4 Chapter Review

Check It Out
Vocabulary Help
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Review Key Vocabulary

linear equation *p. 144*
solution of a linear equation, *p. 144*
slope, *p. 150*
rise, *p. 150*
run, *p. 150*
x-intercept, *p. 168*
y-intercept, *p. 168*
slope-intercept form, *p. 168*
standard form, *p. 174*
point-slope form, *p. 186*

Review Examples and Exercises

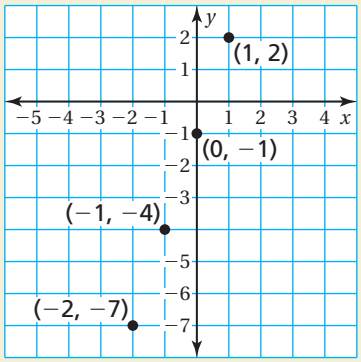
4.1 Graphing Linear Equations *(pp. 142–147)*

Graph $y = 3x - 1$.

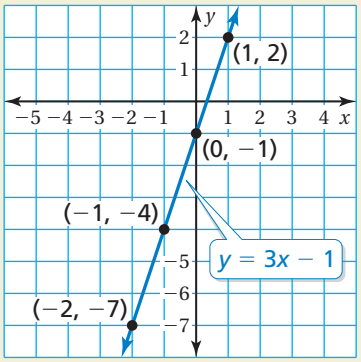
Step 1: Make a table of values.

x	$y = 3x - 1$	y	(x, y)
-2	$y = 3(-2) - 1$	-7	$(-2, -7)$
-1	$y = 3(-1) - 1$	-4	$(-1, -4)$
0	$y = 3(0) - 1$	-1	$(0, -1)$
1	$y = 3(1) - 1$	2	$(1, 2)$

Step 2: Plot the ordered pairs.



Step 3: Draw a line through the points.



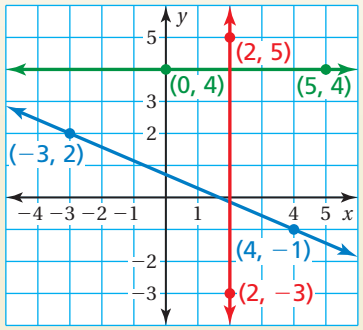
Exercises

Graph the linear equation.

1. $y = \frac{3}{5}x$
2. $y = -2$
3. $y = 9 - x$
4. $y = 1$
5. $y = \frac{2}{3}x + 2$
6. $x = -5$

4.2 Slope of a Line *(pp. 148–157)*

Find the slope of each line in the graph.



Red Line: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - (-3)}{2 - 2} = \frac{8}{0}$

∴ The slope of the red line is undefined.

Blue Line: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 2}{4 - (-3)} = \frac{-3}{7}$, or $-\frac{3}{7}$

Green Line: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 4}{5 - 0} = \frac{0}{5}$, or 0

Exercises

The points in the table lie on a line. Find the slope of the line.

7.

x	0	1	2	3
y	−1	0	1	2

8.

x	−2	0	2	4
y	3	4	5	6

9. Are the lines $x = 2$ and $y = 4$ parallel? Are they perpendicular? Explain.

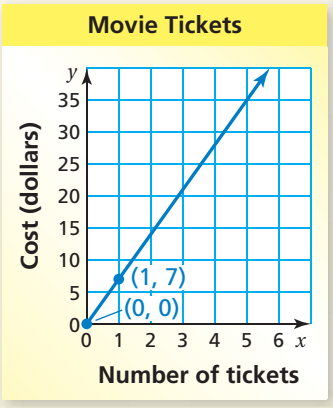
4.3 Graphing Proportional Relationships *(pp. 158–163)*

The cost *y* (in dollars) for *x* tickets to a movie is represented by the equation $y = 7x$. Graph the equation and interpret the slope.

The equation shows that the slope m is 7. So, the graph passes through (0, 0) and (1, 7).

Plot the points and draw a line through the points. Because negative values of x do not make sense in this context, graph in the first quadrant only.

∴ The slope indicates that the unit cost is \$7 per ticket.



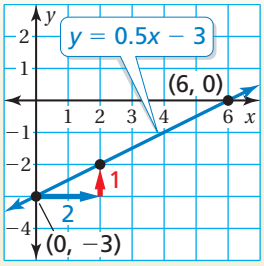
Exercises

10. **RUNNING** The number y of miles you run after x weeks is represented by the equation $y = 8x$. Graph the equation and interpret the slope.

11. **STUDYING** The number y of hours that you study after x days is represented by the equation $y = 1.5x$. Graph the equation and interpret the slope.

4.4 Graphing Linear Equations in Slope-Intercept Form *(pp. 166–171)*

Graph $y = 0.5x - 3$. Identify the x-intercept.



Step 1: Find the slope and the y-intercept.

$$y = 0.5x + (-3)$$

slope — 0.5; y-intercept — -3

Step 2: The y-intercept is -3. So, plot $(0, -3)$.

Step 3: Use the slope to find another point and draw the line.

$$m = \frac{\text{rise}}{\text{run}} = \frac{1}{2}$$

Plot the point that is 2 units right and 1 unit up from (0, –3). Draw a line through the two points.

∴ The line crosses the x-axis at (6, 0). So, the x-intercept is 6.

Exercises

Graph the linear equation. Identify the x-intercept. Use a graphing calculator to check your answer.

12. $y = 2x - 6$ **13.** $y = -4x + 8$ **14.** $y = -x - 8$

4.5 Graphing Linear Equations in Standard Form *(pp. 172–177)*

Graph $8x + 4y = 16$.

Step 1: Write the equation in slope-intercept form.

$8x + 4y = 16$	Write the equation.
$4y = -8x + 16$	Subtract $8x$ from each side.
$y = -2x + 4$	Divide each side by 4.

Step 2: Use the slope and the y-intercept to graph the equation.

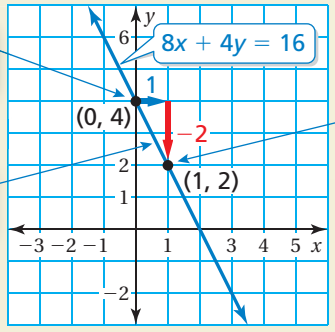
$$y = -2x + 4$$

slope — -2; y-intercept — 4

The y-intercept is 4. So, plot (0, 4).

Draw a line through the points.

Use the slope to plot another point, (1, 2).



Exercises

Graph the linear equation.

15. $\frac{1}{4}x + y = 3$

16. $-4x + 2y = 8$

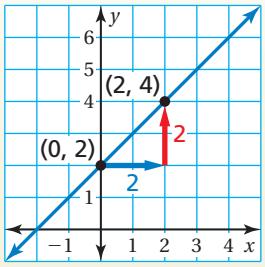
17. $x + 5y = 10$

18. $-\frac{1}{2}x + \frac{1}{8}y = \frac{3}{4}$

19. A dog kennel charges \$30 per night to board your dog and \$6 for each hour of playtime. The amount of money you spend is given by $30x + 6y = 180$, where x is the number of nights and y is the number of hours of playtime. Graph the equation and interpret the intercepts.

4.6 Writing Equations in Slope-Intercept Form *(pp. 178–183)*

Write an equation of the line in slope-intercept form.

a. 

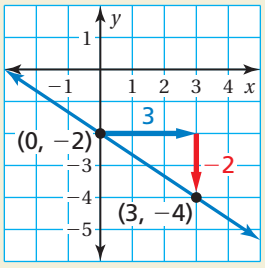
Find the slope and the y-intercept.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{2 - 0} = \frac{2}{2}, \text{ or } 1$$

Because the line crosses the y-axis at $(0, 2)$, the y-intercept is 2.

slope: 1 — y-intercept: 2

∴ So, the equation is $y = 1x + 2$, or $y = x + 2$.

b. 

Find the slope and the y-intercept.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - (-2)}{3 - 0} = \frac{-2}{3}, \text{ or } -\frac{2}{3}$$

Because the line crosses the y-axis at $(0, -2)$, the y-intercept is -2.

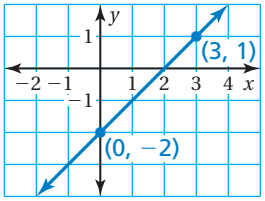
slope: $-\frac{2}{3}$ — y-intercept: -2

∴ So, the equation is $y = -\frac{2}{3}x + (-2)$, or $y = -\frac{2}{3}x - 2$.

Exercises

Write an equation of the line in slope-intercept form.

20.



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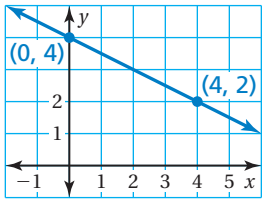

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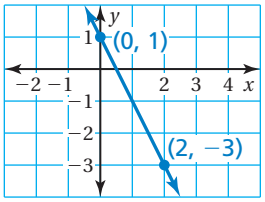

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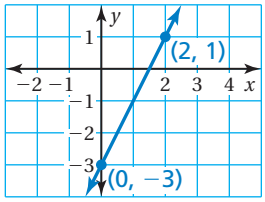
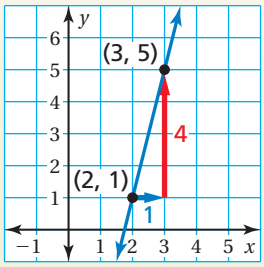


24. Write an equation of the line that passes through (0, 8) and (6, 8).

25. Write an equation of the line that passes through (0, −5) and (−5, −5).

4.7 Writing Equations in Point-Slope Form *(pp. 184–189)*

Write in slope-intercept form an equation of the line that passes through the points (2, 1) and (3, 5).



Find the slope.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 1}{3 - 2} = \frac{4}{1}, \text{ or } 4$$

Then use the slope and one of the given points to write an equation of the line.

Use $m = 4$ and $(2, 1)$.

$y - y_1 = m(x - x_1)$	Write the point-slope form.
$y - 1 = 4(x - 2)$	Substitute 4 for m, 2 for x_1, and 1 for y_1.
$y - 1 = 4x - 8$	Distributive Property
$y = 4x - 7$	Write in slope-intercept form.

So, the equation is $y = 4x - 7$.

Exercises

26. Write in point-slope form an equation of the line that passes through the point (4, 4) with slope 3.

27. Write in slope-intercept form an equation of the line that passes through the points (−4, 2) and (6, −3).