Instructional Unit Project

Target Audience: College students taking an introductory course in business or economics.

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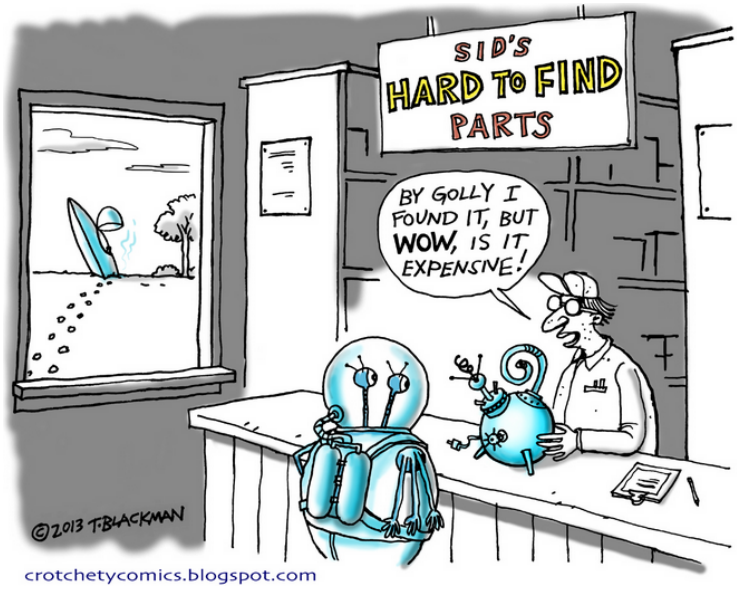
Learning Module: The Law of Supply and Demand

Determine how a change in the supply or demand for a product affects the price and quantity sold in the market.



Introduction

In the cartoon above, our alien friend must make a decision: Is he willing to buy the hard-to-find part in order to fix his spacecraft? Let's assume the part is the *only* one of its kind. Sid will likely be able to charge a high price for the part. It is also likely the alien will desire this part at any cost, in order to get back to his home planet. This is much like the choices consumers and businesses must make every day – How much to pay for an item at a given quantity, and how much of the item should be provided at a given price.

Economics has been described as the study of how people make choices to satisfy their wants. The most fundamental principle behind this is the Law of Supply and Demand. Most of us know intuitively how this works:

- In winter, when the weather is cold, the demand for Ice Cream goes down, so Ice Cream is cheaper.
- In rainy weather, the demand for umbrellas goes up, so the price of umbrellas goes up.
- A limited supply of a certain toy at Christmas time can lead to increased demand, and prices can skyrocket.

But as we begin to think like managers and business owners, we will also see that this principle is fundamental to almost all decision-making. Here are some challenges to consider:

- **Market**. Without a market, there is no supply or demand, and, therefore, no business at all, because there's no one to sell anything to! So, the first consideration is: Are there buyers who want my product and people who want to sell it to them?
- **Supply**. Pricing an item low doesn't make sense if you don't have the manufacturing capacity to keep up with a spike in demand of people who want to get it at the low price.
- **Demand**. As a business owner, you will have to find the perfect pricing that will capture as much of a profit as possible without causing a decrease in demand for your product.

So, as future titans in business, you can see that mastering this concept will be very useful! Let's get started!

Objectives

- Define Market Demand. Given a set of price and quantity data for an item, display the market demand curve on a graph.
- Define Markey Supply. Given a set of price and quantity data for an item, display the market supply curve on a graph.
- Define Equilibrium and explain how the forces of supply and demand affect the price and quantity of a product sold in the market.
- Explain how a change in the supply or demand for a product affects the price and quantity sold in the market.

Prerequisite Skills

To complete this module, you will need to be able to read, construct and analyze graphs. At minimum, you will need to be able to:

- Identify and label the x- and y-axes on a graph.
- Plot points on the graph, where each point represents both an x and a y component.
- Create a line or curve connecting the plot points.
- Estimate a value that lies on the smooth curve or line *between* two actual data points (Interpolation of data).
- Estimate a value that lies on the smooth curve or line *beyond* two actual data points (Extrapolation of data).
- Title your graph appropriately.

Directions

- Each lesson will begin with a short reading on the core concept. Key terms and definitions are also provided.
- Data and worked examples are shown, followed by practice graphing exercises and practice questions.
- The data for practice graphs will be provided for each lesson. You may use a pencil and a ruler to plot points and draw lines on the blank graph template provided. You only need to create a single graph -- With each lesson, you will add new plot points and lines to the same graph.
- For multiple choice questions, circle you answer choice clearly.

Lesson 1: The Law of Demand

The quantity demanded of any good is the amount of the good that buyers are willing and able to purchase. As we will see, many things determine the quantity demanded of any good, but in our analysis of how markets work, one factor plays a central role: the price of the good. If the price of ice cream rose to $20 per scoop, you would buy less ice cream. You might buy frozen yogurt instead. If the price of ice cream fell to $0.20 per scoop, you would buy more. This relationship between price and quantity demanded is true for most goods in the economy and, in fact, is so common that economists call it the law of demand. It states that all other factors being equal, when the price of a good rises, the quantity demanded of the good falls, and when the price falls, the quantity demanded rises.

Key Term: Law of Demand

The claim that, other factors being equal, the quantity demanded of a good falls when the price of the good rises.

Example: The Demand Curve for Ice Cream Cones

Table 1.1 shows how many ice-cream cones Catherine buys each month at different prices. If ice cream is free, Catherine eats 12 cones per month. At $0.50 per cone, Catherine buys 10 cones each month. As the price rises further, she buys fewer and fewer cones. When the price reaches $3.00, Catherine doesn't buy any cones at all. This table is known as a demand schedule and shows the relationship between the price of a good and the quantity demanded (ignoring anything else that may influence how much of the good consumers want to buy).

Key Term: Demand Schedule

A table that shows the relationship between the price of a good and the quantity demanded.

Table 1.1: Demand Schedule for Ice Cream

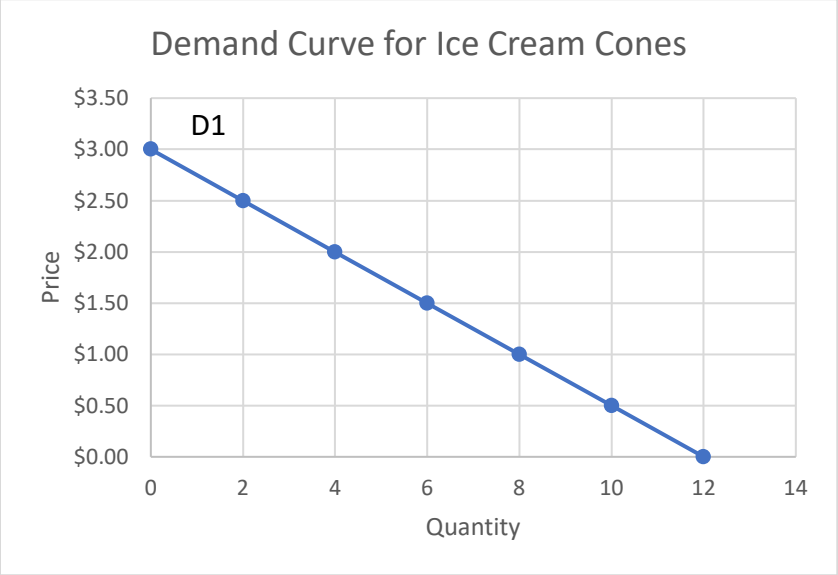
Quantity of Ice Cream Cones Demanded	Price of Ice Cream Cones
12	$0.00
10	$0.50
8	$1.00
6	$1.50
4	$2.00
2	$2.50
0	$3.00

Graph 1.1 uses the numbers from the table to illustrate the law of demand. We always put the price on the vertical axis, and the quantity demanded on the horizontal axis. The line relating price and quantity demanded is called the demand curve. The demand curve (D1) slopes downward because, other factors being equal, a lower price means a greater quantity demanded.

Key Term: Demand Curve

A graph of the relationship between the price of a good and the quantity demanded.

Graph 1.1: Demand Curve for Ice Cream Cones



Graph It! The Demand Curve for Mobile Phones

We are now going to practice creating a graph showing a demand curve. Provided with quantities demanded by buyers at each price, you will plot the points and draw lines on a graph using the blank graph template provided to you. In later lessons you will be adding plot points and lines to the same graph.

Step 1: Using the demand schedule provided below, plot points on your blank graph template.

Step 2: Draw a straight line through points representing the demand curve.

Step 3: Label the demand curve: **D1**.

Step 4: Based on your graph, answer the *Graph It!* practice questions.

Step 5: Compare you answers to the *Graph It!* solutions file provided.

Demand Schedule for Mobile Phones

Quantity of Mobile Phones Demanded	Price of Mobile Phones
10	$0.00
8	$300.00
6	$600.00
4	$900.00
2	$1,200.00

Graph It! Practice Questions

Based on your *Graph It!* Supply and Demand for Mobiles Phones practice graph, answer the following questions.

1. At the price of $750.00, how many mobile phones would be demanded by buyers?
   a. 6
   b. 4
   c. 5
   d. 0

2. Why does a demand curve slope downward?
   a. Because prices tend to plummet sharply when demand goes down.
   b. Because, other things being equal, a lower price means a greater quantity demanded.
   c. Price does not directly affect demand.
   d. They are running low on phones.

3. Let's say a competing phone producer release a new phone that boasts the latest technology and is sold at the same price as your company's older outdated phones. How might this affect the price of your phones?
   a. You could leave the price the same and sell the same number of phones.
   b. You could raise the price of your phones to make up for lower sales.
   c. The demand for your phones goes down, so you may need to cut the price.
   d. The other company is charging too much.

Lesson Summary

- The quantity demanded of any good is the amount of the good that buyers are willing and able to purchase.

- Using a demand schedule (a table that shows the relationship between the price of a good and the quantity demanded), we can plot this relationship on a graph.
- The demand curve slopes downward because, other things being equal, a lower price means a greater quantity demanded.

A Look Ahead

Demand is not the only factor in the behavior of people as they interact with one another in competitive markets. We now turn our attention the other half of the equation: Supply.

Lesson 2: The Law of Supply

The quantity supplied of any good or service is the amount that sellers are willing and able to sell. There are many factors that affect the quantity supplied, but once again, price plays a special role in our analysis. When the price of ice cream is high, selling ice cream is profitable, and so the quantity supplied is large. By contrast, when the price of ice cream is low, the business is less profitable, so sellers produce less ice cream. At a low price, some sellers may even choose to shut down, and their quantity supplied falls to zero. This relationship between price and quantity supplied is called the law of supply: Other things being equal, when the price of a good rises, the quantity supplied of the good also rises, and when the price falls, the quantity supplied falls as well.

Key Term: Law of Supply

The claim that, other factors being equal, the quantity supplied of a good rises when the price of the good rises.

Example: The Supply Curve for Ice Cream Cones

Table 2.1 shows the quantity of ice-cream cones supplied each month by Ben, an ice-cream seller, at various prices of ice cream. At a price below $.50, Ben does not supply any ice cream at all. As the price rises, he supplies a greater and greater quantity. This is the supply schedule, a table that shows the relationship between the price of a good and the quantity supplied, ignoring everything else that influences how much of the good producers want to sell.

Key Term: Supply Schedule

A table that shows the relationship between the price of a good and the quantity supplied.

Table 2.1: Supply Schedule for Ice Cream

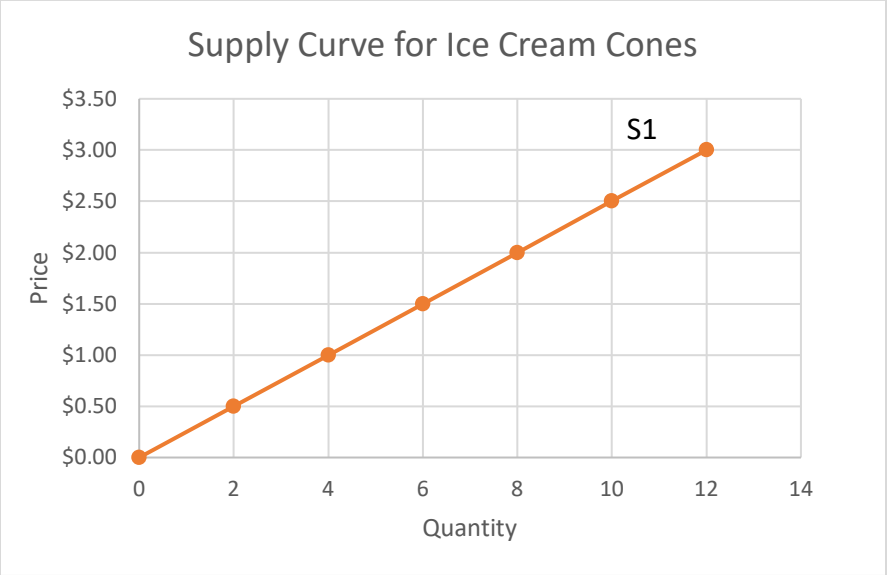
Quantity of Ice Cream Cones Supplied	Price of Ice Cream Cones
0	$0.00
2	$0.50
4	$1.00
6	$1.50
8	$2.00
10	$2.50
12	$3.00

Graph 2.1 uses the numbers from the table to illustrate the law of supply. The curve relating price and quantity supplied is called the supply curve. The supply curve (S1) slopes upward because, other factors being equal, a higher price means a greater quantity supplied.

Key Term: Supply Curve

A graph of the relationship between the price of a good and the quantity supplied.

Graph 2.1: Supply Curve for Ice Cream Cones



Graph It! The Supply Curve for Mobile Phones

Provided with quantities supplied by buyers at each price, plot the points and add a supply curve to your graph from Lesson 1. Use a different color than the demand curve.

Step 1: Using the supply schedule provided below, add plot points on your Supply and Demand for Mobile Phones practice graph from Lesson 1.

Step 2: Draw a straight line through points representing the supply curve.

Step 3: Label the demand curve: **S1**.

Step 4: Based on your graph, answer the *Graph It!* practice questions.

Step 5: Compare you answers to the *Graph It!* solutions file provided.

Supply Schedule for Mobile Phones

Quantity of Mobile Phones Supplied	Price of Mobile Phones
0	$0.00
2	$300.00
4	$600.00
6	$900.00
8	$1,200.00

Graph It! Practice Questions

Based on your Graph It! Supply and Demand for Mobiles Phones practice graph, answer the following questions.

1. At the price of $1050.00, how many mobile phones would be supplied by sellers?
   a. 6
   b. 7
   c. 5
   d. 0

2. Why does a supply curve slope upward?
   a. Because quantity tends to skyrocket sharply when supply goes down.
   b. Price does not directly affect supply.
   c. Because, other things being equal, a higher price means a greater quantity supplied.
   d. There are too many phones in the warehouse.

3. Let's say that a new process is discovered that makes chips used in phones less expensive to manufacture.
   a. You could leave the price the same and sell the same number of phones.
   b. You could produce more phones to make up for higher prices.
   c. The fall in the price of chips makes selling phones more profitable, so your company supplies more phones.
   d. Your company is charging too much.

Lesson Summary

- The quantity supplied of any good or service is the amount that sellers are willing and able to sell.
- Using a supply schedule (A table that shows the relationship between the price of a good and the quantity supplied), we can plot this relationship on a graph.
- The supply curve slopes upward because, other things being equal, a higher price means a greater quantity supplied.

A Look Ahead

Now that we see how price is related to the quantity buyers are willing to pay *as well as* the quantity sellers are willing to supply, let's look at how these work together to determine the best price and quantity in a competitive marketplace.

Lesson 3: Market Equilibrium

When supply and demand are viewed together, the point where the supply and demand curves intersect is called the market equilibrium. At the equilibrium price, the quantity of the good that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell. The equilibrium price is sometimes called the market-clearing price because, at this price, everyone in the market has been satisfied: Buyers have bought all they want to buy, and sellers have sold all they want to sell.

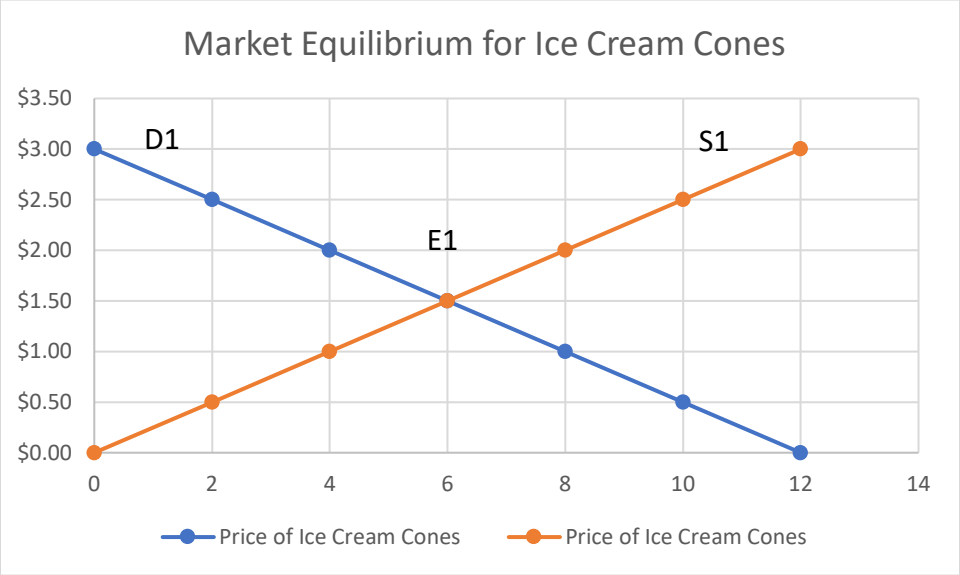
Key Term: Equilibrium

A situation in which the market price has reached the level at which quantity supplied equals quantity demanded

Example: The Market Equilibrium for Ice Cream Cones

Graph 3.1 shows the market supply curve and market demand curve together. The equilibrium (E1) is found where the supply and demand curves intersect. At the equilibrium price, the quantity supplied equals the quantity demanded. Here the equilibrium price is $1.50: At this price, 6 ice-cream cones are supplied, and 6 ice-cream cones are demanded.

Graph 3.1: The Market Equilibrium for Ice Cream Cones



Graph It! The Market Equilibrium for Mobile Phones

By now, you have already added both supply and demand curves to your practice *Graph It!* graph. You can now identify the market equilibrium.

Step 1: Using the Supply and Demand for Mobile Phones practice graph you've created, locate the equilibrium point, and add the label: **E1**.

Step 4: Based on your graph, answer the *Graph It!* practice questions.

Step 5: Compare you answers to the *Graph It!* solutions file provided.

Graph It! Practice Questions

Based on your Graph It! Supply and Demand for Mobiles Phones practice graph, answer the following questions.

1. Market Equilibrium can be described as
   a. The only price buyers are willing to pay.
   b. The price sellers are forced to sell at.
   c. The point in which the market price has reached the level at which quantity supplied equals quantity demanded.
   d. The point that sellers must sell at to make a profit.

2. The equilibrium price is sometimes called the market-clearing price because
   a. At this price, buyers have bought all they want to buy, and sellers have sold all they want to sell.
   b. Sellers must sell at rock-bottom prices to clear out built-up inventory.
   c. Buyers are equally happy with items they may have paid more for.
   d. The amount supplied and demanded never fluctuates.

Lesson Summary

- Equilibrium is the point in which the market price has reached the level at which quantity supplied equals quantity demanded.
- The equilibrium price is sometimes called the market-clearing price because, at this price, everyone in the market has been satisfied: Buyers have bought all they want to buy, and sellers have sold all they want to sell.
- By combining supply and demand curves on a single graph, we can calculate the equilibrium.

A Look Ahead

We've seen that at the market equilibrium, the quantity of the good that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell. But what if some market event causes either the supply or demand curve to shift? In the next section we will explore how such an event may result in a new price and a new quantity exchanged between buyers and sellers.

Lesson 4: Shifts in the Demand Curve

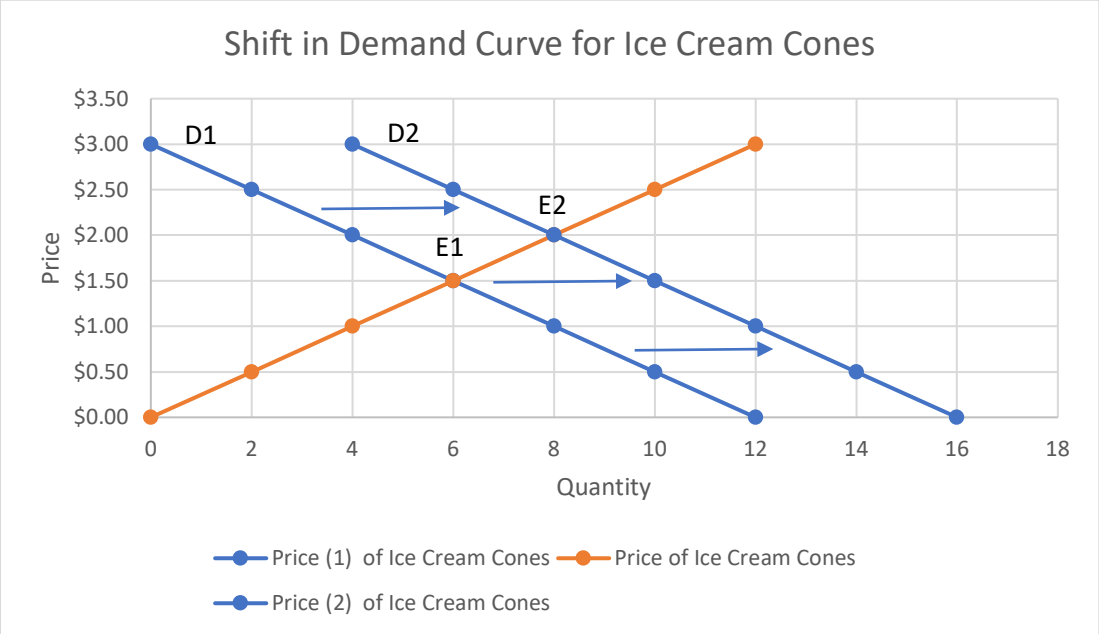
So far, we have seen how supply and demand together determine a market's equilibrium, which in turn determines the price and quantity of the good that buyers purchase and sellers produce. The equilibrium price and quantity depend on the position of the supply and demand curves. When a market event shifts one of these curves, the equilibrium in the market changes, resulting in a new price and a new quantity exchanged between buyers and sellers.

Key Term: Market Event

A change in business conditions or buyer behavior that affects the supply or demand curve of a good.

Example: A Change in Market Equilibrium Due to a Shift in Demand

Let's suppose that one summer the weather is very hot. The hot weather affects the demand curve by changing people's desire for ice cream. That is, the weather changes the amount of ice cream that people want to buy at *any* given price. An abnormally hot summer causes buyers to demand *more* ice cream, so the demand curve shifts to the *right* (D2). This causes the equilibrium price to rise from $1.50 to $2.00 and the equilibrium quantity to rise from 6 to 8 cones (E2).



Graph It! A Change in Market Equilibrium Due to a Shift in Demand

Let's suppose your company gets a glowing review of your mobile phone on a popular consumer Website. This suddenly increase the demand for your phone. Provided with the *new* quantities demanded by buyers at each price, add a second demand curve to your graph.

Step 1: Using the *new* demand schedule provided below, plot points on your Supply and Demand for Mobile Phones practice graph.

Step 2: Draw a straight line through points representing the new demand curve. Use the *same* color as your original (D1) demand curve.

Step 3: Label the demand curve: **D2**.

Step 4: Identify the new equilibrium point and label it **E2**.

Step 5: Based on your graph, answer the *Graph It!* practice questions.

Step 6: Compare you answers to the *Graph It!* solutions file provided.

NEW Demand Schedule for Mobile Phones

Quantity of Mobile Phones Demanded	Price of Mobile Phones
14	$0.00
12	$300.00
10	$600.00
8	$900.00
6	$1,200.00
4	$1500.00

Graph It! Practice Questions

Based on your Supply and Demand for Mobile Phones practice graph, answer the following questions.

1. A market event can be best described as
   a. When your product is out of stock.
   b. When you have too much inventory.
   c. Something in the market that changes the supply or demand for your product.
   d. A store sale where prices are slashed dramatically

2. When a right shift in the demand curve occurs,
    a. Prices go up, but the quantities sold remain the same.
    b. Prices and quantities sold go up.
    c. There is reduced demand for your product.
    d. The equilibrium stays the same.

3. When a new equilibrium is established,
    a. A new price and a new quantity is exchanged between buyers and sellers.
    b. The demand curve always moves to the right.
    c. More quantities are supplied at the same price.
    d. Demand always goes up.

Lesson Summary

- A market event is a change in business conditions or buyer behavior that affects the supply or demand curve of a good.
- When a market event shifts either the supply or demand curves (or both), the equilibrium in the market changes, resulting in a new price and a new quantity exchanged between buyers and sellers.
- Given a new supply or demand schedule, we can plot a new curve on the supply and demand graph and calculate a new equilibrium.

Module Conclusion

The quantity demanded of any good is the amount of the good that buyers are willing and able to purchase. The quantity supplied of any good or service is the amount that sellers are willing and able to sell. At the equilibrium price, the quantity of the good that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell. When a market event occurs, either the supply or demand curve (or both) may shift the equilibrium in the market, and a new price and quantity is established between buyers and sellers.

References

Mankiw, G. (2017). The Market Forces of Supply and Demand. *Principles of Macroeconomics, 8th Edition, Chapter 4* (copyright 2017*).*