

# Advanced Algebra

## Unit 1 Practice: Linear Functions

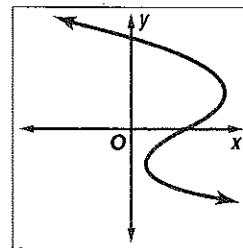
$$g(t) = 5t + 9$$

$$f(t) = 6t^2 - 26t$$

# Check for Understanding

## Concept Check

- OPEN ENDED** Write a relation of four ordered pairs that is *not* a function.
- Copy the graph at the right. Then draw a vertical line that shows that the graph does not represent a function.
- FIND THE ERROR** Teisha and Molly are finding  $g(2a)$  for the function  $g(x) = x^2 + x - 1$ .



Teisha

$$g(2a) = 2(a^2 + a - 1) \\ = 2a^2 + 2a - 2$$

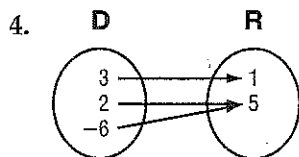
Molly

$$g(2a) = (2a)^2 + 2a - 1 \\ = 4a^2 + 2a - 1$$

Who is correct? Explain your reasoning.

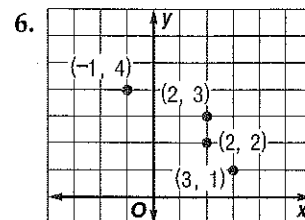
## Guided Practice

Determine whether each relation is a function. Write *yes* or *no*.



5.

x	y
5	-2
10	-2
15	-2
20	-2



Graph each relation or equation and find the domain and range. Then determine whether the relation or equation is a function.

- $\{(7, 8), (7, 5), (7, 2), (7, -1)\}$
- $\{(6, 2.5), (3, 2.5), (4, 2.5)\}$
- $y = -2x + 1$
- $x = y^2$
- Find  $f(5)$  if  $f(x) = x^2 - 3x$ .
- Find  $h(-2)$  if  $h(x) = x^3 + 1$ .

## Application

**WEATHER** For Exercises 13–16, use the table of record high temperatures ( $^{\circ}\text{F}$ ) for January and July.

- Identify the domain and range. Assume that the January temperatures are the domain.
- Write a relation of ordered pairs for the data.
- Graph the relation.
- Is this relation a function? Explain.

City	Jan.	July
Los Angeles	88	97
Sacramento	70	114
San Diego	88	95
San Francisco	72	105

Source: U.S. National Oceanic and Atmospheric Administration

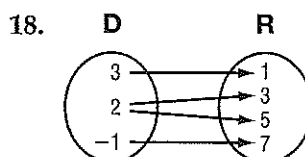
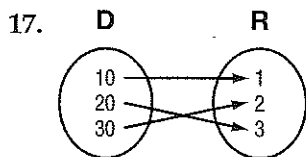
# Practice and Apply

## Homework Help

For Exercises	See Examples
17–28	1, 2
29–32	3
33, 34	4
35–45, 55	2
46–54, 56	5

**Extra Practice**  
See page 830.

Determine whether each relation is a function. Write *yes* or *no*.

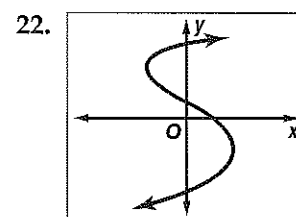
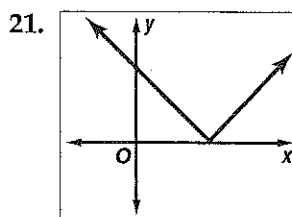


19.

x	y
0.5	-3
2	0.8
0.5	8

20.

x	y
2000	\$4000
2001	\$4300
2002	\$4000
2003	\$4500



Graph each relation or equation and find the domain and range. Then determine whether the relation or equation is a function.

23.  $\{(2, 1), (-3, 0), (1, 5)\}$       24.  $\{(4, 5), (6, 5), (3, 5)\}$   
 25.  $\{(-2, 5), (3, 7), (-2, 8)\}$       26.  $\{(3, 4), (4, 3), (6, 5), (5, 6)\}$   
 27.  $\{(0, -1.1), (2, -3), (1.4, 2), (-3.6, 8)\}$       28.  $\{(-2.5, 1), (-1, -1), (0, 1), (-1, 1)\}$   
 29.  $y = -5x$       30.  $y = 3x$   
 31.  $y = 3x - 4$       32.  $y = 7x - 6$   
 33.  $y = x^2$       34.  $x = 2y^2 - 3$

• **SPORTS** For Exercises 35–37, use the table that shows the leading home run and runs batted in totals in the American League for 1996–2000.

Year	1996	1997	1998	1999	2000
HR	52	56	56	48	47
RBI	148	147	157	165	145

Source: *The World Almanac*

35. Make a graph of the data with home runs on the horizontal axis and runs batted in on the vertical axis.  
 36. Identify the domain and range.  
 37. Does the graph represent a function? Explain your reasoning.

**FINANCE** For Exercises 38–41, use the table that shows a company's stock price in recent years.

Year	Price
1997	\$39
1998	\$43
1999	\$48
2000	\$55
2001	\$61
2002	\$52

38. Write a relation to represent the data.  
 39. Graph the relation.  
 40. Identify the domain and range.  
 41. Is the relation a function? Explain your reasoning.

**GOVERNMENT** For Exercises 42–45, use the table below that shows the number of members of the U.S. House of Representatives with 30 or more consecutive years of service in Congress from 1987 to 1999.

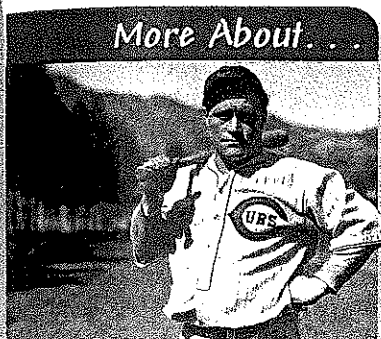
Year	1987	1989	1991	1993	1995	1997	1999
Representatives	12	13	11	12	9	6	3

Source: *Congressional Directory*

42. Write a relation to represent the data.  
 43. Graph the relation.  
 44. Identify the domain and range.  
 45. Is the relation a function? If so, is it a one-to-one function? Explain.

Find each value if  $f(x) = 3x - 5$  and  $g(x) = x^2 - x$ .

46.  $f(-3)$       47.  $g(3)$       48.  $g\left(\frac{1}{3}\right)$   
 49.  $f\left(\frac{2}{3}\right)$       50.  $f(a)$       51.  $g(5n)$   
 52. Find the value of  $f(x) = -3x + 2$  when  $x = 2$ .  
 53. What is  $g(4)$  if  $g(x) = x^2 - 5$ ?



### Sports •

The major league record for runs batted in (RBIs) is 191 by Hack Wilson.

Source: [www.baseball-almanac.com](http://www.baseball-almanac.com)



## Check for Understanding

### Concept Check

- OPEN ENDED** Write an equation whose solution is  $-7$ .
- Determine whether the following statement is *sometimes*, *always*, or *never* true. Explain.  
*Dividing each side of an equation by the same expression produces an equivalent equation.*
- FIND THE ERROR** Crystal and Jamal are solving  $C = \frac{5}{9}(F - 32)$  for  $F$ .

$$\begin{aligned} \text{Crystal} \\ C &= \frac{5}{9}(F - 32) \\ C + 32 &= \frac{5}{9}F \\ \frac{9}{5}(C + 32) &= F \end{aligned}$$

$$\begin{aligned} \text{Jamal} \\ C &= \frac{5}{9}(F - 32) \\ \frac{9}{5}C &= F - 32 \\ \frac{9}{5}C + 32 &= F \end{aligned}$$

Who is correct? Explain your reasoning.

### Guided Practice

Write an algebraic expression to represent each verbal expression.

- five increased by four times a number
- twice a number decreased by the cube of the same number

Write a verbal expression to represent each equation.

- $9n - 3 = 6$
- $5 + 3x^2 = 2x$

Name the property illustrated by each statement.

- $(3x + 2) - 5 = (3x + 2) - 5$
- If  $4c = 15$ , then  $4c + 2 = 15 + 2$ .

Solve each equation. Check your solution.

- $y + 14 = -7$
- $7 + 3x = 49$
- $-4(b + 7) = -12$
- $7q + q - 3q = -24$
- $1.8a - 5 = -2.3$
- $-\frac{3}{4}n + 1 = -11$

Solve each equation or formula for the specified variable.

- $4y - 2n = 9$ , for  $y$
- $I = prt$ , for  $p$

### Standardized Test Practice

- If  $4x + 7 = 18$ , what is the value of  $12x + 21$ ?

- (A) 2.75      (B) 32      (C) 33      (D) 54

## Practice and Apply

### Homework Help

For Exercises	See Examples
19–28	1
29–34	2
35–40	3
41–56	4, 5
57–62	6
63–74	7

### Extra Practice

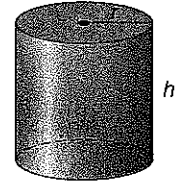
See page 828.

Write an algebraic expression to represent each verbal expression.

- the sum of 5 and three times a number
- seven more than the product of a number and 10
- four less than the square of a number
- the product of the cube of a number and  $-6$
- five times the sum of 9 and a number
- twice the sum of a number and 8
- the square of the quotient of a number and 4
- the cube of the difference of a number and 7

**GEOMETRY** For Exercises 27 and 28, use the following information.

The formula for the surface area of a cylinder with radius  $r$  and height  $h$  is  $\pi$  times twice the product of the radius and height plus twice the product of  $\pi$  and the square of the radius.



27. Translate this verbal expression of the formula into an algebraic expression.
28. Write an equivalent expression using the Distributive Property.

**Write a verbal expression to represent each equation.**

29.  $x - 5 = 12$
30.  $2n + 3 = -1$
31.  $y^2 = 4y$
32.  $3a^3 = a + 4$
33.  $\frac{b}{4} = 2(b + 1)$
34.  $7 - \frac{1}{2}x = \frac{3}{x^2}$

**Name the property illustrated by each statement.**

35. If  $[3(-2)]z = 24$ , then  $-6z = 24$ .
36. If  $5 + b = 13$ , then  $b = 8$ .
37. If  $2x = 3d$  and  $3d = -4$ , then  $2x = -4$ .
38. If  $g - t = n$ , then  $g = n + t$ .
39. If  $14 = \frac{x}{2} + 11$ , then  $\frac{x}{2} + 11 = 14$ .
40. If  $y - 2 = -8$ , then  $3(y - 2) = 3(-8)$ .

**Solve each equation. Check your solution.**

41.  $2p + 15 = 29$
42.  $14 - 3n = -10$
43.  $7a - 3a + 2a - a = 16$
44.  $x + 9x - 6x + 4x = 20$
45.  $\frac{1}{9} - \frac{2}{3}b = \frac{1}{18}$
46.  $\frac{5}{8} + \frac{3}{4}x = \frac{1}{16}$
47.  $27 = -9(y + 5)$
48.  $-7(p + 8) = 21$
49.  $3f - 2 = 4f + 5$
50.  $3d + 7 = 6d + 5$
51.  $4.3n + 1 = 7 - 1.7n$
52.  $1.7x - 8 = 2.7x + 4$
53.  $3(2z + 25) - 2(z - 1) = 78$
54.  $4(k + 3) + 2 = 4.5(k + 1)$
55.  $\frac{3}{11}a - 1 = \frac{7}{11}a + 9$
56.  $\frac{2}{5}x + \frac{3}{7} = 1 - \frac{4}{7}x$

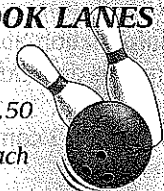
**Solve each equation or formula for the specified variable.**

57.  $d = rt$ , for  $r$
58.  $x = \frac{-b}{2a}$ , for  $a$
59.  $V = \frac{1}{3}\pi r^2 h$ , for  $h$
60.  $A = \frac{1}{2}h(a + b)$ , for  $b$
61.  $\frac{a(b - 2)}{c - 3} = x$ , for  $b$
62.  $x = \frac{y}{y + 4}$ , for  $y$

**Define a variable, write an equation, and solve the problem.**

63. **BOWLING** Jon and Morgan arrive at Sunnybrook Lanes with \$16.75. Find the maximum number of games they can bowl if they each rent shoes.

**SUNNYBROOK LANES**



Shoe Rental: \$1.50  
Games: \$2.50 each

# 2-3 Study Guide and Intervention

## Slope

### Slope

<b>Slope <math>m</math> of a Line</b>	For points $(x_1, y_1)$ and $(x_2, y_2)$ , where $x_1 \neq x_2$ , $m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$
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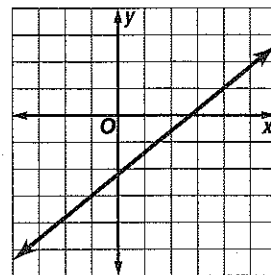
**Example 1** Determine the slope of the line that passes through  $(2, -1)$  and  $(-4, 5)$ .

$$\begin{aligned}
 m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Slope formula} \\
 &= \frac{5 - (-1)}{-4 - 2} && (x_1, y_1) = (2, -1), (x_2, y_2) = (-4, 5) \\
 &= \frac{6}{-6} = -1 && \text{Simplify.}
 \end{aligned}$$

The slope of the line is  $-1$ .

**Example 2** Graph the line passing through  $(-1, -3)$  with a slope of  $\frac{4}{5}$ .

Graph the ordered pair  $(-1, -3)$ . Then, according to the slope, go up 4 units and right 5 units. Plot the new point  $(4, 1)$ . Connect the points and draw the line.



### Exercises

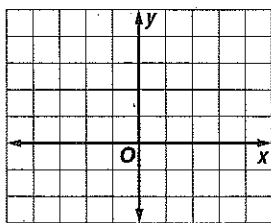
Find the slope of the line that passes through each pair of points.

- |                            |                             |                              |
|----------------------------|-----------------------------|------------------------------|
| 1. $(4, 7)$ and $(6, 13)$  | 2. $(6, 4)$ and $(3, 4)$    | 3. $(5, 1)$ and $(7, -3)$    |
| 4. $(5, -3)$ and $(-4, 3)$ | 5. $(5, 10)$ and $(-1, -2)$ | 6. $(-1, -4)$ and $(-13, 2)$ |
| 7. $(7, -2)$ and $(3, 3)$  | 8. $(-5, 9)$ and $(5, 5)$   | 9. $(4, -2)$ and $(-4, -8)$  |

Graph the line passing through the given point with the given slope.

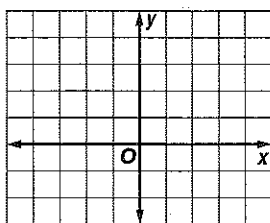
10. slope =  $-\frac{1}{3}$

passes through  $(0, 2)$



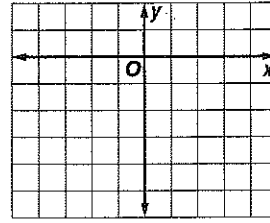
11. slope = 2

passes through  $(1, 4)$



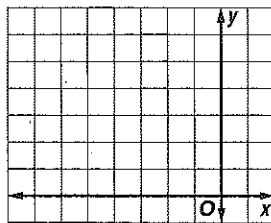
12. slope = 0

passes through  $(-2, -5)$



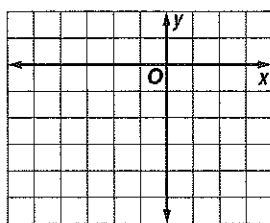
13. slope = 1

passes through  $(-4, 6)$



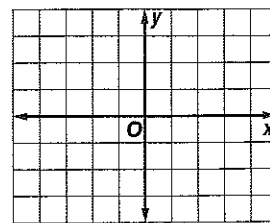
14. slope =  $-\frac{3}{4}$

passes through  $(-3, 0)$



15. slope =  $\frac{1}{5}$

passes through  $(0, 0)$



Lesson 2-3

NAME \_\_\_\_\_ DATE \_\_\_\_\_ PERIOD \_\_\_\_\_

## Study Guide and Intervention

### Slope

#### Slope

**Slope  $m$  of a Line** For points  $(x_1, y_1)$  and  $(x_2, y_2)$ , where  $x_1 \neq x_2$ ,  $m = \frac{\text{change in } y = y_2 - y_1}{\text{change in } x = x_2 - x_1}$

**Example 1** Determine the slope of the line that passes through  $(2, -1)$  and  $(-4, 5)$ .

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

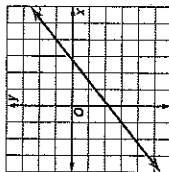
$$= \frac{5 - (-1)}{-4 - 2}$$

$$= \frac{6}{-6} = -1$$

The slope of the line is  $-1$ .

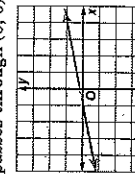
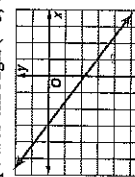
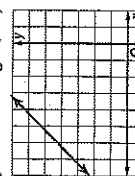
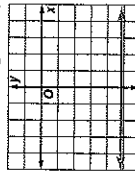
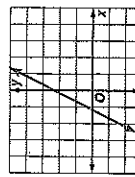
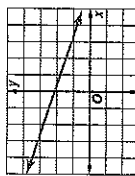
**Example 2** Graph the line passing through  $(-1, -3)$  with a slope of  $\frac{4}{5}$ .

Graph the ordered pair  $(-1, -3)$ . Then, according to the slope, go up 4 units and right 5 units. Plot the new point  $(4, 1)$ . Connect the points and draw the line.



**Example 3** Find the slope of the line that passes through each pair of points.

- $(4, 7)$  and  $(6, 13)$     **3.**  $(5, 1)$  and  $(7, -3)$     **4.**  $(5, -3)$  and  $(-4, 3)$     **5.**  $(5, 10)$  and  $(-1, -2)$     **6.**  $(-1, -4)$  and  $(-13, 2)$     **7.**  $(7, -2)$  and  $(3, 3)$     **8.**  $(-5, 9)$  and  $(5, 5)$     **9.**  $(4, -2)$  and  $(-4, -8)$     **10.** slope  $= \frac{1}{3}$  passes through  $(0, 2)$     **11.** slope  $= 2$  passes through  $(1, 4)$     **12.** slope  $= 0$  passes through  $(-2, -5)$     **13.** slope  $= 1$  passes through  $(-4, 6)$     **14.** slope  $= -\frac{3}{4}$  passes through  $(-3, 0)$     **15.** slope  $= \frac{1}{6}$  passes through  $(0, 0)$



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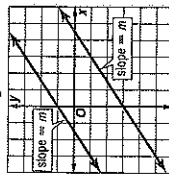
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## Study Guide and Intervention

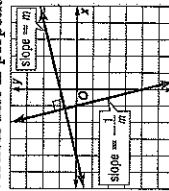
### Slope

#### Parallel and Perpendicular Lines

In a plane, nonvertical lines with the same slope are parallel. All vertical lines are parallel.



In a plane, two oblique lines are perpendicular if and only if the product of their slopes is  $-1$ . Any vertical line is perpendicular to any horizontal line.



**Example 1** Are the lines passing through  $(2, 6)$  and  $(-2, 2)$  and the line passing through  $(3, 0)$  and  $(0, 4)$  parallel, perpendicular, or neither?

Find the slopes of the two lines.

The slope of the first line is  $\frac{6-2}{2-(-2)} = 1$ .

The slope of the second line is  $\frac{4-0}{0-3} = -\frac{4}{3}$ .

The slopes are not equal and the product of the slopes is not  $-1$ , so the lines are neither parallel nor perpendicular.

**Example 2** Are the lines parallel, perpendicular, or neither?

- the line passing through  $(4, 3)$  and  $(1, -3)$  and the line passing through  $(1, 2)$  and  $(-1, 3)$     **perpendicular**
- the line passing through  $(2, 8)$  and  $(-2, 2)$  and the line passing through  $(0, 9)$  and  $(6, 0)$     **neither**
- the line passing through  $(3, 9)$  and  $(-2, -1)$  and the graph of  $y = 2x$     **parallel**
- the line with  $x$ -intercept  $-2$  and  $y$ -intercept  $5$  and the line with  $x$ -intercept  $2$  and  $y$ -intercept  $-5$     **parallel**
- the line with  $x$ -intercept  $1$  and  $y$ -intercept  $3$  and the line with  $x$ -intercept  $3$  and  $y$ -intercept  $1$     **neither**
- the line passing through  $(-2, -3)$  and  $(2, 5)$  and the graph of  $x + 2y = 10$     **perpendicular**
- the line passing through  $(-4, -8)$  and  $(6, -4)$  and the graph of  $2x - 5y = 5$     **parallel**

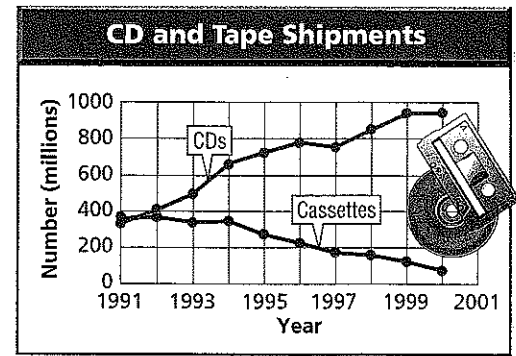
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**ENTERTAINMENT** For Exercises 37–39, refer to the graph that shows the number of CDs and cassette tapes shipped by manufacturers to retailers in recent years.

37. Find the average rate of change of the number of CDs shipped from 1991 to 2000.
38. Find the average rate of change of the number of cassette tapes shipped from 1991 to 2000.
39. Interpret the sign of your answer to Exercise 38.



Source: Recording Industry Association of America

**TRAVEL** For Exercises 40–42, use the following information.

Mr. and Mrs. Wellman are taking their daughter to college. The table shows their distance from home after various amounts of time.

Time (h)	Distance (mi)
0	0
1	55
2	110
3	165
4	165
5	225

40. Find the average rate of change of their distance from home between 1 and 3 hours after leaving home.
41. Find the average rate of change of their distance from home between 0 and 5 hours after leaving home.
42. What is another word for *rate of change* in this situation?

**Graph the line that satisfies each set of conditions.**

43. passes through  $(-2, 2)$ , parallel to a line whose slope is  $-1$
44. passes through  $(-4, 1)$ , perpendicular to a line whose slope is  $-\frac{3}{2}$
45. passes through  $(3, 3)$ , perpendicular to graph of  $y = 3$
46. passes through  $(2, -5)$ , parallel to graph of  $x = 4$
47. passes through  $(2, -1)$ , parallel to graph of  $2x + 3y = 6$
48. passes through origin, parallel to graph of  $x + y = 10$
49. perpendicular to graph of  $3x - 2y = 24$ , intersects that graph at its  $x$ -intercept
50. perpendicular to graph of  $2x + 5y = 10$ , intersects that graph at its  $y$ -intercept

51. **GEOMETRY** Determine whether quadrilateral  $ABCD$  with vertices  $A(-2, -1)$ ,  $B(1, 1)$ ,  $C(3, -2)$ , and  $D(0, -4)$  is a rectangle. Explain.

52. **CRITICAL THINKING** If the graph of the equation  $ax + 3y = 9$  is perpendicular to the graph of the equation  $3x + y = -4$ , find the value of  $a$ .

53. **WRITING IN MATH** Answer the question that was posed at the beginning of the lesson.

**How does slope apply to the steepness of roads?**

Include the following in your answer:

- a few sentences explaining the relationship between the grade of a road and the slope of a line, and
- a graph of  $y = 0.08x$ , which corresponds to a grade of 8%. (A road with a grade of 6% to 8% is considered to be fairly steep. The scales on your  $x$ - and  $y$ -axes should be the same.)





Use the point-slope form and the ordered pair  $(-4, 3)$  to write the equation.

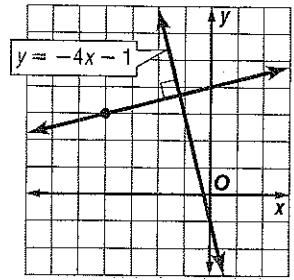
$$y - y_1 = m(x - x_1) \quad \text{Point-slope form}$$

$$y - 3 = \frac{1}{4}[x - (-4)] \quad (x_1, y_1) = (-4, 3), m = \frac{1}{4}$$

$$y - 3 = \frac{1}{4}x + 1 \quad \text{Distributive Property}$$

$$y = \frac{1}{4}x + 4 \quad \text{Add 3 to each side.}$$

An equation of the line is  $y = \frac{1}{4}x + 4$ .



## Check for Understanding

- Concept Check**
- OPEN ENDED** Write an equation of a line in slope-intercept form.
  - Identify the slope and  $y$ -intercept of the line with equation  $y = 6x$ .
  - Explain how to find the slope of a line parallel to the graph of  $3x - 5y = 2$ .

**Guided Practice** State the slope and  $y$ -intercept of the graph of each equation.

4.  $y = 2x - 5$

5.  $3x + 2y - 10 = 0$

Write an equation in slope-intercept form for the line that satisfies each set of conditions.

6. slope 0.5, passes through  $(6, 4)$

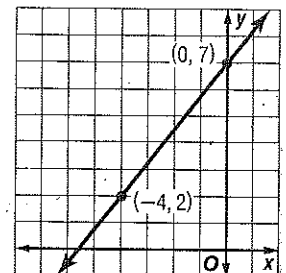
7. slope  $-\frac{3}{4}$ , passes through  $(2, \frac{1}{2})$

8. passes through  $(6, 1)$  and  $(8, -4)$

9. passes through  $(-3, 5)$  and  $(2, 2)$

10. passes through  $(0, -2)$ , perpendicular to the graph of  $y = x - 2$

11. Write an equation in slope-intercept form for the graph at the right.



## Standardized Test Practice

A B C D

12. What is an equation of the line through  $(2, -4)$  and  $(-3, -1)$ ?

(A)  $y = -\frac{3}{5}x + \frac{26}{5}$

(B)  $y = -\frac{3}{5}x - \frac{14}{5}$

(C)  $y = \frac{3}{5}x - \frac{26}{5}$

(D)  $y = \frac{3}{5}x + \frac{14}{5}$

## Practice and Apply

### Homework Help

For Exercises	See Examples
13-18, 21-28	1
19, 20	2, 3
29-34, 39, 40	
35-38	4
41-52	1-3

**Extra Practice**  
See page 831.

State the slope and  $y$ -intercept of the graph of each equation.

13.  $y = -\frac{2}{3}x - 4$

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

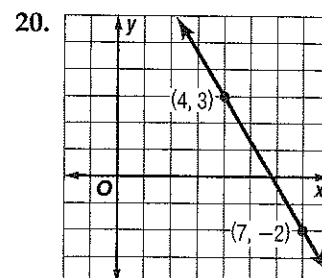
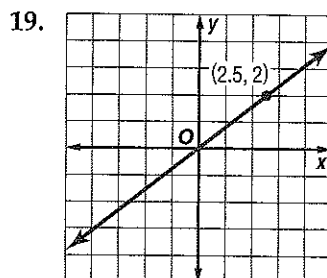
15.  $2x - 4y = 10$

16.  $3x + 5y - 30 = 0$

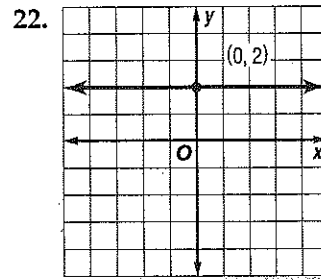
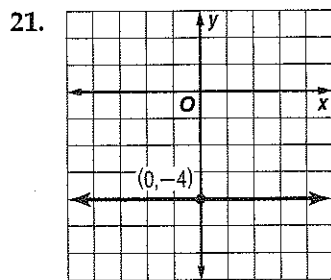
17.  $x = 7$

18.  $cx + y = d$

Write an equation in slope-intercept form for each graph.



Write an equation in slope-intercept form for each graph.

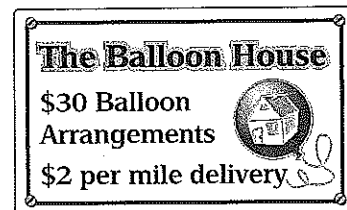
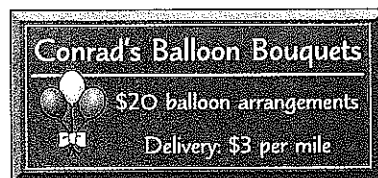


Write an equation in slope-intercept form for the line that satisfies each set of conditions.

23. slope 3, passes through  $(0, -6)$       24. slope 0.25, passes through  $(0, 4)$   
 25. slope  $-\frac{1}{2}$ , passes through  $(1, 3)$       26. slope  $\frac{3}{2}$ , passes through  $(-5, 1)$   
 27. slope  $-0.5$ , passes through  $(2, -3)$       28. slope 4, passes through the origin  
 29. passes through  $(-2, 5)$  and  $(3, 1)$       30. passes through  $(7, 1)$  and  $(7, 8)$   
 31. passes through  $(-4, 0)$  and  $(3, 0)$       32. passes through  $(-2, -3)$  and  $(0, 0)$   
 33. x-intercept  $-4$ , y-intercept 4      34. x-intercept  $\frac{1}{3}$ , y-intercept  $-\frac{1}{4}$   
 35. passes through  $(4, 6)$ , parallel to the graph of  $y = \frac{2}{3}x + 5$   
 36. passes through  $(2, -5)$ , perpendicular to the graph of  $y = \frac{1}{4}x + 7$   
 37. passes through  $(6, -5)$ , perpendicular to the line whose equation is  $3x - \frac{1}{5}y = 3$   
 38. passes through  $(-3, -1)$ , parallel to the line that passes through  $(3, 3)$  and  $(0, 6)$
39. Write an equation in slope-intercept form of the line that passes through the points indicated in the table.
- | x  | y  |
|----|----|
| -1 | -5 |
| 1  | 1  |
| 3  | 7  |
40. Write an equation in slope-intercept form of the line that passes through  $(-2, 10)$ ,  $(2, 2)$ , and  $(4, -2)$ .

**GEOMETRY** For Exercises 41–43, use the equation  $d = 180(c - 2)$  that gives the total number of degrees  $d$  in any convex polygon with  $c$  sides.

41. Write this equation in slope-intercept form.  
 42. Identify the slope and  $d$ -intercept.  
 43. Find the number of degrees in a pentagon.
44. **ECOLOGY** A park ranger at Blendon Woods estimates there are 6000 deer in the park. She also estimates that the population will increase by 75 deer each year thereafter. Write an equation that represents how many deer will be in the park in  $x$  years.
45. **BUSINESS** Refer to the signs below. At what distance do the two stores charge the same amount for a balloon arrangement?



# 7-8 Skills Practice

## Inverse Functions and Relations

Find the inverse of each relation.

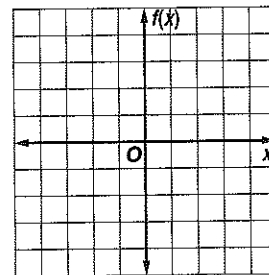
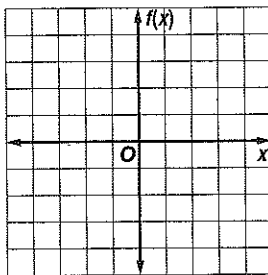
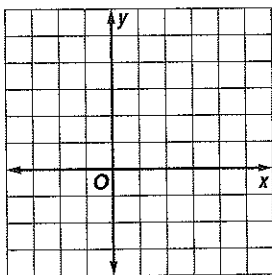
1.  $\{(3, 1), (4, -3), (8, -3)\}$
2.  $\{(-7, 1), (0, 5), (5, -1)\}$
3.  $\{(-10, -2), (-7, 6), (-4, -2), (-4, 0)\}$
4.  $\{(0, -9), (5, -3), (6, 6), (8, -3)\}$
5.  $\{(-4, 12), (0, 7), (9, -1), (10, -5)\}$
6.  $\{(-4, 1), (-4, 3), (0, -8), (8, -9)\}$

Find the inverse of each function. Then graph the function and its inverse.

7.  $y = 4$

8.  $f(x) = 3x$

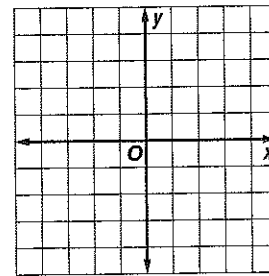
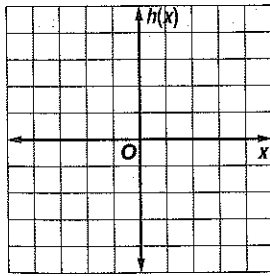
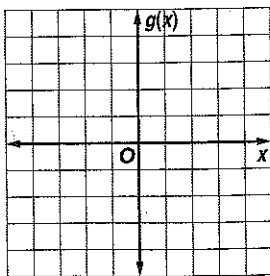
9.  $f(x) = x + 2$



10.  $g(x) = 2x - 1$

11.  $h(x) = \frac{1}{4}x$

12.  $y = \frac{2}{3}x + 2$



Determine whether each pair of functions are inverse functions.

13.  $f(x) = x - 1$   
 $g(x) = 1 - x$

14.  $f(x) = 2x + 3$   
 $g(x) = \frac{1}{2}(x - 3)$

15.  $f(x) = 5x - 5$   
 $g(x) = \frac{1}{5}x + 1$

16.  $f(x) = 2x$   
 $g(x) = \frac{1}{2}x$

17.  $h(x) = 6x - 2$   
 $g(x) = \frac{1}{6}x + 3$

18.  $f(x) = 8x - 10$   
 $g(x) = \frac{1}{8}x + \frac{5}{4}$

NAME \_\_\_\_\_ PERIOD \_\_\_\_\_

DATE \_\_\_\_\_

## 7-8 Practice (Average)

### Inverse Functions and Relations

Find the inverse of each relation.

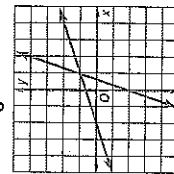
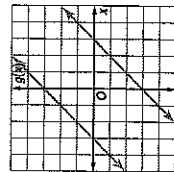
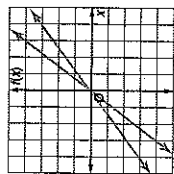
1.  $\{(0, 3), (4, 2), (5, -6)\}$   
 $\{(3, 0), (2, 4), (-6, 5)\}$
2.  $\{(-5, 1), (-5, -1), (-5, 8)\}$   
 $\{(1, -5), (-1, -5), (8, -5)\}$
3.  $\{(-3, -7), (0, -1), (5, 9), (7, 13)\}$   
 $\{(-7, -3), (-1, 0), (9, 5), (13, 7)\}$
4.  $\{(8, -2), (10, 5), (12, 6), (14, 7)\}$   
 $\{(-2, 8), (5, 10), (6, 12), (7, 14)\}$
5.  $\{(-5, -4), (1, 2), (3, 4), (7, 8)\}$   
 $\{(-4, -5), (2, 1), (4, 3), (8, 7)\}$
6.  $\{(-3, 9), (-2, 4), (0, 0), (1, 1)\}$   
 $\{(9, -3), (4, -2), (0, 0), (1, 1)\}$

Find the inverse of each function. Then graph the function and its inverse.

7.  $f(x) = \frac{3}{2}x$   
 $f^{-1}(x) = \frac{2}{3}x$

8.  $g(x) = 3 + x$   
 $g^{-1}(x) = x - 3$

9.  $y = 3x - 2$   
 $y = \frac{x+2}{3}$



## Lesson 7-8

NAME \_\_\_\_\_ PERIOD \_\_\_\_\_

DATE \_\_\_\_\_

## 7-8 Skills Practice

### Inverse Functions and Relations

Find the inverse of each relation.

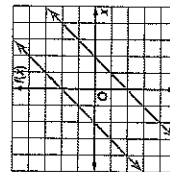
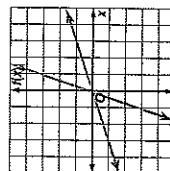
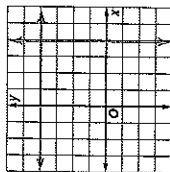
1.  $\{(3, 1), (4, -3), (8, -3)\}$   
 $\{(1, 3), (-3, 4), (-3, 8)\}$
2.  $\{(-7, 1), (0, 5), (5, -1)\}$   
 $\{(1, -7), (5, 0), (-1, 5)\}$
3.  $\{(-10, -2), (-7, 6), (-4, -2), (-4, 0)\}$   
 $\{(-2, -10), (6, -7), (-2, -4), (0, -4)\}$
4.  $\{(0, -9), (5, -3), (6, 6), (8, -3)\}$   
 $\{(-9, 0), (-3, 5), (6, 6), (-3, 8)\}$
5.  $\{(-4, 12), (0, 7), (9, -1), (10, -5)\}$   
 $\{(12, -4), (7, 0), (-1, 9), (-5, 10)\}$
6.  $\{(-4, 1), (-4, 3), (0, -8), (8, -9)\}$   
 $\{(1, -4), (3, -4), (-8, 0), (-9, 8)\}$

Find the inverse of each function. Then graph the function and its inverse.

7.  $y = 4$   
 $x = 4$

8.  $f(x) = 3x$   
 $f^{-1}(x) = \frac{1}{3}x$

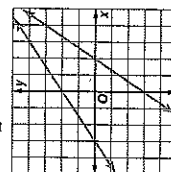
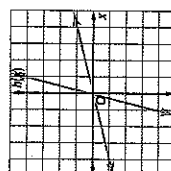
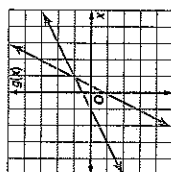
9.  $f(x) = x + 2$   
 $f^{-1}(x) = x - 2$



10.  $g(x) = 2x - 1$   
 $g^{-1}(x) = \frac{x+1}{2}$

11.  $h(x) = \frac{1}{4}x$   
 $h^{-1}(x) = 4x$

12.  $y = \frac{2}{3}x + 2$   
 $y = \frac{3}{2}(x - 3)$



Determine whether each pair of functions are inverse functions.

13.  $f(x) = x - 1$  no  
 $g(x) = 1 - x$

14.  $f(x) = 2x + 3$  yes  
 $g(x) = \frac{1}{2}(x - 3)$

15.  $f(x) = 5x - 5$  yes  
 $g(x) = \frac{1}{5}x + 1$

16.  $f(x) = 2x$  yes  
 $g(x) = \frac{1}{2}x$

17.  $h(x) = 6x - 2$  no  
 $g(x) = \frac{1}{6}x + 3$

18.  $f(x) = 8x - 10$  yes  
 $g(x) = \frac{1}{8}x + \frac{5}{4}$

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Glencoe Algebra 2

NAME \_\_\_\_\_

## 7-8 Practice (Average)

### Inverse Functions and Relations

Find the inverse of each relation.

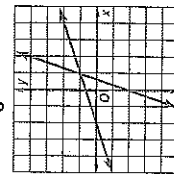
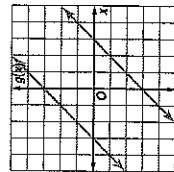
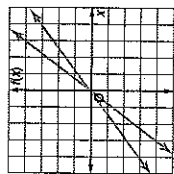
1.  $\{(0, 3), (4, 2), (5, -6)\}$   
 $\{(3, 0), (2, 4), (-6, 5)\}$
2.  $\{(-5, 1), (-5, -1), (-5, 8)\}$   
 $\{(1, -5), (-1, -5), (8, -5)\}$
3.  $\{(-3, -7), (0, -1), (5, 9), (7, 13)\}$   
 $\{(-7, -3), (-1, 0), (9, 5), (13, 7)\}$
4.  $\{(8, -2), (10, 5), (12, 6), (14, 7)\}$   
 $\{(-2, 8), (5, 10), (6, 12), (7, 14)\}$
5.  $\{(-5, -4), (1, 2), (3, 4), (7, 8)\}$   
 $\{(-4, -5), (2, 1), (4, 3), (8, 7)\}$
6.  $\{(-3, 9), (-2, 4), (0, 0), (1, 1)\}$   
 $\{(9, -3), (4, -2), (0, 0), (1, 1)\}$

Find the inverse of each function. Then graph the function and its inverse.

7.  $f(x) = \frac{3}{2}x$   
 $f^{-1}(x) = \frac{2}{3}x$

8.  $g(x) = 3 + x$   
 $g^{-1}(x) = x - 3$

9.  $y = 3x - 2$   
 $y = \frac{x+2}{3}$



Determine whether each pair of functions are inverse functions.

10.  $f(x) = x + 6$  yes  
 $g(x) = x - 6$

11.  $f(x) = -4x + 1$  yes  
 $g(x) = \frac{1}{4}(1 - x)$

12.  $g(x) = 13x - 13$  no  
 $h(x) = \frac{1}{13}x - 1$

13.  $f(x) = 2x$  no  
 $g(x) = -2x$

14.  $f(x) = \frac{6}{7}x$  yes  
 $g(x) = \frac{7}{6}x$

15.  $g(x) = 2x - 8$  yes  
 $h(x) = \frac{1}{2}x + 4$

**16. MEASUREMENT** The points (68, 121), (71, 180), (67, 140), (65, 108), and (72, 165) give the weight in pounds as a function of height in inches for 5 students in a class. Give the points for these students that represent height as a function of weight.

(121, 63), (180, 71), (140, 67), (108, 65), (165, 72)

**REMODELING** For Exercises 17 and 18, use the following information.

The Clearys are replacing the flooring in their 15 foot by 18 foot kitchen. The new flooring costs \$17.99 per square yard. The formula  $f(x) = 9x$  converts square yards to square feet.

17. Find the inverse  $f^{-1}(x)$ . What is the significance of  $f^{-1}(x)$  for the Clearys?  $f^{-1}(x) = \frac{x}{9}$ ; it will allow them to convert the square footage of their kitchen floor to square yards, so they can then calculate the cost of the new flooring.

18. What will the new flooring cost the Clearys? \$539.70

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