



Using Slope- Intercept Form

Use formula $y = mx + b$, use given information to find m, b .

Example - Find the equation of a line that has a slope of 2 and passes through the point $(3, 9)$

$$y = mx + b$$

Diagram showing the substitution of values into the slope-intercept form equation $y = mx + b$. An arrow points from the number 9 to the variable y . Another arrow points from the number 2 to the variable m . A third arrow points from the number 3 to the variable x . A fourth arrow points from the text "solve for b" to the variable b .

$$9 = 2(3) + b$$

$$9 = 6 + b$$

$$b = 3$$

equation of line $y = 2x + 3$



Using Point-Slope Form

$$y - y_1 = m(x - x_1) \leftarrow \text{Point-Slope Formula}$$

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plug in these values - then solve for y
write equation as $y = mx + b$

Example - Find the equation of a line that has a slope of 2 and passes through the point $(3, 9)$

$$y - y_1 = m(x - x_1)$$

$$\begin{array}{ccc} \uparrow & \uparrow & \uparrow \\ 9 & 2 & 3 \end{array}$$

$$y - 9 = 2(x - 3)$$

$$y - 9 = 2x - 6$$

$$y = 2x + 3 \leftarrow \text{equation of line}$$

Finding Linear Equations Given Two Points

- Can use point-slope formula or $y = mx + b$
- Both methods require you to find the slope, m

Example - Find the equation of a line that passes through $(1, 2)$ and $(3, -8)$

$$m = \frac{2 - (-8)}{1 - 3} = \frac{2 + 8}{-2} = \frac{10}{-2} = -5$$

$$m = -5$$

$y = mx + b$, use $m = -5$ and one point on the line, $(1, 2)$ or $(3, -8)$

$$m = -5 \quad \text{point } (1, 2)$$

$$y = mx + b$$

$$2 = -5(1) + b$$

$$2 = -5 + b$$

$$b = 7$$

Equation of line, $y = -5x + 7$

point-slope formula , use $m = -5$ and one point on the line, $(1, 2)$ or $(3, -8)$

$$m = -5 \quad \text{point } (3, -8)$$

$$y - y_1 = m(x - x_1)$$

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-8 -5 3

$$y - (-8) = -5(x - 3)$$
$$y + 8 = -5x + 15$$

-8 -8

Equation of line $\rightarrow y = -5x + 7$



Standard Form of Linear Equations

Write equation in $Ax + By = C$ form

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No fractions, integers only

Example,

Write $y = -\frac{1}{2}x + 5$ in standard form

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

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

clear fractions

$$2(y + \frac{1}{2}x = 5)$$

$$\boxed{2y + x = 10}$$

