## **Lesson 4.3 Writing Linear Equations**

### Use the slope-intercept form to identify slopes and y-intercepts.

- Example -

An equation of a line is given. State the slope and y-intercept of the line.

$$y - 6x + 9 = 0$$

First write the equation in slope-intercept form.

$$y - 6x + 9 = 0$$
  
$$y - 6x + 9 - 9 = 0 - 9$$

Subtract 9 from both sides.

$$y-6x=-9$$
 Simplify.  
 $y-6x+6x=-9+6x$  Add 6x to both sides.  
 $y=6x-9$  Write in slope-intercept form.

$$y = 6x - 9$$

Comparing the equation y = 6x - 9 with y = mx + b:

Slope: 
$$m = 6$$

y-intercept: 
$$b = 9$$

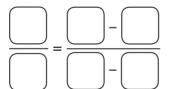
#### Complete.

1. 
$$2x + 6y = 15$$

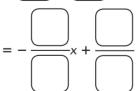
$$2x + 6y = 15$$

Subtract \_\_\_\_\_ on both sides.

Simplify.



Divide both sides by \_\_\_\_\_.



Write in slope-intercept form.

Comparing the equation  $y = \underline{\hspace{1cm}}$  with y = mx + b:

Slope: 
$$m = -$$

For each line, state its slope and its y-intercept.

**2.** 
$$x + 4y = 1$$

**3.** 
$$6y - 2x = 15$$

Write an equation of a line given its slope and y-intercept.

Example -

Use the given slope and y-intercept of a line to write an equation in slope-intercept form

Slope, 
$$m = \frac{4}{3}$$

y-intercept, 
$$b = -1$$

$$y = mx + b$$

$$y = \frac{4}{3}x + (-1)$$

Substitute the given values for 
$$m$$
 and  $b$ .

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

Complete.

**4.** Slope, 
$$m = 9$$

y-intercept, 
$$b = 2$$

$$y = mx + b$$

Substitute the given values for m and b.

Use the given slope and y-intercept of a line to write an equation in slope-intercept form.

**5.** Slope, 
$$m = -\frac{3}{8}$$

y-intercept, 
$$b = \frac{1}{4}$$

**6.** Slope, 
$$m = -3$$

y-intercept, 
$$b = -8$$

# Write an equation of a line, given its y-intercept and the equation of another line parallel to the line.

Example

A line has the equation 3y = 2 - 5x. Write an equation of a line parallel to this given line that has a y-intercept of 2.

First write the given equation in slope-intercept form.

$$3y = 2 - 5x$$

$$\frac{3y}{3} = \frac{2-5x}{3}$$

Divide both sides by 3.

$$y = \frac{2}{3} - \frac{5}{3}x$$

Simplify.

$$y = -\frac{5}{3}x + \frac{2}{3}$$

Write in slope-intercept form.

The given line has a slope  $m = \frac{-\frac{5}{3}}{3}$  and y-intercept  $b = \frac{\frac{2}{3}}{3}$ .

Then write an equation for the parallel line with slope  $m = \frac{-\frac{5}{3}}{2}$  and y-intercept,

$$y = mx + b$$

$$y = -\frac{5}{3}x + 2$$

Substitute the given values for m and b.

So, an equation of the line parallel to 3y = 2 - 5x is  $y = -\frac{5}{3}x + 2$ .

### Complete.

7. A line has the equation  $\frac{1}{2}y + 3 = 4x$ . Write an equation of a line parallel to this given line that has a y-intercept of 5.

First write the given equation in slope-intercept form.

$$\frac{1}{2}y + 3 = 4x$$

$$\frac{1}{2}y + 3 - \underline{\hspace{1cm}} = 4x - \underline{\hspace{1cm}}$$

Subtract 3 from both sides.



Simplify.

Multiply both sides by \_\_\_\_\_\_.

Simplify. Write in slope-intercept form.

The line has slope m = and y-intercept b =

Then write an equation for the parallel line with slope  $m = \underline{\hspace{1cm}}$  and y-intercept,  $b = \underline{\hspace{1cm}}$ .

$$y = mx + b$$

Substitute the given values for m and b.

So, an equation of the line parallel to  $\frac{1}{2}y + 3 = 4x$  is \_\_\_\_\_\_.

### Write an equation.

- **8.** A line has the equation 4x 13 = 2y. Write an equation of a line parallel to this given line that has a y-intercept of 1.
- **9.** A line has the equation 8 3y 9x = 0. Write an equation of a line parallel to this given line that has a y-intercept of 2.

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