

Writing Equations in Slope-Intercept Form

(Pages 296–301)

The coordinates at which a graph intersects the axes are known as the **x-intercept** and the **y-intercept**.

Slope-Intercept Form of a Linear Equation

If a line has a slope of m and a y -intercept of b , then the slope-intercept form of an equation of the line is $y = mx + b$.

EXAMPLES

- A** Write an equation in slope-intercept form of the line with a slope of 5 and a y -intercept of 9.

$$y = mx + b \quad \text{Slope-Intercept Form}$$

$$y = 5x + 9 \quad \text{Replace } m \text{ with } 5 \text{ and } b \text{ with } 9.$$

An equation of the line is $y = 5x + 9$.

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

First determine the slope of the line.

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

Substitute the known values into the point-slope form.

$$y - y_1 = m(x - x_1)$$

$$y - 3 = 2(x - 1) \quad \text{Replace } y_1 \text{ with } 3, m \text{ with } 2, \text{ and } x_1 \text{ with } 1$$

$$y - 3 = 2x - 2 \quad \text{Distributive Property}$$

Write in slope-intercept form.

$$y - 3 + 3 = 2x - 2 + 3 \quad \text{Add } 3 \text{ to each side.}$$

$$y = 2x + 1$$

PRACTICE

Write an equation in slope-intercept form of the line with each slope and y -intercept.

1. $m = 5, b = 5$

2. $m = 2, b = -7$

3. $m = -3, b = 0$

Write an equation in slope-intercept form of the line having the given slope and passing through the given point.

4. $m = 4, (4, 2)$

5. $m = -3, (-1, 5)$

6. $m = \frac{3}{5}, (5, -6)$

Write an equation in slope-intercept form of the line passing through each pair of points.

7. $(1, 2)$ and $(-2, -4)$

8. $(5, 6)$ and $(2, -3)$

9. $(8, 1)$ and $(4, 3)$

- 10. Chemistry** The graph of an equation to convert degrees Celsius, x , to degrees Fahrenheit, y , has a y -intercept of 32° . Given that water boils at 212°F and at 100°C , write the conversion equation.



- 11. Standardized Test Practice** What is the slope-intercept form of an equation for the line that passes through $(0, 1)$ and $(3, 37)$?

A $y = 12x - 1$

B $y = 12x + 1$

C $y = -12x - 1$

D $y = -12x + 1$

Answers 1. $y = 5x + 5$ 2. $y = 2x - 7$ 3. $y = -3x$ 4. $y = 4x - 14$ 5. $y = -3x + 2$ 6. $y = \frac{5}{3}x - 9$ 7. $y = 2x$ 8. $y = 3x - 9$ 9. $y = -\frac{2}{3}x + 5$ 10. $y = \frac{5}{9}x + 32$ 11. **B**