

## Section 2.4 Writing Linear Equations

### PART 1: Forms of Equations

Slope-Intercept Form:

$$y = mx + b$$

To write an equation starting in **slope-intercept form**:

1. Find the slope of the line.
2. Select a point from the line.
3. Plug in slope ( $m$ ) and the values of ( $x$ ) and ( $y$ ) from the point into  $y = mx + b$ .
4. Solve for  $b$ .
5. Rewrite the equation using  $m$  and  $b$ , in the slope-intercept equation  $y = mx + b$ .

**Example 1:** Write an equation in slope-intercept form for the line described.

<p><b>a.</b> slope <math>\frac{4}{3}</math>, passes through (0, 4)</p> $m = \frac{4}{3}$ $x = 0$ $y = 4$ $y = mx + b$ $4 = \frac{4}{3}(0) + b$ $4 = b$ $y = \frac{4}{3}x + 4$	<p><b>b.</b> passes through (0, -6) and (-4, 10)</p> $m = \frac{10 - (-6)}{-4 - 0} = \frac{16}{-4} = -4$ $x = 0$ $y = -6$ $-6 = -4(0) + b$ $-6 = b$ $y = -4x - 6$
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### Point-Slope Form:

To write an equation using **point-slope form**:  $y - y_1 = m(x - x_1)$

1. Find the slope of the line.
2. Select a point from the line.
3. Plug in slope for ( $m$ ) and the value of ( $x$ ) in for  $x_1$  and the value of ( $y$ ) in for  $y_1$  in the point-slope equation  $y - y_1 = m(x - x_1)$
5. Rewrite the equation using the form requested in the problem.

**Example 2:** Use point-slope form to write an equation in slope-intercept form for the line described.

<p><b>a.</b> slope <math>\frac{1}{2}</math>; passes through (6, 5)</p> $m = \frac{1}{2}$ $x_1 = 6$ $y_1 = 5$ $y - 5 = \frac{1}{2}(x - 6)$ $y - 5 = \frac{1}{2}x - 3$ $\begin{array}{r} +5 \\ +5 \end{array}$ $y = \frac{1}{2}x + 2$	<p><b>b.</b> passes through (-2, -1); <math>m = -3</math></p> $m = -3$ $x_1 = -2$ $y_1 = -1$ $y + 1 = -3(x + 2)$ $y + 1 = -3x - 6$ $\begin{array}{r} -1 \\ -1 \end{array}$ $y = -3x - 7$
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