

# Writing Equations in Slope-Intercept Form

## Today's Goals

- Write an equation of a line in slope-intercept form given the slope and one point.
- Write an equation of a line in slope-intercept form given two points.

### 3.1 Subtopic: Writing Equations in Slope-Intercept Form

**Source:** Reveal Math Integrated I –Section 5.1: Writing Equations in Slope-Intercept Form

- |       |   |
|-------|---|
| 3.1.1 | Write the equation of a straight line in slope-intercept form given the slope and a point on the line, two points on the line, or the graph of the line |
| 3.1.2 | Deduce that the equation of a vertical line $x = \text{constant}$ has an undefined slope, and all points on the line have the same x-coordinate         |
| 3.1.3 | Deduce that the equation of a horizontal line $y = \text{constant}$ has a zero slope, and all points on the line have the same y-coordinate             |
| 3.1.4 | Determine whether a given point lies on a given line  |
| 3.1.5 | Determine a third point on a line given two known points on the line  |
| 3.1.6 | Write a linear equation to model and solve a real-world problem   |

## Learn Creating Linear Equations in Slope-Intercept Form Given the Slope and a Point

If you are given the slope of a line and the coordinates of any point on that line, you can create an equation for that line.

### Key Concept • Creating Equations in Slope-Intercept Form Given the Slope and a Point

Step 1	Determine whether the given point is the y-intercept. If not, substitute the given information into the slope-intercept form equation to find the y-intercept.
Step 2	Use the given slope and y-intercept you found in Step 1 to write the equation of the line in slope-intercept form.

### Example 1 Write an Equation Given the Slope and a Point

Write an equation of the line that passes through  $(-8, 6)$  and has a slope of  $-\frac{3}{4}$ .

### Example 2 Write an Equation in Slope-Intercept Form

**BAKING** Marissa is baking a recipe that calls for her to turn down the temperature on her oven for part of the baking time. Write an equation to represent the situation if the temperature in her oven drops  $25^{\circ}\text{F}$  every 30 seconds, and after 2 minutes the temperature is  $350^{\circ}\text{F}$ .

## **Learn** Creating Linear Equations in Slope-Intercept Form Given Two Points

If you are given the coordinates of any two points on a line, you can create an equation for that line.

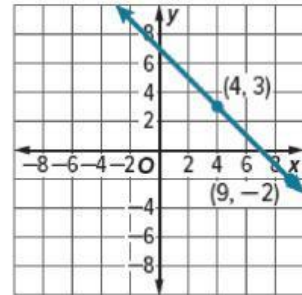
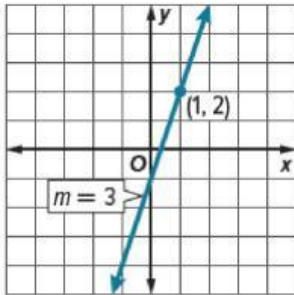
### Key Concept • Creating Equations in Slope-Intercept Form Given Two Points

Step 1	Use the given points to find the slope of the line containing the points.
Step 2	Use the slope from Step 1 and either of the given points to find the y-intercept of the line.
Step 3	Use the slope you found in Step 1 and the y-intercept you found in Step 2 to write the equation of the line in slope-intercept form.

### **Example 3** Write Equations Given Two Points

Write an equation of the line that passes through  $(1.2, -0.7)$  and  $(-3.4, 1.6)$ .

**Example4:** Write an equation of each line.



## Practice

1. Which equation represents a line passing through the point (8, 9) with a slope of 3?

- A.  $y = 3x - 15$
- B.  $y = 3x - 8$
- C.  $y = 3x + 33$
- D.  $y = 3x + 9$

2. Which equation represents a line that passes through the points (4, 5) and (6, 9)?

- A.  $y = 2x - 3$
- B.  $y = 3x - 7$
- C.  $y = \frac{1}{2}x + 3$
- D.  $y = \frac{1}{3}x + 7$

3. Determine the slope,  $m$ , and  $y$ -intercept,  $b$ , of a line that passes through the points (-2, 6) and (4, -3).

$m =$  \_\_\_\_\_  $b =$  \_\_\_\_\_

4. Match the equation to the line it represents.

- a.  $y$ -intercept 2.5, slope 0.5     \_\_\_\_\_
- b.  $y$ -intercept -2.5, slope 0.5     \_\_\_\_\_
- c.  $y$ -intercept 0.5, slope -2.5     \_\_\_\_\_

- A.  $y = 0.5x + 2.5$
- B.  $y = 2.5x + 0.5$
- C.  $y = -2.5x + 0.5$
- D.  $y = 0.5x - 2.5$

5. A health club has a monthly membership fee of AED 750 and charges an additional fee of AED 30 for every exercise class attended.

Write an equation that represents the total cost,  $y$ , for a month in which a member attends  $x$  exercise classes.

\_\_\_\_\_

6. A movie theater sells popcorn in a reusable bucket for \$3.50. They offer refills for \$0.50 each.

Write an equation in slope-intercept form to model the cost in dollars,  $y$ , for  $x$  refills.

\_\_\_\_\_

7. A line with a slope of  $\frac{2}{5}$  passes through the point  $(3, 8)$ . What is the  $y$ -intercept of the line? Round to the nearest tenth if necessary.

$y$ -intercept: \_\_\_\_\_

8. Which point is on the graph of  $y + 4 = \frac{1}{2}(x - 7)$ ?

- A.  $(-4, 7)$
- B.  $(4, -7)$
- C.  $(7, -4)$
- D.  $(7, 4)$



9. Which of the following represents the equation of a straight line that is parallel to the x-axis?

- A.  $y = 9$
- B.  $x = 9$
- C.  $x = 2y$
- D.  $y = 2x$

10. Which of the following linear equations has a slope of  $-1$ ?

- A.  $y = -1$
- B.  $y - x = 1$
- C.  $y + x = 1$
- D.  $y - x = -1$

11. Which of the following represents the equation of a straight line that is parallel to the y-axis?

- A.  $y = 9$
- B.  $x = 9$
- C.  $x = 2y$
- D.  $y = 2x$

12. Complete the table below to match the equation of the line with its correct description.  
Write A, B, or C.

- A.  $2x - 2y = 1$
- B.  $x = 5$
- C.  $y = 2$
- D.  $x + y = 5$

	Letter
The equation of a straight line that has a slope of $-1$	
The equation of a straight line that is parallel to the x- axis.	
The equation of a straight line that has a slope of 1	
The equation of a straight line that is parallel to the y- axis.	