

1. What are some of the characteristics of a market that can be described by a demand and supply model?

Ans: A market that can be represented by a demand and supply curve is an institution or mechanism which brings together large numbers of independently acting buyers and *sellers* who want to exchange some standardized product. Examples of such markets are a central grain exchange, a stock market or a market for foreign currencies.

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Learning Objective: 3.1

2. Define “demand.”

Ans: Demand is a schedule or curve that shows the various amounts of a product buyers are willing and able to purchase at each price in a series of possible prices during a specified period of time. Demand portrays alternative price/quantity possibilities which can be set down in a table. The key point to be recognized is that demand is more than a statement of quantity purchased at a certain price; it is a schedule of quantities which will be demanded at various prices, other things being equal, for a specified period of time.

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Learning Objective: 3.1

3. State the law of demand and explain why the other-things-equal assumption is critical to it.

Ans: The law states that, other things being equal, as price increases, the corresponding quantity demanded falls. Restated, there is an inverse relationship between price and quantity demanded with everything else held constant. The other-things-equal assumption refers to constant prices of related goods, income, tastes, and other things that affect demand besides price. The law of demand only looks at the relationship between price and quantity demanded.

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Learning Objective: 3.1

4. Give two explanations for the law of demand.

Ans: First, there is diminishing marginal utility: a decrease in satisfaction that results with an increase in the amounts of a good or service. The second unit of a good yields less satisfaction (or utility) than the first. Second, there are income and substitution effects. With an income effect, a lower price increases the purchasing power of money income, enabling you to buy more at lower price. With a substitution effect, a lower price for good X gives an incentive to substitute away from the now relatively high-priced good Y and replace it with the low-priced good X.

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Learning Objective: 3.1

5. Suppose that a decrease in the price of feed grain leads to a dramatic decrease in the price of beef. Use the income effect and the substitution effect to explain why there was an increase in the quantity of beef purchased.

Ans: The income effect predicts that the quantity of beef purchased will rise when beef prices fall because people will now be able to afford more. The purchasing power of their income rises when prices fall, assuming other things remain the same.

The substitution effect predicts that the lower price of beef will lead consumers of substitute foods such as chicken and pork to buy more of the relatively less expensive beef and to buy less chicken or pork or other beef substitutes whose prices have not fallen.

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Learning Objective: 3.1

6. The demand schedules of three individuals (Tom, Dick, and Harry) are shown. If they are the only three buyers of CDs, complete the market demand schedule for CDs. Graphically, is the market demand for a product the horizontal or vertical sum of the individual demand schedules?

<u>Price</u>	<u>Quantity demanded, CDs</u>			<u>Total</u>
	<u>Tom</u>	<u>Dick</u>	<u>Harry</u>	
\$15	1	4	0	_____
13	3	5	1	_____
11	6	6	5	_____
9	10	7	10	_____
7	15	8	16	_____

The market demand is the horizontal sum of the individual schedules.

Ans:

<u>Price</u>	<u>Quantity demanded, CDs</u>			<u>Total</u>
	<u>Tom</u>	<u>Dick</u>	<u>Harry</u>	
\$15	1	4	0	5
13	3	5	1	9
11	6	6	5	17
9	10	7	10	27
7	15	8	16	39

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Learning Objective: 3.1

7. List seven basic determinants of market demand that could cause demand to decrease.

Ans: (a) Consumers' tastes become less favourable toward the item.

(b) The number of buyers decreases.

(c) Incomes fall and the item is a normal good.

(d) Incomes rise and the item is an inferior good.

(e) A decrease in the price of a substitute product.

(f) An increase in the price of a complementary product.

(g) Consumers expect lower prices in the future.

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Learning Objective: 3.1

8. Differentiate between a normal (superior) and an inferior good.

Ans: A normal (superior) good is one whose demand varies directly with income as is true for most goods and services the more income one earns, the more one is willing and able to buy. However, there are exceptions, called inferior goods, whose demand varies inversely with income. Inferior goods are those whose demand increases when incomes fall and vice versa.

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Learning Objective: 3.1

9. Explain how the prices of related goods also affect demand.

Ans: Substitute goods are those that can be used in place of each other. The price of the substitute and demand for the other good are directly related. If the price of Coke rises, demand for Pepsi should increase. Complementary goods are those that are used together like tennis balls and rackets. When goods are complements, there is an inverse relationship between the price of one and the demand for the other. Some goods are not related to each other and are independent goods. In these cases, a change in price of one will not affect the demand for the other.

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Learning Objective: 3.1

10. Give examples of two substitute goods and two complementary goods. In each case explain why the goods are substitutes or complements.

Ans: The pair of substitute goods given should correspond to the explanation that they are substitutes because when the price of one changes, the demand for the other changes in the same direction. When the price of butter rises, one expects the demand for margarine to increase; when the price of butter falls, one expects the demand for margarine to fall as butter lovers switch back to butter consumption.

The pair of complementary goods should fit the explanation that they are complements because when the price of one changes, the demand for the other is inversely related. When the price of tennis equipment rises, the demand for tennis-club memberships should fall (if tennis playing is a normal good).

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Learning Objective: 3.1

11. What is the difference between a change in demand and a change in quantity demanded?

Ans: A change in demand is a shift in the entire demand curve either to the left (a decrease in demand) or to the right (an increase in demand). “Demand” refers to the entire schedule or curve. By contrast, a change in quantity demanded is a movement along an existing demand curve or schedule from one price-quantity combination to another. A change in product price causes the change in quantity demanded.

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Learning Objective: 3.1

12. Suppose a producer sells 1,000 units of a product at \$5 per unit one year, 2,000 units at \$8 the next year, and 3,000 units at \$10 the third year. Is this evidence that the law of demand is violated? Explain.

Ans: No. The law of demand shows the relationship between price and quantity demanded. In general, as price falls the quantity demanded will increase. One of the assumptions, however, is that all other things are equal or held constant. In this case, this assumption may have been violated and that is why it seems there is a positive relationship between price and quantity. The most likely explanation for the set of events is that demand for the product increased from one year to the next. If that was true, then price would rise and the equilibrium quantity would increase.

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Learning Objective: 3.1

13. What effect should each of the following have upon the demand for MP3 players?
Explain your reasoning in each case.

- (a) the development of reasonably-priced smart phones that compete with MP3 players
- (b) an increase in population and incomes
- (c) a substantial increase in the number and quality free downloadable MP3s
- (d) consumer expectations of substantial price increases in MP3 players
- (e) a decrease in the price of MP3 players

Ans: (a) Would cause a decrease in demand for MP3 players as the smart phone can substitute as an MP3 player.

(b) Would cause an increase in demand because there are more consumers and they have more income to spend. This assumes that MP3 players are a normal good and more would be bought with higher incomes.

(c) Would increase demand as with more songs available people will want more MP3 players to hear their music.

(d) Would increase current demand as consumers will want to beat the future price increase.

(e) Would not change demand for MP3 players – a different quantity will be demanded, but the demand schedule/curve would not move.

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Learning Objective: 3.1

14. Define “supply.”

Ans: Supply is a schedule or curve that shows the various amounts of a product sellers are willing and able to produce and offer for sale at each price in a series of possible prices during a specified period, other things being equal.

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Learning Objective: 3.2

15. Describe and give a reason for the law of supply.

Ans: The law of supply indicates that, other things being equal, producers will produce and be willing to sell more of their product at a high price than at a low price. This means that there is a direct relationship between price and quantity supplied. The basic explanation is that, given product costs, a higher price means greater profits and thus more incentive for business to increase the quantity supplied.

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Learning Objective: 3.2

16. List six basic determinants of market supply that could cause supply to increase.

Ans: (a) Resource prices decrease.
(b) Technology advances.
(c) Lower taxes or higher subsidies reduce production costs.
(d) Prices of other related goods increase.
(e) Producers expect higher prices in the future and respond by expanding production now.
(f) The number of sellers increases.

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Learning Objective: 3.2

17. The Federal government is considering passing an excise tax that would increase the price of a pack of cigarettes by \$1.00. What would be the likely effect of this change on the demand and supply of cigarettes? What is likely to happen to cigarette prices and the quantity consumed if the tax bill is enacted?

Ans: In the short run, the excise tax would decrease the supply of cigarettes because in essence it increases the cost of production. The decrease in supply would increase the price of cigarettes and decrease the quantity of cigarettes consumed. The demand for cigarettes would not change, but the quantity demanded would decrease.

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Learning Objective: 3.2

18. What is the difference between a change in supply and a change in quantity supplied?

Ans: A change in supply is a shift in the entire supply curve either to the left (a decrease in supply) or to the right (an increase in supply). A change in supply, therefore, is a change in the entire supply schedule or curve. In contrast, a change in quantity supplied is a movement along an existing supply curve or schedule from one price-quantity combination to another. A change in product price causes the change in quantity supplied.

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Learning Objective: 3.2

19. Newspaper item: “Due to lower grain prices, consumers can expect retail prices of choice beef to begin dropping slightly this spring with pork becoming cheaper after midsummer,” the Agriculture Department predicted. “This reflects increasing supply,” the department said. Is the term “supply” used correctly? What effects might this announcement have on consumer demand? Explain.

Ans: The announcement does use the term “supply” correctly because the drop in price predicted is a result of lower resource (grain) prices. This means that producers of beef and pork will lower prices for each quantity on the existing supply schedule assuming “all other things remain equal.”

Consumer demand at present might decrease as consumers wait to make big purchases of beef and pork in the future when prices are predicted to drop. By spring, if beef prices drop, there should be an increase in the quantity of beef demanded and probably a decrease in the demand for pork, which is a substitute for beef. By midsummer, if pork prices drop, there will be an increase in the quantity of pork demanded, and depending on what is then happening with beef prices, a decline in the demand for beef. If beef prices had continued to fall, it is hard to say whether there would be much of a change in demand due to the price of the substitute pork falling. More likely, there would be only a movement along the curve for beef if the price continued to fall.

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Learning Objective: 3.2

20. What effect will each of the following have upon the supply of television sets? Explain your reasoning in each case.

- (a) an increase in the price of electronic equipment used in producing television sets
- (b) a decline in the number of firms producing television sets
- (c) a large new tariff on imported Japanese TV sets
- (d) new inexpensive satellite dishes which make televisions more popular among consumers

Ans: (a) This should decrease the supply because a higher price must be charged for each quantity due to the rising price of resources. The supply curve will shift to the left.

(b) The outcome is indeterminate because we don't know why the firms left the industry. Perhaps remaining firms are more efficient and will produce more. On the other hand, there may be just a few firms remaining and the resulting decline in competition could lead to higher prices for each quantity, or a decrease in supply.

(c) A higher tariff will cause a decrease in the supply of imported television sets because costs, i.e., taxes, have risen. Because the supply of Japanese TV sets is part of the total market supply, the effect is to decrease the market supply.

(d) New inexpensive satellite dishes should have no effect on the supply schedule. However, demand should increase resulting in a higher equilibrium price and greater quantity supplied. Note that supply does not shift, but that the quantity supplied changes.

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Learning Objective: 3.2

21. Economist Jones defines an increase in supply as a decrease in the prices needed to ensure various amounts of a good being offered for sale. Economist Brown defines an increase in supply as an increase in the amounts that producers will offer at various possible prices. Economist Cole defines an increase in supply as an increase in the amount firms will offer in the market which is caused by an increase in the price of the product. Which, if any, of these is defining an increase in supply correctly? Explain.

Ans: Economists Brown and Jones are both correct. Brown recognizes that a shift in supply means greater quantities will be supplied at each of the various prices given for the original supply schedule. In other words, more will be supplied at each of the prices on the original schedule. Jones recognizes that a shift in supply means sellers are willing to accept a lower price at each of the various amounts of a good being offered for sale. It is an equivalent statement to Brown's. Cole is not correct. Cole is defining a change in the quantity supplied, or a movement along the supply curve, not an increase in supply.

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Learning Objective: 3.2

22. Assuming no government intervention, describe the market behaviour that should result if the price of a product is below its equilibrium price; then describe the behaviour that should occur if the price is above its equilibrium price.

Ans: If the price of a product is below its equilibrium price, the quantity demanded will be greater than the quantity supplied and the price will be bid up as buyers compete to obtain the product and sellers realize that they can raise the price. As the price rises, the quantity supplied will increase and the quantity demanded decrease until the two are equal at the so-called equilibrium or market-clearing price.

If the price of a product is above its equilibrium price, the quantity supplied will be greater than the quantity demanded and a temporary surplus exists. As sellers compete, the price will fall. In response, the quantity demanded will increase and the quantity supplied will decrease until the two are equal at the equilibrium or market-clearing price.

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Learning Objective: 3.3

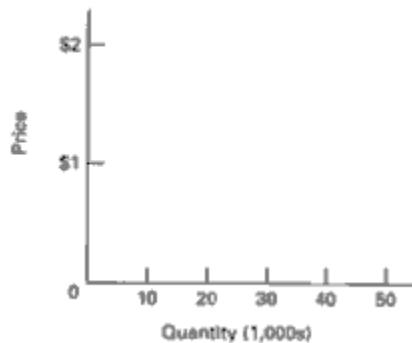
23. Describe in words how one can recognize the market equilibrium point in a graph of a demand schedule and a supply schedule.

Ans: The market equilibrium point is the point where the demand curve intersects the supply curve. The quantity vertically below this point is the equilibrium quantity and the price horizontally opposite this point is the equilibrium price.

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Learning Objective: 3.3

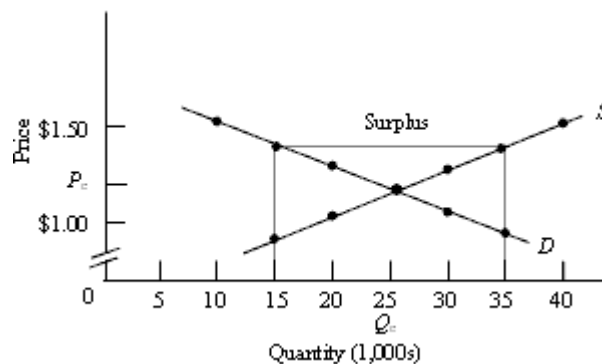
24. Using the schedules given, plot the demand curve and the supply curve on the below graph. Label the axes and indicate for each axis the units being used to measure price and quantity. Then answer the questions.



<u>Price</u>	<u>Quantity demanded (tons of oats)</u>	<u>Price</u>	<u>Quantity supplied (tons of oats)</u>
\$1.50	10,000	\$1.50	40,000
1.40	15,000	1.40	35,000
1.30	20,000	1.30	30,000
1.20	25,000	1.20	25,000
1.10	30,000	1.10	20,000
1.00	35,000	1.00	15,000

- (a) Give the equilibrium price and quantity for oats.
- (b) Indicate the equilibrium price and quantity on the graph by drawing lines from the intersection of the supply and demand curves to the price and quantity axes.
- (c) If the Federal government decided to support the price of oats at \$1.40 per ton, tell whether there would be a surplus or shortage and how much it would be.
- (d) Demonstrate your answer to part (c) on your graph being sure to label the quantity you designated as the shortage or surplus.

Ans:



- (a) The equilibrium price and quantity for oats will be \$1.20 and 25,000 tons.
- (b) The equilibrium price and quantity on the graph are labelled P_e and Q_e .

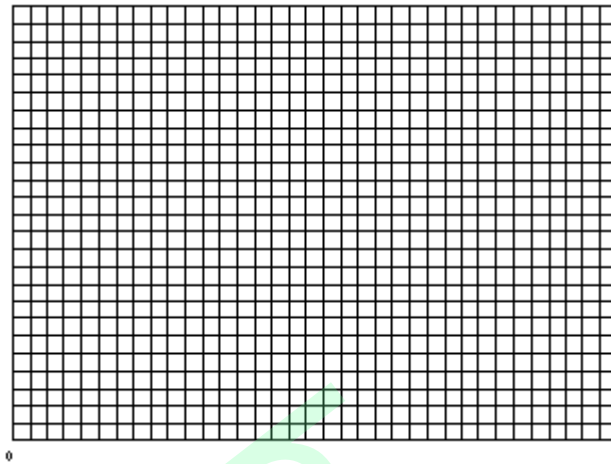
- (c) If the Federal government decided to support the price of oats at \$1.40 per ton, there would be a surplus of $35,000 - 15,000 = 20,000$ tons.
- (d) See surplus labelled on above figure.

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Learning Objective: 3.3

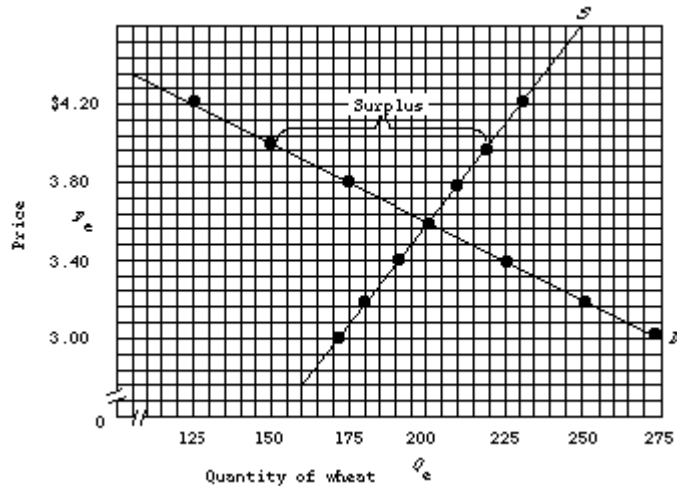
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25. Using the schedules given, plot the demand curve and the supply curve on the below graph. Label the axes and indicate for each axis the units being used to measure price and quantity. Then answer the questions.



<u>Price</u>	<u>Quantity demanded (tons of wheat)</u>	<u>Price</u>	<u>Quantity supplied (tons of wheat)</u>
\$4.20	125,000	\$4.20	230,000
4.00	150,000	4.00	220,000
3.80	175,000	3.80	210,000
3.60	200,000	3.60	200,000
3.40	225,000	3.40	190,000
3.20	250,000	3.20	180,000
3.00	275,000	3.00	170,000

- (a) Give the equilibrium price and quantity for wheat.
- (b) Indicate the equilibrium price and quantity on the graph by drawing lines from the intersection of the supply and demand curves to the price and quantity axes.
- (c) If the Federal government decided to support the price of wheat at \$4.00 per ton, tell whether there would be a surplus or shortage and how much it would be.
- (d) Demonstrate your answer to part (c) on your graph being sure to label the quantity you designated as the shortage or surplus.



Ans:

- The equilibrium price and quantity for wheat will be \$3.60 and 200,000 tons.
- The equilibrium price and quantity on the graph are labelled P_e and Q_e .
- If the Federal government decided to support the price of wheat at \$4.00 per ton, there would be a surplus of $220,000 - 150,000 = 70,000$ tons.
- See surplus labelled on figure.

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Learning Objective: 3.3

26. Evaluate. An increase in demand causes price to rise which, in turn, causes demand to fall. Therefore, an increase in demand will not have lasting effects.

Ans: While an increase in demand, which causes the demand curve to shift to the right, does lead to an increase in price. The resulting increase in price does not cause demand to fall. A change in price affects the quantity demanded and is represented by a movement along the demand curve. The higher price reduces the quantity demanded until a new equilibrium is established. Therefore, the statement is not correct.

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Learning Objective: 3.1, 3.3

27. Evaluate. A decrease in supply causes price to rise which, in turn, causes supply to rise. Therefore, a decrease in supply will not have lasting effects.

Ans: While a decrease in supply, which causes the supply curve to shift to the left, does lead an increase in price, the resulting increase in price does not cause supply to rise. A change in price affects the quantity supplied and is represented by a movement along the supply curve. The higher price increases the quantity supplied until a new equilibrium is established. Therefore, the statement is not correct.

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Learning Objective: 3.2-3.3

28. In the space below each of the following, indicate the effect [**increase (+)**, **decrease (-)**] on equilibrium price (**P**) and equilibrium quantity (**Q**) of each of these changes in demand and/or supply.

	P	Q
(a) Increase in demand, supply constant	_____	_____
(b) Increase in supply, demand constant	_____	_____
(c) Decrease in demand, supply constant	_____	_____
(d) Decrease in supply, demand constant	_____	_____

Ans: (a) +, +; (b) -, +; (c) -, -; (d) +, -

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Learning Objective: 3.3

29. In the spaces below each of the following, indicate the [**increase (+)**, **decrease (-)**, or **indeterminate (ind)**] on equilibrium price (**P**) and equilibrium quantity (**Q**) of each of these changes in demand and/or supply.

	P	Q
(a) Increase in demand, increase in supply	_____	_____
(b) Increase in demand, decrease in supply	_____	_____
(c) Decrease in demand, decrease in supply	_____	_____
(d) Decrease in demand, increase in supply	_____	_____

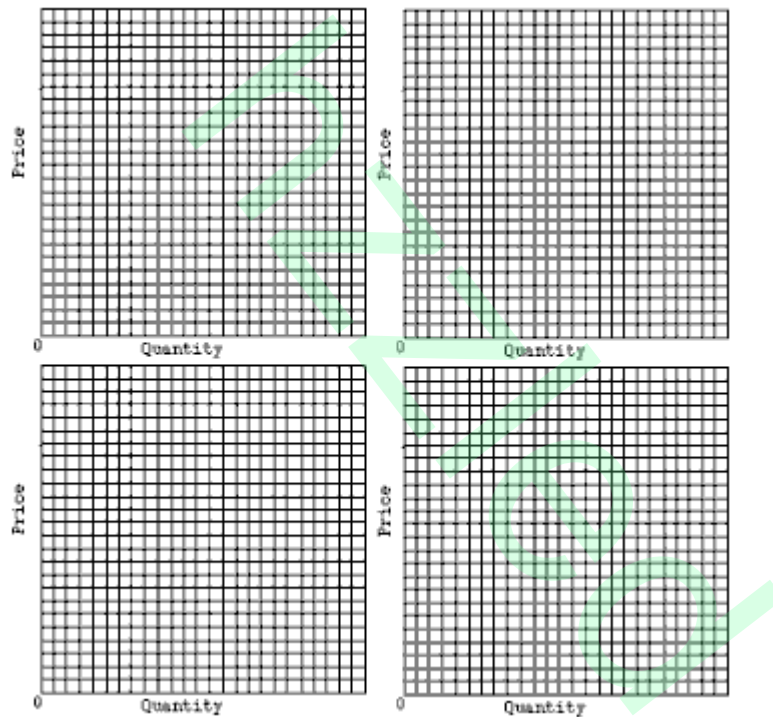
Ans: (a) ind, +; (b) +, ind; (c) ind, -; (d) -, ind;

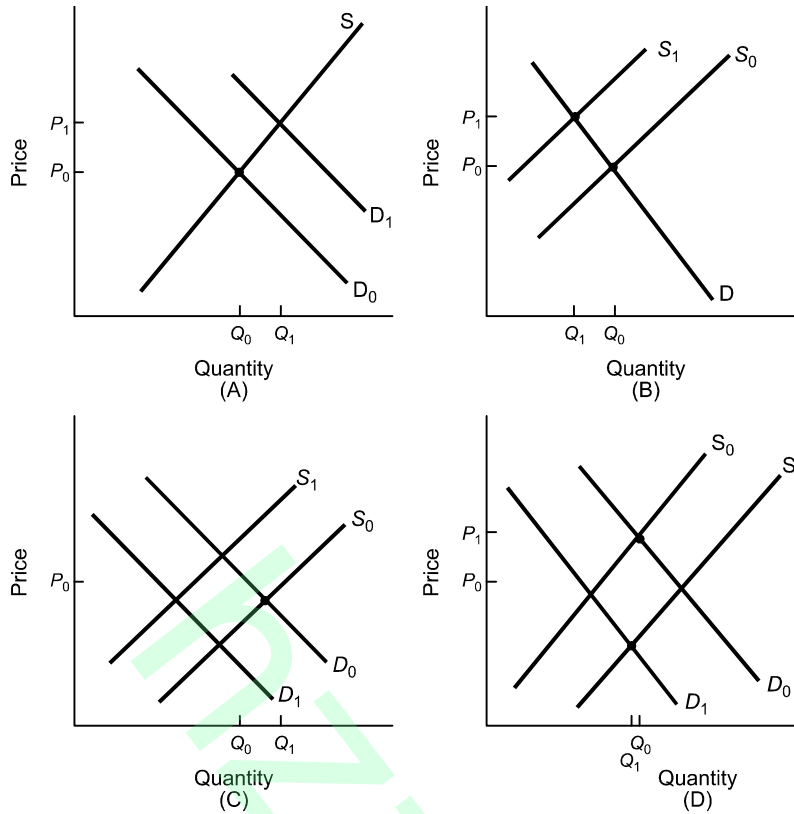
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Learning Objective: 3.3

30. In each case below, indicate the effect [*increase* (+); *decrease* (-); *indeterminate* (ind)] upon equilibrium price (*P*) and equilibrium quantity (*Q*) and illustrate the change graphically. Where you believe the effect is indeterminate, two graphical illustrations may be necessary to demonstrate your point.

	<i>P</i>	<i>Q</i>
(a) Increase in demand, supply constant	___	___
(b) Decrease in supply, demand constant	___	___
(c) Decrease in demand, decrease in supply	___	___
(d) Decrease in demand, increase in supply	___	___





Ans:

- (a) Increase in demand, supply constant
- (b) Decrease in supply, demand constant
- (c) Decrease in demand, decrease in supply
- (d) Decrease in demand, increase in supply

P	Q
+	+
+	-
ind	-
-	ind

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Learning Objective: 3.3

31. The price of gold is lower today than several decades ago. Yet, the production of gold is greater than in the past. How is this possible without violating the law of supply?

Ans: The supply of gold has increased and as a result, the price of gold has fallen and the quantity of gold has risen. The main reason for the increase in the supply of gold is improvement in technology that allows producers to lower production costs by using fewer resources.

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Learning Objective: 3.3

32. Given the products below and the events that affect them, indicate what happens to demand or supply, and the equilibrium price and quantity. Identify the determinant of demand or supply that causes the shift.

(a) Blue jeans. The wearing of blue jeans becomes *less* fashionable among consumers.

(b) Computers. Parts for making computers fall in price because of improvements in technology.

(c) Lettuce. El Nino produces heavy rains that destroy a significant portion of the lettuce crop.

(d) Chicken. Beef prices rise because severe winter weather reduces cattle herds.

Ans: (a) Demand for blue jeans decreases because of a decline in buyer tastes for blue jeans, thus decreasing the equilibrium price and quantity.

(b) Supply of computers increases because of an improvement in technology, thus decreasing the equilibrium price and increasing the equilibrium quantity.

(c) Supply of lettuce decreases because of a fall in the number of suppliers, thus increasing the equilibrium price and decreasing the equilibrium quantity.

(d) Demand for chicken increases because of an increase in the price of a substitute food (beef prices rose because of a supply decrease), thus increasing the equilibrium price and quantity.

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Learning Objective: 3.1, 3.2, 3.3

33. Given the products below and the events that affect them, indicate what happens to demand, supply, equilibrium quantity, and equilibrium price. Identify the determinant of demand and supply that causes the shifts.

(a) Calculators. More schools require students to buy and use calculators; improved productivity shortens the time it takes to make calculators.

(b) Gasoline. Oil production declines due to a crisis in the Middle East; people take more car vacations and drive more.

(c) New homes. The average incomes fall as the economy moves into recession; the productivity of home construction workers and builders increases.

(d) Tobacco. The government cut its subsidy to tobacco farmers; more people quit smoking.

Ans: (a) The demand for calculators increases because of an increase in the number of buyers. The supply of calculators increases because of a fall in resource prices (productivity reduces resource costs). The equilibrium quantity increases, but what happens to the equilibrium price is indeterminate and depends on the magnitudes of the shifts.

(b) The supply of gasoline decreases because of a rise in resource price (oil prices increase due to a cutback in production). The demand for gasoline increases due to an increase in the taste for taking driving vacations. The equilibrium price increases, but what happens to the equilibrium quantity is indeterminate and depends on the magnitudes of the shifts.

(c) The demand for new homes decreases because of a decline in consumer incomes. The supply of new homes increases because of a fall in the price of labour resources (productivity increases reduce resource costs). The equilibrium price decreases, but what happens to the equilibrium quantity is indeterminate and depends on the magnitudes of the shifts.

(d) The supply of tobacco decreases because of a cut in government subsidies for tobacco. The demand for tobacco decreases due to a decline in the taste for smoking tobacco. The equilibrium quantity decreases, but what happens to the equilibrium price is indeterminate and depends on the magnitudes of the shifts.

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Learning Objective: 3.1-3.3

34. What is a price ceiling and what are its economic effects?

Ans: A price ceiling means that the price is not allowed to rise above the maximum price set by government. If the price ceiling is set below the equilibrium price in a market, then there will be a shortage of the product at the government-set price. A price ceiling interferes with the rationing function of price that serves to balance the decisions of suppliers and demanders. The shortage indicates that resources are being underallocated to the production of this product and that there is economic inefficiency. Less output is being produced than consumers want. This output is not being produced because some producers cannot make a profit at the price ceiling level.

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Learning Objective: 3.4

35. Use the data in the following table to explain the economic effects of a price ceiling at \$6, at \$5, and at \$4.

<u>Price</u>	<u>Quantity demanded</u>	<u>Quantity supplied</u>
\$7	4,500	4,500
6	5,000	3,500
5	5,500	2,500
4	6,000	1,500

Ans: A price ceiling means that the price will not be permitted to rise above a maximum price. If the price ceiling is below the competitive equilibrium price of \$7, it would produce a shortage of the product. For example, if the price ceiling was set at \$6, the quantity demanded would be 5,000 units and the quantity supplied would be 3,500 for a shortage of 1,500 units. With a price ceiling set at \$5, the shortage would be 3,000 units, and with a price ceiling of \$4, the shortage would be 4,500 units. A price ceiling interferes with the rationing function of price that serves to balance the decisions of demanders and suppliers. The price ceiling produces a shortage that indicates that resources are being underallocated; output is not being produced because some producers cannot make a profit at the price ceiling level.

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Learning Objective: 3.4

36. Use the data in the following table to explain the economic effects of a price ceiling at \$9.

<u>Price</u>	<u>Quantity demanded</u>	<u>Quantity supplied</u>
\$10	3,000	7,500
9	3,500	6,500
8	4,000	5,500
7	4,500	4,500

Ans: A price ceiling is a maximum price above which the price is not allowed to exceed. To be effective, a price ceiling must be set below the equilibrium price. Since the price ceiling of \$9 exceeds the equilibrium price, it is not binding. The price ceiling has no effect. The market remains at equilibrium where the price and quantity are \$7 and 4,500 units.

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Learning Objective: 3.4

37. What is a price floor and what are its economic effects?

Ans: A price floor means that the price is not allowed to fall below a minimum price set by government. If the price floor is set above the equilibrium price in a market, then there will a surplus of the product. A price floor interferes with the rationing function of price that serves to balance the decisions of suppliers and demanders. The surplus indicates that resources are being overallocated to the production of this product and that there is economic inefficiency; output is being produced which consumers do not want to purchase at the price floor.

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Learning Objective: 3.4

38. Use the data in the following table to explain the economic effects of a price floor at \$8, at \$9, and at \$10. Explain the economic effects.

<u>Price</u>	<u>Quantity demanded</u>	<u>Quantity supplied</u>
\$10	3,000	7,500
9	3,500	6,500
8	4,000	5,500
7	4,500	4,500

Ans: A price floor means that the price is not allowed to fall below a minimum price set by government. If the price floor is above the competitive equilibrium price of \$7, a surplus of the product would result. If the price floor was set at \$8, the quantity demanded would be 4,000 units but the quantity supplied would be 5,500 units for a surplus of 1,500 units. At a price floor of \$9, the surplus would be 3,000 units, and with a price floor of \$10, the surplus would be 4,500 units. A price floor interferes with the rationing function of price that serves to balance the decisions of suppliers and demanders. The price floor that produces a surplus indicates that resources are being overallocated and that there is economic inefficiency; output is being produced which consumers do not want to purchase at the price floor.

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Learning Objective: 3.4

39. Use the data in the following table to explain the economic effects of a price floor at \$6.

<u>Price</u>	<u>Quantity demanded</u>	<u>Quantity supplied</u>
\$7	4,500	4,500
6	5,000	3,500
5	5,500	2,500
4	6,000	1,500

Ans: A price floor is a minimum price below which the price is not allowed to fall. To be effective, a price floor must be set above the equilibrium price. Since the equilibrium price exceeds the floor price of \$6, the price floor is not binding. The price floor has no effect. The market remains at equilibrium where the price and quantity are \$7 and 4,500 units.

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Learning Objective: 3.4

40. “Government-set prices undermine the rationing function of competitive prices.” Explain carefully in terms of both price ceilings and price floors.

Ans: A ceiling price means that the government may hold prices at a level that is below the market equilibrium price. Since the market equilibrium is where the quantity demanded is equal to the quantity supplied, any price below that would find an excess quantity demanded over that supplied. In other words, a shortage would develop and the market would fail to ration ($Q_D > Q_S$). In unregulated competition, this situation could not persist because competition would drive up the price until the equilibrium quantity and price were reached.

A price floor means that the government may hold prices above the market equilibrium price by agreeing to pay that price for any unsold surplus. The rationing function of the competitive price system will not work because sellers will have no competitive pressure to lower prices to get rid of the surplus, if they can sell it to the government at the supported price there will be a persistent product surplus ($Q_S > Q_D$).

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Learning Objective: 3.3, 3.4

41. Despite a lower price for its product, the widget industry is selling fewer units. How is this possible if the law of demand has not been violated? Give and explain two distinct reasons.

Ans: One reason that can explain the lower sales despite the lower price is a decrease in demand. A leftward shift of the demand curve leads to both a lower equilibrium price and a lower equilibrium quantity. The lower demand could be the result of an unfavourable change in tastes, a decrease in the number of buyers, a decrease in income if widgets are normal goods, an increase in income if widgets are an inferior good, a decrease in the price of a substitute, an increase in the price of a complement, or newly formed expectations of a lower price.

A second explanation for the lower sales is the imposition of a price ceiling which lowers the price below the equilibrium price and reduces the quantity supplied to a level below the equilibrium quantity. Although buyers wish to purchase more units at the price ceiling, sellers have reduced the quantity supplied and therefore fewer units are sold.

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Learning Objective: 3.3-3.4

42. Despite a higher price for widgets, buyers are purchasing more units. How is this possible if the law of demand has not been violated? Give and explain two distinct reasons.

Ans: One reason that can explain the higher sales despite the higher price is an increase in demand. The rightward shift of the demand curve leads to a lower equilibrium price and a lower equilibrium quantity. The higher demand could be the result of an favourable change in tastes, an increase in the number of buyers, an increase in income if widgets are normal goods, a decrease in income if widgets are an inferior good, an increase in the price of a substitute, a decrease in the price of a complement, or newly formed expectations of a higher price.

A second explanation for the higher sales is the removal of a price ceiling, which raises the price to its equilibrium level. Although buyers wish to purchase fewer units, actual sales are higher since sellers are willing to increase the quantity supplied. When the price ceiling was in place, a shortage existed and buyers could not purchase all of the units they desired.

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Learning Objective: 3.3-3.4

43. Why might there be a shortage of donated human organs that can be used for transplants?

Ans: The basic reason is that no market exists for human organs. The demand curve for human organs would be similar to other demand curves in that a greater quantity would be demanded at low prices than at higher prices. Donated organs that are rationed by a waiting list have a zero price. The existing supply is perfectly inelastic and is the fixed quantity offered by willing donors. There is a shortage of human organs because at a zero price the quantity demanded exceeds the quantity supplied.

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Learning Objective: Last Word

44. (a) Using the schedules given, determine the demand equation and the supply equation.

Price	Quantity demanded	Price	Quantity supplied
\$19	5	\$19	65
18	10	18	60
17	15	17	55
16	20	16	50
15	25	15	45
14	30	14	40

(b) What is the intercept of the demand equation? What is the slope of the demand equation?

(c) What is the intercept of the supply equation? What is the slope of the supply equation?

(d) What is the equilibrium price and quantity?

Ans: (a) The demand equation is $P = 20 - .2Q_D$ and the supply equation is $P = 6 + .2Q_S$.

(b) The intercept of the demand equation is \$20. The slope of the demand equation is $-.2$.

(c) The intercept of the supply equation is \$6. The slope of the supply equation is $.2$.

(d) The equilibrium price and quantity are \$13 and 35 units.

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Learning Objective: Appendix

45. Demand is represented by the equation, $P = 80 - .3Q_D$ and supply by the equation $P = 30 + .2Q_S$.

- (a) Determine the equilibrium price and quantity.
- (b) What are the economic effects of a price ceiling at \$41?
- (c) What are the economic effects of a price ceiling at \$72?
- (d) What are the economic effects of a price floor at \$62?
- (e) What are the economic effects of a price floor at \$37?

Ans: (a) The equilibrium price and quantity are \$50 and 100 units.

(b) The price ceiling prevents the price from exceeding \$41. At \$41, the quantity demanded is 130 units and the quantity supplied is 55 units. Therefore, a shortage of 75 units exists. The price ceiling interferes with the rationing function of price and causes an underallocation of resources to this market. Not enough output is being produced to satisfy the desires of buyers because some producers cannot make a profit at this price level. Allocative efficiency is not achieved at the current level of output because the marginal benefit exceeds the marginal cost.

(c) A price ceiling set above the equilibrium price is not effective. Therefore, a price ceiling at this level has no economic effect and the market remains at equilibrium.

(d) The price floor prevents the price from falling below \$62. At \$62, the quantity demanded is 60 units and the quantity supplied is 160 units. Therefore, a surplus of 100 units exists. The price floor interferes with the rationing function of price and causes an overallocation of resources to this market. Output is being produced that buyers do not wish to purchase at this price. Allocative efficiency is not achieved at the current level of output because the marginal cost exceeds the marginal benefit.

(e) A price floor set below the equilibrium price is not effective. Therefore, a price floor at this level has no economic effect and the market remains at equilibrium.

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Learning Objective: 3.4, Appendix

46. Determine the equilibrium price and quantity in each of the following.

(a) Demand is represented by the equation, $P=28-.2Q_D$ and supply by the equation $P=8+.3Q_S$.

(b) Demand is represented by the equation, $P=30-.5Q_D$ and supply by the equation $P=5+.5Q_S$.

(c) Demand is represented by the equation, $P=20-.3Q_D$ and supply by the equation $P=4+.2Q_S$.

Ans: (a) The equilibrium price and quantity are \$20 and 40 units.

(b) The equilibrium price and quantity are \$17.50 and 25 units.

(c) The equilibrium price and quantity are \$10.40 and 32 units.

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Learning Objective: Appendix

47. (a) Determine the equilibrium price and quantity if demand is represented by the equation, $P = 40 - .2Q_D$ and supply by the equation $P = 10 + .4Q_S$.

(b) Suppose demand changes and is now represented by the equation $P = 52 - .2Q_D$. Has demand increased or decreased? What is the new equilibrium price and quantity?

(c) Suppose instead supply changes and is now represented by the equation $P = 16 + .4Q_S$. Has supply increased or decreased? What is the new equilibrium price and quantity?

Ans: (a) The equilibrium price and quantity are \$30 and 50 units.

(b) Demand has increased since buyers are willing to pay a higher price at each level of quantity demanded. The new equilibrium price and quantity are \$38 and 70 units.

(c) Supply has decreased since sellers require a higher price at each level of quantity supplied. The new equilibrium price and quantity are \$32 and 40 units.

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Learning Objective: 3.4, Appendix