

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.

$$\begin{array}{l} y - 6x + 9 = 0 \\ y - 6x + 9 - 9 = 0 - 9 \quad \text{Subtract 9 from both sides.} \\ y - 6x = -9 \quad \text{Simplify.} \\ y - 6x + 6x = -9 + 6x \quad \text{Add 6x to both sides.} \\ y = 6x - 9 \quad \text{Write in slope-intercept form.} \end{array}$$

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

Slope: $m = \underline{6}$

y-intercept: $b = \underline{-9}$

Complete.

1. $2x + 6y = 15$

$$2x + 6y = 15$$

$$2x + 6y - \underline{\quad\quad} = 15 - \underline{\quad\quad}$$

Subtract _____ on both sides.

$$\underline{\quad\quad} = \underline{\quad\quad} - \underline{\quad\quad}$$

Simplify.

$$\frac{\boxed{\quad}}{\boxed{\quad}} = \frac{\boxed{\quad} - \boxed{\quad}}{\boxed{\quad} - \boxed{\quad}}$$

Divide both sides by _____.

$$y = -\frac{\boxed{\quad}}{\boxed{\quad}}x + \frac{\boxed{\quad}}{\boxed{\quad}}$$

Write in slope-intercept form.

Comparing the equation $y = \underline{\quad\quad}$ with $y = mx + b$:

Slope: $m = -\frac{\boxed{\quad}}{\boxed{\quad}}$

y-intercept: $b = \frac{\boxed{\quad}}{\boxed{\quad}}$

Name: _____

Date: _____

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, $b = 2$

$y = mx + b$

$y = \underline{\hspace{2cm}}x + \underline{\hspace{2cm}}$

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, $b = -8$

Name: _____

Date: _____

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 $m = -\frac{5}{3}$ and y-intercept $b = \frac{2}{3}$.

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

$$y = mx + b$$

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

Substitute the given values for m and b .

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

Name: _____

Date: _____

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.

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

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

Subtract 3 from both sides.

$$\frac{\boxed{\hspace{1cm}}}{\boxed{\hspace{1cm}}}y = \underline{\hspace{1cm}} - \underline{\hspace{1cm}}$$

Simplify.

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}} (\underline{\hspace{1cm}} - \underline{\hspace{1cm}})$$

Multiply both sides by _____.

$$y = \underline{\hspace{1cm}} - \underline{\hspace{1cm}}$$

Simplify. Write in slope-intercept form.

The line has slope $m = \underline{\hspace{1cm}}$ and y-intercept $b = \underline{\hspace{1cm}}$.

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

$$y = mx + b$$

$$y = \underline{\hspace{1cm}}$$

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.