

Writing Linear Equations Given the Slope and a Point

***Slope-Intercept Form** $y = mx + b$
Point-Slope Form $y - y_1 = m(x - x_1)$



****When writing the equation of the line you need the slope (m) and the y-intercept (b)****



Given the slope and a point you need to ...

- 1) Substitute in the slope and the x and y coordinates to the equation $y = mx + b$.
- 2) Solve for b.
- 3) Use the given slope and newly found b in the $y = mx + b$ equation.
- 4) OR substitute the point and slope into the point-slope formula and solve for y.





Let's Practice

Write the equation of the line that passes through the point and has the given slope. Write the equation in slope-intercept form.

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

Pull for graph

Point - Slope $y - y_1 = m(x - x_1)$	Slope-Intercept $y = mx + b$
$y - 5 = -1(x - 3)$ $y - 5 = -1x + 3$ $\begin{array}{r} +5 \\ +5 \end{array}$ $y = -1x + 8$	$5 = -1 \cdot 3 + b$ $5 = -3 + b$ $\begin{array}{r} +3 \\ +3 \end{array}$ $8 = b$ $y = -1x + 8$

Write the equation of the line that passes through $(-3, 0)$ with a slope of $m = 2$.

x y

Pull for graph

Point - Slope $y - y_1 = m(x - x_1)$	Slope-Intercept $y = mx + b$
$y - 0 = 2(x - (-3))$ $y = 2x + 6$	$0 = 2 \cdot (-3) + b$ $0 = -6 + b$ $\begin{array}{r} +6 \\ +6 \end{array}$ $6 = b$ $y = 2x + 6$

Write the equation of a line that passes through $(-4, -1)$ with a slope $m = \frac{3}{4}$.

Point - Slope $y - y_1 = m(x - x_1)$	Slope-Intercept $y = mx + b$
$y + 1 = \frac{3}{4}(x + 4)$ $y + 1 = \frac{3}{4}x + 3$ $\begin{array}{r} -1 \\ \hline y = \frac{3}{4}x + 2 \end{array}$	$-1 = \frac{3}{4}(-4) + b$ $-1 = -3 + b$ $\begin{array}{r} +3 \\ \hline 2 = b \end{array}$ $y = \frac{3}{4}x + 2$

Pull for graph

Write the equation of a line with the same slope as $y = 5x + 2$ and passes through $(3, 2)$.

Point - Slope $y - y_1 = m(x - x_1)$	Slope-Intercept $y = mx + b$
$y - 2 = 5(x - 3)$ $y - 2 = 5x - 15$ $\begin{array}{r} +2 \\ \hline y = 5x - 13 \end{array}$	$2 = 5 \cdot 3 + b$ $2 = 15 + b$ $\begin{array}{r} -15 \\ \hline -13 = b \end{array}$ $y = 5x - 13$

Pull for graph

Write the equation of a line with the same slope as $y = \frac{2}{3}x + 5$ and passes through $(3, 1)$.

$\frac{2}{3}$
m

x y

Pull for graph

Point - Slope $y - y_1 = m(x - x_1)$	Slope-Intercept $y = mx + b$
$y - 1 = \frac{2}{3}(x - 3)$ $y - 1 = \frac{2}{3}x - 2$ $\begin{array}{r} +1 \qquad +1 \\ \hline y = \frac{2}{3}x - 1 \end{array}$	$1 = \frac{2}{3} \cdot 3 + b$ $1 = 2 + b$ $\begin{array}{r} -2 \quad -2 \\ \hline -1 = b \end{array}$ $y = \frac{2}{3}x - 1$