

10.1 Lesson

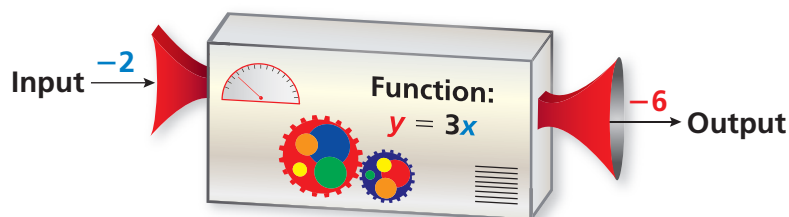
Key Vocabulary

function
domain
range
function form

Key Idea

Functions

A **function** is a relationship that pairs each *input* with exactly one *output*. The **domain** is the set of all possible input values. The **range** is the set of all possible output values.

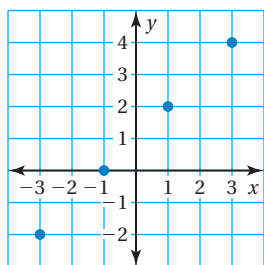


Remember



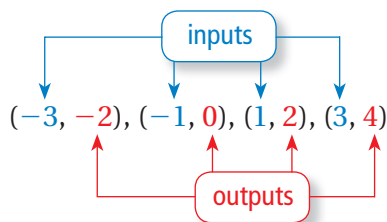
The ordered pair (x, y) shows the output y for an input x .

EXAMPLE 1 Finding Domain and Range from a Graph



Find the domain and range of the function represented by the graph.

Write the ordered pairs. Identify the inputs and outputs.

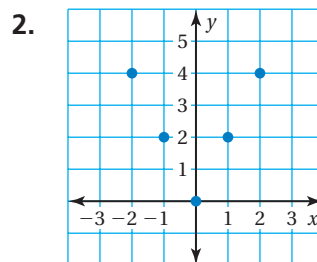
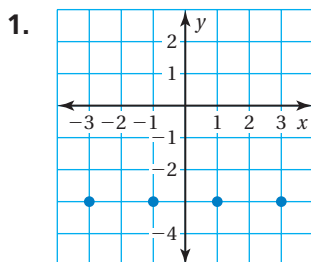


∴ The domain is $-3, -1, 1, \text{ and } 3$. The range is $-2, 0, 2, \text{ and } 4$.

On Your Own

Now You're Ready
Exercises 4–6

Find the domain and range of the function represented by the graph.



An equation is in **function form** if it is solved for y .

$x + y = 1$
not in function form

$y = -x + 1$
in function form

EXAMPLE 2 Finding the Range of a Function

Input, x	$-2x + 8$	Output, y
-2	$-2(-2) + 8$	12
0	$-2(0) + 8$	8
2	$-2(2) + 8$	4
4	$-2(4) + 8$	0
6	$-2(6) + 8$	-4

The domain of the function represented by $2x + y = 8$ is $-2, 0, 2, 4,$ and 6 . What is the range of the function represented by the table?

Write the function in function form.

$$2x + y = 8$$

$$y = -2x + 8$$

Use this form to make an input-output table.

❖ The range is 12, 8, 4, 0, and -4 .

EXAMPLE 3 Real-Life Application



The table shows the percent y (in decimal form) of the moon that was visible at midnight x days after January 24, 2011. (a) Interpret the domain and range. (b) What percent of the moon was visible on January 26, 2011?

x	y
0	0.76
1	0.65
2	0.54
3	0.43
4	0.32

- a. Zero days after January 24 is January 24. One day after January 24 is January 25. So, the domain of 0, 1, 2, 3, and 4 represents January 24, 25, 26, 27, and 28.

The range is 0.76, 0.65, 0.54, 0.43, and 0.32. These amounts are decreasing, so the moon was less visible each day.

- b. January 26, 2011 corresponds to the input $x = 2$. When $x = 2$, $y = 0.54$. So, 0.54, or 54% of the moon was visible on January 26, 2011.

On Your Own

Now You're Ready
Exercises 9–11

Copy and complete the input-output table for the function. Then find the domain and range of the function represented by the table.

3. $y = 2x - 3$

x	-1	0	1	2
y				

4. $x + y = -3$

x	0	1	2	3
y				

5. The table shows the percent y (in decimal form) of the moon that was visible at midnight x days after December 17, 2012.

x	0	1	2	3	4
y	0.2	0.3	0.4	0.5	0.6

- (a) Interpret the domain and range.
(b) What percent of the moon was visible on December 21, 2012?

10.1 Exercises

Vocabulary and Concept Check

- VOCABULARY** Is the equation $2x - 3y = 4$ in function form? Explain.
- DIFFERENT WORDS, SAME QUESTION** Which is different? Find “both” answers.

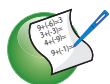
Find the range of the function represented by the table.

Find the inputs of the function represented by the table.

Find the x -values of the function represented by $(2, 7)$, $(4, 5)$, and $(6, -1)$.

Find the domain of the function represented by $(2, 7)$, $(4, 5)$, and $(6, -1)$.

x	2	4	6
y	7	5	-1



Practice and Problem Solving

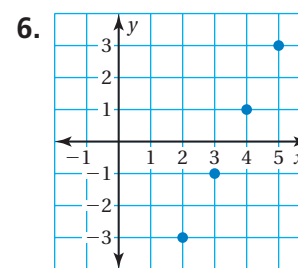
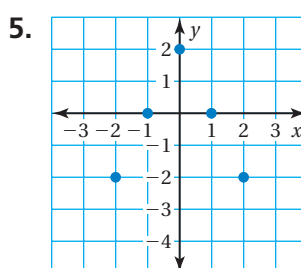
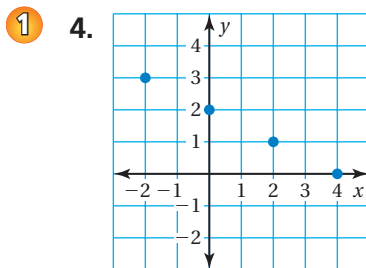
- The number of earrings and headbands you can buy with \$24 is represented by the equation $8x + 4y = 24$. The table shows the number of earrings and headbands.



- Write the equation in function form.
- Find the domain and range.
- Why is $x = 6$ not in the domain of the function?

Earrings, x	0	1	2	3
Headbands, y	6	4	2	0

Find the domain and range of the function represented by the graph.



X

The domain is $-2, 0, 2,$ and 4 .
The range is $-3, -1, 1, 3$.

- ERROR ANALYSIS** Describe and correct the error in finding the domain and range of the function represented by the graph.
- REASONING** Find the domain and range of the function represented by the table.

Tickets, x	2	3	5	8
Cost, y	\$14	\$21	\$35	\$56

Copy and complete the input-output table for the function. Then find the domain and range of the function represented by the table.

2 9. $y = 6x + 2$

x	-1	0	1	2
y				

10. $y = -\frac{1}{4}x - 2$

x	0	4	8	12
y				

11. $y = 1.5x + 3$

x	-1	0	1	2
y				

12. **VAULTING** In the sport of vaulting, a vaulter performs a routine while on a moving horse. For each round x of competition, the vaulter receives a score y from 1 to 10.

- Find the domain and range of the function represented by the table.
- Interpret the domain and range.
- What is the mean score of the vaulter?

x	y
1	6.856
2	7.923
3	8.135



13. **MANATEE** Florida's state marine mammal is the manatee. A manatee eats about 12% of its body weight each day.

- Write an equation in function form that represents the amount y (in pounds) of food a manatee eats each day for its weight x .
- Create an input-output table for the equation in part (a). Use the inputs 150, 300, 450, 600, 750, and 900.
- Find the domain and range of the function represented by the table.
- An aquatic center has manatees that weigh 300 pounds, 750 pounds, and 1050 pounds. How many pounds of food do all three manatees eat in a day? in a week?



14. **Critical Thinking** Describe the domain and range of the function.

- $y = |x|$
- $y = -|x|$
- $y = |x| - 6$
- $y = -|x| + 4$



Fair Game Review what you learned in previous grades & lessons

Graph the linear equation.

15. $y = 2x + 8$ 16. $5x + 6y = 12$ 17. $-x - 3y = 2$ 18. $y = 7x - 5$

19. **MULTIPLE CHOICE** The minimum number of people needed for a group rate at an amusement park is 8. Which inequality represents the number of people needed to get the group rate?

- (A) $x \leq 8$ (B) $x > 8$ (C) $x < 8$ (D) $x \geq 8$

10.2 Lesson

Key Vocabulary

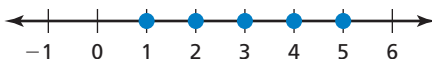
discrete domain
continuous domain

Key Idea

Discrete and Continuous Domains

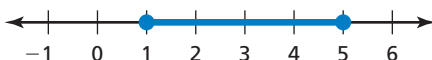
A **discrete domain** is a set of input values that consists of only certain numbers in an interval.

Example: Integers from 1 to 5



A **continuous domain** is a set of input values that consists of all numbers in an interval.

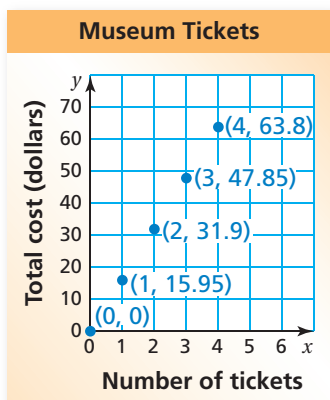
Example: All numbers from 1 to 5.



EXAMPLE 1 Graphing Discrete Data

The function $y = 15.95x$ represents the cost y (in dollars) of x tickets for the South Florida Museum. Graph the function using a domain of 0, 1, 2, 3, and 4. Is the domain of the graph discrete or continuous? Explain.

Make an input-output table.



Input, x	$15.95x$	Output, y	Ordered Pair, (x, y)
0	$15.95(0)$	0	(0, 0)
1	$15.95(1)$	15.95	(1, 15.95)
2	$15.95(2)$	31.9	(2, 31.9)
3	$15.95(3)$	47.85	(3, 47.85)
4	$15.95(4)$	63.8	(4, 63.8)

Plot the ordered pairs. Because you cannot buy part of a ticket, the graph consists of individual points.

∴ So, the domain is discrete.

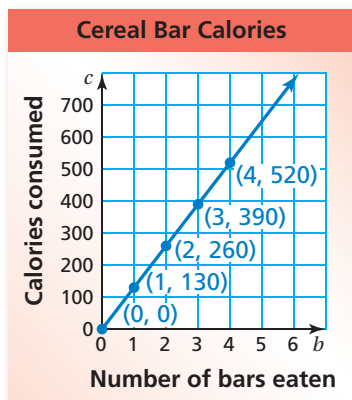
On Your Own

- The function $m = 50 - 9d$ represents the amount of money m (in dollars) you have after buying d DVDs. Graph the function. Is the domain discrete or continuous? Explain.

EXAMPLE 2 Graphing Continuous Data

A cereal bar contains 130 calories. The number c of calories consumed is a function of the number b of bars eaten. Graph the function. Is the domain of the graph discrete or continuous?

Make an input-output table.



Input, b	Output, c	Ordered Pair, (b, c)
0	0	$(0, 0)$
1	130	$(1, 130)$
2	260	$(2, 260)$
3	390	$(3, 390)$
4	520	$(4, 520)$

Plot the ordered pairs. Because you can eat part of a cereal bar, b can be any value greater than or equal to 0. Draw a line through the points.

∴ So, the domain is continuous.

EXAMPLE 3 Standardized Test Practice

You conduct an experiment on the speed of sound waves in dry air at 86°F . You record your data in a table. Which of the following is true?

Input Time, t (seconds)	Output Distance, d (miles)
2	0.434
4	0.868
6	1.302
8	1.736
10	2.170

- (A) The domain is $t \geq 2$ and $t \leq 10$ and it is discrete.
 (B) The domain is $t \geq 2$ and $t \leq 10$ and it is continuous.
- (C) The domain is $d \geq 0.434$ and $d \leq 2.17$ and it is discrete.
 (D) The domain is $d \geq 0.434$ and $d \leq 2.17$ and it is continuous.

The domain is the set of possible input values, or the time t . The time t can be any value from 2 to 10. So, the domain is continuous.

∴ The correct answer is (B).

On Your Own

Now You're Ready
Exercises 5–8

- A 20-gallon bathtub is draining at a rate of 2.5 gallons per minute. The number g of gallons remaining is a function of the number m of minutes. Graph the function. Is the domain discrete or continuous?
- Are the data shown in the table discrete or continuous? Explain.

Number of Stories	1	2	3	4	5
Height of Building (feet)	12	24	36	48	60

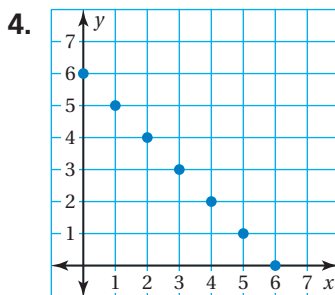
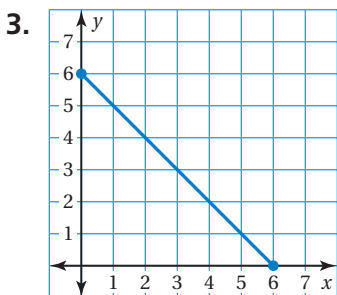
10.2 Exercises

Vocabulary and Concept Check

- VOCABULARY** Describe the difference between a discrete domain and a continuous domain.
- WRITING** Describe how you can use a graph to determine whether a domain is discrete or continuous.

Practice and Problem Solving

Describe the domain and range of the function. Is the domain discrete or continuous?



Graph the function. Is the domain of the graph discrete or continuous?

1 2 5.

Input Bags, x	Output Marbles, y
2	20
4	40
6	60

6.

Input Years, x	Output Height of a Tree, y (feet)
0	3
1	6
2	9

7.

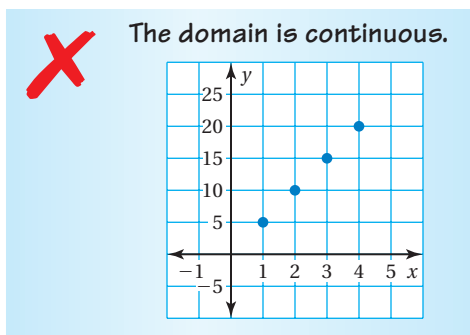
Input Width, x (inches)	Output Volume, y (cubic inches)
5	50
10	100
15	150

8.

Input Hats, x	Output Cost, y (dollars)
0	0
1	8.45
2	16.9

9. **ERROR ANALYSIS** Describe and correct the error in classifying the domain.

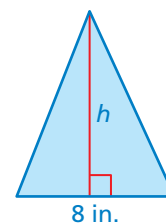
10. **YARN** The function $m = 40 - 8.5b$ represents the amount m of money (in dollars) that you have after buying b balls of yarn. Graph the function using a domain of 0, 1, 2, and 3. Is the domain discrete or continuous?



11. **REASONING** The input of one function is *length*. The input of another function is *number of shirts*. Which function has a continuous domain? Explain.

12. **DISTANCE** The function $y = 3.28x$ converts length from x meters to y feet. Graph the function. Is the domain discrete or continuous?

13. **AREA** The area A of the triangle is a function of the height h . Graph the function. Is the domain discrete or continuous?



14. **PACKING** You are packing books into boxes. The function $y = 20x$ represents the number y of books that will fit into x boxes.

a. Is 4 in the domain? Explain.

b. Is 60 in the range? Explain.

15. **Reasoning** You want to fill a 2-foot shelf with framed pictures. There are x pictures in 4-inch frames and y pictures in 8-inch frames.

a. Write a function for this situation.

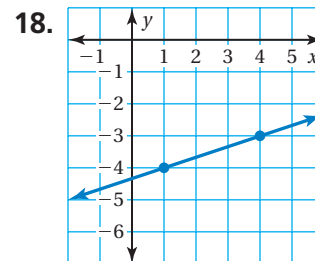
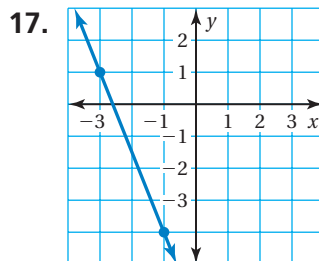
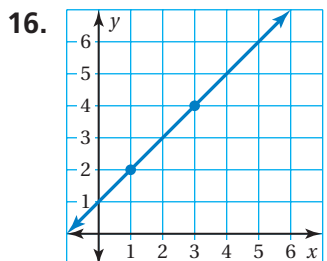
b. Graph the function.

c. Is the domain discrete or continuous?



Fair Game Review what you learned in previous grades & lessons

Find the slope of the line.



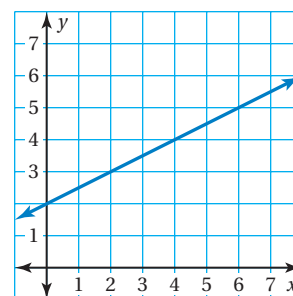
19. **MULTIPLE CHOICE** What is the y -intercept of the graph of the linear equation?

(A) -4

(B) -2

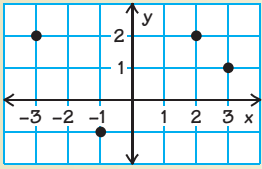
(C) 2

(D) 4



10 Study Help

You can use a **comparison chart** to compare two topics. Here is an example of a comparison chart for domain and range.

	Domain	Range										
Definition	the set of all possible input values	the set of all possible output values										
Algebra Example: $y = mx + b$	x-values	corresponding y-values										
Ordered pairs Example: $(-4, 0)$, $(-3, 1)$, $(-2, 2)$, $(-1, 3)$	$-4, -3, -2, -1$	$0, 1, 2, 3$										
Table Example: <table border="1" style="display: inline-table; margin: 5px;"> <tr><td>x</td><td>-1</td><td>0</td><td>2</td><td>3</td></tr> <tr><td>y</td><td>1</td><td>0</td><td>4</td><td>9</td></tr> </table>	x	-1	0	2	3	y	1	0	4	9	$-1, 0, 2, 3$	$0, 1, 4, 9$
x	-1	0	2	3								
y	1	0	4	9								
Graph Example: 	$-3, -1, 2, 3$	$-1, 1, 2$										

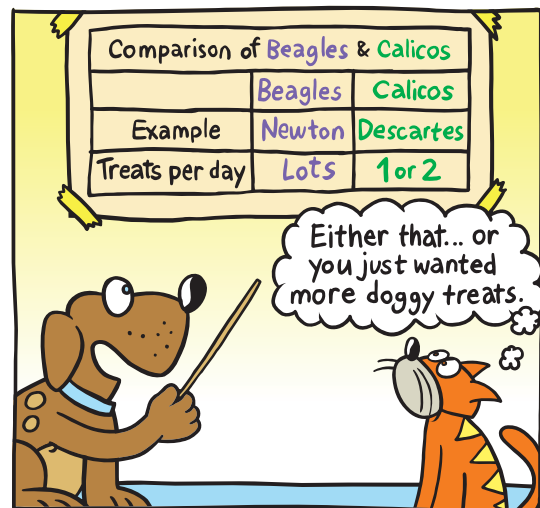
On Your Own

Make a comparison chart to help you study and compare these topics.

1. discrete data and continuous data

After you complete this chapter, make comparison charts for the following topics.

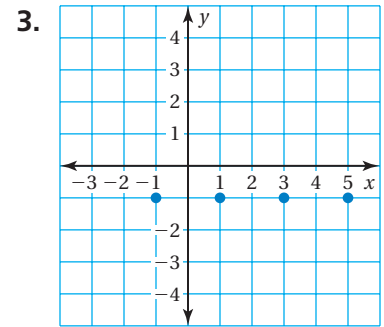
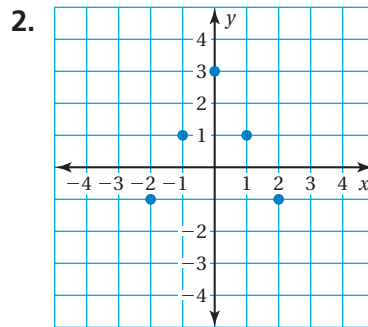
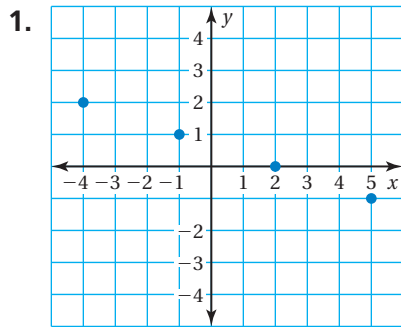
2. linear functions with positive slopes and linear functions with negative slopes
3. linear functions and nonlinear functions



“Creating a comparison chart causes canines to crystalize concepts.”

10.1–10.2 Quiz

Find the domain and range of the function represented by the graph.



Copy and complete the input-output table for the function. Then find the domain and range of the function represented by the table.

4. $y = 5x - 6$

x	0	1	2	3
y				

5. $2x + y = 2$

x	-1	0	1	2
y				

Graph the function. Is the domain of the graph discrete or continuous?

6.

Rulers, x	Cost, y
0	0
1	1.5
2	3
3	4.5

7.

Gallons, x	Miles Remaining, y
0	300
1	265
2	230
3	195

8.

Minutes, x	0	10	20	30
Height, y	40	35	30	25

9.

Relay Teams, x	2	4	6	8
Athletes, y	8	16	24	32

10. **VIDEO GAME** The function $m = 30 - 3r$ represents the amount m (in dollars) of money you have after renting r video games. Graph the function using a domain of 0, 1, 2, 3, and 4. Is the domain of the graph discrete or continuous?

11. **WATER** Water accounts for about 60% of a person's body weight.

- Write an equation in function form that represents the water weight y of a person that weighs x pounds.
- Make an input-output table for the function in part (a). Use the inputs 100, 120, 140, and 160.



10.3 Lesson

Key Vocabulary

linear function

A **linear function** is a function whose graph is a line.

EXAMPLE 1 Finding a Linear Function Using a Graph

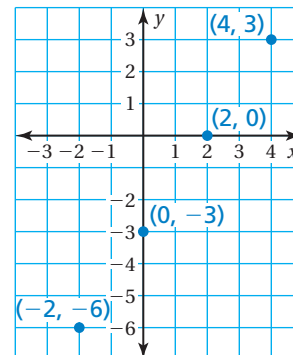
Use the graph to write a linear function that relates y to x .

The points lie on a line. Find the slope and y -intercept of the line.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{3}{2}$$

Because the line crosses the y -axis at $(0, -3)$, the y -intercept is -3 .

∴ So, the linear function is $y = \frac{3}{2}x - 3$.



EXAMPLE 2 Finding a Linear Function Using a Table

Use the table to write a linear function that relates y to x .

x	-3	-2	-1	0
y	9	7	5	3

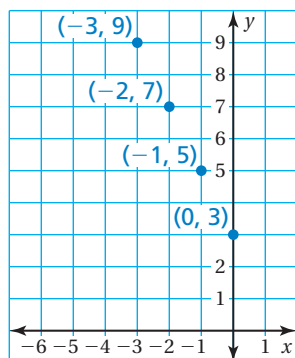
Plot the points in the table.

The points lie on a line. Find the slope and y -intercept of the line.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-2}{1} = -2$$

Because the line crosses the y -axis at $(0, 3)$, the y -intercept is 3.

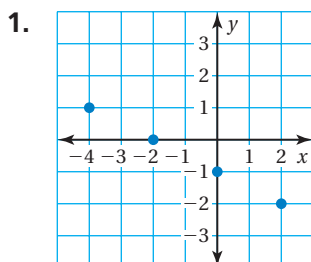
∴ So, the linear function is $y = -2x + 3$.



On Your Own

Use the graph or table to write a linear function that relates y to x .

Now You're Ready
Exercises 5–10



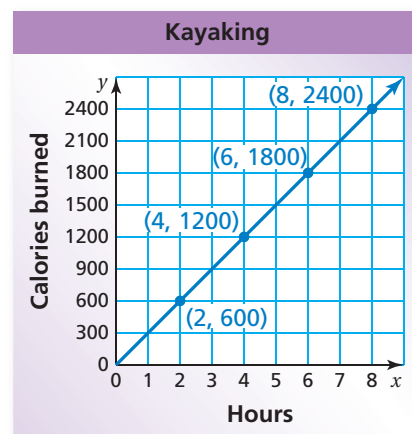
2.

x	-2	-1	0	1
y	2	2	2	2

EXAMPLE 3 Real-Life Application

Hours Kayaking, x	Calories Burned, y
2	600
4	1200
6	1800
8	2400

Graph the data in the table. (a) Is the domain discrete or continuous? (b) Write a linear function that relates y to x . (c) How many calories do you burn in 4.5 hours?



a. Plot the points. Time can represent any value greater than or equal to 0, so the domain is continuous. Draw a line through the points.

b. The slope is $\frac{600}{2} = 300$ and the y -intercept is 0.

∴ So, the linear function is $y = 300x$.

c. Find the value of y when $x = 4.5$.

$$\begin{aligned}
 y &= 300x && \text{Write the equation.} \\
 &= 300(4.5) && \text{Substitute 4.5 for } x. \\
 &= 1350 && \text{Multiply.}
 \end{aligned}$$

∴ You burn 1350 calories in 4.5 hours of kayaking.



On Your Own

Hours Rock Climbing, x	Calories Burned, y
3	1950
6	3900
9	5850
12	7800

3. Graph the data in the table.

a. Is the domain discrete or continuous?

b. Write a linear function that relates y to x .

c. How many calories do you burn in 5.5 hours?

Summary

Representing a Function

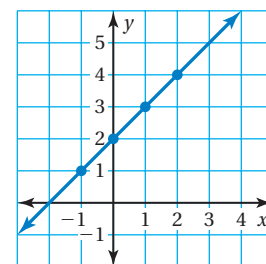
Words An output is 2 more than the input.

Equation $y = x + 2$

Input-Output Table

Input, x	-1	0	1	2
Output, y	1	2	3	4

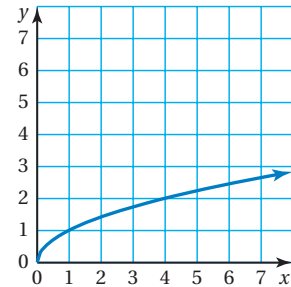
Graph



10.3 Exercises

Vocabulary and Concept Check

- VOCABULARY** Describe four ways to represent a function.
- VOCABULARY** Is the function represented by the graph a linear function? Explain.

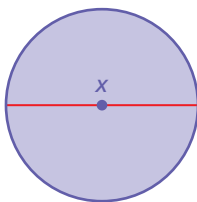


Practice and Problem Solving

The table shows a familiar linear pattern from geometry. Write a linear function that relates y to x . What do the variables x and y represent? Graph the linear function.

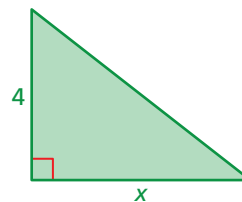
3.

x	1	2	3	4	5
y	π	2π	3π	4π	5π



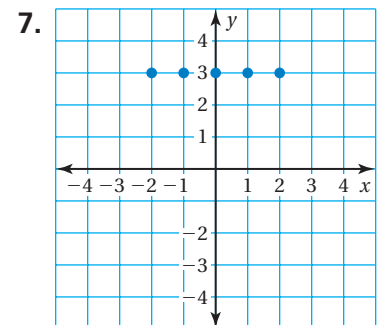
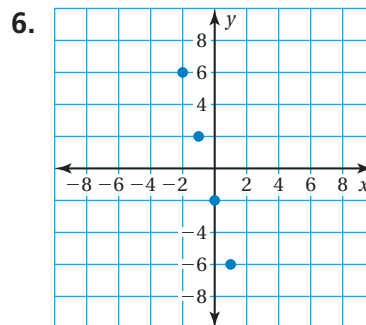
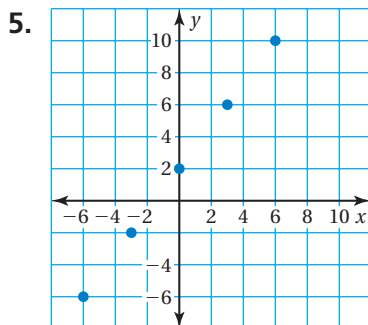
4.

x	1	2	3	4	5
y	2	4	6	8	10



Use the graph or table to write a linear function that relates y to x .

1 2



8.

x	-2	-1	0	1
y	-4	-2	0	2

9.

x	-8	-4	0	4
y	2	1	0	-1

10.

x	-3	0	3	6
y	3	5	7	9

11. **MOVIES** The table shows the cost y (in dollars) of renting x movies.

- Graph the data. Is the domain of the graph discrete or continuous?
- Write a linear function that relates y to x .
- How much does it cost to rent three movies?

Number of Movies, x	0	1	2	4
Cost, y	0	3	6	12

12. **BIKE JUMPS** A bunny hop is a bike trick in which the rider brings both tires off the ground without using a ramp. The table shows the height y (in inches) of a bunny hop on a bike that weighs x pounds.

Weight, x	19	21	23
Height, y	10.2	9.8	9.4

- Graph the data. Then describe the pattern.
- Write a linear function that relates the height of a bunny hop to the weight of the bike.
- What is the height of a bunny hop on a bike that weighs 21.5 pounds?



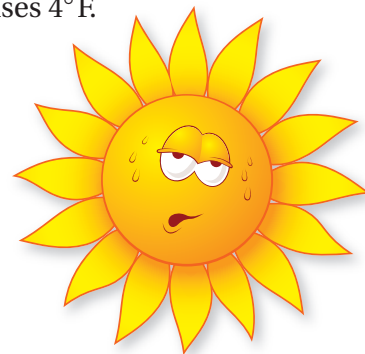
Years of Education, x	Annual Salary, y
0	28
2	40
4	52
6	64
10	88

13. **SALARY** The table shows a person's annual salary y (in thousands of dollars) after x years of education beyond high school.

- Graph the data.
- Write a linear function that relates the person's annual salary to the number of years of education beyond high school.
- What is the annual salary of the person after 8 years of education beyond high school?

14. **Critical Thinking** The Heat Index is calculated using the relative humidity and the temperature. For every 1 degree increase in the temperature from 94°F to 98°F at 75% relative humidity, the Heat Index rises 4°F .

- On a summer day in Pensacola, the relative humidity is 75%, the temperature is 94°F , and the Heat Index is 122°F . Construct a table that relates the temperature t to the Heat Index H . Start the table at 94°F and end it at 98°F .
- Write a linear function that represents this situation.
- Estimate the Heat Index when the temperature is 100°F .



Fair Game Review what you learned in previous grades & lessons

Find the annual simple interest rate.

15. $I = \$60, P = \$400, t = 3$ years

16. $I = \$45, P = \$1000, t = 18$ months

17. **MULTIPLE CHOICE** You buy a pair of gardening gloves for $\$2.25$ and x packets of seeds for $\$0.88$ each. Which equation represents the total cost y ?

(A) $y = 0.88x - 2.25$

(B) $y = 0.88x + 2.25$

(C) $y = 2.25x - 0.88$

(D) $y = 2.25x + 0.88$

10.4 Lesson

Key Vocabulary
nonlinear function

The graph of a linear function shows a constant rate of change. A **nonlinear function** does not have a constant rate of change. So, its graph is *not* a line.

EXAMPLE 1 Identifying Functions from Tables

Does the table represent a *linear* or *nonlinear* function? Explain.

a.

x	3	6	9	12
y	40	32	24	16

$+3$ $+3$ $+3$
 -8 -8 -8

As x increases by 3, y decreases by 8. The rate of change is constant. So, the function is linear.

b.

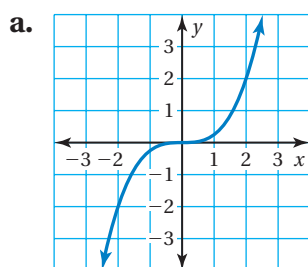
x	1	3	5	7
y	2	11	33	88

$+2$ $+2$ $+2$
 $+9$ $+22$ $+55$

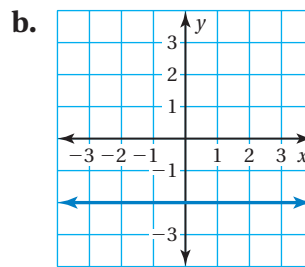
As x increases by 2, y increases by different amounts. The rate of change is *not* constant. So, the function is nonlinear.

EXAMPLE 2 Identifying Functions from Graphs

Does the graph represent a *linear* or *nonlinear* function? Explain.



The graph is *not* a line. So, the function is nonlinear.



The graph is a line. So, the function is linear.

On Your Own

Does the table or graph represent a *linear* or *nonlinear* function? Explain.

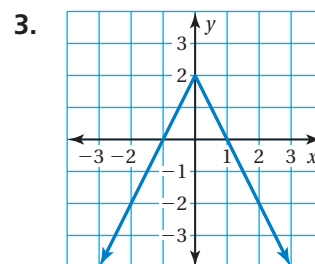
Now You're Ready
Exercises 3–11

1.

x	y
0	25
7	20
14	15
21	10

2.

x	y
2	8
4	4
6	0
8	-4



EXAMPLE 3 Standardized Test Practice

Which equation represents a *nonlinear* function?

- (A) $y = 4.7$ (B) $y = \pi x$
 (C) $y = \frac{4}{x}$ (D) $y = 4(x - 1)$

The equations $y = 4.7$, $y = \pi x$, and $y = 4(x - 1)$ can be rewritten in slope-intercept form. So, they are linear functions.

The equation $y = \frac{4}{x}$ cannot be rewritten in slope-intercept form. So, it is a nonlinear function.

∴ The correct answer is (C).

EXAMPLE 4 Real-Life Application

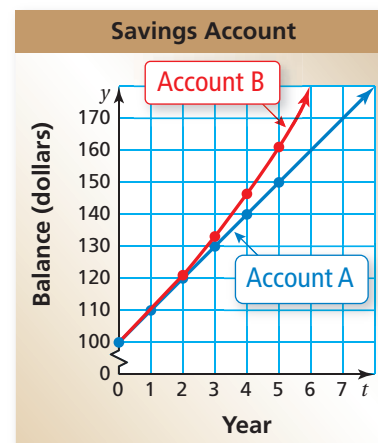
Account A earns simple interest. Account B earns compound interest. The table shows the balances for 5 years. Graph the data and compare the graphs.

Remember

The simple interest formula is given by $I = Prt$.

- I is the simple interest
- P is the principal
- r is the annual interest rate
- t is the time in years

Year, t	Account A Balance	Account B Balance
0	\$100	\$100
1	\$110	\$110
2	\$120	\$121
3	\$130	\$133.10
4	\$140	\$146.41
5	\$150	\$161.05



The balance of Account A has a constant rate of change of \$10. So, the function representing the balance of Account A is linear.

The balance of Account B increases by different amounts each year. Because the rate of change is not constant, the function representing the balance of Account B is nonlinear.

On Your Own

Does the equation represent a *linear* or *nonlinear* function? Explain.

4. $y = x + 5$

5. $y = \frac{4x}{3}$

6. $y = 1 - x^2$

Now You're Ready
Exercises 12–14

10.4 Exercises



Vocabulary and Concept Check

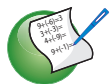
- VOCABULARY** Describe the difference between a linear function and a nonlinear function.
- WHICH ONE DOESN'T BELONG?** Which equation does *not* belong with the other three? Explain your reasoning.

$$5y = 2x$$

$$y = \frac{2}{5}x$$

$$10y = 4x$$

$$5xy = 2$$



Practice and Problem Solving

Graph the data in the table. Decide whether the function is *linear* or *nonlinear*.

1 3.

x	0	1	2	3
y	4	8	12	16

4.

x	1	2	3	4
y	1	2	6	24

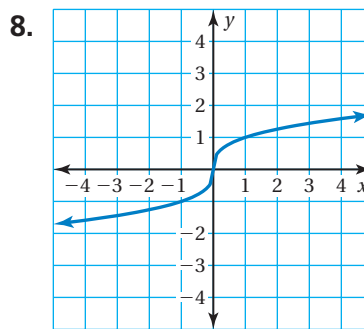
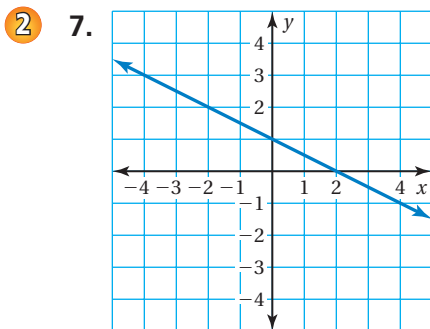
5.

x	6	5	4	3
y	21	15	10	6

6.

x	-1	0	1	2
y	-7	-3	1	5

Does the table or graph represent a *linear* or *nonlinear* function? Explain.



9.

x	5	11	17	23
y	7	11	15	19

10.

x	-3	-1	1	3
y	9	1	1	9

11. **VOLUME** The table shows the volume V (in cubic feet) of a cube with a side length of x feet. Does the table represent a linear or nonlinear function? Explain.

Side Length, x	1	2	3	4	5	6	7	8
Volume, V	1	8	27	64	125	216	343	512

Does the equation represent a *linear* or *nonlinear* function? Explain.

3 12. $2x + 3y = 7$

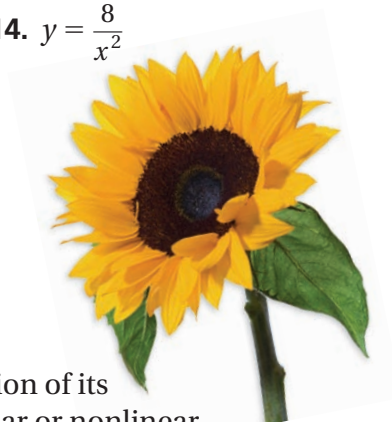
13. $y + x = 4x + 5$

14. $y = \frac{8}{x^2}$

15. **SUNFLOWER SEEDS** The table shows the cost y (in dollars) of x pounds of sunflower seeds.

Pounds, x	Cost, y
2	2.80
3	?
4	5.60

- What is the missing y -value that makes the table represent a linear function?
- Write a linear function that represents the cost y of x pounds of seeds.



16. **LIGHT** The frequency y (in terahertz) of a light wave is a function of its wavelength x (in nanometers). Does the table represent a linear or nonlinear function? Explain.

Color	Red	Yellow	Green	Blue	Violet
Wavelength, x	660	595	530	465	400
Frequency, y	454	504	566	645	749

17. **LIGHTHOUSES** The table shows the heights x (in feet) of four Florida lighthouses and the number y of steps in each. Does the table represent a linear or nonlinear function? Explain.

Lighthouse	Height, x	Steps, y
Ponce de Leon Inlet	175	213
St. Augustine	167	219
Cape Canaveral	145	179
Key West	86	98



18. **PROJECT** The wooden bars of a xylophone produce different musical notes when struck. The pitch of a note is determined by the length of the bar. Use the Internet or some other reference to decide whether the pitch of a note is a linear function of the length of the bar.

19. **Geometry** The radius of the base of a cylinder is 3 feet. Is the volume of the cylinder a linear or nonlinear function of the height of the cylinder?



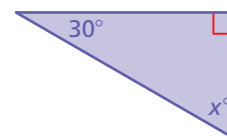
Fair Game Review what you learned in previous grades & lessons

Classify the angle as *acute*, *obtuse*, *right*, or *straight*.



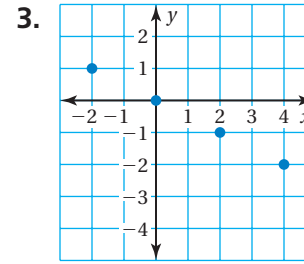
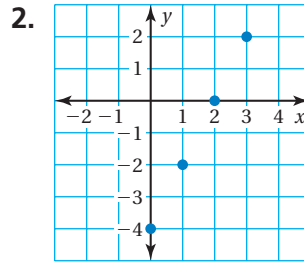
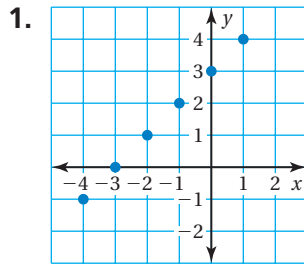
24. **MULTIPLE CHOICE** What is the value of x ?

- (A) 30 (B) 60 (C) 90 (D) 180



10.3–10.4 Quiz

Use the graph or table to write a linear function that relates y to x .



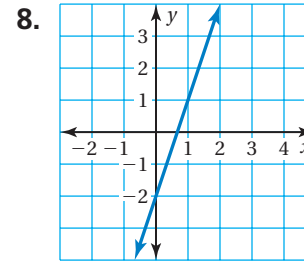
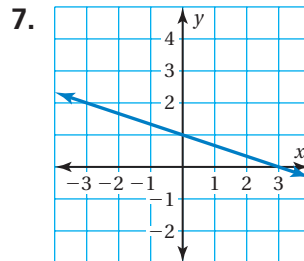
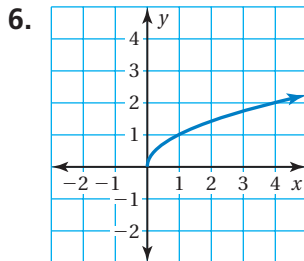
4.

x	0	1	2	3
y	2	1	0	-1

5.

x	-3	0	3	6
y	-3	-1	1	3

Does the table or graph represent a *linear* or *nonlinear* function? Explain.



9.

x	y
0	0
2	-2
4	-4
6	-6

10.

x	y
1	-2
3	7
5	23
7	47

11.

x	y
0	3
3	0
6	3
9	6

12. **ADVERTISING** The table shows the revenue R (in millions of dollars) of a company when it spends A (in millions of dollars) on advertising.

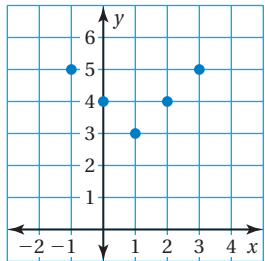
Advertising, A	Revenue, R
0	2
2	6
4	10
6	14
8	18

- Write a linear function that relates the revenue to the advertising cost.
- What is the revenue of the company when it spends \$10 million on advertising?

13. **CHICKEN SALAD** The equation $y = 7.9x$ represents the cost y (in dollars) of buying x pounds of chicken salad. Does this equation represent a linear or nonlinear function? Explain.

10 Chapter Test

1. Find the domain and range of the function represented by the graph.



2. Copy and complete the input-output table for the function $y = 7x - 3$. Then find the domain and range of the function represented by the table.

x	-1	0	1	2
y				

Graph the function. Is the domain of the graph discrete or continuous?

- 3.

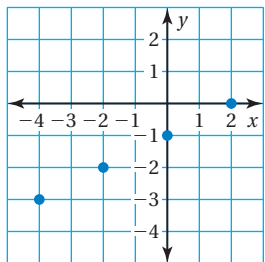
Hair Clips, x	Cost, y
0	0
1	1.5
2	3
3	4.5



- 4.

Minutes, x	Gallons, y
0	60
5	45
10	30
15	15

5. Write a linear function that relates y to x .



6. Does the table represent a *linear* or *nonlinear* function? Explain.

x	0	2	4	6
y	8	0	-8	-16

7. **SAVINGS** You save 15% of your monthly earnings x (in dollars).
- Write an equation in function form that represents the amount y (in dollars) you save each month.
 - Create an input-output table for the equation in part (a). Use the inputs 25, 30, 35, and 40.
 - What is the total amount saved during those 4 months?
8. **FOOD DRIVE** You are putting cans of food into boxes for a food drive. One box holds 30 cans of food. Write a linear function that represents the number y of cans of food that will fit in x boxes.
9. **SURFACE AREA** The table shows the surface area S (in square inches) of a cube with a side length of x feet. Does the table represent a linear or nonlinear function? Explain.

Side Length, x	1	2	3	4
Surface Area, S	6	24	54	96