LESSON 4.1 – GRAPHING EQUATIONS

OVERVIEW

Here's what you'll learn in this lesson:

Graphing Lines I

a. Definition of a linear equation in two variables

b. Recognizing linear equations in two variables

c. Solutions of linear equations

d. Graphing a linear equation by plotting ordered pairs

Graphing Lines II

a. Equations and graphs of horizontal and vertical lines

b. The intercepts of a line

c. Graphing a linear equation by finding the intercepts

Slope of a Line

a. Definition of the slope of a line

b. Positive slope, negative slope, zero slope, undefined slope

c. Graphing a line given a point and the slope

d. Parallel and perpendicular lines

You may notice a relationship between the number of hours you work and the amount of money you earn; between the number of students in your class and the amount of time your professor spends grading tests; and between the distance you drive and the amount of gas you have left.

Any time you know the relationship between two quantities, you may be able to better understand the relationship by drawing its graph. If the relationship is linear, its graph will be a straight line.

In this lesson, you will learn how to graph a line. First, you will learn how to graph a line by plotting points whose coordinates satisfy the equation of the line. Then, you will learn about the slope of a line, and how to graph a line given the slope of the line and the coordinates of a single point on the line.

EXPLAIN

GRAPHING LINES I

Summary

Linear Equations

A linear equation in two variables is an algebraic representation of a line.

To find a solution of a linear equation:

1. Pick a number for one of the variables and substitute it into the equation.

2. Solve the equation for the other variable.

For example, to find one solution of the equation $x + y = 4$:

1.	Pick a value for x, say $x = -1$, and substitute it into the equation.	$x + y = 4$ $-1 + y = 4$
2.	Solve for the other variable.	$y = 5$

So, one solution of the linear equation $x + y = 4$ is $x = -1$, $y = 5$.

The solution can be written as an ordered pair: (–1, 5).

For any linear equation, no matter what number you choose for x, you can always find the value of y that makes the linear equation true. So there are infinitely many solutions to any linear equation.

Below is an xy-table that shows several solutions of the linear equation $x + y = 4$:

x	y
–1	5
0	4
1	3
2	2
3	1

Graphing Linear Equations

The graph of a linear equation is a line.

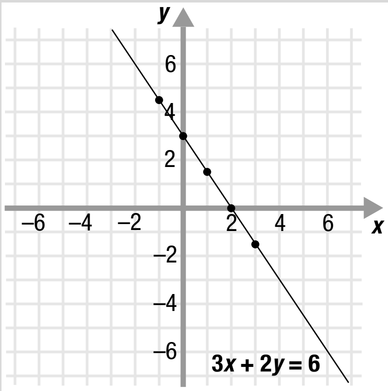
To graph a linear equation:

1. Make a table of ordered pairs that satisfy the equation.

2. Plot these ordered pairs.

3. Draw a line through the plotted points.

For example, to graph the linear equation $3x + 2y = 6$:



1. Make a table of ordered pairs that satisfy the equation.

x	y
–1	4.5
0	3
1	1.5
2	0
3	–1.5

2. Plot these ordered pairs.

3. Draw a line through the plotted points.

Sample Problems

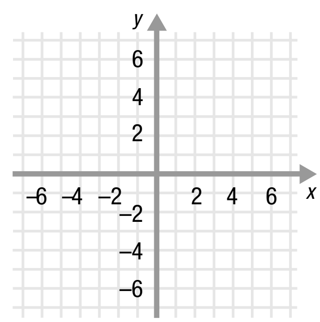
1. Graph the equation $x + y = -3$.

✔ a. Make a table of ordered pairs that satisfy the equation.

x	y
–2	–1
–1	–2
0	–3
1	–4
2	–5
3	–6

☐ b. Plot these ordered pairs.

☐ c. Draw a line through the plotted points.



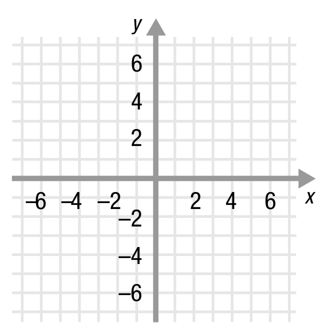
2. Graph the equation $2x - y = 6$.

☐ a. Make a table of ordered pairs that satisfy the equation.

x	y
1	___
___	0
0	___
___	–2

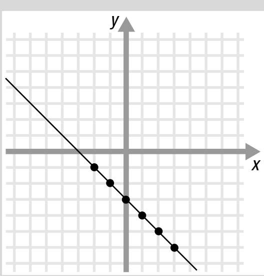
☐ b. Plot these ordered pairs.

☐ c. Draw a line through the plotted points.



Answers to Sample Problems

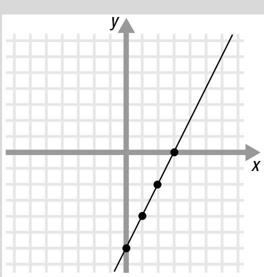
b., c.



a.

x	*y*
1	*–4*
3	*0*
0	*–6*
2	*–2*

b., c.



GRAPHING LINES II

Summary

Linear Equations

A linear equation in two variables, x and y, can be written in the form $Ax + By = C$, where A and B are real numbers that are not both zero. The graph of a linear equation is a straight line.

Since two points determine a line, you can use any two points that satisfy the equation to determine the graph of a line.

In a linear equation, all of the variables are raised to the first power. For example, the equation $2x - 5y = 8$ is a linear equation, but the equation $3x^2 + 2x - 5 = 8$ is not.

*Even though you only **have** to have two points to graph a line, it's a good idea to use more than two. That way, if any of your points don't lie on the line you can tell you've made a mistake.*

Horizontal and Vertical Lines

In a linear equation of the form $Ax + By = C$, if A is 0, you get a horizontal line. If B is 0, you get a vertical line.

For example, if $A = 0$, $B = 1$, and $C = -2$, the linear equation simplifies to:

$$\begin{aligned} 0x + 1y &= -2 \\ 0 + y &= -2 \\ y &= -2 \end{aligned}$$

To graph the linear equation $y = -2$:

1. Make a table of ordered pairs that satisfy the equation.
2. Plot these ordered pairs on a grid. (See Figure 4.1.0.)
3. Draw a line through the plotted points.

x	y
2	–2
–5	–2
3	–2
–3	–2
0	–2

$y = -2$ may not look like a linear equation — but it is!

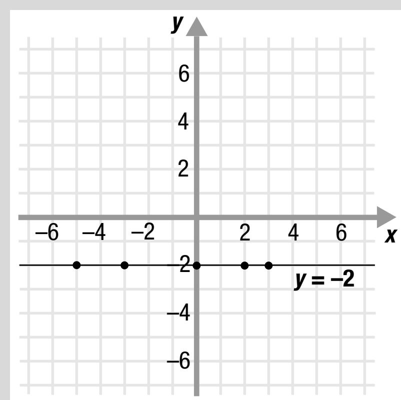


Figure 4.1.0

The graph of $y = -2$ is a horizontal line.

In general, the graph of any linear equation of the following form is a horizontal line.

$y = k$

Here, k is a constant.

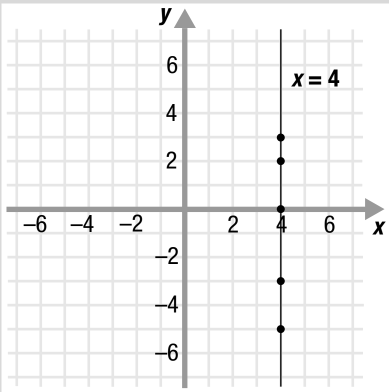
Here is another example. If $A = 1$, $B = 0$, and $C = 4$, the linear equation $Ax + By = C$ simplifies to:

$$\begin{aligned} 1x + 0y &= 4 \\ x + 0 &= 4 \\ x &= 4 \end{aligned}$$

To graph the equation $x = 4$:

1. Make a table of ordered pairs that satisfy the equation.

x	y
4	2
4	–5
4	3
4	–3
4	0



2. Plot these ordered pairs on a grid.
3. Draw a line through the plotted points.

The graph of $x = 4$ is a vertical line.

In general, the graph of any linear equation of the following form is a vertical line.

$$x = k$$

Here, k is a constant.

Intercepts

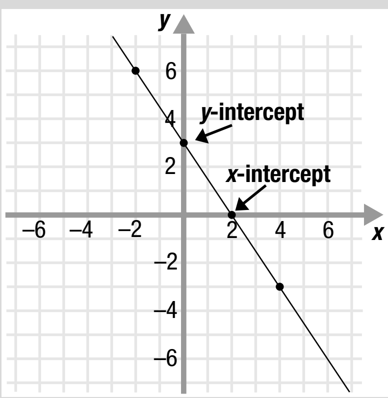
Two points that are often easy to identify on the graph of a line are the x-intercept and the y-intercept.

The x-intercept is the point where the line crosses the x-axis. The y-intercept is the point where the line crosses the y-axis.

For example, to find the x- and y-intercepts of the line $3x + 2y = 6$, graph the line:

1. Make a table of ordered pairs that satisfy the equation.

x	y
4	–3
2	0
0	3
–2	6



2. Plot these ordered pairs on a grid.
3. Draw a line through the plotted points.

So, the x-intercept is (2, 0) and the y-intercept is (0, 3).

You can also find the intercepts without graphing:

This may seem backwards, but it may help if you remember that the x-intercept lies on the x-axis (so y = 0) and the y-intercept lies on the y-axis (so x = 0).

- Let $y = 0$ and solve for x. This will give you the x-intercept.
- Let $x = 0$ and solve for y. This will give you the y-intercept.

The x- and y-intercepts are often good points to use to graph a line because they're usually easy to find.

Most lines cross both the x- and y-axes, so they have both x- and y-intercepts. Since horizontal and vertical lines cross only one axis, they have only one intercept:

- Horizontal lines have a y-intercept but no x-intercept.
- Vertical lines have an x-intercept but no y-intercept.

Sample Problems

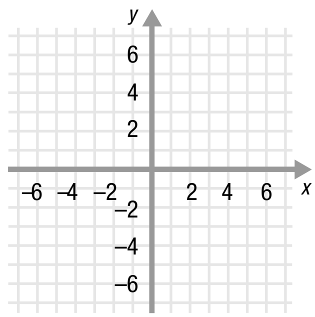
1. Graph the line $y = -5$.

☐ a. Make a table of ordered pairs that satisfy the equation.

x	y
-4	-5
-1	-5
0	___
2	___
4	___

☐ b. Plot these ordered pairs on a grid.

☐ c. Draw a line through the plotted points.



2. Find the x- and y-intercepts of the line $4x - 3y = 12$.

☑ a. Find the x-intercept by setting $y = 0$ and solving for x.

$$4x - 3y = 12$$
$$4x - 3(0) = 12$$
$$4x - 0 = 12$$
$$4x = 12$$
$$x = 3$$

So the x-intercept is (___,___).

☐ b. Find the y-intercept by setting $x = 0$ and solving for y.

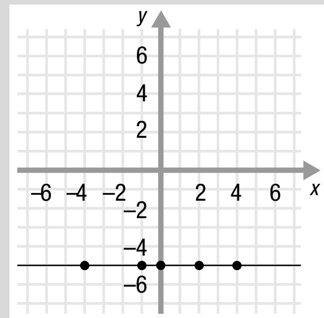
$$4x - 3y = 12$$
$$4(\_\_\_) - 3y = 12$$
$$\_\_\_ - 3y = 12$$
$$\_\_\_ = 12$$
$$y = \_\_\_$$

So the y-intercept is (___,___).

Answers to Sample Problems

a. –5
–5
–5

b., c.



a. (3, 0)

b. 0
0
–3y
–4
(0, –4)

SLOPE OF A LINE

Summary

Finding Slope

The slope of a line is a number that describes the steepness of the line. This number is the ratio of the rise to the run in moving from any point on the line to **any** other point on the line.

In general, if (x_1, y_1) and (x_2, y_2) are any two points on a line and $x_1 \neq x_2$, the slope m of the line can be expressed as:

$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

To find the slope of a line through two points (x_1, y_1) and (x_2, y_2):

1. Substitute the points into the definition of slope. $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
2. Simplify.

For example, to find the slope of the line through the points (3, 1) and (6, 3):

1. Substitute the points into the definition of slope. $m = \dfrac{3 - 1}{6 - 3}$
2. Simplify. $= \dfrac{2}{3}$

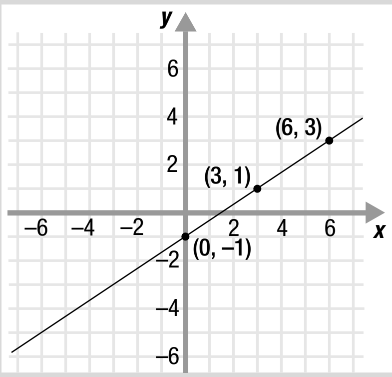
Similarly, to find the slope of the line through the points (0, –1) and (3, 1):

1. Substitute the points into the definition of slope. $m = \dfrac{1 - (-1)}{3 - 0}$
2. Simplify. $= \dfrac{2}{3}$

You will find that no matter which two points you use to find the slope of a line, you will always get the same value.

Positive and Negative Slopes

Lines with positive slope slant upward from left to right. All of the lines in Figure 4.1.1 have positive slopes.



You would get the same slope even if you switched the order of the points:
$m = \dfrac{1 - 3}{3 - 6} = \dfrac{-2}{-3} = \dfrac{2}{3}$

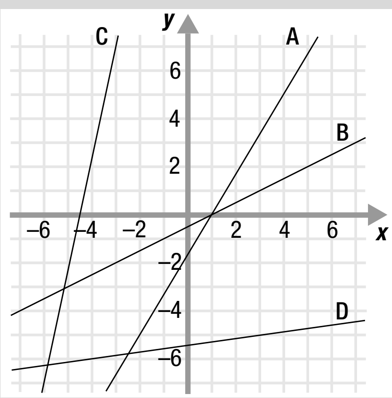


Figure 4.1.1

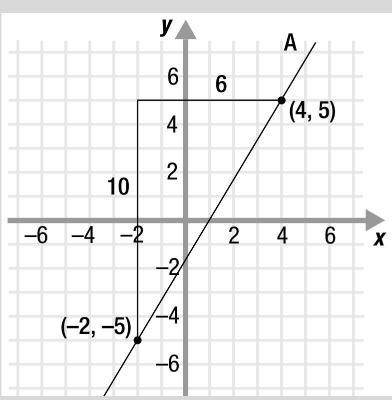


Figure 4.1.2

You can find the slope of each of the lines to verify they are positive. For example, find the slope of line A in Figure 4.1.2 using the points (–2, –5) and (4, 5):

1. Substitute the points into the formula for slope. $m = \frac{5 - (-5)}{4 - (-2)}$
2. Simplify. $= \frac{10}{6}$

   $= \frac{5}{3}$

You can see the slope of line A is positive.

Lines with negative slope slant downward from left to right. All of the lines in Figure 4.1.3 have negative slopes.

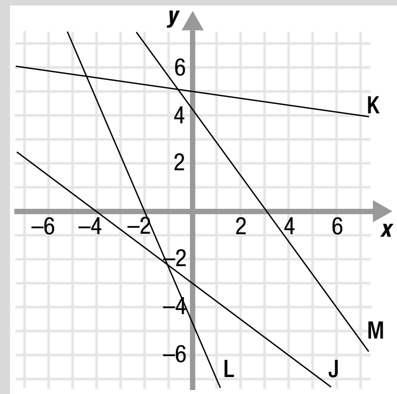


Figure 4.1.3

You can find the slope of each of the lines to verify they are negative. For example, to find the slope of line J in Figure 4.1.4 using the points (–4, 0) and (4, –6):

1. Substitute the points into the definition of slope. $m = \frac{-6 - 0}{4 - (-4)}$
2. Simplify. $= \frac{-6}{8}$

   $= -\frac{3}{4}$

You can see the slope of line J is negative.

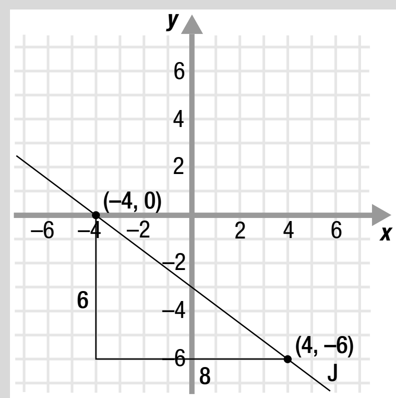


Figure 4.1.4

Slopes of Horizontal Lines

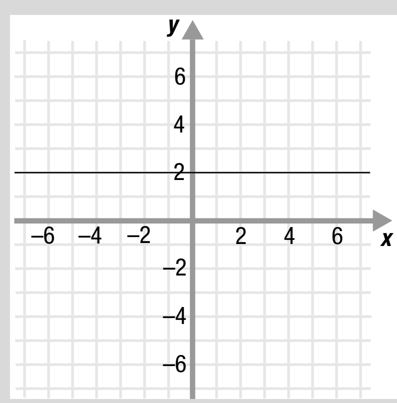
The slope of a horizontal line is 0.

A horizontal line is flat. It doesn't slant up or down.

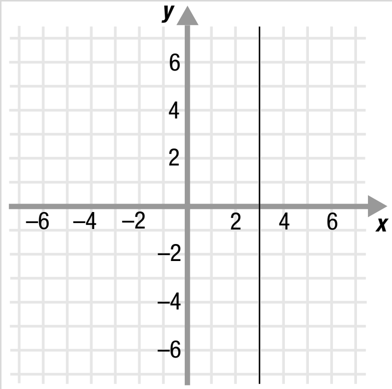
For example, to find the slope of the horizontal line that passes through the points (–4, 2) and (3, 2):

1. Substitute the points into the definition of slope. $m = \frac{2 - 2}{3 - (-4)}$
2. Simplify. $= \frac{0}{7}$

   $= 0$



Because there is no **rise** between points on a horizontal line, the numerator of the slope is 0. So the slope of a horizontal line is 0.



Slopes of Vertical Lines

The slope of a vertical line is undefined.

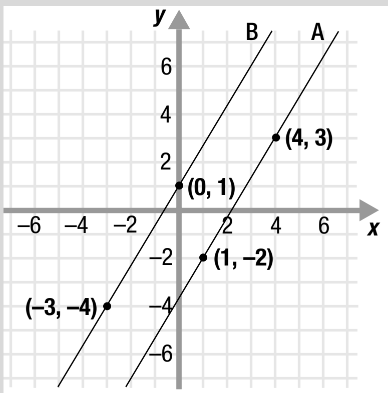
For example, to find the slope of the vertical line that passes through the points (3, −4) and (3, 2):

1. Substitute the points into the definition of slope. $m = \frac{2-(-4)}{3-3}$
2. Simplify. $= \frac{6}{0}$

Division by 0 is undefined, so the slope of the line is undefined.

Because there is no **run** between points on a vertical line, the denominator of the slope is 0. So the slope of a vertical line is undefined.

Slopes of Parallel Lines



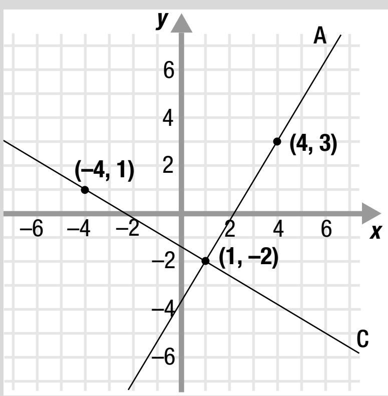
Lines that never cross, no matter how far they are extended, are said to be parallel. Two lines that are parallel have slopes that are the same.

For example, to see whether lines A and B are parallel:

1. Find the slope of line A. $m = \frac{3-(-2)}{4-1} = \frac{5}{3}$
2. Find the slope of line B. $m = \frac{1-(-4)}{0-(-3)} = \frac{5}{3}$

Since lines A and B have the same slope, they are parallel.

Slopes of Perpendicular Lines



Lines that cross at a 90 degree angle are said to be perpendicular. Lines that are perpendicular have slopes that are negative reciprocals of each other.

For example, to see whether the lines A and C are perpendicular:

1. Find the slope of line A. $m = \frac{3-(-2)}{4-1} = \frac{5}{3}$
2. Find the slope of line C. $m = \frac{1-(-2)}{-4-1} = \frac{3}{-5} = -\frac{3}{5}$

Since lines A and C have slopes that are negative reciprocals of each other, they are perpendicular.

To find the negative reciprocal of a fraction, just switch the numerator and the denominator and change the sign. For example, the negative reciprocal of $\frac{5}{3}$ is $-\frac{3}{5}$. The negative reciprocal of -3 is $\frac{1}{3}$.

Using Slope to Graph a Line

When you know one point, (x_1, y_1), on a line and the slope m of the line, you can graph the line. Here's how:

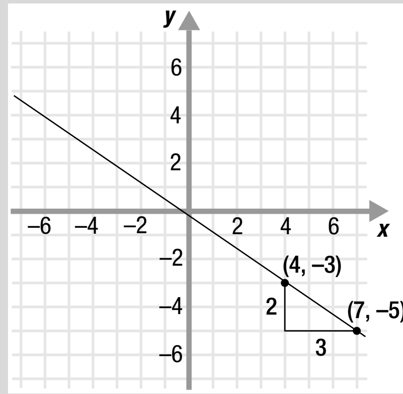
1. Start at the point (x_1, y_1) and **rise** in the y-direction the number of units in the numerator of the slope.
2. Then **run** in the x-direction the number of units in the denominator of the slope.
3. Plot a point at this location.
4. Graph the line through these two points.

If the slope of the line is negative, you can either rise in the negative direction and run in the positive direction or run in the negative direction and rise and positive direction.

For example, to graph the line through the point (4, –3) with slope $-\frac{2}{3}$:

1. Start at the point (4, –3) and **rise** 2 units in the negative y-direction.
2. Then **run** 3 units in the positive x-direction.
3. Plot a point at this location.
4. Graph the line through these two points.

You can find other points on the line by repeating this process.



Since the slope of the line is $-\frac{2}{3}$, you can rise +2 and run –3 or you can rise –2 and run +3.

Sample Problems

Answers to Sample Problems

1. Find the slope of the line through the points (3, –4) and (9, 5).

☑ a. Substitute the points into the definition of slope.

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

$$= \frac{5 - (-4)}{9 - 3}$$

☐ b. Simplify. $= \_\_\_\_\_$

b. $\frac{9}{6}$ *or* $\frac{3}{2}$

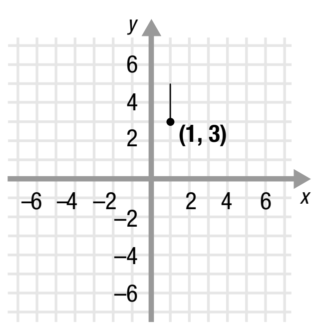
2. The point (1, 3) lies on a line with slope 2. Graph this line.

☑ a. Start at the point (1, 3) and **rise** 2 units in the positive y direction.

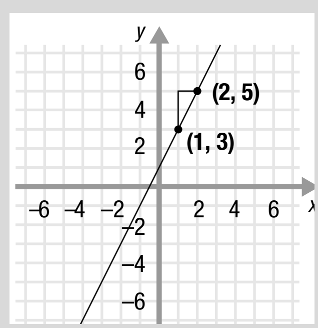
☐ b. Now **run** 1 unit in the positive x direction.

☐ c. Plot a point at this location.

☐ d. Graph the line through these two points.



b., c., d.



HOMEWORK

Homework Problems

Circle the homework problems assigned to you by the computer, then complete them below.

Explain

Graphing Lines I

1. Circle the points below that lie on the line described by the equation $x + y = 5$.
   (1, 4)
   (–3, 5)
   (9, 6)
   (–2, 7)
   (–8, 4)
2. Graph the equation $x + y = 3$.
3. Graph the equation $2x + y = 6$.
4. Circle the points below that lie on the line described by the equation $x - 2y = 8$.
   (3, 2)
   (–4, 6)
   (–7, 4)
   (0, –4)
   (2, –3)
5. Graph the equation $x + 3y = 6$.
6. Graph the equation $4x + y = 12$.
7. Graph the equation $5x - 4y = 10$.
8. Graph the equation $2x - 3y = 6$.
9. Jay has decided to devote a total of 10 hours a week to his music, either playing his guitar or writing songs. If $x =$ the number of hours he spends playing the guitar, and $y =$ the number of hours he spends writing songs, then the equation $x + y = 10$ describes how he can split his time. Graph this equation.
10. Barbara is going to donate a total of \$50 to two charities. If $x =$ the amount she will donate to the American Heart Association and $y =$ the amount she will donate to the American Cancer Society, then the equation $x + y = 50$ describes how she can divide her money. Graph this equation.
11. Graph the equation $\frac{2}{3}x + y = 4$.
12. Graph the equation $x - \frac{3}{5}y = -2$

Graphing Lines II

13. Complete the table below to find six ordered pairs that satisfy the equation $y = 5$.

x	y
5	
3	
0	
2	
–2	
–4	

14. Graph the equation $y = 5$.
15. Find the x- and y-intercepts of the line $x + 4y = 4$.
16. Graph the equation $x = -4$.
17. Graph the equation $y = 1$.
18. Find the x- and y-intercepts of the line $4x - 3y = 12$.
19. Graph the equation $y = -6$.
20. Graph the equation $x = 3$.
21. To change a temperature from degrees Fahrenheit to degrees Celsius, use the formula $C = \frac{5}{9}(F - 32)$. Graph this equation.

22. To change a temperature from degrees Fahrenheit to degrees Celsius, use the formula $C = \frac{5}{9}(F - 32)$. Find the *F*- and *C*-intercepts of the line described by this equation.

23. Graph the equation $x = 3.5$.

24. Find the *x*- and *y*-intercepts of the line $x - \frac{3}{4}y = 2$.

Slope of a Line

25. Find the slope of the line through the points (2, 4) and (5, 7).

26. Find the slope of the line through the points (1, 3) and (5, 3).

27. The point (1, –4) lies on a line with slope $\frac{2}{3}$. Graph this line by finding another point that lies on the line.

28. Find the slope of a line parallel to the line through the points (–1, 2) and (2, 8).

29. Find the slope of the line through the points (–4, –3) and (–4, 5).

30. The point (1, 3) lies on a line with slope 1. Graph this line by finding another point that lies on the line.

31. Find the slope of a line perpendicular to the line through the points (2, –4) and (6, 1).

32. The point (–5, 2) lies on a line that has slope $-\frac{3}{7}$. Graph this line by finding another point that lies on the line.

33. The number of eggs used by a bakery can be expressed by the equation $y = 12x$, where *x* is the number of cartons purchased and *y* is the number of eggs used. Use the point (0, 0) and the slope of the line, 12, to find another point on the line.

34. The linear equation $P = 4s$ describes the relationship between the perimeter, *P*, of a square and the length of each of its sides, *s*. If the length of the sides of a square is 0, its perimeter is 0. Use the point (0, 0) and the slope of the line, 4, to find three other points that satisfy the equation $P = 4s$.

35. Each line listed in the left column below is parallel to a line listed in the right column. Match pairs of parallel lines.

The line through (2, 5) and (–1, –2).	The line through (3, 2) and (5, 6).
A line with slope 2.	The line through (4, 5) and (1, –2).
The line through (9, –1) and (3, –4).	A line with slope $-\frac{3}{4}$.
The line through (1, 2) and (5, –1).	The line through (–1, 1) and (11, 7).

36. Each line listed in the left column below is perpendicular to a line listed in the right column. Match pairs of perpendicular lines.

The line through (12, 4) and (3, 7).	A line with slope 3.
The line through (2, 6) and (0, 8).	The line through (3, –1) and (–2, –3).
The line through (5, 6) and (7, 1).	The line through (–3, 4) and (4, 8).
The line through (–4, 10) and (0, 3).	The line through (–2, 2) and (1, 5).

APPLY

Practice Problems

Here are some additional practice problems for you to try.

Graphing Lines I

1. Circle the points below that lie on the line whose equation is $2x - y = 5$.

   (2, 1)
   (3, 1)
   (0, –5)
   (–5, 0)
   (1, –3)

2. Circle the points below that lie on the line whose equation is $x + 3y = 6$.

   (3, 3)
   (0, 2)
   (5, 1)
   (–3, 3)
   (3, 1)

3. Circle the points below that lie on the line whose equation is $x + 2y = 6$.

   (–2, 3)
   (1, 3)
   (0, 3)
   (6, 0)
   (–2, 4)

4. Circle the points below that lie on the line whose equation is $3x - 2y = 12$.

   (2, –3)
   (–2, 3)
   (–2, 9)
   (4, 0)
   (0, 4)

5. Circle the points below that lie on the line whose equation is $4x - y = 3$.

   (1, 1)
   (0, –3)
   (–1, 1)
   (2, 5)
   (3, 15)

6. Circle the points below that lie on the line whose equation is $\frac{1}{2}x - \frac{2}{3}y = 6$.

   (2, 3)
   (4, –6)
   (0, 9)
   (12, 0)
   (–8, –15)

7. Circle the points below that lie on the line whose equation is $\frac{1}{3}x + \frac{3}{4}y = 4$.

   (6, 4)
   (–6, 8)
   (0, 4)
   (12, 0)
   (21, –4)

8. Graph the equation $x + y = 4$.

9. Graph the equation $x + y = -5$.

10. Graph the equation $x + y = -2$.

11. Graph the equation $x - y = -1$.

12. Graph the equation $x - y = 2$.

13. Graph the equation $x - y = 3$.

14. Graph the equation $x + 3y = 6$.

15. Graph the equation $3x - y = -3$.

16. Graph the equation $2x + y = -2$.

17. Graph the equation $2x + 3y = -6$.

18. Graph the equation $3x + 5y = 15$.

19. Graph the equation $4x - 3y = 12$.

20. Graph the equation $3x + 2y = -5$.

21. Graph the equation $x - 2y = 2$.

22. Graph the equation $2x - 5y = -1$.

23. Graph the equation $\frac{2}{3}x - \frac{1}{2}y = 2$.

24. Graph the equation $\frac{3}{4}x + \frac{2}{5}y = 1$.

25. Graph the equation $\frac{1}{2}x + \frac{2}{3}y = 1$.

26. Graph the equation $\frac{1}{3}x - \frac{1}{2}y = 1$.

27. Graph the equation $\frac{1}{2}x + \frac{2}{5}y = -1$.

28. Graph the equation $\frac{1}{4}x + \frac{1}{5}y = 1$.

Graphing Lines II

29. Graph the equation $y = 5$.

30. Graph the equation $y = -6$.

31. Graph the equation $y = -3$.

32. Graph the equation $y = 1$.

33. Graph the equation $y = -3$.

34. Graph the equation $y = 4$.

35. Graph the equation $x = 5$.

36. Graph the equation $x = -4.5$.

37. Graph the equation $x = 2.5$.

38. Graph the equation $y = 0$.

39. Graph the equation $x = 0$.

40. Graph the equation $x = 6$.

41. Graph the equation $x = -5$.

42. Graph the equation $x = -1.5$.

43. Find the x- and y-intercepts of the line $x - y = 6$.

44. Find the x- and y-intercepts of the line $x + y = 5$.

45. Find the x- and y-intercepts of the line $3x + y = 9$.

46. Find the x- and y-intercepts of the line $x + 2y = 8$.

47. Find the x- and y-intercepts of the line $2x + y = 6$.

48. Find the x- and y-intercepts of the line $3x + 5y = 15$.

49. Find the x- and y-intercepts of the line $4x - 3y = 24$.

50. Find the x- and y-intercepts of the line $2x - 9y = 18$.

51. Find the x- and y-intercepts of the line $3x + 4y = 9$.

52. Find the x- and y-intercepts of the line $5x + 2y = 8$.

53. Find the x- and y-intercepts of the line $2x - 3y = 10$.

54. Find the x- and y-intercepts of the line $\frac{2}{5}x + y = 6$.

55. Find the x- and y-intercepts of the line $x + \frac{3}{4}y = 9$.

56. Find the x- and y-intercepts of the line $x - \frac{2}{3}y = 18$.

Slope of a Line

57. Find the slope of the line through the points (1, 4) and (–3, –2).

58. Find the slope of the line through the points (5, 3) and (–10, –3).

59. Find the slope of the line through the points (2, 3) and (–4, –1).

60. Find the slope of the line through the points (–3, 6) and (2, 5).

61. Find the slope of the line through the points (–2, 7) and (4, –5).

62. Find the slope of the line through the points (–5, 1) and (3, –7).

63. Find the slope of the line through the points (7, 5) and (3, 1).

64. Find the slope of the line through the points (9, 5) and (4, 3).

65. Find the slope of the line through the points (8, 6) and (1, 2).

66. Find the slope of the line through the points (0, –5) and (3, 0).

67. Find the slope of the line through the points (0, 7) and (4, 0).

68. Find the slope of the line through the points (0, 3) and (–7, 0).

69. What is the slope of a horizontal line?

70. What is the slope of a vertical line?

71. Find the slope of a line parallel to the line that passes through the points (12, 2) and (8, –3).

72. Find the slope of a line parallel to the line that passes through the points (8, 7) and (4, –3).

73. Find the slope of a line parallel to the line that passes through the points (15, 3) and (10, –2).

74. Find the slope of a line parallel to the line that passes through the points (6, 2) and (9, –1).

75. Find the slope of a line parallel to the line that passes through the points (5, –1) and (–4, 7).

76. Find the slope of a line parallel to the line that passes through the points (7, –2) and (–1, 4).

77. Find the slope of a line perpendicular to the line that passes through the points (–1, –3) and (4, 7).

78. Find the slope of a line perpendicular to the line that passes through the points (5, –2) and (–3, 8)

79. Find the slope of a line perpendicular to the line that passes through the points (–2, –3) and (4, 12).

80. Find the slope of a line perpendicular to the line that passes through the points (–4, 5) and (2, –7).

81. Find the slope of a line perpendicular to the line that passes through the points (9, 3) and (–1, –2).

82. Find the slope of a line perpendicular to the line that passes through the points (–3, 5) and (–6, 4).

83. The point (5, 1) lies on a line with slope $\frac{2}{5}$. Graph this line by finding another point that lies on the line.

84. The point (3, 2) lies on a line with slope $-\frac{1}{3}$. Graph this line by finding another point that lies on the line.

EVALUATE

Practice Test

Take this practice test to be sure that you are prepared for the final quiz in Evaluate.

1. The table below contains three points whose coordinates satisfy the equation $2x - 3y = 12$. Plot these ordered pairs then graph the line through them.

x	y
6	0
0	–4
3	–2

2. Circle the ordered pairs in the table below whose coordinates **do not** satisfy the equation $x + y = 7$.

x	y
6	1
2.7	4.3
–5	–2
3	–4
12	–5
4	11
–2	9

3. Graph the equation $x + 2y = 6$.

4. Complete the table below so that the coordinates of the ordered pairs in the table satisfy the equation $\frac{2}{5}x + \frac{4}{5}y = 8$.

x	y
30	___
___	5
0	___
–10	___
___	0

5. Complete the table below to find three ordered pairs whose coordinates satisfy the equation $x = -3$. Then graph the line.

x	y
___	0
___	5
___	–4

6. Circle the statement(s) below that are true about the equation $y = -7$.

   Its graph is a horizontal line.
   Its graph is a vertical line.
   Its graph is a line that passes through the origin.
   Its graph is none of the above.

7. Find the x- and y-intercepts of the line $4x - y = 7$.

8. Find the x- and y-intercepts of the line $5x - 3y = 15$.

9. Find the slope of the line that passes through the points (7, –2) and (4, 5).

10. The line $y = \frac{5}{4}x$ is shown in Figure 4.1.5. What is the slope of this line?

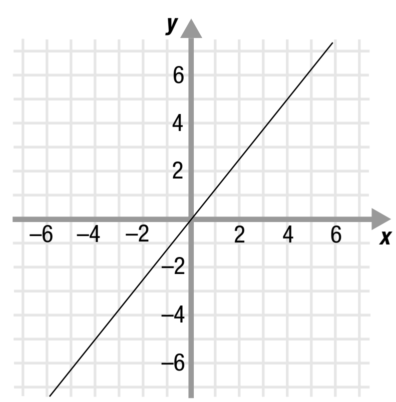


Figure 4.1.5

11. The line through the points (–2, 3) and (8, 1) is shown in Figure 4.1.6. What is the slope of a line that is perpendicular to this line?

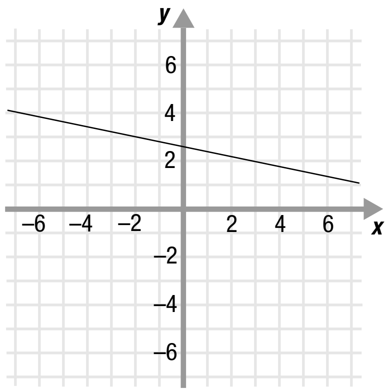


Figure 4.1.6

12. Draw the line that passes through the point (1, 3) and has slope $m = 0$.