# READY TO GO ON?

Quiz for Lessons 3-1 Through 3-4

✓ **3-1** **Graphing Relationships**

**Choose the graph that best represents each situation.**

1. A person bungee jumps from a high platform.

2. A person jumps on a trampoline in a steady motion.

3. Xander takes a quiz worth 100 points. Each question is worth 20 points. Sketch a graph to show his score if he misses 1, 2, 3, 4, or 5 questions.

A

Height

Time

B
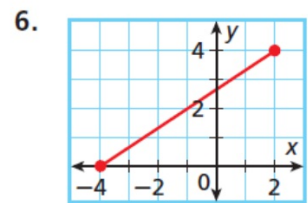
Height

Time
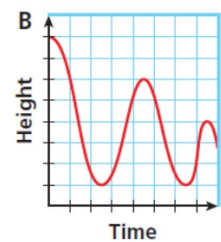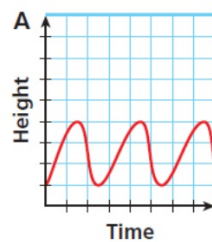
✓ **3-2** **Relations and Functions**

Give the domain and range of each relation. Tell whether the relation is a function. Explain.

4.

5.

x	−2	−2	0	2	2
y	3	3	3	3	3

6.
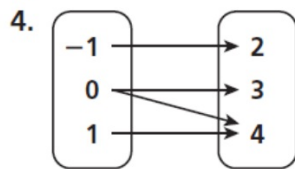
✅ 3-3 Writing Functions

Determine a relationship between the *x*- and *y*-values. Write an equation.

7.

x	1	2	3	4
y	−6	−5	−4	−3

8.

x	1	2	3	4
y	−3	−6	−9	−12

9. A printer can print 8 pages per minute. Identify the dependent and independent variables for the situation. Write an equation in function notation.

Evaluate each function for the given input values.

10. For $f(x) = 3x − 1$, find $f(x)$ when $x = 2$.   **11.** For $g(x) = x^2 − x$, find $g(x)$ when $x = −2$.

12. A photographer charges a sitting fee of $15 plus $3 for each pose. Write a function to describe the situation. Find a reasonable domain and range for up to 5 poses.

✓ **3-4** **Graphing Functions**

Graph each function for the given domain.

13. $2x - y = 3$; D: $\{-2, 0, 1, 3\}$ **14.** $y = 4 - x^2$; D: $\{-1, 0, 1, 2\}$ **15.** $y = 3 - 2x$; D: $\{-1, 0, 1, 3\}$

Graph each function.

16. $x + y = 6$ **17.** $y = |x| - 3$ **18.** $y = x^2 + 1$

19. The function $y = 8x$ represents how many miles y a certain storm travels in x hours. Graph the function and estimate the number of miles the storm travels in 10.5 h.

3-1 Graphing Relationships

EXAMPLES

Sketch a graph for each situation. Tell whether the graph is continuous or discrete.

■ A parking meter has a limit of 1 hour. The cost is $0.25 per 15 minutes and the meter accepts quarters only.
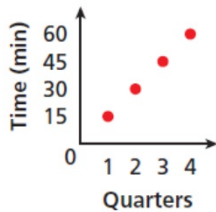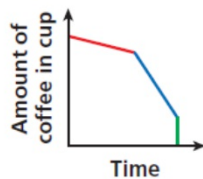

Since only quarters are accepted, the points are not connected.

The graph is discrete.

■ Ian bought a cup of coffee. At first, he sipped slowly. As it cooled, he drank more quickly. The last bit was cold, and he dumped it out.

As time passes the coffee was **sipped slowly,** **drank more quickly,** and then **dumped out.**


The graph is continuous.

EXERCISES

Sketch a graph for each situation. Tell whether the graph is continuous or discrete.

4. A girl was walking home at a steady pace. Then she stopped to talk to a friend. After her friend left, she jogged the rest of the way home.

5. A ball is dropped from a second story window and bounces to a stop on the patio below.

6. Jason was on the second floor when he got a call to attend a meeting on the sixth floor. He took the stairs. After the meeting, he took the elevator to the first floor.

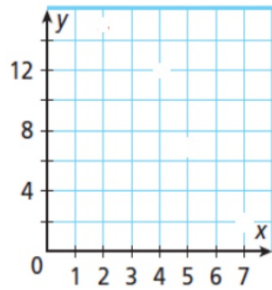**Write a possible situation for each graph.**

7.

8.
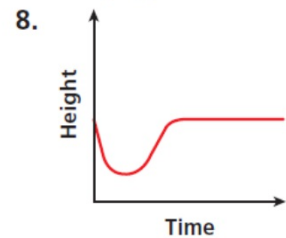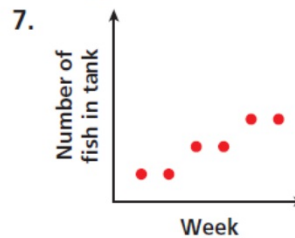
3-2 Relations and Functions

■ Express the relation $\{(2, 15), (4, 12), (5, 7), (7, 2)\}$ as a table, as a graph, and as a mapping diagram.

Table

x	y

Graph

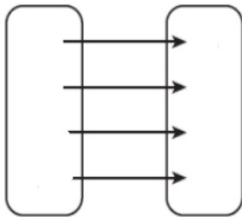**Mapping Diagram**

Give the domain and range of each relation. Tell whether the relation is a function. Explain.

■

x	y
−3	0
−2	0
−1	1

D: {   }
R: {   }

The relation is a

■
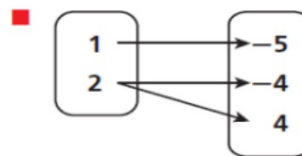
D: {   }
R: {   }

The relation is not a function because one domain value is paired with two range values.

■
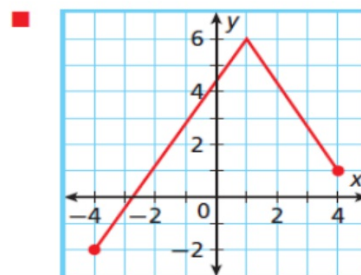
D: $\leq x \leq$
R: $\leq y \leq$

The relation is a

EXERCISES

Express each relation as a table, as a graph, and as a
mapping diagram.

9. $\{(-1, 0), (0, 1), (2, 1)\}$

10. $\{(-2, -1), (-1, 1), (2, 3), (3, 4)\}$

Give the domain and range of each relation.

11. $\{(-4, 5), (-2, 3), (0, 1), (2, -1)\}$

12. $\{(-2, -1) (-1, 0), (0, -1), (1, 0), (2, -1)\}$

13.

x	0	1	4	1	4
y	0	−1	−2	1	2

14.

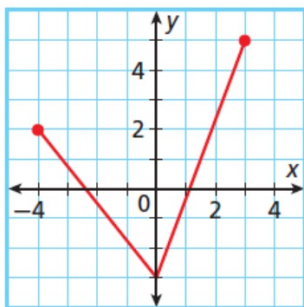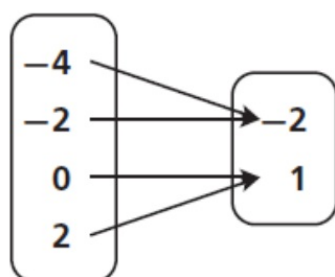**Give the domain and range of each relation. Tell whether the relation is a function. Explain.**

15. $\{(-5, -3), (-3, -2), (-1, -1), (1, 0)\}$

16.

17.

x	1	2	3	4	1
y	3	2	1	0	−1

18. A local parking garage charges $5.00 for the first hour plus $1.50 for each additional hour or part of an hour. Write a relation as a set of ordered pairs in which the x-value represents the number of hours and the y-value represents the cost for x hours. Use a domain of 1, 2, 3, 4, 5. Is this relation a function? Explain.

19. A baseball coach is taking the team for ice cream. Four students can ride in each car. Create a mapping diagram to show the number of cars needed to transport 8, 10, 14, and 16 students. Is this relation a function? Explain.

3-3 Writing Functions

EXAMPLES

- **Determine a relationship between the x- and y-values in the table. Write an equation.**

What are possible relationships between the x-values and the y-values?

x	1	2	3	4
y	−3	−6	−9	−12

$1 - 4 = -3$ $1(-3) = -3$

$2 - 4 \neq -6$ ✗ $2(-3) = -6$ ✓

$3(-3) = -9$ ✓

$4(-3) = -12$ ✓

$y = -3x$ *Write an equation.*

- **Nia earns \$5.25 per hour. Identify the independent and dependent variables. Write an equation in function notation for the situation.**

  Nia's **pay** depends on the **number of hours** she works.
  Dependent: **pay**
  Independent: **hours**

  Let h represent the number of hours Nia works.
  The function for Nia's pay is $f(h) = 5.25h$.

EXERCISES

Determine the relationship between the x- and y-values. Write an equation.

20.

x	1	2	3	4
y	−6	−5	−4	−3

21. $\{(1, 9), (2, 18), (3, 27), (4, 36)\}$

Identify the independent and dependent variables. Write an equation in function notation for the situation.

22. A baker spends \$6 on ingredients for each cake he bakes.

23. Tim will buy twice as many CDs as Raul.

Evaluate each function for the given input values.

24. For $f(x) = -2x + 4$, find $f(x)$ when $x = -5$.

25. For $g(n) = -n^2 - 2$, find $g(n)$ when $n = -3$.

26. For $h(t) = 7 - |t + 3|$, find $h(t)$ when $t = -4$ and when $t = 5$.
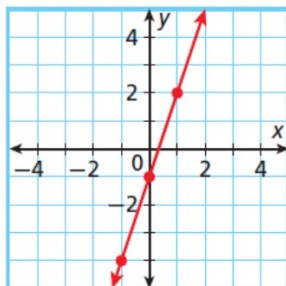
3-4 Graphing Functions

EXAMPLE

■ Graph the function $y = 3x - 1$.

Step 1 Choose several values of x to generate ordered pairs.

x	$y = 3x - 1$	y
−1	$y = 3(-1) - 1 = -4$	−4
0	$y = 3(0) - 1 = -1$	−1
1	$y = 3(1) - 1 = 2$	2
2	$y = 3(2) - 1 = 5$	5

Step 2 Plot enough points to see a pattern.

Step 3 Draw a line through the points to show all the ordered pairs that satisfy this function.

EXERCISES

Graph each function for the domain $\{-2, -1, 1, 2\}$.

27. $4x + y = 2$

28. $y = (1 - x)^2$

Graph each function.

29. $3x - y = 1$

30. $y = 2 - |x|$

31. $y = x^2 - 6$

32. $y = |x + 5| + 1$

33. The function $y = 6.25x$ describes the amount of money y Peter gets paid after x hours. Graph the function. Use the graph to estimate how much money Peter gets paid after 7 hours.

MULTIPLE CHOICE

1. Which set of ordered pairs represents a function?

   A. $\{(-1, 1), (0, 0), (1, 1), (2, 2)\}$

   B. $\{(3, -3), (2, -2), (1, -1), (1, 1)\}$

   C. $\{(4, 2), (4, -2), (9, 3), (9, -3)\}$

   D. $\{(-2, -1), (-2, 0), (-2, 1), (-2, 2)\}$

2. You and three friends plan to split the cost b (in dollars) of a large bag of popcorn at a movie. Which function describes the cost for each person as a function of the cost per bag?

   F. $P(b) = 3b$

   G. $P(b) = \dfrac{3}{b}$

   H. $P(b) = 4b$

   J. $P(b) = \dfrac{b}{4}$

3. Jorge bought a mechanical pencil for $8. A lead and eraser refill pack costs $2. Write a linear function to describe the cost of using the pencil as a function of the number of refill packs.

   A. $C(r) = 8r - 2$ **C.** $C(r) = 2r$

   B. $C(r) = 2r + 8$ **D.** $C(r) = 8r + 2$

4. Gary works no more than 9 hours on weekends and gets paid $10 per hour. He works whole-hour shifts. His pay P is a function of the number of hours he works n. What is the range of this function?

   F. $0 \leq n \leq 9$

   G. $0 \leq P \leq 90$

   H. $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$

   J. $\{0, 10, 20, 30, 40, 50, 60, 70, 80, 90\}$

5. Given $f(x) = 3x + 2$ and $g(x) = -2x - 4$, find $h(x) = f(x) - g(x)$.

A. $h(x) = x - 2$

B. $h(x) = x + 6$

C. $h(x) = 5x + 6$

D. $h(x) = 5x - 2$

6. The cost to ship a package is $C(w) = 0.23w + 7$ where w is the weight in pounds. Write the inverse function to find the weight of a package as a function $w(C)$ of the cost.
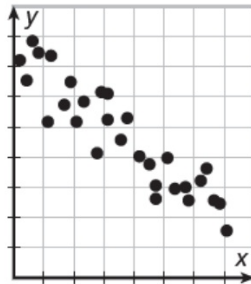
F. $w(C) = \dfrac{C - 7}{0.23}$

G. $w(C) = \dfrac{C + 7}{0.23}$

H. $w(C) = 0.23C + 7$

J. $w(C) = -0.23C - 7$

7. Which number best approximates the correlation coefficient for the data below?

A. −0.8   **C.** 0.2

B. −0.2   **D.** 0.8

8. The function $C(t)$ gives the cost C of buying t tickets to a museum exhibit when a group discount is offered.

$$C(t) = \begin{cases} 20t \text{ if } 0 \le t < 10 \\ 18t \text{ if } t \ge 10 \end{cases}$$

Which statement describes what $C(10)$ represents?

F. 10 tickets cost $200.

G. 10 tickets cost $180.

**H.** 10 tickets cost $20.

J. 10 tickets cost $18.

CONSTRUCTED RESPONSE

9. A taxicab driver charges $6.00 for any distance less than 1 mile. For distances of 1 mile or more, he charges $6.00 plus $3.00 for each complete mile.

    a. Write the equation for the function $C(d)$, which gives the cost C (in dollars) of riding in the taxicab for a distance d (in miles).

    b. Graph the function to show the costs for all distances less than 5 miles. Include labels and scales on your graph.
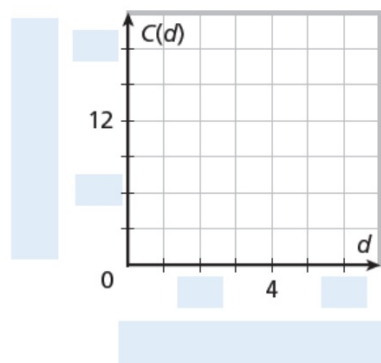
10. Emily walks to meet her brother and one of his classmates after kindergarten and walks them home.
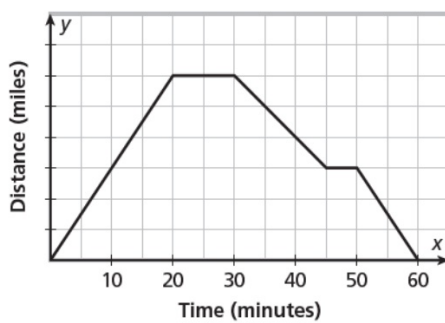
a. During which interval(s) is Emily's distance from home increasing?

_____

b. During which interval(s) is Emily's distance from home decreasing?

_____

_____

c. Which interval do you think represents the time when Emily is dropping her brother's classmate at his house? Justify your answer.
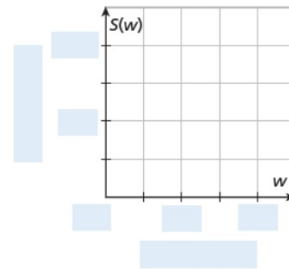
_____

11. Henry purchased a roll of 100 stamps. He uses 5 stamps each week.

a. The number of stamps at the end of each week is a function $S(w)$ of the number of weeks. Write an equation for the function.

_____

b. What types of numbers are reasonable for the domain and the range?

_____

_____

_____

c. Complete the table using selected domain values. Then graph the function.

w	S(w)	(w, S(w))

d. At the end of how many weeks will Henry have one quarter of the stamps left? Explain your reasoning.

_____

_____