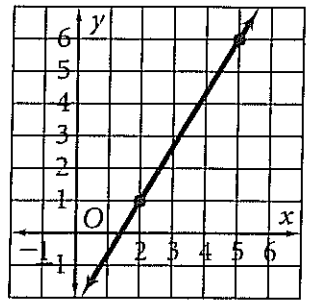
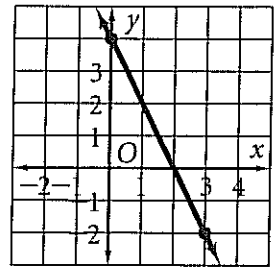
Name _____ Class _____ Date _____

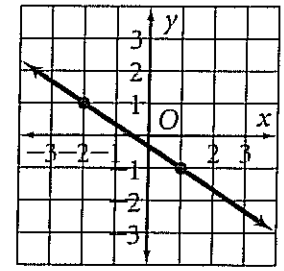
Practice 6-1

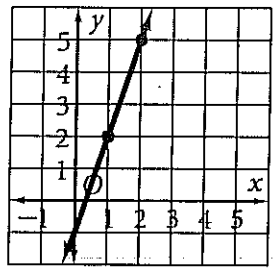
Rate of Change and Slope

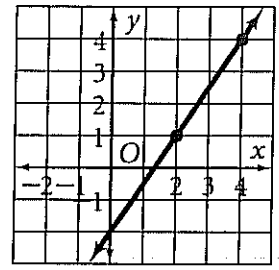
Find the slope of each line.

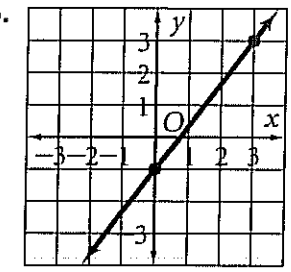
1. 

2. 

3. 

4. 

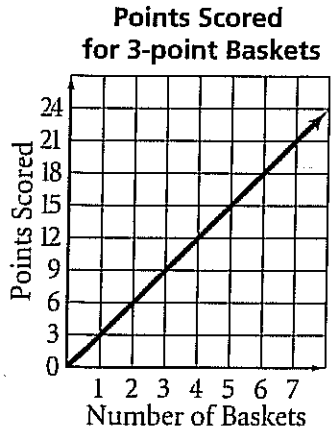
5. 

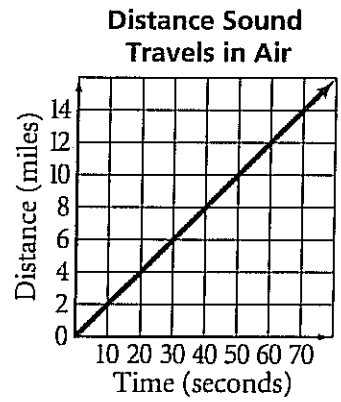
6. 

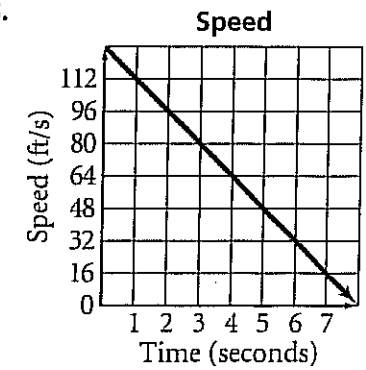
Find the slope of the line that passes through each pair of points.

7. (1, 2), (4, 3)
8. (7, 2), (3, 5)
9. (0, 2), (4, 6)
10. (−2, 5), (3, −4)
11. (2, 4), (6, 7)
12. (−2, −5), (4, 5)
13. (−3, −2), (4, −2)
14. (4, −2), (4, 9)
15. (5, 2), (8, −4)

Find the rate of change. Explain what the rate of change means for each situation.

16. 

17. 

18. 

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

19. (0, 0), (3, 7)
20. (−2, 4), (4, −1)
21. (−3, 6), (1, −2)
22. (2, 4), (4, −4)
23. (2, −10), (5, −6)
24. (5, 1), (11, 1)
25. (3, 7), (3, 5)
26. (7, 9), (2, 9)
27. (−5, −2), (−5, 3)

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Practice 6-2

Slope-Intercept Form

Find the slope and *y*-intercept of each equation. Then graph.

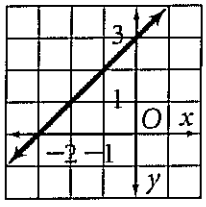
1. $y = x + 2$
2. $y + 3 = -\frac{1}{3}x$
3. $y = 2x - 1$
4. $y - \frac{3}{5}x = -1$
5. $y = \frac{1}{2}x - 4$
6. $y - 2x = -3$
7. $y = \frac{2}{5}x + 3$
8. $y + \frac{1}{3}x = -2$
9. $y = -x - 2$
10. $y - 6 = -2x$
11. $y = -5x - 2$
12. $y + x = 0$
13. $y + 4 = 2x$
14. $y = -5x + 5$
15. $y = -4 + x$
16. $y = -4x$
17. $y = \frac{4}{5}x + 2$
18. $y - \frac{3}{4}x = -5$
19. $y = -6$
20. $y - 3 = -\frac{2}{3}x$
21. $y = -\frac{7}{4}x + 6$
22. $y + 3x = 6$
23. $y + \frac{1}{5}x = -2$
24. $y = \frac{3}{7}x$

Write an equation of a line with the given slope and *y*-intercept.

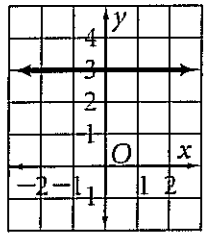
25. $m = 4, b = 8$
26. $m = -2, b = -6$
27. $m = \frac{4}{3}, b = 0$
28. $m = -\frac{9}{5}, b = -7$
29. $m = -6, b = 1$
30. $m = \frac{3}{7}, b = -1$
31. $m = -\frac{1}{5}, b = -3$
32. $m = 9, b = 4$
33. $m = -8, b = 11$
34. $m = \frac{2}{9}, b = 0$
35. $m = -11, b = 13$
36. $m = -\frac{7}{2}, b = -6$

Write the slope-intercept form of the equation for each line.

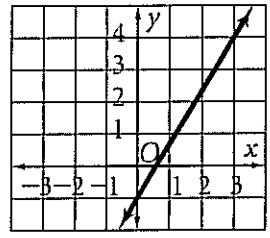
37.



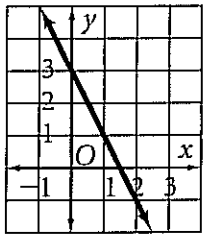
38.



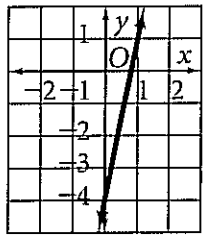
39.



40.



41.



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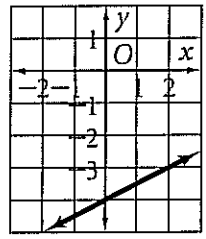

43. A television production company charges a basic fee of $4000 and then $2000 per hour when filming a commercial.

   a. Write an equation in slope-intercept form relating the basic fee and per-hour charge.

   b. Graph your equation.

   c. Use your graph to find the production costs if 4 hours of filming were needed.

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Practice 6-3

Standard Form

Graph each equation using x- and y-intercepts.

1. $x + y = 3$
2. $x + 3y = -3$
3. $-2x + 3y = 6$
4. $5x - 4y = -20$
5. $3x + 4y = 12$
6. $7x + 3y = 21$
7. $y = -2.5$
8. $2x - 3y = 4$
9. $x = 3$
10. $3x - 2y = -6$
11. $5x + 2y = 5$
12. $-7x + 2y = 14$
13. $3x + y = 3$
14. $-3x + 5y = 15$
15. $2x + y = 3$
16. $8x - 3y = 24$
17. $3x - 5y = 15$
18. $x + 4y = 4$
19. $x = -3.5$
20. $y = 6$

Write each equation in standard form using integers.

21. $y = 4x - 11$
22. $y = 2x - 6$
23. $y = -2x - 3$
24. $y = 5x - 32$
25. $y = \frac{2}{3}x - \frac{25}{3}$
26. $y = 43 - 4x$
27. $y = -\frac{4}{5}x + \frac{6}{5}$
28. $y = -\frac{x}{5}$
29. $y = \frac{5}{2}x - 22$
30. $y = \frac{7}{3}x + \frac{25}{3}$
31. $y = -\frac{x}{3} + \frac{2}{3}$
32. $y = -6x - 38$

33. The drama club sells 200 lb of fruit to raise money. The fruit is sold in 5-lb bags and 10-lb bags.
    a. Write an equation to find the number of each type of bag that the club should sell.
    b. Graph your equation.
    c. Use your graph to find two different combinations of types of bags.

34. The student council is sponsoring a carnival to raise money. Tickets cost \$5 for adults and \$3 for students. The student council wants to raise \$450.
    a. Write an equation to find the number of each type of ticket they should sell.
    b. Graph your equation.
    c. Use your graph to find two different combinations of tickets sold.

35. Anna goes to a store to buy \$70 worth of flour and sugar for her bakery. A bag of flour costs \$5, and a bag of sugar costs \$7.
    a. Write an equation to find the number of bags of each type Anna can buy.
    b. Graph your equation.

36. You have \$50 to spend on cold cuts for a party. Ham costs \$5.99/lb, and turkey costs \$4.99/lb. Write an equation in standard form to relate the number of pounds of each kind of meat you could buy.

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Practice 6-4

Point-Slope Form and Writing Linear Equations

Write an equation in point-slope form for the line through the given points or through the given point with the given slope.

1. $(5, 7), (6, 8)$
2. $(-2, 3); m = -1$
3. $(1, 2), (3, 8)$
4. $(-2, 3); m = 4$
5. $(4, 7); m = \frac{3}{2}$
6. $(6, -2); m = -\frac{4}{3}$
7. $(0, 5), (-3, 2)$
8. $(8, 11), (6, 16)$
9. $(4, 2), (-4, -2)$
10. $(15, 16), (13, 10)$
11. $(0, -7); m = -4$
12. $(-3, 4), (1, 6)$
13. $(1, 2); m$ undefined
14. $(-6, 7); m = -\frac{1}{2}$
15. $(21, -2), (27, 2)$
16. $(7, 5); m = 0$
17. $(8, -2), (14, 1)$
18. $(4, 8), (2, 12)$
19. $(-5, 13), (-10, 9)$
20. $(6, 2); m = \frac{3}{4}$
21. $(5, -3); m = -2$
22. $(4, 3.5); m = 0.5$
23. $(-6, 2); m = \frac{5}{3}$
24. $(100, 90), (80, 120)$
25. $(-3, 6), (3, -6)$
26. $(11, 7), (9, 3)$
27. $(2, 7); m = \frac{5}{2}$
28. $(-9, 8); m = -\frac{5}{3}$

Is the relationship shown by the data linear? If it is, model the data with an equation.

29.

x	y
2	3
3	7
4	11
5	15

30.

x	y
−3	4
−1	6
1	7
3	10

31.

x	y
−4	12
−1	8
5	−4
10	−8

32.

x	y
−2	5
3	−5
7	−13
11	−21

33.

x	y
−6	−5
−2	1
0	4
8	16

34.

x	y
−6	11
−3	9
6	3
15	−3

35.

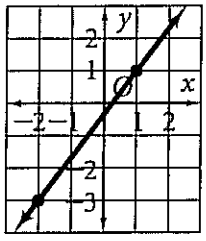
x	y
−7	−3
−5	0
−1	3
3	7

36.

x	y
−4	1
2	4
6	6
14	10

Write an equation of each line in point-slope form.

37.



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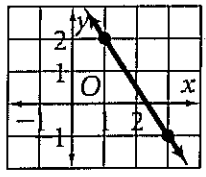
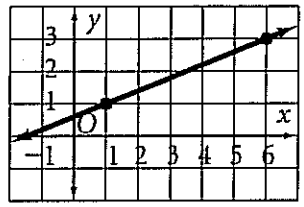


39.



Name _____ Class _____ Date _____

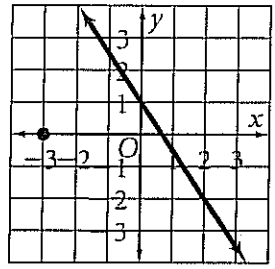
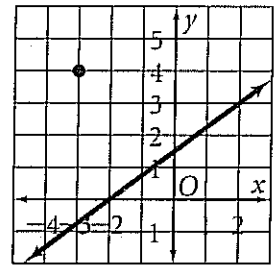
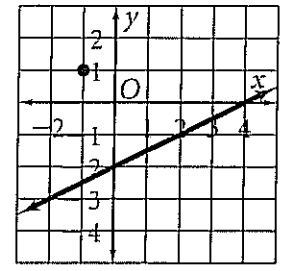
Practice 6-5

Parallel and Perpendicular Lines

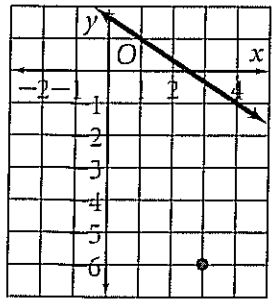
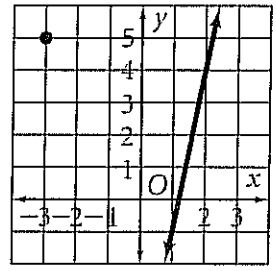
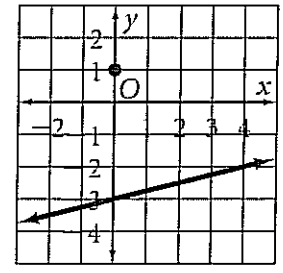
Find the slope of a line parallel to the graph of each equation.

1. $y = 4x + 2$
2. $y = \frac{2}{7}x + 1$
3. $y = -9x - 13$
4. $y = -\frac{1}{2}x + 1$
5. $6x + 2y = 4$
6. $y - 3 = 0$
7. $-5x + 5y = 4$
8. $9x - 5y = 4$
9. $-x + 3y = 6$
10. $6x - 7y = 10$
11. $x = -4$
12. $-3x - 5y = 6$

Write an equation for the line that is perpendicular to the given line and that passes through the given point.

13. $(6, 4); y = 3x - 2$
14. $(-5, 5); y = -5x + 9$
15. $(-1, -4); y = \frac{1}{6}x + 1$
16. $(1, 1); y = -\frac{1}{4}x + 7$
17. $(12, -6); y = 4x + 1$
18. $(0, -3); y = -\frac{4}{3}x - 7$
19. 
20. 
21. 

Write an equation for the line that is parallel to the given line and that passes through the given point.

22. $(3, 4); y = 2x - 7$
23. $(1, 3); y = -4x + 5$
24. $(4, -1); y = x - 3$
25. $(4,0); y = \frac{3}{2}x + 9$
26. $(-8, -4); y = -\frac{3}{4}x + 5$
27. $(9, -7); -7x - 3y = 3$
28. 
29. 
30. 

Tell whether the lines for each pair of equations are *parallel*, *perpendicular*, or *neither*.

31. $y = 3x - 8$
    $3x - y = -1$
32. $3x + 2y = -5$
    $y = \frac{2}{3}x + 6$
33. $y = -\frac{5}{2}x + 11$
    $-5x + 2y = 20$
34. $9x + 3y = 6$
    $3x + 9y = 6$
35. $y = -4$
    $y = 4$
36. $x = 10$
    $y = -2$

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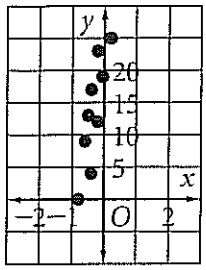
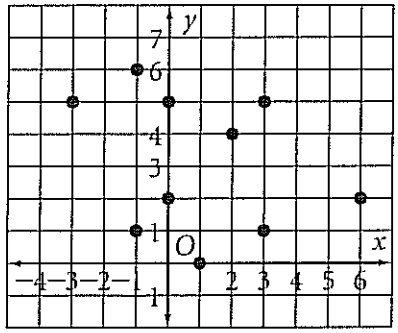
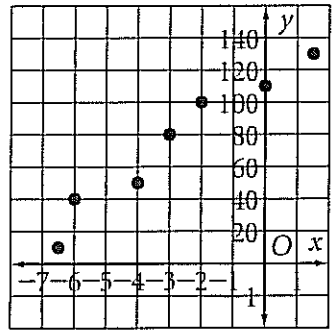
Practice 6-6

Scatter Plots and Equations of Lines

Decide whether the data in each scatter plot follow a linear pattern. If they do, find the equation of a trend line.

1. 

2. 

3. 

Use a graphing calculator to find the equation of the line of best fit for the following data. Find the value of the correlation coefficient r and determine if there is a strong correlation between the data.

4.

x	y
1	7
2	5
3	−1
4	3
5	−5

5.

x	y
1	6
2	15
3	−5
4	1
5	−2

6.

x	y
1	5
4	8
8	3
13	10
19	13

7.

x	y
12	28
15	50
18	14
21	28
24	36

Draw a scatter plot. Write the equation of the trend line.

8.

x	y
1	17
2	20
3	22
4	26
5	28
6	31

9.

Year	U.S. Union Membership (millions)
1988	17.00
1989	16.96
1990	16.74
1991	16.57
1992	16.39
1993	16.60
1994	16.75
1995	16.36
1996	16.27
1997	16.11
1998	16.21

Source: *World Almanac 2000*, p. 154.

10.

x	y
1	18
2	20
3	24
4	30
5	28
6	33

11.

Year	U.S. Unemployment Rate (%)
1988	5.5
1989	5.3
1990	5.6
1991	6.8
1992	7.5
1993	6.9
1994	6.1
1995	5.6
1996	5.4
1997	4.9
1998	4.5

Source: *World Almanac 2000*, p. 145.

Name _____ Class _____ Date _____

Practice 6-7

Graphing Absolute Value Equations

Graph each equation by translating $y = |x|$.

1. $y = |x| - 3$
2. $y = |x| + 4$
3. $y = |x| - 1$
4. $y = |x| + \frac{1}{2}$
5. $y = |x| + 2\frac{1}{2}$
6. $y = |x| + 3$
7. $y = |x + 2|$
8. $y = |x - 4|$
9. $y = |3x|$
10. $y = |x + 3| - 2$
11. $y = |x - 2| + 1$
12. $y = |x - 3| + 2$

Graph each equation by translating $y = -|x|$.

13. $y = -|x| + 1$
14. $y = -|x + 2|$
15. $y = -|x| - 5$
16. $y = -|x - 4| + 2$
17. $y = -|x - 5|$
18. $y = -|x| + 4.5$
19. $y = -|x - 3| + 1$
20. $y = -|x + 1| + 3$
21. $y = -|x + 2| - 4$

Write an equation for each translation of $y = |x|$.

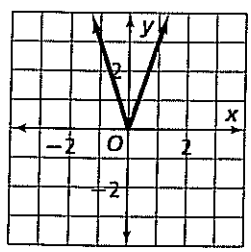
22. left 7 units
23. right 5 units
24. up 6 units
25. up 2 units, right 3 units
26. down 3 units, left 1 unit
27. down 1 unit, right 2 units
28. left 2 units, up 4 units
29. right 3 units, up 2 units
30. left 4 units, down 3.5 units

Write an equation for each translation of $y = -|x|$.

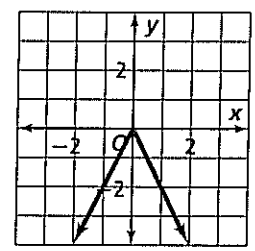
31. 3 units up
32. 3.5 units left
33. $\frac{3}{4}$ unit down
34. down 3 units
35. up 2 units, right 1 unit
36. down 5 units, left 1 unit
37. right 3 units, up 2 units
38. down 4 units, left 2 units
39. up 4 units, right 3 units

Write an equation for the given graphs.

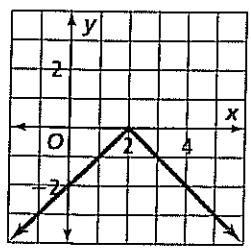
40.



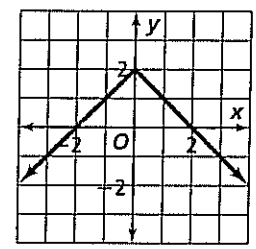
41.



42.



43.



Name _____ Class _____ Date _____

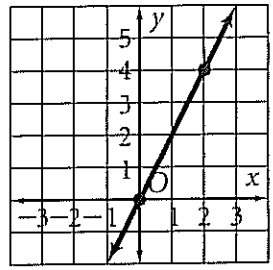
Reteaching 6-1

Rate of Change and Slope

OBJECTIVE: Calculating the slope of a line **MATERIALS:** None

Example

Calculate the slope of the line shown in the graph.



a. Pick any two points on the line. Write their coordinates. Underline the x-coordinates and circle the y-coordinates. This example uses $(\underline{0},\textcircled{0})$, $(\underline{2},\textcircled{4})$.

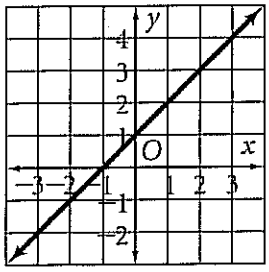
b. The difference of y-coordinates shows the vertical change or *rise*. Find the rise of the line by subtracting the y-coordinates.
vertical change = rise = $4 - 0 = 4$

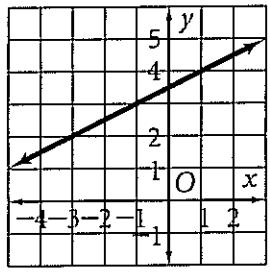
c. The difference of x-coordinates shows the horizontal change or *run*. Find the run of the line by subtracting the x-coordinates. Be sure to subtract the x-coordinates in the same order as the y-coordinates.
horizontal change = run = $2 - 0 = 2$

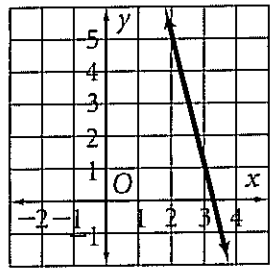
d. Find the slope of the line through the two points by forming the ratio of rise to run.
slope = $\frac{\text{rise}}{\text{run}} = \frac{4}{2}$ or 2

Exercises

Use steps a–d from the example to find the slope of each line.

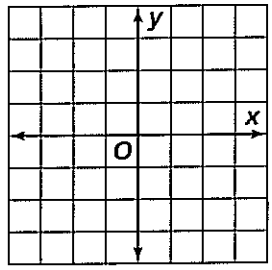
1. 

2. 

3. 

4. Draw a horizontal line. Find the slope of the line.

5. Draw a vertical line. Find the slope of the line.



Name _____ Class _____ Date _____

Reteaching 6-2

Slope-Intercept Form

OBJECTIVE: Using the slope and y-intercept to draw graphs and write equations

MATERIALS: Graph paper, counters, ten index cards

Write these numbers on the index cards, one number to a card: $1, -1, 2, -2, \frac{1}{2}, -\frac{1}{2}, 3, -3, \frac{1}{3}, -\frac{1}{3}$. These numbers represent different slopes.

- Draw a coordinate plane on the graph paper.
- Put a counter at any integer on the y-axis. Choose one of the index cards.
- Use the y-intercept shown by the counter and the slope shown on the card to write the equation of a line.
- Draw the graph of that line.

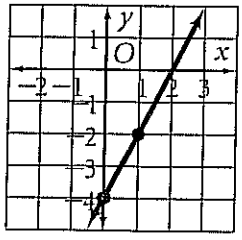
Example

Place the counter at -4. Choose the index card with the number 2.

$y = mx + b$ ← **Write the slope-intercept form of the equation of a straight line. The counter shows that $b = -4$. The first card gives a slope of 2, so $m = 2$.**

$y = 2x + (-4)$ ← **Substitute the values shown by the counter and the card.**

$y = 2x - 4$ ← **Write the equation of the line in simplified form.**



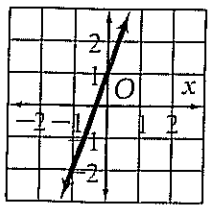
← **Slope $= \frac{\text{vertical change}}{\text{horizontal change}}$, so rewrite 2 as $\frac{2}{1}$. Starting at the counter, move 2 units up and 1 unit to the right and place a second counter. Draw a straight line joining the two points for the graph of $y = 2x - 4$.**

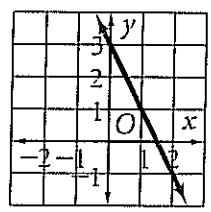
Exercises

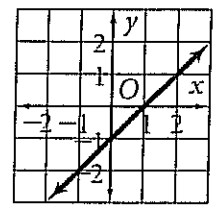
Place the counter. Then choose an index card.

1. Write the equation of the line.
2. Draw the graph.

Write an equation for each line.

3. 

4. 

5. 

Name _____ Class _____ Date _____

Reteaching 6-3

Standard Form

OBJECTIVE: Graphing equations using x- and y-intercepts

MATERIALS: Small self-stick removable notes

Example

Graph $4x + 5y = 20$ using x- and y-intercepts.

a. Write the equation in large figures so that each term is slightly smaller than a self-stick note.

b. Write a zero on a self-stick note.

c. Place the note over the $4x$. Solve the remaining equation.

$$0 + 5y = 20$$
$$5y = 20$$
$$y = 4$$

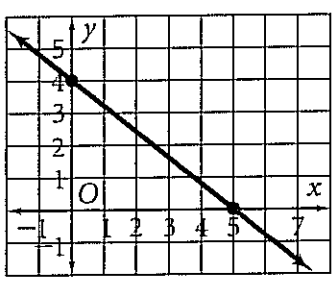
This gives us the point of the y-intercept: $(0, 4)$.

d. Place the note over the $5y$. Solve the remaining equation.

$$4x + 0 = 20$$
$$4x = 20$$
$$x = 5$$

This gives us the point of the x-intercept: $(5, 0)$.

e. Graph the two points. Draw the line between them.



Exercises

Graph each equation using steps a–e.

1. $3x + 4y = 36$
2. $5x + 3y = 15$
3. $7x - 4y = 28$
4. $4x - 3y = 9$
5. $10x + 30y = 90$
6. $6x + 3y = 12$

Name _____ Class _____ Date _____

Reteaching 6-4

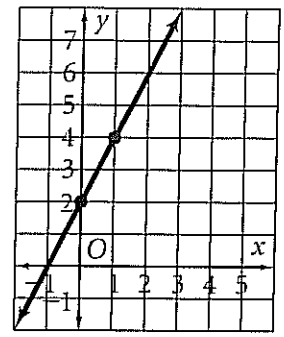
Point-Slope Form and Writing Linear Equations

OBJECTIVE: Writing an equation given the graph of a line or two points on a line

MATERIALS: Graph paper

Example

Write an equation for the line shown in point-slope form.



a. Select any two points on the line. It is a good idea to select points whose coordinates are integers.
(0, 2) and (1, 4) lie on the line.

b. Use slope $= \frac{\text{rise}}{\text{run}}$ to find the slope.
From (0, 2), move up 2 units (rise = +2) and right 1 unit (run = +1) to get to (1, 4). So, $\frac{\text{rise}}{\text{run}} = \frac{+2}{+1} = 2$.
or
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the slope.
If $(x_1, y_1) = (0, 2)$ and $(x_2, y_2) = (1, 4)$, then $m = \frac{4 - 2}{1 - 0} = \frac{2}{1} = 2$.

c. Use the point-slope form to write the equation.
Substitute $m = 2$ and $(x_1, y_1) = (0, 2)$.
$y - y_1 = m(x - x_1)$
$y - 2 = 2(x - 0)$
$y - 2 = 2x$

or

Substitute $m = 2$ and $(x_1, y_1) = (1, 4)$.
$y - y_1 = m(x - x_1)$
$y - 4 = 2(x - 1)$

Note: If you rewrite $y - 2 = 2x$ and $y - 4 = 2(x - 1)$ in slope-intercept form, you get $y = 2x + 2$. Although the two equations look different, they do represent the same line.

Exercises

Graph the line through the given points. Then follow steps a–c from the Example to write the equation of the line passing through the given points in point-slope form.

1. (6, 4), (4, 3)
2. (0, −18), (5, 2)
3. (−2, −2), (−4, 2)
4. (−4, 5), (2, 5)

Write an equation for the line through the given points in point-slope form.

5. (2, −5), (0, −7)
6. (4, 3), (3, −2)
7. (2, −1), (−1, 8)
8. (−3, 4), (3, 8)
9. (4, −1), (−8, 2)
10. (5, −2), (−4, −2)
11. (−2, −6), (8, 4)
12. (−4, 1), (−2, 2)
13. (6, −6), (−3, −12)
14. (0, 0), (8, 7)
15. (0, −2), (8, −6)
16. (2, 7), (−6, −5)
17. (−1, −10), (5, 2)
18. (0, 7), (−5, 12)
19. (0, 1), (4, −7)

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Reteaching 6-5

Parallel and Perpendicular Lines

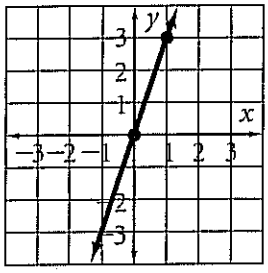
OBJECTIVE: Writing equations for parallel and perpendicular lines

MATERIALS: Graph paper and two items that can be used to represent lines such as pencils, straws, or coffee stirrers

Example

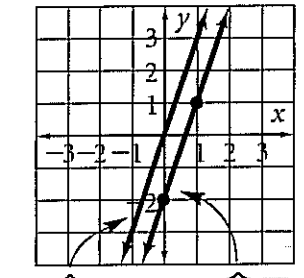
Write an equation for the line that is parallel to $y = 3x$, and contains $(0, -2)$. Then, write an equation for the line that is perpendicular to $y = 3x$ and contains $(0, -2)$.

On a piece of graph paper, draw a grid like the one shown below. Comparing $y = 3x$ to $y = mx + b$, we see that the line has y-intercept 0 and its slope is 3 or $\frac{3}{1}$. This means that the graph contains $(0, 0)$ and a point 3 units up and 1 unit right from there, $(1, 3)$. Place a pencil or other object on the grid that joins the points $(0, 0)$ and $(1, 3)$.



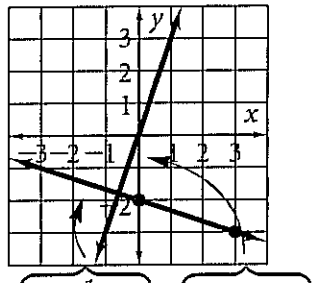
$y = 3x$

Place a second pencil on the grid so that it is parallel to the first pencil. Notice that you can move your second pencil to many other places on the grid and still have it parallel to your first pencil. Now, place your second pencil so that it contains $(0, -2)$, keeping it parallel to your first pencil. You have only one correct placement. Count units to verify that the slope of the line represented by your second pencil is also $\frac{3}{1}$ or 3. This line has slope $m = 3$ and y-intercept $b = -2$. So, its equation is $y = 3x - 2$.



$y = 3x$ $\quad y = 3x - 2$

Leaving your first pencil in place, move the second pencil so that it is perpendicular to the first. Now, place your second pencil so that it contains $(0, -2)$, keeping it perpendicular to the first pencil. You have only one correct placement. Count units to verify that the slope of the line represented by your second pencil is $-\frac{1}{3}$. Recall that the product of the slopes of perpendicular lines is -1, so $3(-\frac{1}{3}) = -1$. This line has slope $m = -\frac{1}{3}$ and y-intercept $b = -2$. So, its equation is $y = -\frac{1}{3}x - 2$.



$y = -\frac{1}{3}x - 2$ $\quad y = 3x$

Exercises

Follow the steps above to find an equation of the line parallel to the given line that contains the given y-intercept. Then find an equation of the line perpendicular to the given line that contains the given y-intercept.

1. $y = 5x; (0, -1)$
2. $y = -3x; (0, 4)$
3. $y = 2x + 1; (0, -3)$
4. $y = -\frac{1}{4}x - 2; (0, 2)$
5. $y = \frac{1}{2}x + 2; (0, -1)$
6. $y = -\frac{1}{2}x; (0, 2)$
7. $y = -3x - 1; (0, 2)$
8. $y = \frac{2}{3}x + 1; (0, -2)$
9. $y = 3x - 4; (0, 6)$

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Reteaching 6-6

Scatter Plots and Equations of Lines

OBJECTIVE: Finding the equation of a trend line **MATERIALS:** None

Example

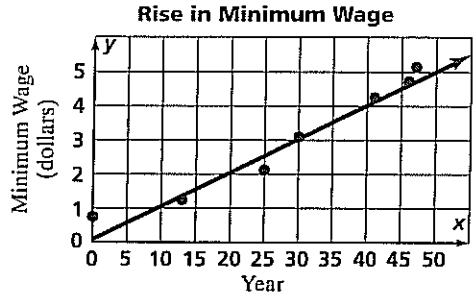
Find an equation of a reasonable trend line for the data.

Rise in Minimum Wage

Year	Minimum Wage
1950	$.75
1963	$1.25
1975	$2.10
1980	$3.10
1991	$4.25
1996	$4.75
1997	$5.15

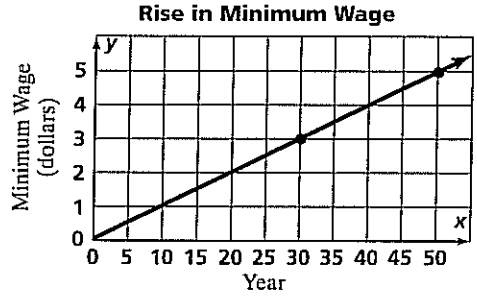
Source: *World Almanac 2001*, p. 150.

a. Graph the points and draw a trend line. Let 0 correspond to 1950.



b. Pick any two points that appear to lie on the trend line, for example, (30, 3) and (50, 5).

c. On a new grid, graph the two points you selected. Draw the line through these two points.



d. Find the slope of the trend line.

$$\text{slope} = \frac{\text{number of units up}}{\text{number of units across}} = \frac{\text{rise}}{\text{run}} = \frac{2}{20} = \frac{1}{10}$$

e. Make substitutions to obtain the equation of the line using either (30, 3) or (50, 2) as (x_1, y_1).

$y - y_1 = m(x - x_1)$ ← **Use point-slope form.**

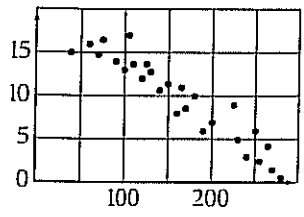
$y - 3 = \frac{1}{10}(x - 30)$ ← **Substitute $\frac{1}{10}$ for m, 3 for y, and 30 for x.**

The equation $y - 3 = \frac{1}{10}(x - 30)$ models the rise in minimum wage.

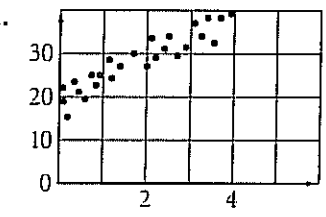
Exercises

Find an equation of a reasonable trend line for each scatter plot.

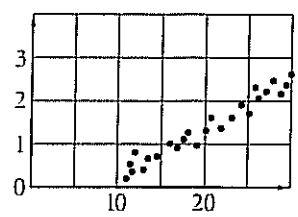
1.



2.



3.



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Reteaching 6-7

Graphing Absolute Value Equations

OBJECTIVE: To translate an absolute value equation

MATERIALS: None

An absolute value equation has a graph that looks like a *V* and it points either upward or downward.

A translation shifts a graph from its home position horizontally (left or right), vertically (up or down), or in some cases both. Translating a graph does not change its shape, but moves it to a different position.

Example

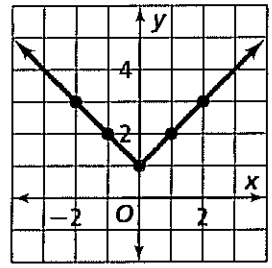
Graph $y = |x| + 1$.

Start with the graph of $y = |x|$.

Remember this is a *V*-shaped graph pointing upward with its vertex at the origin.
The + 1 tells us that the the graph will be shifted up 1 unit.
If the equation were $y = |x| - 1$, then the graph would be shifted down 1 unit.
You could also make a table of values.

$y = \|x\| + 1$	
x	y
−2	3
−1	2
0	1
1	2
2	3

Substitute values for x and then plot the points.



Remember that an equation in the form $y = |x + 4|$ would be shifted horizontally. The shift would be the ***opposite*** of the sign inside the absolute value symbols.

For example, $y = |x - 3|$ would shift to the right (positive direction) 3 units.
$y = |x + 3|$ would shift to the left (negative direction) 3 units.

Exercises

In which direction would each absolute value equation shift and by how many units?

1. $y = |x| + 12$
2. $y = |x| - 15$
3. $y = |x + 13|$
4. $y = |x - 15|$

Graph each absolute value equation.

5. $y = |x| + 1$
6. $y = |x| - 2$
7. $y = |x - 3|$
8. $y = |x + 3|$

Chapter 6 Answers

Practice 6-1

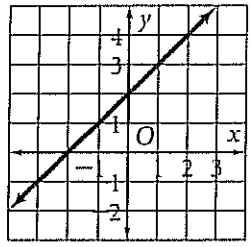
1. $\frac{5}{3}$ **2.** -2 **3.** $-\frac{2}{3}$ **4.** 3 **5.** $\frac{3}{2}$ **6.** $\frac{4}{3}$ **7.** $\frac{1}{3}$ **8.** $-\frac{3}{4}$ **9.** 1
10. $-\frac{9}{5}$ **11.** $\frac{3}{4}$ **12.** $\frac{5}{3}$ **13.** 0 **14.** undefined **15.** -2

16. 3; point score increases by 3 for each 3-point basket.
17. $\frac{1}{5}$; sound travels 1 mi for each 5 s.

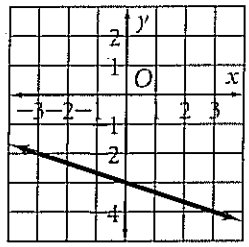
18. -16; the speed decreases 16 ft/s every second. **19.** $\frac{7}{3}$
20. $-\frac{5}{6}$ **21.** -2 **22.** -4 **23.** $\frac{4}{3}$ **24.** 0 **25.** undefined
26. 0 **27.** undefined

Practice 6-2

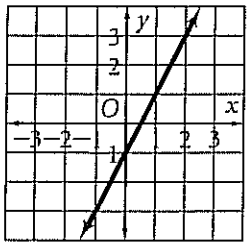
1. 1; 2



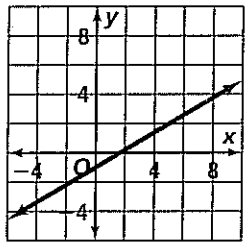
2. $-\frac{1}{3}$; -3



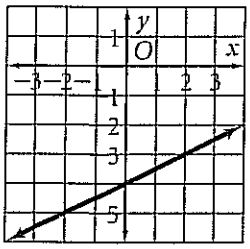
3. 2; -1



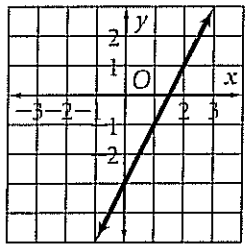
4. $\frac{3}{5}$; -1



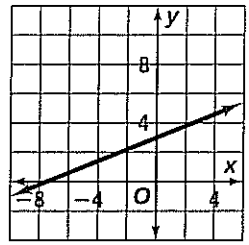
5. $\frac{1}{2}$; -4



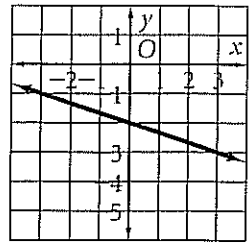
6. 2; -3



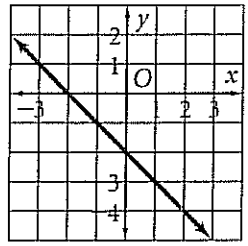
7. $\frac{2}{5}$; 3



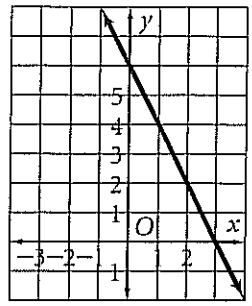
8. $-\frac{1}{3}$; -2



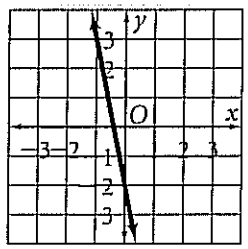
9. -1; -2



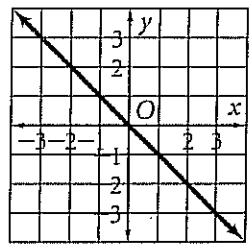
10. -2; 6



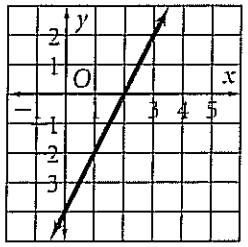
11. -5; -2



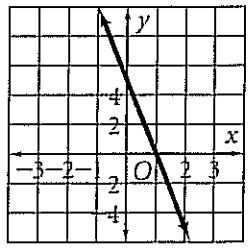
12. -1; 0



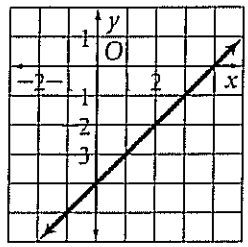
13. 2; -4



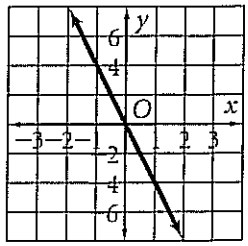
14. -5; 5



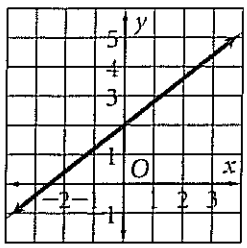
15. 1; -4



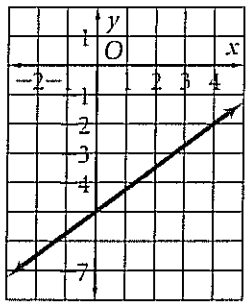
16. -4; 0



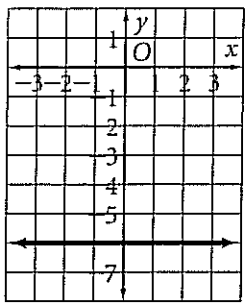
17. $\frac{4}{5}$; 2



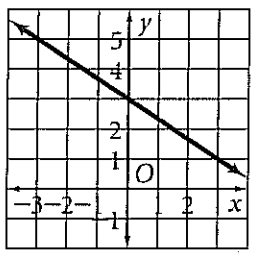
18. $\frac{3}{4}$; -5



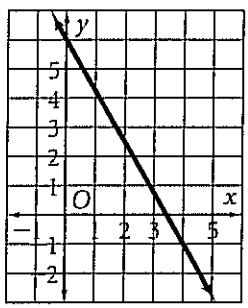
19. 0; -6



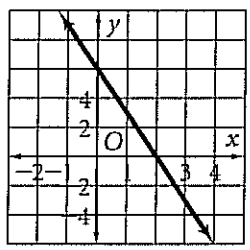
20. $-\frac{2}{3}$; 3



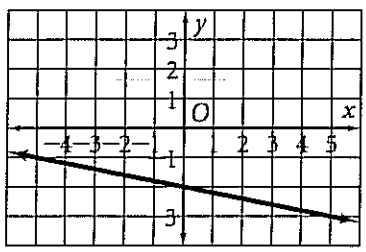
21. $-\frac{7}{4}$; 6



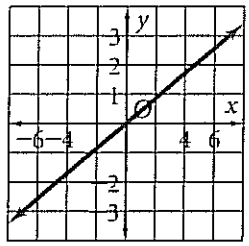
22. -3; 6



23. $-\frac{1}{5}$; -2



24. $\frac{3}{7}$; 0



25. $y = 4x + 8$ **26.** $y = -2x - 6$ **27.** $y = \frac{4}{3}x$

28. $y = -\frac{9}{5}x - 7$ **29.** $y = -6x + 1$ **30.** $y = \frac{3}{7}x - 1$

31. $y = -\frac{1}{5}x - 3$ **32.** $y = 9x + 4$ **33.** $y = -8x + 11$

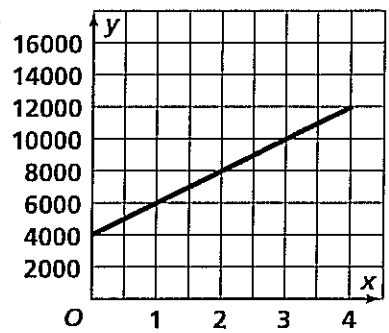
34. $y = \frac{2}{9}x$ **35.** $y = -11x + 13$ **36.** $y = -\frac{7}{2}x - 6$

37. $y = x + 3$ **38.** $y = 3$ **39.** $y = \frac{5}{3}x - 1$

40. $y = -2x + 3$ **41.** $y = 5x - 4$

42. $y = \frac{1}{2}x - 4$ **43a.** $y = 2000x + 4000$

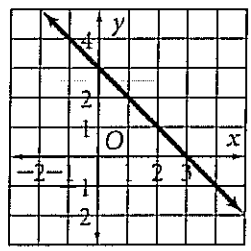
43b.



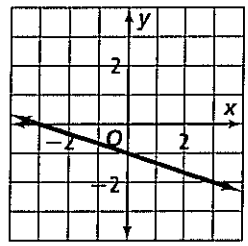
43c. $12,000

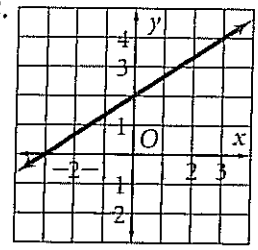
Practice 6-3

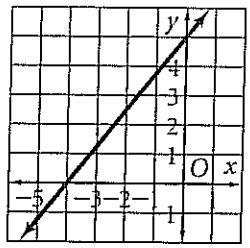
1.

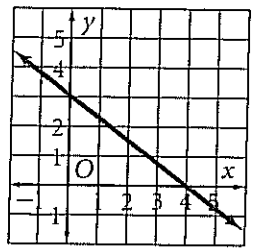


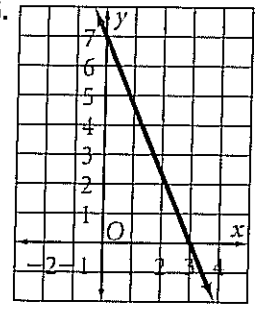
2.

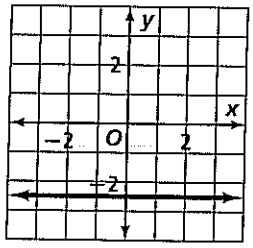


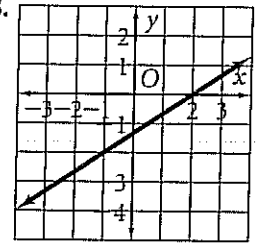
3. 

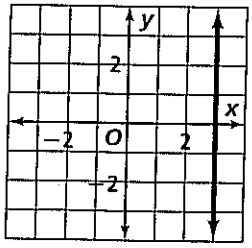
4. 

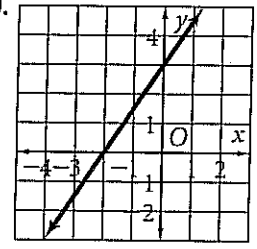
5. 

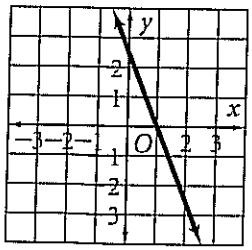
6. 

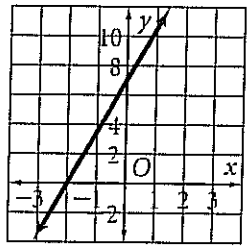
7. 

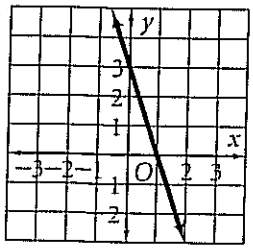
8. 

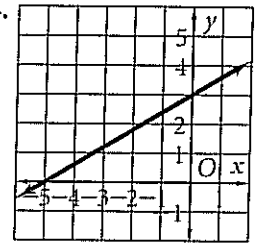
9. 

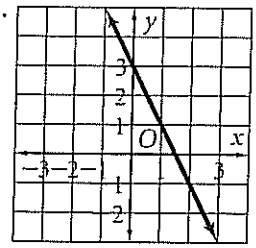
10. 

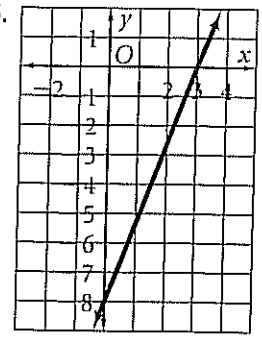
11. 

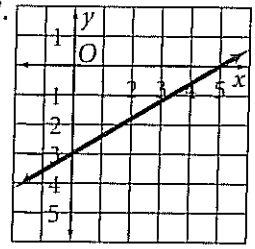
12. 

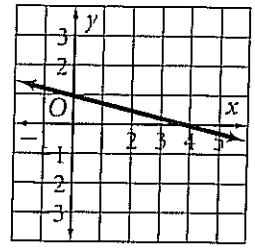
13. 

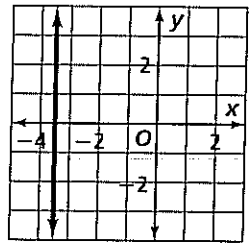
14. 

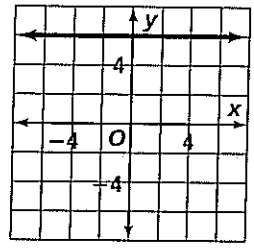
15. 

16. 

17. 

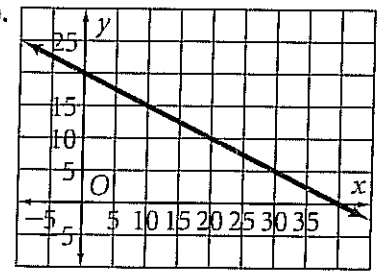
18. 

19. 

20. 

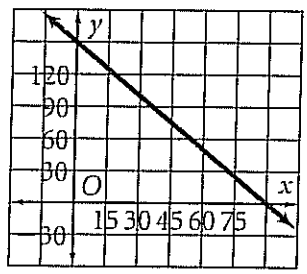
21. $-4x + y = -11$ **22.** $-2x + y = -6$
23. $2x + y = -3$ **24.** $-5x + y = -32$
25. $-2x + 3y = -25$ **26.** $4x + y = 43$
27. $4x + 5y = 6$ **28.** $x + 5y = 0$ **29.** $-5x + 2y = -44$
30. $-7x + 3y = 25$ **31.** $x + 3y = 2$ **32.** $6x + y = -38$

33a. $5x + 10y = 200$

33b. 

33c. Answers may vary. Sample: (6 5-lb bags, 17 10-lb bags), or (12 5-lb bags, 14 10-lb bags)

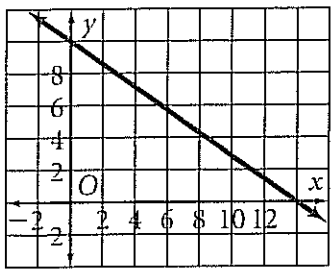
34a. $5x + 3y = 450$

34b. 

34c. Answers may vary. Sample: (75 adult, 25 student), (60 adult, 50 student)

35a. $5x + 7y = 70$

35b.



36. $5.99x + 4.99y = 50$

Practice 6-4

Note: One possible form of the answer is given.

1. $y - 8 = x - 6$ **2.** $y - 3 = -1(x + 2)$

3. $y - 8 = 3(x - 3)$ **4.** $y - 3 = 4(x + 2)$

5. $y - 7 = \frac{3}{2}(x - 4)$ **6.** $y + 2 = -\frac{4}{3}(x - 6)$

7. $y - 2 = x + 3$ **8.** $y - 16 = -\frac{5}{2}(x - 6)$

9. $y + 2 = \frac{1}{2}(x + 4)$ **10.** $y - 10 = 3(x - 13)$

11. $y + 7 = -4x$ **12.** $y - 6 = \frac{1}{2}(x - 1)$ **13.** $x = 1$

14. $y - 7 = -\frac{1}{2}(x + 6)$ **15.** $y - 2 = \frac{2}{3}(x - 27)$

16. $y = 5$ **17.** $y - 1 = \frac{1}{2}(x - 14)$

18. $y - 12 = -2(x - 2)$ **19.** $y - 9 = \frac{4}{5}(x + 10)$

20. $y - 2 = \frac{3}{4}(x - 6)$ **21.** $y + 3 = -2(x - 5)$

22. $y - 3.5 = 0.5(x - 4)$ **23.** $y - 2 = \frac{5}{3}(x + 6)$

24. $y - 120 = -\frac{3}{2}(x - 80)$ **25.** $y + 6 = -2(x - 3)$

26. $y - 3 = 2(x - 9)$ **27.** $y - 7 = \frac{5}{2}(x - 2)$

28. $y - 8 = -\frac{5}{3}(x + 9)$ **29.** yes; $y - 3 = 4(x - 2)$

30. no **31.** no **32.** yes; $y - 5 = -2(x + 2)$

33. yes; $y + 5 = \frac{3}{2}(x + 6)$

34. yes; $y - 11 = -\frac{2}{3}(x + 6)$

35. no **36.** yes; $y - 1 = \frac{1}{2}(x + 4)$

37. $y - 1 = \frac{4}{3}(x - 1)$ **38.** $y - 2 = -\frac{3}{2}(x - 1)$

39. $y - 1 = \frac{2}{5}(x - 1)$

Practice 6-5

1. 4 **2.** $\frac{2}{7}$ **3.** −9 **4.** $-\frac{1}{2}$ **5.** −3 **6.** 0 **7.** 1 **8.** $\frac{9}{5}$ **9.** $\frac{1}{3}$

10. $\frac{6}{7}$ **11.** undefined **12.** $-\frac{3}{5}$ **13.** $y = -\frac{1}{3}x + 6$

14. $y = \frac{1}{5}x + 6$ **15.** $y = -6x - 10$ **16.** $y = 4x - 3$

17. $y = -\frac{1}{4}x - 3$ **18.** $y = \frac{3}{4}x - 3$

19. $y = \frac{2}{3}x + 2$ **20.** $y = -\frac{4}{3}x$ **21.** $y = -2x - 1$

22. $y = 2x - 2$ **23.** $y = -4x + 7$ **24.** $y = x - 5$

25. $y = \frac{3}{2}x - 6$ **26.** $y = -\frac{3}{4}x - 10$

27. $y = -\frac{7}{3}x + 14$ **28.** $y = -\frac{2}{3}x - 4$

29. $y = 5x + 20$ **30.** $y = \frac{1}{4}x + 1$ **31.** parallel

32. perpendicular **33.** neither **34.** neither **35.** parallel

36. perpendicular

Practice 6-6

1. Answers may vary. Sample: $y = 30x + 25$

2. not linear

3. Answers may vary. Sample: $y = 15x + 120$

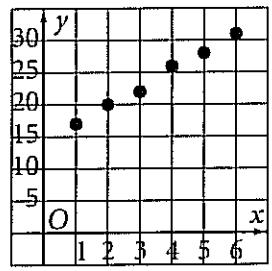
4. $y = -2.6x + 9.6$; −0.8535; yes

5. $y = -3x + 12$; −0.6049; no

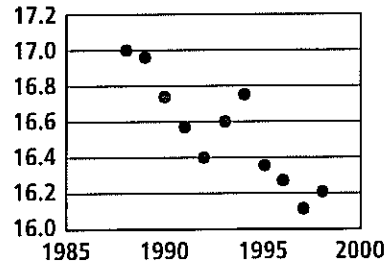
6. $y = 0.4223x + 3.9990$; 0.7649; yes

7. $y = -0.2x + 34.8$; −0.0721; no

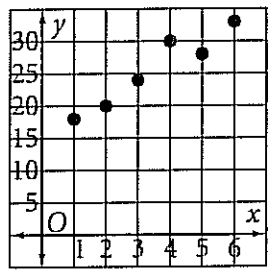
8. Answers may vary. Sample: $y = 3x + 15$



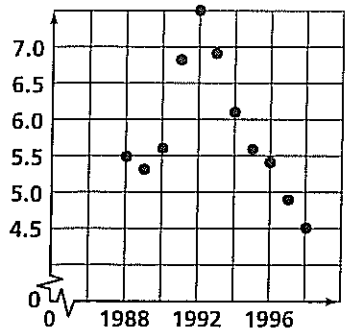
9. Answers may vary. Sample: $y = -0.0857x + 17.3$



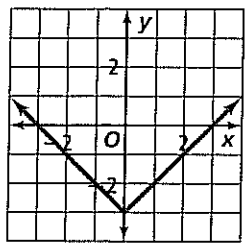
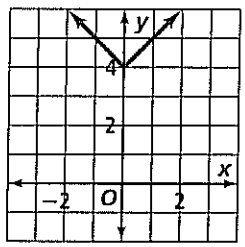
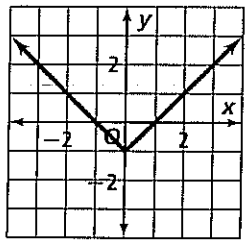
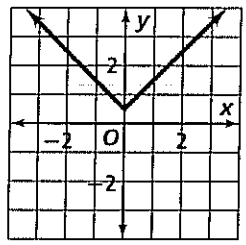
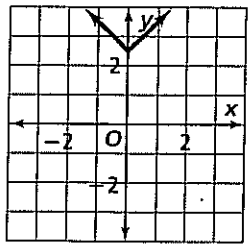
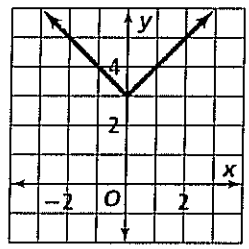
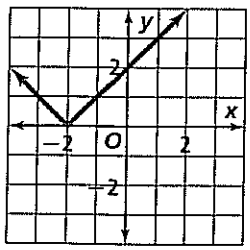
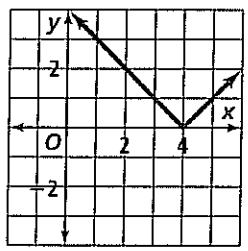
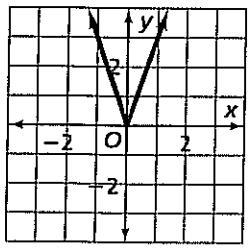
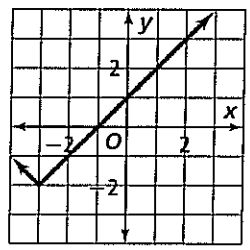
10. Answers may vary. Sample: $y = 3x + 15$

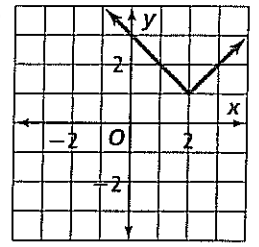
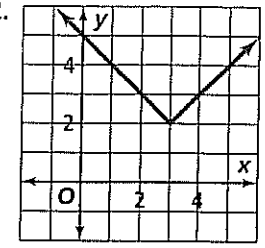
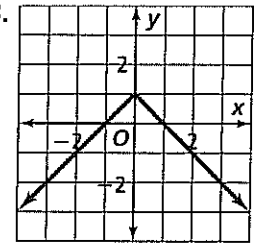
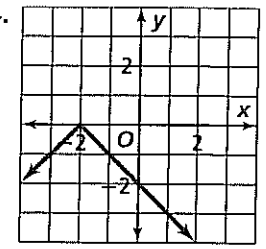
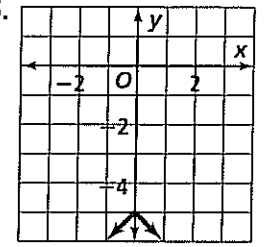
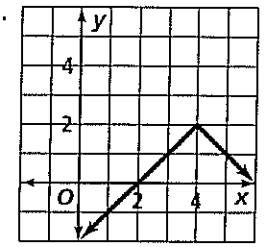
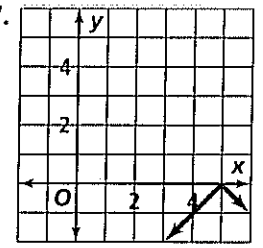
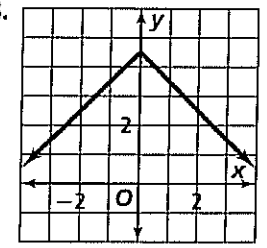
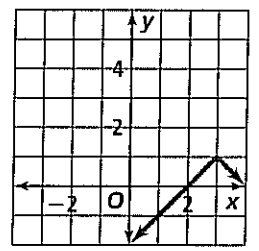
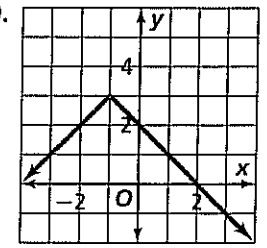
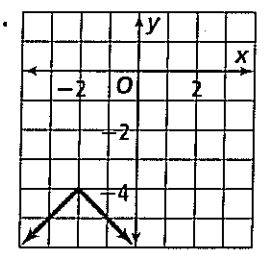


11. Answers may vary. Sample: $y = -0.1x + 15$



Practice 6-7

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

11. 
12. 
13. 
14. 
15. 
16. 
17. 
18. 
19. 
20. 
21. 

22. $y = |x + 7|$ 23. $y = |x - 5|$
24. $y = |x| + 6$ 25. $y = |x - 3| + 2$
26. $y = |x + 1| - 3$ 27. $y = |x - 2| - 1$
28. $y = |x + 2| + 4$ 29. $y = |x - 3| + 2$
30. $y = |x + 4| - 3.5$ 31. $y = -|x| + 3$

32. $y = -|x + 3.5|$ **33.** $y = -|x| - \frac{3}{4}$
34. $y = -|x| - 3$ **35.** $y = -|x - 1| + 2$
36. $y = -|x + 1| - 5$ **37.** $y = -|x - 3| + 2$
38. $y = -|x + 2| - 4$ **39.** $y = -|x - 3| + 4$
40. $y = |3x|$ **41.** $y = -|2x|$ **42.** $y = -|x - 2|$
43. $y = -|x| + 2$

Reteaching 6-1

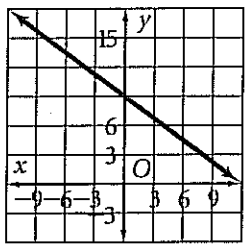
1. 1 **2.** $\frac{1}{2}$ **3.** -4 **4.** 0 **5.** undefined

Reteaching 6-2

1. Check students' work. **2.** Check students' work.
3. $y = 3x + 1$ **4.** $y = -2x + 3$ **5.** $y = x - 1$

Reteaching 6-3

1.



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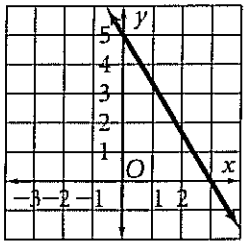

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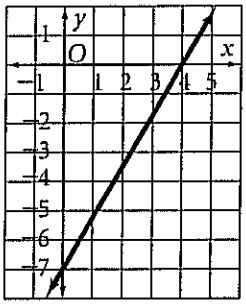

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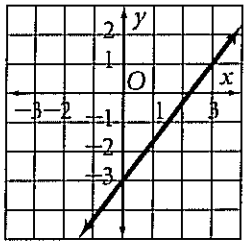

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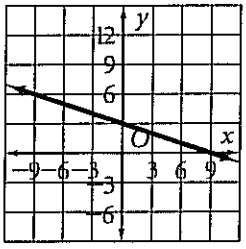

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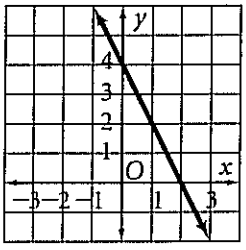


Reteaching 6-4

Note: One possible form of the answer is given.

1. $y - 3 = \frac{1}{2}(x - 4)$ **2.** $y - 2 = 4(x - 5)$
3. $y - 2 = -2(x + 4)$ **4.** $y = 5$ **5.** $y + 5 = x - 2$
6. $y - 3 = 5(x - 4)$ **7.** $y + 1 = -3(x - 2)$
8. $y - 4 = \frac{2}{3}(x + 3)$ **9.** $y + 1 = -\frac{1}{4}(x - 4)$
10. $y = -2$ **11.** $y - 4 = x - 8$ **12.** $y - 1 = \frac{1}{2}(x + 4)$
13. $y + 6 = \frac{2}{3}(x - 6)$ **14.** $y = \frac{7}{8}x$ **15.** $y + 2 = -\frac{1}{2}x$
16. $y - 7 = \frac{3}{2}(x - 2)$ **17.** $y + 10 = 2(x + 1)$
18. $y - 7 = -x$ **19.** $y - 1 = -2x$

Reteaching 6-5

1. $y = 5x - 1; y = -\frac{1}{5}x - 1$

2. $y = -3x + 4; y = \frac{1}{3}x + 4$

3. $y = 2x - 3; y = -\frac{1}{2}x - 3$

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

5. $y = \frac{1}{2}x - 1; y = -2x - 1$

6. $y = -\frac{1}{2}x + 2; y = 2x + 2$

7. $y = -3x + 2; y = \frac{1}{3}x + 2$

8. $y = \frac{2}{3}x - 2; y = -\frac{3}{2}x - 2$

9. $y = 3x + 6; y = -\frac{1}{3}x + 6$

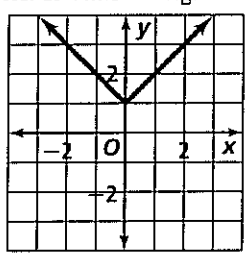
Reteaching 6-6

1. Answers may vary. Sample: $y = -0.075x + 21$
2. Answers may vary. Sample: $y = 4x + 20$
3. Answers may vary. Sample: $y = 0.12x - 1.2$

Reteaching 6-7

1. up 12 units **2.** down 15 units
3. left 13 units **4.** right 15 units

5.



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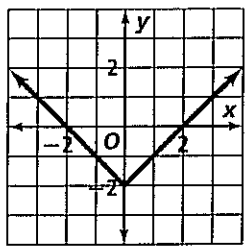

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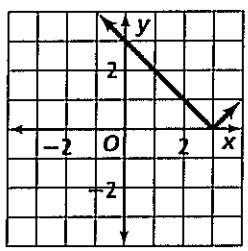

8.