

# Writing Linear Equations Given Slope and a Point

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## Slope-Intercept Form: $y = mx + b$

Write the equation of the line in *slope-intercept* form given the slope and a point on the line

- 1) Slope: 3  
Point: (4, 8)  
x y

$$y = 3x - 4$$

$$\begin{aligned}y &= m \cdot x + b \\y &= 3x + b \\8 &= 3 \cdot 4 + b \\8 &= 12 + b \\-12 & \quad -12 \\ \hline b &= -4\end{aligned}$$

- 1) Slope:  $-\frac{2}{5}$   
Point: (10, -3)  
x y

$$y = mx + b$$
$$y = -\frac{2}{5}x + 1$$

$$\begin{aligned}y &= mx + b \\-3 &= -\frac{2}{5} \left( \frac{10}{1} \right) + b \\-3 &= \frac{-20}{5} + b \\-3 &= -4 + b \\+4 & \quad +4 \\ \hline b &= 1\end{aligned}$$

1) Plug in the slope and (x, y) into  $y = mx + b$

2) solve for b

3) write equation using m and b

- 1) Slope: 4  
Point: (-2, -8)

$$y = m \cdot x + b$$
$$y = 4x$$

$$\begin{aligned}y &= 4x + b \\-8 &= 4(-2) + b \\-8 &= -8 + b \\+8 & \quad +8 \\ \hline b &= 0\end{aligned}$$