9. Note the reference to the *short run* and the *long run* on page 58. These are important economic concepts that you’ll meet later on. Essentially, suppliers will be more responsive to demand-side changes in a longer time period than they will be in a shorter time period.

◆◆◆ **LEARNING TIP:** When you are told to imagine that income or some other variable has changed, imagine an *enormous* change—this will help you work out the effects. If a can of Pepsi has risen in price—suppose that it has tripled in price—it’s easier to see what will happen to the quantity demanded or supplied of Pepsi and to the demand for Coke.

Practice

3. A decrease in the supply of American cars might be caused by
- (a) an increase in the price of imported Japanese cars.
 - (b) an increase in the wages of U.S. car workers.
 - (c) an increase in demand that causes car prices to rise.
 - (d) a reduction in the cost of steel.

ANSWER: (b) The supply of American cars will decrease if input prices, such as the wages of U.S. car workers, increase. Refer to p. 59.

4. Energizer batteries and Duracell's Coppertop batteries are substitutes. The Energizer Bunny cuts supply and increases the price of its batteries. Equilibrium price will _____ and quantity exchanged will _____ in the market for Duracell.
- (a) rise; rise
 - (b) fall; rise
 - (c) fall; fall
 - (d) rise; fall

ANSWER: (a) If Energizer increases the price of its batteries, consumers will switch over to substitutes such as Duracell, increasing the demand for Duracell. This will raise both equilibrium price and quantity.

5. Barney's Bowling Balls and Fred's Bowling Shoes are complements. Fred notices a decrease in the quantity demanded of bowling shoes (a movement along his demand curve). This could have been caused by
- (a) a decrease in the income of Fred's customers.
 - (b) an increase in the price of Fred's Bowling Shoes.
 - (c) an increase in the price of Barney's Bowling Balls.
 - (d) an increased expectation that Fred will reduce the price of his bowling balls in the near future.

ANSWER: (b) This is a change in quantity demanded, not a change in demand! The only thing that can cause a change in quantity demanded is a change in price. Refer to p. 53.

6. As the price of oranges increases, orange growers will
- (a) use more-expensive methods of growing oranges.
 - (b) use less-expensive methods of growing oranges.
 - (c) increase the supply of oranges.
 - (d) decrease the supply of oranges.

ANSWER: (a) An increase in price results in an increase in quantity supplied. Suppliers are able to produce more because, at the higher price, they can afford to hire more-expensive resources. Refer to p. 59.

7. The supply of oranges to households will shift to the right if
- (a) the price of oranges increases.
 - (b) oranges are rumored to have been treated with an insecticide that causes heart disease.
 - (c) the Florida government requires that all orange workers be given more substantial health benefits by employers.
 - (d) citrus growers see the price of grapefruits decreasing permanently.

ANSWER: (d) As the price of grapefruits falls, citrus farmers will switch over to another production option—oranges. Refer to p. 59.

**OBJECTIVE 4:**

Derive market demand and market supply curves from individual demand and supply schedules.

Market demand is the sum of all the quantities of a good or service demanded per period by all the households buying in the market for that good or service. The *market demand curve* is a summing of all the individual demand curves. At a given price level, the quantity demanded by each household is determined and the total quantity demanded is calculated. (pages 55/61)

The *market supply curve* is a horizontal summing of all the supply curves for the product.

Practice

8. If the firms producing fuzzy dice for cars must obtain a higher price than they did previously to produce the same level of output as before, then we can say that there has been
- an increase in quantity supplied.
 - an increase in supply.
 - a decrease in supply.
 - a decrease in quantity supplied.

ANSWER: (c) Draw the supply curve. At the same output level and at a higher price, the supply curve has shifted to the left—a decrease in supply. Refer to p. 59.

9. The market supply curve for wheat depends on each of the following EXCEPT
- the price of wheat-producing land.
 - the price of production alternatives for wheat.
 - the tastes and preferences of wheat consumers.
 - the number of wheat farmers in the market.

ANSWER: (c) Tastes and preferences are determinants of demand, not supply. Refer to p. 59.

**OBJECTIVE 5:**

Differentiate between a shift of a demand curve or supply curve and a movement along a curve, and depict these cases correctly on a graph.

When important factors other than the price of the product change, such as tastes or income, the entire demand curve shifts position. This is called a *change in demand* to distinguish it from a movement along the demand curve, which represents a *change in quantity demanded* and can be caused *only* by a change in the price of the commodity. (page 53)

Similarly, when important factors other than price change for a producer, the amount of a given product offered for sale will change, even if the price level is unchanged. This is a *change in supply*. If *only* the price of the product itself changes, there will be a movement along the original supply curve—a *change in quantity supplied*. (page 59)

Graphing Pointer: Changes in Quantity Demanded (Supplied) vs. Changes in Demand (Supply). Most students experience confusion regarding the distinction between a “change in quantity demanded” and a “change in demand.” The distinction is rather artificial; the six factors (listed on page 48) that affect demand include the price of the product. However, we regard the price-quantity demanded relationship as the most important and draw the demand curve with these two variables on the axes, assuming that all other factors are fixed at a “given” level. This is the *ceteris paribus* assumption.

Look at a demand curve; price and quantity demanded can have a range of values whereas all other factors (income, other prices, etc.) are fixed at a particular level. If price changes, we move along

the curve; if another factor changes, our *ceteris paribus* assumption is broken, and we must redraw the price-quantity demanded relationship.

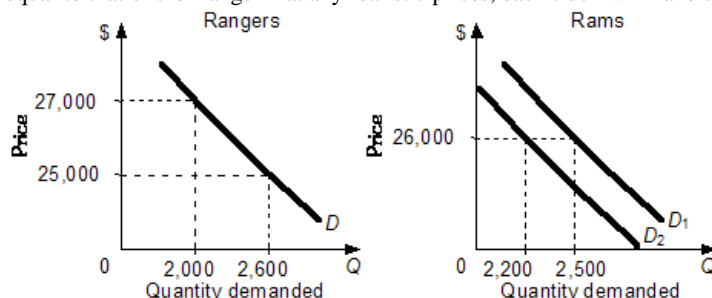
The *only* thing that can cause a “change in the quantity demanded” of Pepsi is a change in the price of Pepsi—a movement from one point on the demand curve to another point on the same demand curve.

If any other factor on the list changes, we will have to redraw the entire diagram—a “change in demand”—because the “all else being equal” assumption has been broken.

Similarly, a “change in the quantity supplied” of chicken can only be caused by a change in the price of chicken. A change in any other factor on the list on page 59 of the text causes a “change in supply.”

◆◆◆ **LEARNING TIP:** Here is an example that points up the difference between a “change in quantity demanded” and a “change in demand.” In the following diagram, we have a demand curve for Ford Rangers on the left and a demand curve for Dodge Rams on the right.

Initially, the price of the Ranger is \$27,000, and 2,000 are demanded per week. The Ram sells for \$26,000 and has 2,500 demanders at that price. (Note: It’s irrelevant whether the Ram’s price is above, below, or equal to that of the Ranger—at any realistic prices, each truck will have some enthusiasts.)



Suppose that the price of Rangers decreases to \$25,000. More truck buyers will order Rangers—an increase in quantity demanded, as there is a movement along the demand curve. Some of those new Ford customers would have bought the Dodge Ram, but now will not. At the same price (\$26,000) as before, demand for Rams has decreased, perhaps to 2,200. The entire demand curve for Rams has shifted.

Practice

10. Return to Practice Question 1. Suppose that the prices of other fruits you might buy increase. What would happen to the number of apples you demand per month? Sketch this change on your diagram. Label the demand curve D_2 . What is likely to happen to the price of apples?

ANSWER: Refer to your diagram for Practice Question 1. Presumably you’d demand more apples at each price. The demand curve shifts right, to D_2 . Because apples are more popular now, the price of apples will likely rise.

11. A “change in demand” means
- the quantity demanded changes as price changes.
 - a movement along a given demand curve or schedule.
 - a shift in the position of the demand curve.
 - a change in the shape of a demand curve.

ANSWER: (c) A “change in demand” means that, at every price level, more or less is being demanded. This is represented as a shift in the position of the demand curve. Refer to p. 53.

12. Which of the following will cause a decrease in the demand for tennis racquets?
- A rise in the price of squash racquets

- (b) A rise in the price of tennis racquets
- (c) A rise in the price of tennis balls
- (d) A fall in the price of tennis shoes

ANSWER: (c) A decrease in the demand for tennis racquets will occur if a complement (tennis balls) increases in price because fewer tennis balls will be bought. ■



OBJECTIVE 6:

Provide explanations for the slope of a typical demand curve.

Demand curves slope down—as price rises, quantity demanded falls. We know this intuitively, but economists have explored this important “social law” more analytically. The higher the price of a good, lowfat milk, for instance, the higher the opportunity cost of buying it (i.e., the more of other goods we will give up, and the less willing we are to buy lowfat milk).

Utility is a conceptual measure of satisfaction. Successive units of a good bestow satisfaction, but typically at a decreasing rate—the second cup of coffee may be less enjoyable than the first. Accordingly, the price we are willing to pay will decrease. (page 50)

Practice

13. The demand curve diagram has
- (a) “price” on the vertical axis, “quantity demanded per time period” on the horizontal axis, and an upward sloping demand curve.
 - (b) “price” on the horizontal axis, “quantity demanded per time period” on the vertical axis, and an upward sloping demand curve.
 - (c) “price” on the vertical axis, “quantity demanded per time period” on the horizontal axis, and a downward sloping demand curve.
 - (d) “price” on the horizontal axis, “quantity demanded per time period” on the vertical axis, and a downward sloping demand curve.

ANSWER: (c) Refer to p. 49.

14. We are trying to explain the law of demand. When the price of pretzels rises,
- (a) the opportunity cost of pretzels increases along the demand curve.
 - (b) sellers switch production and increase the quantity supplied of pretzels.
 - (c) income rises for producers of pretzels.
 - (d) the opportunity cost of other goods increases.

ANSWER: (a) Refer to p. 50 for a full explanation of the negative relationship between price and quantity demanded.



OBJECTIVE 7:

Distinguish the relationship that exists between two goods that are substitutes and the relationship that exists between two goods that are complements.

If, when the price of Good *A* rises, the demand for Good *B* also rises, then *A* and *B* are *substitutes*; however, if the demand for *B* falls when the price of *A* rises, then *A* and *B* are *complements*. Substitutes are used in place of each other: complements are used together. (page 51)

◆◆◆ LEARNING TIP: Think of several ready-made examples of substitute goods and complementary goods from your own life. Using with your own examples (during an exam) makes it easier to do the analysis correctly. Here are a few examples.

Substitutes: Coke and Pepsi, Exxon gasoline and Texaco gasoline, phone calls and e-mail.

Complements: peanut butter and jelly, CDs and CD players, cars and gasoline, cameras and film, left and right shoes.

Practice

15. The demand for JIF peanut butter will decrease if there is an increase in
- the price of JIF peanut butter.
 - the price of Peter Pan peanut butter (a substitute).
 - the demand for jelly (a complement).
 - the price of bread (a complement).

ANSWER: (d) Bread and peanut butter are complements. An increase in the price of bread will result in less bread being bought and a lower demand for JIF to spread on it. Refer to p. 52.

16. Good *A* and Good *B* are substitutes for one another. An increase in the price of *A* will
- increase the demand for *B*.
 - reduce the quantity demanded of *B*.
 - increase the quantity demanded of *B*.
 - reduce the demand for *B*.

ANSWER: (a) Suppose *A* is Coke and *B* is Pepsi. If Coke rises in price, we would buy less Coke (a fall in quantity demanded of Coke) and more of Pepsi (an increase in the demand for Pepsi). Refer to p. 52.



OBJECTIVE 8:

Distinguish between a good that is normal and a good that is inferior.

When income increases, demand increases for *normal* goods. If demand for a good decreases when income increases, then the good is *inferior*. (page 51)

◆◆◆ LEARNING TIP: Think of several ready-made examples of both normal goods and inferior goods from your own life. Slotting in your own examples (during an exam) makes it easier to do the analysis correctly. Here are some examples:

Normal goods: movie tickets, steak, restaurant meals, imported beers.

Inferior goods: second-hand clothes, store-brand (versus name-brand) foods, generic medicines, rice, beans, bus rides.

Practice

17. If the economy's income rises by 10% then, *ceteris paribus*, we would predict
- a decrease in demand for a normal good.
 - an increase in quantity demanded for a normal good.
 - an increase in quantity demanded for an inferior good.
 - a decrease in demand for an inferior good.

ANSWER: (d) Refer to p. 51. Remember that a change in "quantity demanded" can only be due to a change in the price of the good.

18. The demand for Good A has been increasing over the past year. Having examined the following facts, you conclude that Good A is an inferior good. Which fact led you to that conclusion?
- The price of Good A has been increasing over the past year.
 - An economic slowdown has reduced the income of the traditional buyers of Good A.
 - Good B, a substitute for Good A, has cut its price over the last 12 months.
 - Household wealth has increased among the traditional buyers of Good A.

ANSWER: (b) Inferior goods experience increasing popularity as income levels fall.
Refer to p. 52.

19. Turnips are available in both the United States and in Mexico. During the past year, incomes have grown by 10% in each country. The demand for turnips has grown by 12% in the United States and by 3% in Mexico. We can conclude that turnips are
- normal goods in the United States and normal goods in Mexico.
 - normal goods in the United States and inferior goods in Mexico.
 - inferior goods in the United States and normal goods in Mexico.
 - inferior goods in the United States and inferior goods in Mexico.

ANSWER: (a) In each case, demand has increased as income has increased. Refer to p. 51.



OBJECTIVE 9:

Determine equilibrium price and quantity and detail the process by which the market moves from one equilibrium situation to another when demand or supply shifts.

In the market for a particular good or service, quantity demanded may be greater than, less than, or equal to quantity supplied. *Equilibrium* occurs when quantity demanded equals quantity supplied. There is no tendency for the price to change because, at that price, there is a perfect match between the quantity of the good demanded and the quantity supplied. (page 62)

»» LEARNING TIP: **Equilibrium.** The notion of equilibrium is important throughout the remainder of the course. The simple, less analytical, way to think about this concept is as “the point where the lines cross.” It will help your understanding if you remember that equilibrium is the “balance” situation in which there is no tendency for change—unless some outside factor intervenes.

Changes in Equilibrium Price and Quantity. Demand and supply may change position simultaneously. If the magnitudes of the shifts are unknown, then either the effect on equilibrium price or on equilibrium quantity *must* be uncertain. It’s easy to forget this important fact. If demand and supply change position simultaneously, break down the situation into two separate graphs, one for the “demand shift” and the other for the “supply shift.” In each case, decide the direction of change in price and quantity, and then add them together.

Example: Demand decreases and supply increases.

	Price Change	Quantity Change
Demand-side effect	Decrease	Decrease
Supply-side effect	Decrease	Increase
Total effect	Decrease	Uncertain

In this case, where demand decreases and supply increases, we predict a certain decrease in price and an uncertain change in equilibrium quantity.

ECONOMICS IN PRACTICE: On page 67, the textbook looks at the effects of demand and supply on the market for orange juice. What about other markets? In 2002, the *Economist* magazine reported record low levels of wool production in Australia following a severe drought. Wool prices surged to a 15-year peak. What do you think was the effect on the market for cotton, a substitute fiber?

ANSWER: Initially, cotton prices had been languishing at a 30-year low. However, as garment producers switched from wool to cotton, they caused the demand for cotton to increase, resulting in a 50% boost in the price of cotton. For “extra credit,” can you draw a demand and supply diagram (one for wool and another for cotton) depicting what happened?

ECONOMICS IN PRACTICE (CONTINUED): During the spring and summer of 2008, the corn-growing states of the mid-west suffered from extreme wet weather. Corn planting declined by 10 percent while, simultaneously, the use of corn for ethanol was increasing. The Chicago Board of Trade has a futures market where dealers can bid for future deliveries of corn and other goods, such as soy beans. This market is largely driven by predictions about future market conditions. What do you think happened to the price of corn and soy beans on the futures market as a result of the storms?

ANSWER: The price of corn tripled to about \$7.00 per bushel. Soy beans, (a production substitute of corn) also experienced price increases.

ECONOMICS IN PRACTICE: Your textbook examines the opinions of three analysts on page 69. Essentially, the issue of rising prices boils down to whether it is triggered by changes in demand or changes in supply. The market for corn offers another example. During the first few months of 2008, corn prices rose throughout the world. Was this caused by cutbacks in supply or increases in demand? Background: Over the two previous years, major corn-growing regions had experienced poor weather conditions, the Chinese economy was experiencing increased affluence, and there had been a push by environmental-conscious governments to produce more ethanol (an oil substitute that uses corn). Given these facts, how would you analyze the changes in the corn market?

ANSWER: There were changes in both supply and demand. The poor growing conditions reduced supply while increasing affluence expanded the demand for corn (a normal good). At the same time, the demand for corn to be used to produce ethanol increased, which reduced the amount available for food production.

PRACTICE: In the summer of 2008, President Bush appealed to Saudi Arabia to increase the supply of oil in order to reduce pressure on gas prices at the pumps. His point was that restricted supply was forcing up prices. The Saudi response, in summary, was “There is no shortage of oil. World oil prices are responding as they should to the increase in demand.” However, the Law of Demand states that rising prices should reduce the amount of a good demanded. First, is there some inconsistency here in the Law of Demand? Following this, can you analyze who was correct about the oil market in 2008, President Bush or the Saudi Oil Ministry?

ANSWER: There’s no contradiction of the Law of Demand. In fact, as prices rose in the United States, oil consumption fell, as we should expect. On the second point, both parties are correct. An increase in supply would have slowed or, perhaps, reversed the rise in oil prices, as President Bush argued. However, the main cause of rising oil prices was the worldwide increase in demand. The Saudis were correct—the market was seeking to compete away excess demand by raising prices. If a market is in equilibrium there is no shortage.

Practice

20. Equilibrium quantity will certainly decrease if
- demand and supply both increase.
 - demand and supply both decrease.
 - demand decreases and supply increases.
 - demand increases and supply decreases.

ANSWER: (b) A decrease in demand will decrease equilibrium quantity. Similarly, a decrease in supply will decrease equilibrium quantity.

21. The market for canned dog food is in equilibrium when

- (a) the quantity demanded is less than the quantity supplied.
- (b) the demand curve is downward-sloping and the supply curve is upward-sloping.
- (c) the quantity demanded and the quantity supplied are equal.
- (d) all inputs producing canned dog food are employed.

ANSWER: (c) A market is in equilibrium when price has adjusted to make the quantity demanded and the quantity supplied equal. Refer to p. 62.

22. In the market for broccoli, the price of broccoli will certainly increase if the supply of broccoli
- (a) increases and the demand for broccoli increases.
 - (b) increases and the demand for broccoli decreases.
 - (c) decreases and the demand for broccoli increases.
 - (d) decreases and the demand for broccoli decreases.

ANSWER: (c) An increase in demand will increase equilibrium price. Similarly, a decrease in supply will increase equilibrium price.

23. In the market for mushrooms, the price of mushrooms will certainly increase if the supply curve shifts
- (a) right and the demand curve shifts right.
 - (b) right and the demand curve shifts left.
 - (c) left and the demand curve shifts right.
 - (d) left and the demand curve shifts left.

ANSWER: (c) When demand increases and supply decreases, both shifts are prompting a price increase.

24. In the market for broccoli, the equilibrium quantity of broccoli will certainly increase if the supply of broccoli _____ and the demand for broccoli _____ .
- (a) increases; increases
 - (b) increases; decreases
 - (c) decreases; increases
 - (d) decreases; decreases

ANSWER: (a) An increase in supply will increase the quantity traded; similarly, an increase in demand will increase the quantity traded. ■



OBJECTIVE 10:

Define excess demand (shortage) and excess supply (surplus) and predict their effects on the existing price level.

If the quantity demanded is greater than the quantity supplied of a good, there is *excess demand* (shortage). We would expect the price of the good to rise. If quantity supplied is greater than the quantity demanded of a good, there is an *excess supply* (surplus), and we would expect the price of the good to fall. (pages 62/63)

Practice

25. When there is a surplus, quantity supplied _____ quantity demanded. Price will _____ .
- (a) exceeds; rise

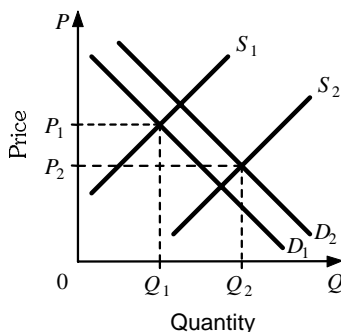
- (b) is less than; fall
- (c) is less than; rise
- (d) exceeds; fall

ANSWER: (d) A surplus (excess supply) occurs when quantity supplied exceeds quantity demanded. This surplus will force price down. Refer to p. 63.

26. The equilibrium price of a gallon of unleaded gas is \$4.50. At a price of \$3.00
- (a) quantity supplied will be less than quantity demanded, causing a shortage of unleaded gas.
 - (b) quantity supplied will be greater than quantity demanded, causing a surplus of unleaded gas.
 - (c) quantity supplied will be greater than quantity demanded, causing a shortage of unleaded gas.
 - (d) quantity supplied will be less than quantity demanded, causing a surplus of unleaded gas.

ANSWER: (a) If the current price is less than the equilibrium price, a shortage will occur (quantity supplied will be less than quantity demanded). This shortage will force price to increase. ■

BRAIN TEASER I SOLUTION: Behavior in the cell phone market did not contradict the law of supply. Market behavior depends on both supply and demand. Demand increased (the demand curve shifted to the right from D_1 to D_2) as more consumers were attracted to the benefits of cell phones—particularly their convenience, and supply increased (the supply curve shifted to the right from S_1 to S_2) due to technological improvements. Increasing supply and vigorous competition drove down the price (from P_1 to P_2) even as the market grew (from Q_1 to Q_2).



BRAIN TEASER II SOLUTION: The presence of competitors, income and wealth of the neighborhood, the percentage of families with young children, expected growth, and volume of traffic should all be important considerations. It is rumored that McDonald's also figures in the direction of after-work traffic.

PRACTICE TEST

I. MULTIPLE-CHOICE QUESTIONS

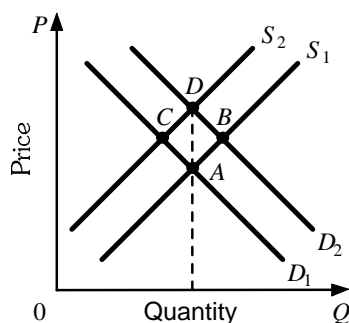
Select the option that provides the single best answer.

- _____ 1. Households are
- (a) suppliers in the input market.
 - (b) demanders in the labor market.
 - (c) suppliers in the product market.
 - (d) demanders in the input market.
- _____ 2. Following a decrease in supply, Good *C* increases its price. The demand for Good *D* increases. The goods are
- (a) complements.
 - (b) substitutes.
 - (c) normal.
 - (d) inferior.
- _____ 3. The demand for prerecorded CDs is downsloping. Suddenly the price of CDs rises from \$12 to \$20. This will cause
- (a) demand to shift to the left.
 - (b) demand to shift to the right.
 - (c) quantity demanded to increase.
 - (d) quantity demanded to decrease.
- _____ 4. All of the following will shift the supply curve of yo-yos to the right EXCEPT
- (a) an increase in price of yo-yos.
 - (b) an improvement in the production processes used to manufacture yo-yos.
 - (c) a reduction in the price of plastic from which yo-yos are made.
 - (d) an improvement in storage resulting in fewer defective yo-yos.
- _____ 5. Along a given supply curve for eggs,
- (a) supply increases as price increases.
 - (b) supply increases as technology improves.
 - (c) quantity supplied increases as price increases.
 - (d) quantity supplied increases as technology improves.
- _____ 6. Price is currently below equilibrium. There is a situation of excess _____. We would expect price to _____.
- (a) demand; rise
 - (b) demand; fall
 - (c) supply; rise
 - (d) supply; fall
- _____ 7. Consumers expect their income to rise. For a normal good, this would result in an increase in
- (a) quantity demanded and a fall in price.
 - (b) demand and a fall in price.
 - (c) quantity demanded and a rise in price.
 - (d) demand and a rise in price.
- _____ 8. The price of Frisbees (a normal good) will definitely increase if

- (a) there is an improvement in the technology of making Frisbees and Frisbees become more popular.
 - (b) the cost of plastic used to produce Frisbees increases and people have more leisure time to throw Frisbees.
 - (c) Frisbee workers negotiate a wage increase and boomerangs (a Frisbee substitute) decrease in price.
 - (d) a sales tax is imposed on Frisbees and (because of widespread unemployment) incomes fall.
- _____ 9. A rightward shift in the supply of U.S. cars might be due to
- (a) an increase in the price of steel.
 - (b) a reduction in foreign competition.
 - (c) the introduction of cost-saving robots.
 - (d) increased popularity of foreign cars.
- _____ 10. If the market is initially in equilibrium, a technological improvement will cause price to _____ and quantity demanded to _____ .
- (a) fall; fall
 - (b) rise; rise
 - (c) fall; rise
 - (d) rise; fall
- _____ 11. The price of beans rises sharply. Which of the following cannot be true?
- (a) The supply of beans may have decreased with no change in the demand for beans.
 - (b) The demand for beans may have increased with no change in the supply of beans.
 - (c) The demand for beans may have increased with an increase in the quantity supplied of beans.
 - (d) The supply of beans may have increased with an increase in the quantity demanded of beans.
- _____ 12. The market for peas is experiencing a surplus. You should predict that price will
- (a) increase, quantity demanded will fall, and the quantity supplied will rise.
 - (b) increase, quantity demanded will rise, and the quantity supplied will fall.
 - (c) decrease, quantity demanded will rise, and the quantity supplied will fall.
 - (d) decrease, quantity demanded will fall, and the quantity supplied will rise.
- _____ 13. Today, you change your expectations about your future income. In fact, you now believe that your future income will be significantly higher than you had previously expected. For a normal good, this would result in an increase in
- (a) quantity demanded today.
 - (b) demand today.
 - (c) quantity demanded but only in the future.
 - (d) demand, but only in the future.
- _____ 14. If less is demanded of a product at each possible price, then there has been
- (a) a decrease in the quantity demanded.
 - (b) a decrease in demand.
 - (c) an increase in demand.

- (d) an increase in the quantity demanded.
- _____ 15. Chuck's Chips and Debi's Dip are complements. Costs of chip production fall. At the same time a government health report alleges that dip consumption causes bone cancer. For Debi's Dip, the equilibrium price will _____ and the equilibrium quantity will _____.
 (a) fall; be indeterminate
 (b) be indeterminate; rise
 (c) be indeterminate; fall
 (d) be indeterminate; be indeterminate
- _____ 16. The market for legal secretaries is in equilibrium. Now there is a simultaneous increase in the demand for legal secretaries and a decrease in the supply of legal secretaries. If there is no change in the wage paid to legal secretaries,
 (a) there will be a shortage of legal secretaries.
 (b) there will be a surplus of legal secretaries.
 (c) law firms will have no difficulty in hiring the desired number of legal secretaries at the current wage.
 (d) the supply of legal secretaries will decrease even more.

Use the following diagram to answer the next six questions. The diagram refers to the demand for and supply of hot dogs. The hot dog market is initially in equilibrium at Point A. Assume that hot dogs are a normal good.



- _____ 17. The hot dog market moves from Point A to a new equilibrium at Point B. There has been an increase in
 (a) demand and an increase in supply.
 (b) demand and an increase in quantity supplied.
 (c) quantity demanded and an increase in quantity supplied.
 (d) quantity demanded and an increase in supply.
- _____ 18. The movement from Point A to Point B might have been caused by
 (a) an increase in the price of hamburgers (a substitute for hot dogs).
 (b) an increase in the price of fries (a complement for hot dogs).
 (c) a new widespread belief that meat products are bad for the heart.
 (d) a decrease in the price of ketchup (an ingredient used in making hot dogs).
- _____ 19. The hot dog market moves from Point A to a new equilibrium at Point C. There has been a decrease in

- (a) demand and a decrease in supply.
 - (b) demand and a decrease in quantity supplied.
 - (c) quantity demanded and a decrease in quantity supplied.
 - (d) quantity demanded and a decrease in supply.
- _____ 20. The movement from Point *A* to Point *C* might have been caused by a
- (a) decrease in the price of hamburgers (a substitute for hot dogs).
 - (b) tightening of sanitary regulations required for the preparation of hot dogs.
 - (c) decrease in the wages of workers in the hot dog industry.
 - (d) decrease in the price of hot dog buns.
- _____ 21. The hot dog market moves from Point *A* to a new equilibrium at Point *D*. There has been a(n)
- (a) increase in demand and an increase in supply.
 - (b) increase in demand and a decrease in supply.
 - (c) decrease in demand and an increase in supply.
 - (d) decrease in demand and a decrease in supply.
- _____ 22. The movement from Point *A* to Point *D* might have been caused by a(n)
- (a) increase in the price of hot dogs and no change in the equilibrium quantity of hot dogs.
 - (b) expected increase in the income of hot dog consumers and a hike in the wages of hot dog preparers.
 - (c) expected decrease in the price of hot dogs and an increase in the cost of making hot dogs.
 - (d) decrease in the income of hot dog consumers and a reduction in the cost of making hot dogs.
- _____ 23. Generic aspirin is an inferior good. As Jorge's income decreases we would expect a(n)
- (a) decrease in Jorge's demand for generic aspirin.
 - (b) increase in Jorge's quantity demanded of generic aspirin.
 - (c) increase in Jorge's demand for generic aspirin.
 - (d) decrease in Jorge's quantity demanded of generic aspirin.
- _____ 24. The supply of computer software packages increases. As a result, the demand for personal computers rises. These two goods are _____. The price of microchips, used to produce personal computers, will _____.
- (a) substitutes; increase
 - (b) substitutes; decrease
 - (c) complements; increase
 - (d) complements; decrease
- _____ 25. Along a given demand curve for corn, which of the following is not held constant?
- (a) The price of corn
 - (b) The income of corn farmers
 - (c) The income of corn demanders
 - (d) The price of wheat
- _____ 26. The law of demand is best illustrated by
- (a) the price of Pepsi rising, leading consumers to buy more Coke.
 - (b) increased purchases of Coke as the price of Coke decreases.

- (c) an increase in income, which results in reduced purchases of store-brand soft drinks.
- (d) an increase in income, which results in increased purchases of Coke.

Use the following table to answer the next three questions. The table refers to the demand for and supply of cans of tuna.

Price of Tuna	Quantity Demanded	Quantity Supplied
90¢	30	80
80¢	45	70
70¢	60	60
60¢	75	50
50¢	90	40
40¢	105	30

- _____ 27. The equilibrium price is _____ and the equilibrium quantity is _____ cans.
- (a) 70¢; 60
 - (b) 60¢; 75
 - (c) 60¢; 50
 - (d) 70¢; 70
- _____ 28. There would be an excess demand for tuna if the price were at
- (a) 90¢.
 - (b) 80¢.
 - (c) 70¢.
 - (d) 60¢.
- _____ 29. If the price were 80¢, there would be
- (a) an excess demand of 70 cans.
 - (b) an excess demand of 25 cans.
 - (c) an excess supply of 25 cans.
 - (d) an excess supply of 70 cans.
- _____ 30. New costly regulations to protect workers are introduced in the production of tuna. We would expect the equilibrium price of tuna to _____ and the equilibrium quantity of tuna to _____.
- (a) increase; increase
 - (b) increase; decrease
 - (c) decrease; increase
 - (d) decrease; decrease

II. APPLICATION QUESTIONS

1. Consider the following information regarding the quantity of corn demanded and supplied per month at a number of prices.

Price per Bushel	Quantity Demanded	Quantity Supplied
80¢	39,000	83,000
70¢	48,000	78,000
60¢	58,000	74,000
50¢	67,000	67,000
40¢	75,000	62,000

30¢

81,000

59,000

- (a) What is the equilibrium price? What is the equilibrium quantity?
- (b) Describe the situation when the price is at 80¢ per bushel and predict what will happen.
- (c) Describe the situation when the price is at 30¢ per bushel and predict what will happen.
- (d) Explain what would happen if a serious transport strike reduced corn output (at each price) by 30,000 bushels.
2. DoughCrust Bread is a normal good produced by the DoughCrust Bakery. What will happen to the equilibrium price and quantity of DoughCrust Bread in each of the following situations?
- (a) Due to a recession, households that buy DoughCrust experience a decrease in income.
- (b) The cost of wheat used in DoughCrust increases significantly.
- (c) DoughCrust buys improved ovens that reduce the costs of DoughCrust bread.
- (d) Luvly Loaf, a rival, cuts the price of its bread.
- (e) Consumers become health conscious and switch to low-calorie breads.
3. How will each of the following changes affect the supply of hamburgers?
- (a) There is an increase in the price of hamburger buns (used in the production of burgers).
- (b) There is an increase in the price of hamburgers.
- (c) Producers discover that the price of cheeseburgers is increasing.
4. Pietro Cavalini sells ice cream at the beach. He is in competition with numerous other vendors. How will each of the following changes affect the demand for Pietro's ice cream?
- (a) Hot dog vendors reduce the price of hot dogs. Hot dogs are consumption substitutes for ice cream.
- (b) The cost of refrigeration decreases.
- (c) Fine weather attracts record crowds to the beach.
5. The market for DVDs has demand and supply curves given by $Q_d = 60 - 2P$ and $Q_s = 3P$, respectively. DVDs are a normal good.
- (a) Complete the following table.

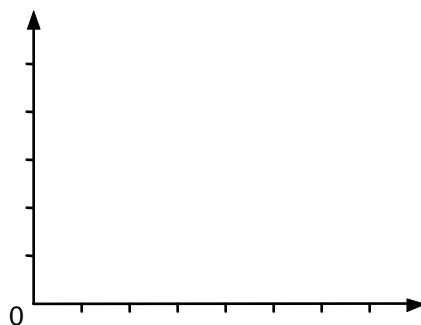
Price	Quantity Demanded	Quantity Supplied
\$30	_____	_____
\$25	_____	_____
\$20	_____	_____
\$15	_____	_____
\$10	_____	_____
\$5	_____	_____
\$0	_____	_____

- (b) Calculate the equilibrium price and quantity. You can do this either by graphing the curves or algebraically.
- (c) Suppose that the current market price of a DVD is \$20. Calculate the number of units that will be traded.
- (d) Suppose that the demand equation changed to $Q_d = 80 - 2P$. Is this an increase or a decrease in demand? Suggest what might have caused such a change.
- (e) Calculate the new equilibrium price and quantity.

6. Here is a demand and supply schedule for loaves of bread in East Yeastville, Colorado.

Price (\$)	Quantity Demanded	Quantity Supplied
5.00	1,000	6,000
4.50	1,300	4,500
4.00	1,600	4,000
3.50	2,000	3,500
3.00	3,000	3,000
2.50	3,200	2,700
2.00	4,000	2,200
1.50	4,500	1,800
1.00	5,400	1,400
0.50	7,000	1,200

- (a) Find equilibrium price and equilibrium quantity.
 (b) Graph the demand (D_1) and supply (S_1) schedules in the space below and confirm the equilibrium values.



- (c) At a price of \$1, is there an excess demand or supply? How great is the excess?

Suppose supply increases by 1,800 loaves at each price level.

- (d) Draw the new supply curve (S_2) on the graph in (b).
 (e) At the original equilibrium price level, is there an excess demand or an excess supply?
 (f) What will now happen to price, quantity demanded, and quantity supplied?
7. The diagram following shows the labor market. D is the demand for labor and S is the supply. The minimum wage is \$6.00 and unemployment is 150 workers. Can you verify that 150 workers are unemployed?

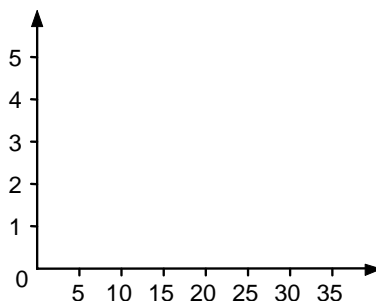


If the minimum wage law was revoked, the wage would fall to an equilibrium level of \$4.00, and there would be no unemployment because quantity demanded would be equal to quantity supplied. However, the number of workers demanded would rise by only 100, not 150. Reconcile this apparent contradiction.

8. Here are the demand schedules for orange juice for three buyers in the orange juice market and the supply schedules for three sellers in the orange juice market.

Price/Gallon	Quantity Demanded By:			Quantity Supplied By:		
	Blue	Black	Brown	Gray	Green	Scarlett
\$5	1	0	0	5	10	14
\$4	3	2	0	4	7	9
\$3	7	5	4	3	6	7
\$2	9	9	5	0	4	5
\$1	11	12	7	0	0	1

- (a) Graph market demand (D_1) and market supply (S_1).



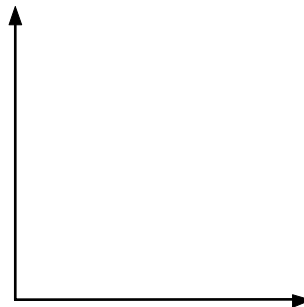
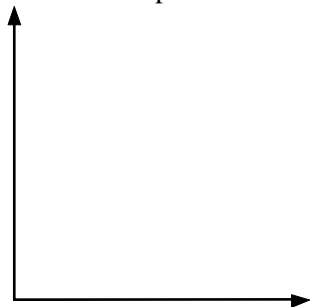
- (b) Show equilibrium price (P^*) and quantity (Q^*).
- (c) Now suppose the farm workers who pick oranges are given a higher wage rate. Show on your graph the changes that will occur in the orange juice market. Label any new demand curve D_2 and supply curve S_2 . Discuss why curves shift, why price changes, and the significance of any shortage or surplus. Note that you don't have the data to draw precise curves.
- (d) Suppose now that, in addition to the orange pickers' higher wage rate, All-Cola, a substitute for orange juice, reduces its price. Sketch in the new demand curve for orange juice (D_3), and explain the reason why you moved the curve as you did.
9. (a) Draw a demand and supply graph for milk, and establish the equilibrium price (P^*).



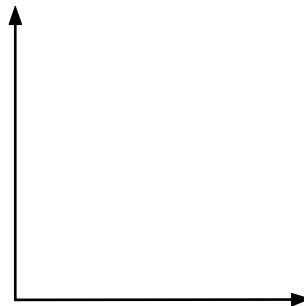
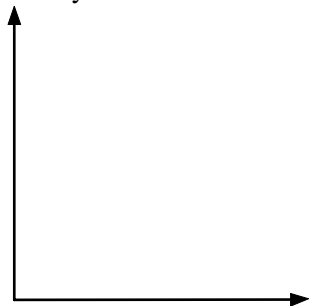
- (b) There is an increase in the demand for milk (from D_1 to D_2). How will this change affect the equilibrium price?
- (c) In terms of the diagram you just sketched, what is the only way that the equilibrium price can increase, if the supply curve doesn't shift?
- (d) Draw in the new demand curve. Now trace through the process by which a new equilibrium is established.

10. Mooville is a small town in Texas. Assume that beef is a normal good. What happens to the amount of beef demanded or supplied in each of the following cases? Draw a separate demand and supply graph for each part of this question, label the axes, and show how the change will shift the demand and/or the supply curve. Explain any curve shifts in each case. Show initial and final equilibrium price (P^* and P^{**}) and initial and final equilibrium quantity (Q^* and Q^{**}) for beef.

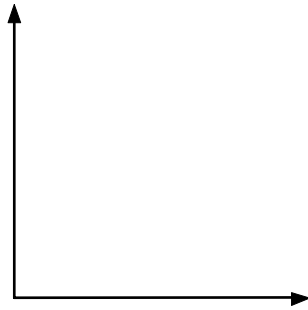
- (a) A subsidy that reduces production costs for beef producers. (b) A reduced supply of fish (consumers view beef and fish as substitutes).



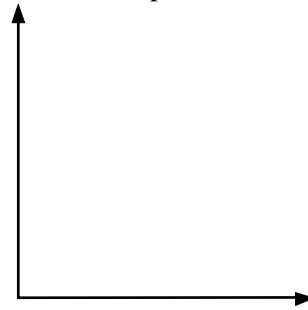
- (c) A rise in the wage rate in the beef industry. (d) A rise in income.



(e) An improvement in the productivity of producing beef.



(f) A bad tomato crop (beef and ketchup are complements and tomatoes are used to produce ketchup).



11. Think of some commodity that you like. Try to avoid “lumpy” things, like cars or houses, and pick something like coffee, movies, CDs, or long-distance phone calls.

(a) Sketch your demand curve for this good. Does it intersect the price axis? Where? How much of this commodity would you buy at a zero price?



(b) Are there substitutes for this commodity? How does the availability of substitutes affect the shape of your curve?

(c) How would your demand curve change in response to an increase in the price of a substitute?

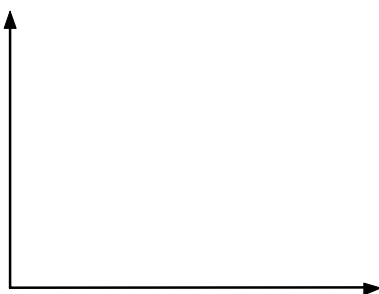
(d) How would your demand curve change if you won the lottery and were to receive \$2,000 per week for life?

12. During the last few years, home prices in the northeastern United States have soared. The result was a significant increase in new home construction and a large increase in the demand for labor in the region. At the same time, though, high home prices caused a drop in the supply of labor, as people found it too expensive to live in the region. Draw a diagram of the labor market and discuss the impact of these events on wages and thus on the costs of doing business in the Northeast.



13. In London, cabbies must be able to demonstrate a knowledge of at least 400 streets in order to obtain a license. This is quite difficult, so the number of cabbies is rather limited.

(a) Draw a demand and supply diagram for taxi service in London. How has this diagram been affected by the presence of the test?



- (b) How has the presence of the test affected usage of other forms of public transport—for example, the red buses and the “tube” (subway)? How have these prices responded?
- (c) If the effect of restricting the numbers of cabbies is to reduce the number of customers, why might cabdrivers favor the restriction?
14. Indicate in each case whether demand for steak (a normal good) will increase (I), decrease (D), or remain unchanged (U) in the following cases.
- (a) ___ Pork, a substitute for steak, decreases in price.
- (b) ___ High levels of unemployment sweep the nation.
- (c) ___ The price of steak falls.
- (d) ___ The price of steak sauce increases dramatically.
- (e) ___ A government report establishes a conclusive link between the consumption of steak and cancer.
- (f) ___ New refrigeration techniques reduce spoilage of steaks before they reach the market.
- (g) ___ It is expected that the price of steak will skyrocket within two months.
15. Indicate in each case whether the supply of beer will increase (I), decrease (D), or remain unchanged (U) in the following cases.
- (a) ___ Wine coolers become more popular with consumers.
- (b) ___ Beer decreases in price.
- (c) ___ States impose a new tax on beer producers.
- (d) ___ Beer workers’ wages increase.
- (e) ___ The price of hops, an important ingredient in brewing, decreases.
- (f) ___ Costs of transportation decrease.

- (g) ___ Improved technology results in less waste of beer.
 (h) ___ The economy enters a downturn, and many beer drinkers become unemployed.
 (i) ___ Fuel costs rise at the brewery.
16. Indicate in each case whether the market price and quantity of popcorn will increase (I), decrease (D), or be uncertain (U) in the following cases. Assume that popcorn and lemonade are normal goods.
- | | <i>Price</i> | <i>Quantity</i> | |
|-----|--------------|-----------------|--|
| (a) | ___ | ___ | The price of lemonade, a complement of popcorn, rises while the harvest of popping corn is unusually poor this year. |
| (b) | ___ | ___ | Consumers' income falls; low-cost migrant workers cause the cost of popping corn to decline. |
| (c) | ___ | ___ | Oil, used in popcorn production, falls in price; consumers expect an imminent rise in the price of popcorn. |
| (d) | ___ | ___ | Eating popcorn is shown to be healthy; new hybrid corn is less expensive to produce and provides higher yields. |
17. Kornville is a small town in rural Virginia. Work out what will happen to the amount of corn supplied in each of the following cases and explain your answer.

Result *A* = increase in the supply of corn

Result *B* = decrease in the supply of corn

Result *C* = increase in the quantity supplied of corn

Result *D* = decrease in the quantity supplied of corn

- (a) ___ A new government tax is imposed on corn.
 (b) ___ Landlords raise the rent on land used for growing corn.
 (c) ___ A new spray, effective in controlling insects harmful to corn plants, is made available.
 (d) ___ The local senator campaigns effectively for an increase in the price of corn, which can be grown in Kornville.
 (e) ___ The local senator campaigns effectively for a rise in the price of tobacco.
 (f) ___ Many corn-growing farmers suffer bankruptcy.
 (g) ___ The cost of diesel fuel, used in farm machinery, falls.
 (h) ___ Red McPinkie unionizes agricultural workers and raises their wages.
 (i) ___ Tougher laws stop foreign workers from working at harvest time.
 (j) ___ Cornflakes (which are made from corn) become much more popular. (Careful!)

PRACTICE TEST SOLUTIONS

I. Solutions to Multiple-Choice Questions

1. (a) In the input market, firms demand inputs and household supply inputs.
2. (b) To check your answer, put in a pair of substitutes, such as Pepsi and Coke. If Pepsi increases in price, we will buy less Pepsi and the demand for Coke will increase.

3. (d) A change in price leads to a movement along the demand curve. This is a “change in quantity demanded.” An increase in price causes a decrease in quantity demanded.
4. (a) A change in price leads to a movement along the supply curve. Refer to p. 59.
5. (c) A movement along a supply curve (a change in quantity supplied) can only be caused by a change in the price of the good itself. Refer to p. 59.
6. (a) Draw the demand and supply diagram. In equilibrium, quantity demanded equals quantity supplied. At lower prices, quantity demanded exceeds quantity supplied.
7. (d) For a normal good, higher income will stimulate additional demand. Higher demand will cause the equilibrium price to increase. Refer to p. 51.
8. (b) If the cost of plastic increases, supply will decrease. If buyers have more leisure time, demand for leisure goods (like Frisbees) will increase. A decrease in supply, coupled with an increase in demand, will push up the price.
9. (c) A rightward shift—an increase in supply—will occur if costs are reduced.
10. (c) A technological improvement will increase supply. This will drive down the equilibrium price. As the price decreases, quantity demanded will increase.
11. (d) If the price of beans rises, then it cannot have been caused by an increase in the supply of beans.
12. (c) A surplus means that quantity supplied is greater than the quantity demanded. To reduce the surplus, sellers will accept lower prices. As price falls, quantity demanded will increase and quantity supplied will decrease.
13. (b) For a normal good, expected higher income will increase demand now and in the future.
14. (b) Try drawing this. At each price level the demand curve will be further to the left.
15. (d) Chip supply increases because costs have fallen. Consumers will buy more chips (and the demand for dip will increase). The health report will reduce demand for dip. Because we don’t know which has the stronger effect on the demand for dip, the change in both equilibrium price and quantity is indeterminate.
16. (a) Higher demand and less supply will lead to a shortage if the wage level doesn’t increase.
17. (b) The demand curve has shifted right from D_1 to D_2 . As the price increased, quantity supplied increased.
18. (a) There has been an increase in demand. This could have been due to an increase in the price of hamburgers because consumers would wish to buy fewer hamburgers and would switch over to demanding hot dogs.

19. (d) The supply curve has shifted left, from S_1 to S_2 . As the price increased, quantity demanded decreased.
20. (b) There has been a decrease in supply. This could have been due to a tightening of the sanitary regulations required for the preparation of hot dogs (which would have increased costs and/or reduced the number of sellers).
21. (b) The demand curve has shifted right, from D_1 to D_2 , and the supply curve has shifted left, from S_1 to S_2 .
22. (b) An expected increase in the income of hot dog consumers will increase demand for a normal good, and a hike in the wages of hot dog preparers will increase costs and reduce supply. Option A is incorrect—it describes the effect rather than the cause.
23. (c) As income changes, it changes the *demand* for a good. A decrease in income results in a decrease in the demand for a normal good. A decrease in income results in an increase in the demand for an inferior good.
24. (c) If the supply of software increases, the price will fall. As one might expect, software and computers are complements—the evidence in the question bears this out. As the quantity of computers traded increases, the demand for microchips will increase, which pushes up their price. Refer to p. 52.
25. (a) A movement along a demand curve is a change in quantity demanded. The only factor that can cause such a change is a change in the price of the good. Refer to p. 49.
26. (b) The law of demand relates the relationship between the price of a good and the quantity demanded. Refer to p. 50.
27. (a) Equilibrium occurs where quantity demanded equals quantity supplied. Refer to p. 62.
28. (d) At 60¢, quantity demanded is 25 units greater than quantity supplied.
29. (c) At 80¢, quantity supplied is 25 units greater than quantity demanded.
30. (b) The new regulations will decrease the supply of tuna which, in turn, will increase the equilibrium price and decrease the equilibrium quantity.

II. Solutions to Application Questions

1. (a) 50¢. 67,000 bushels.
(b) There is a surplus of 44,000 bushels at a price of 80¢ per bushel. Pressure is present to force price down.
(c) There is a shortage of 22,000 bushels at a price of 30¢ per bushel. Pressure is present to force price up.

- (d) Supply would shift to the left by 30,000 bushels. Equilibrium price would increase to 70¢ per bushel, and the equilibrium quantity would be 48,000 bushels.
2. (a) A decrease in income will reduce demand. Equilibrium price will fall and equilibrium quantity will fall.
 (b) An increase in the cost of wheat will decrease supply. Equilibrium price will rise and equilibrium quantity will fall.
 (c) A decrease in the cost of wheat will increase supply. Equilibrium price will fall and equilibrium quantity will rise.
 (d) A fall in the price of a substitute will reduce the demand for DoughCrust. Equilibrium price will fall and equilibrium quantity will fall.
 (e) There will be a decrease in demand. Equilibrium price will fall and equilibrium quantity will fall.
3. (a) Supply will decrease—cost of inputs has increased.
 (b) Supply will not change. A change in the price of a good results in a change in quantity supplied.
 (c) Supply of hamburgers will decrease—producers will switch resources to cheeseburger production.
4. (a) Hot dogs are substitutes for ice cream. Demand for ice cream will decrease.
 (b) No effect on demand. Changes in the cost of refrigeration will affect supply.
 (c) Demand will increase as the number of buyers increases.

5. (a)

Price	Quantity Demanded	Quantity Supplied
\$30	0	90
\$25	10	75
\$20	20	60
\$15	30	45
\$10	40	30
\$5	50	15
\$0	60	0

- (b) Equilibrium price is \$12 and equilibrium quantity is 36. In equilibrium, $Q_d = Q_s$, therefore,

$$60 - 2P = 3P$$

$$60 = 5P \text{ and } P = 12$$

If $P = 12$, then $Q = 60 - 2(12) = 36$.

- (c) At \$20, there is an excess supply of 40 units. It's a buyers market—only 20 units will be traded.
 (d) This is an increase in demand. Tastes might have changed, consumer incomes may have risen (if DVDs are a normal good), and so on.
 (e) Equilibrium price is \$16 and equilibrium quantity is 48. In equilibrium, $Q_d = Q_s$, therefore,

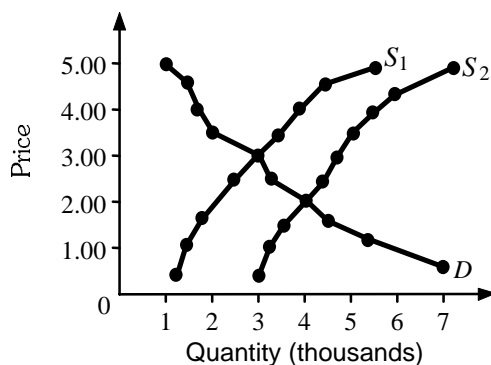
$$80 - 2P = 3P$$

$$80 = 5P \text{ and } P = 16$$

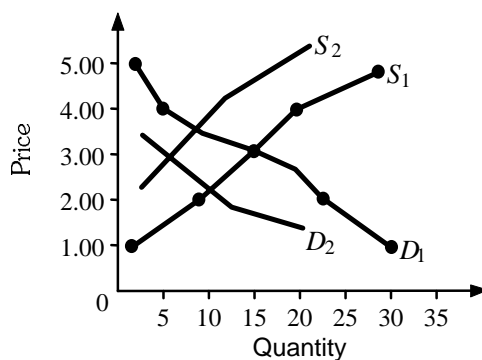
If $P = 16$, then $Q = 80 - 2(16) = 48$.

6. (a) \$3; 3,000 loaves

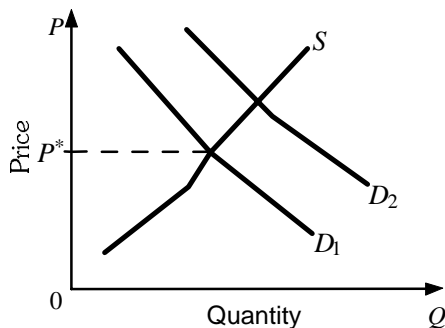
- (b) Refer to the following diagram.



- (c) There is an excess demand (shortage) equal to 4,000 units ($5,400 - 1,400$).
 (d) Refer to the diagram above ($\$2, 4,000$).
 (e) There will be an excess supply (surplus) of 1,800 loaves.
 (f) Price will fall to $\$2$; quantity demanded and supplied will move to 4,000 loaves.
7. The unemployment was removed because 100 extra jobs were created (increase in quantity demanded), and because the wage had become too low, 50 workers decided to cease offering themselves for employment (decrease in quantity supplied).
8. (a) Refer to the following diagram.

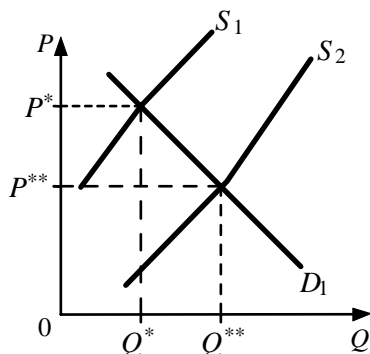


- (b) $P^* = \$3$; $Q^* = 16$.
 (c) Refer to the preceding diagram. There will be no change in demand! Costs have risen, reducing profits, so supply will shift to the left (although we can't say how far). At $\$3$, a shortage now exists, which will push prices higher.
 (d) Refer to the preceding diagram. Demand for orange juice will fall (although we can't say by how much). Consumption of All-Cola will rise, and some consumers of orange juice will substitute the relatively cheap All-Cola.
9. (a) Refer to the following diagram.

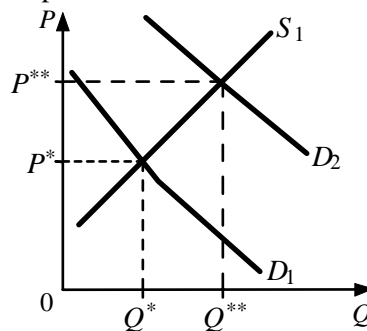


- (b) Increase
- (c) The demand curve must shift to the right.
- (d) Excess demand, leading to pressure for price to rise, will cause a reduction in the quantity demanded and an increase in the quantity supplied. This will continue until a new equilibrium is established.

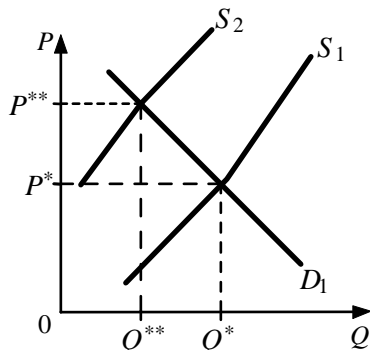
10. (a) The subsidy will increase supply. Price will fall and output will rise.



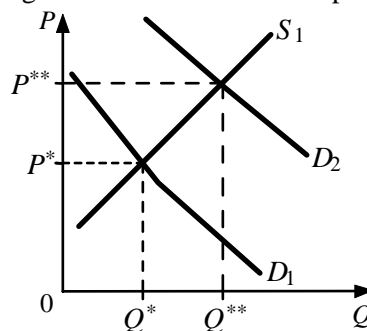
(b) The price of fish will increase and consumers will switch to beef. The demand for beef will increase. Price will rise and output will rise.



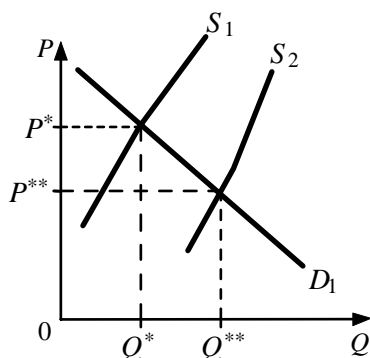
- (c) Costs of production have risen. This will decrease supply. Price will rise and output will fall.



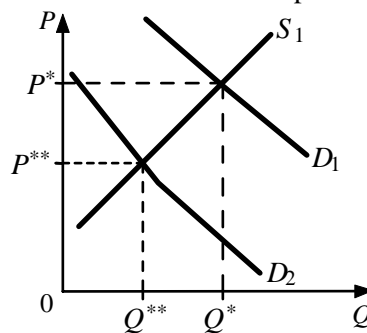
- (d) Beef is a normal good. Higher incomes will cause the demand curve to shift right. Price will rise and output will rise.



- (e) Costs of production will fall. Supply will shift to the right. Price will fall and output will rise.



- (f) A poor tomato crop will drive up the price of tomatoes (and ketchup). Less ketchup will be used, so less beef will be demanded. Price and output will fall.



11. (a) Presumably, your demand curve is downsloping and intersects the price axis at some point.
 (b) With a greater number of substitutes, you will be more sensitive to changes in the price of your good. The curve will tend to be flatter. This refers to elasticity of demand, which we will discuss in Chapter 5.
 (c) The demand curve would shift to the right.
 (d) If this is a normal good, demand would increase. If it is an inferior good, demand would decrease.
12. Demand for labor would increase and, as workers moved away from the region, supply of labor would decrease. Wages, then, would increase, and the costs of doing business in the Northeast would rise.

13. (a) The test has reduced the supply of cabbies. This has forced up the price of taxi rides in London.
 (b) Given the raised price of cab rides, the demand for substitutes will have increased. Other forms of public transportation will have been able to increase their prices.
 (c) Cabbies who have passed the test and earned their license like the scheme because it reduces competition. This is especially true if the degree of substitutability with other types of public transportation is slight.
14. (a) D (b) D (c) U (d) D
 (e) D (f) I or U (g) I
15. (a) U (b) U (c) D (d) D
 (e) I (f) I (g) I (h) U
 (i) D
16. (a) U and D (b) D and U (c) U and I (d) U and I
17. (a) *B* (b) *B* (c) *A* (d) *C*
 (e) *B* (f) *B* (g) *A* (h) *B*
 (i) *B* (j) *C*

