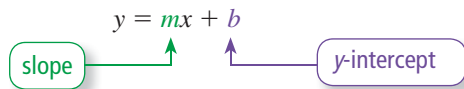
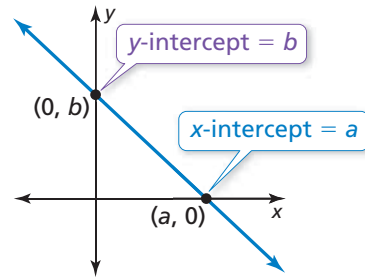


Slope-Intercept Form

The **x-intercept** of a line is the x -coordinate of the point where the line crosses the x -axis. It occurs when $y = 0$.

The **y-intercept** of a line is the y -coordinate of the point where the line crosses the y -axis. It occurs when $x = 0$.

A linear equation written in the form $y = mx + b$ is in **slope-intercept form**. The slope of the line is m , and the y -intercept of the line is b .



Example 1 Identify the slope and the y -intercept of the graph of each linear equation.

a. $y = -3x - 8$

$y = -3x + (-8)$ Write in slope-intercept form.

▶ The slope is -3 , and the y -intercept is -8 .

b. $y - 4 = \frac{1}{3}x$

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

▶ The slope is $\frac{1}{3}$, and the y -intercept is 4.

Example 2 Find the x -intercept and the y -intercept of the graph of $2x + y = 4$.

To find the x -intercept, substitute 0 for y and solve for x .

$$\begin{aligned} 2x + y &= 4 \\ 2x + (0) &= 4 \\ x &= 2 \end{aligned}$$

▶ The x -intercept is 2, and the y -intercept is 4.

To find the y -intercept, substitute 0 for x and solve for y .

$$\begin{aligned} 2x + y &= 4 \\ 2(0) + y &= 4 \\ y &= 4 \end{aligned}$$

Practice

Check your answers at BigIdeasMath.com.

Identify the slope and the y -intercept of the graph of the linear equation.

1. $y = 4x + 7$ slope: 4; y -int.: 7 2. $y = -\frac{1}{3}x + 8$ slope: $-\frac{1}{3}$; y -int.: 8 3. $y = \frac{1}{9}x - 6$ slope: $\frac{1}{9}$; y -int.: -6
 4. $y + 9 = -5x$ slope: -5 ; y -int.: -9 5. $y - 2x = -6$ slope: 2; y -int.: -6 6. $7 + y = -\frac{2}{3}x$ slope: $-\frac{2}{3}$; y -int.: -7

Find the x -intercept and the y -intercept of the graph of the equation.

7. $y = 2x$ x -int.: 0; y -int.: 0 8. $y = x + 8$ x -int.: -8 ; y -int.: 8 9. $y = 3x + 6$ x -int.: -2 ; y -int.: 6
 10. $3x + y = 9$ x -int.: 3; y -int.: 9 11. $2x + 3y = 12$ x -int.: 6; y -int.: 4 12. $2x - 5y = 10$ x -int.: 5; y -int.: -2

13. **SHOPPING** The amount of money you spend on x books and y movies is given by the equation $8x + 12y = 96$. Find the intercepts of the graph of the equation. What do these values represent?
 x -int.: 12; y -int.: 8; The x -intercept represents the number of books you can buy when you do not buy any movies, and the y -intercept represents the number of movies you can buy when you do not buy any books.