



Math Virtual Learning

Grade 8

Equation of a Line Using a Point & Slope

May 14, 2020



Math 8

Lesson: May 14, 2020

Objective/Learning Target:

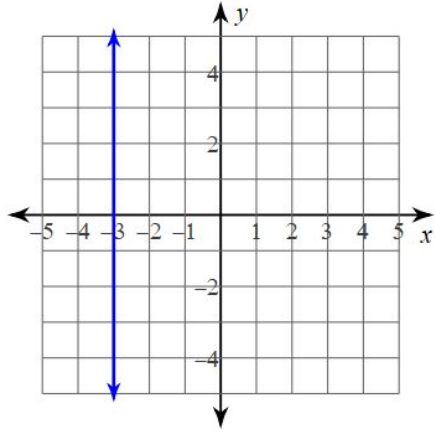
I can write an equation given a point and a slope.

Warm-Up:

Answers on next slide

Match each graph below with its equation.

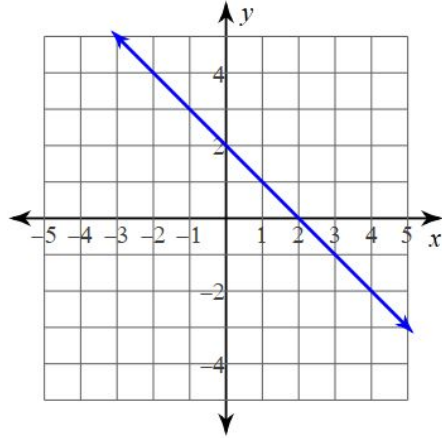
①



(a)

$$y = 2x + 3$$

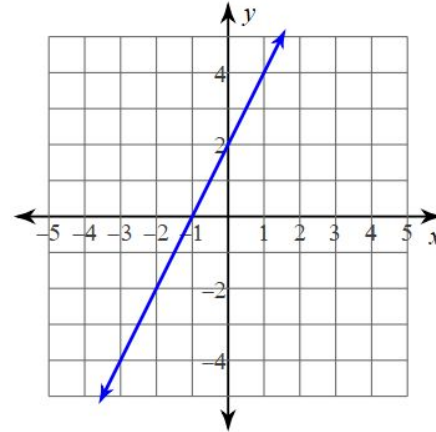
②



(b)

$$y = -x + 2$$

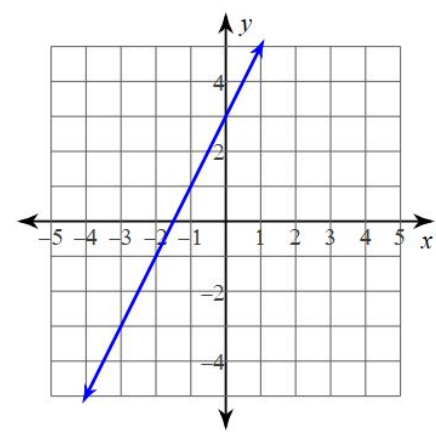
③



(c)

$$x = -3$$

④

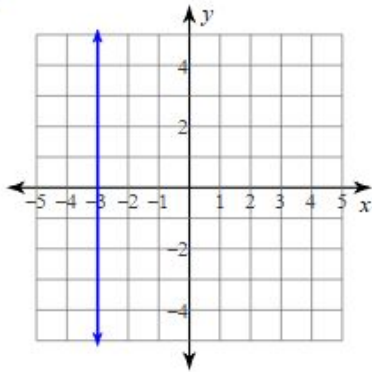


(d)

$$y = 2x + 2$$

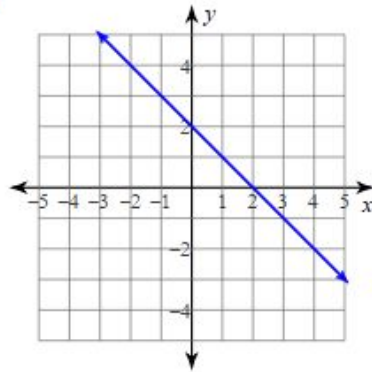
Warm-Up: *Answer Key*

1)



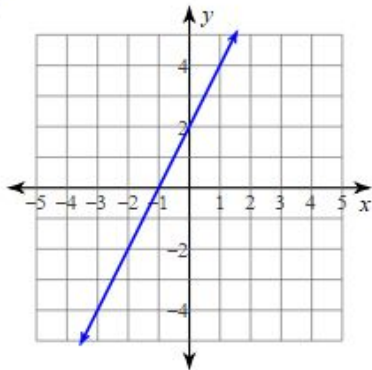
$$x = -3$$

2)



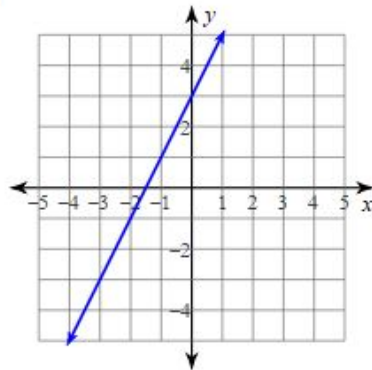
$$y = -x + 2$$

3)



$$y = 2x + 2$$

4)



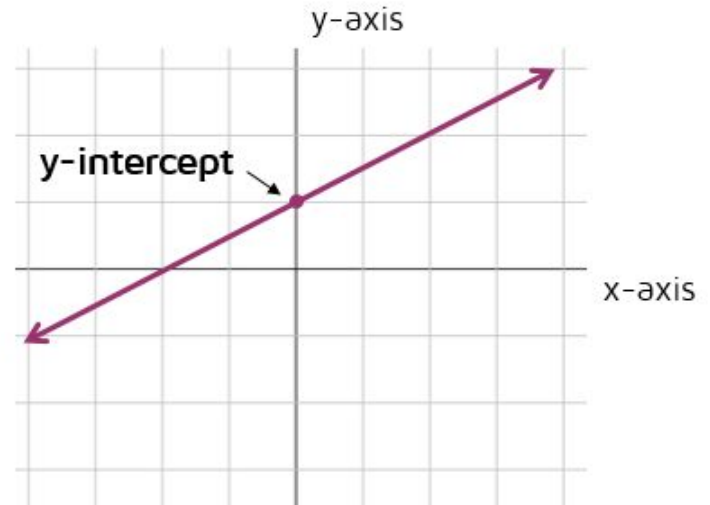
$$y = 2x + 3$$

Review: What is an Intercept?

There are two axes on the coordinate plane: the **x-axis** and the **y-axis**.

When your line crosses one of those axes, it is called an **intercept**.

For slope-intercept form, we want to find the **y - intercept**: The point where the line crosses the y-axis.



Review: Equation in Slope-Intercept Form

$$y = mx + b$$

↑ ↑
slope y-intercept

Example:

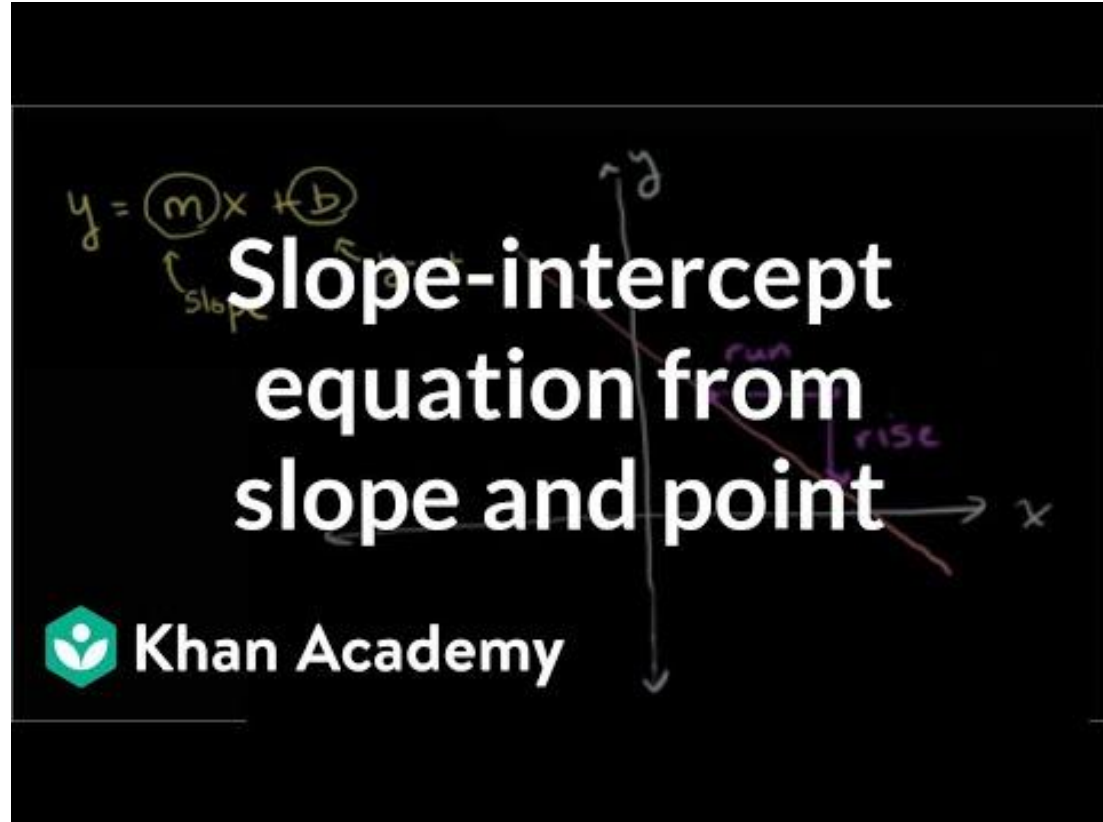
$$y = 2x + 3$$

↑ ↑
slope y-intercept

2/1 is the slope
(0,3) is the y-intercept

Video:

Take notes on a piece of paper as you watch this video.



The video thumbnail features a blackboard background. At the top left, the equation $y = m \cdot x + b$ is written in yellow, with 'm' and 'b' circled. A yellow arrow points from the word 'slope' to the circled 'm'. In the center, the text 'Slope-intercept equation from slope and point' is written in white. To the right, a coordinate plane is shown with a red line. A purple arrow labeled 'run' points horizontally along the line, and another purple arrow labeled 'rise' points vertically from the line. The x and y axes are labeled with white arrows. At the bottom left, the Khan Academy logo (a green leaf-like shape) and the text 'Khan Academy' are displayed in white.

How To: Write an Equation *if Given a Slope & a Point*

Given a point at $(0, -5)$ and given $m = \frac{1}{5}$, write the equation.

① $y = \frac{1}{5}x + b$

② $y = \frac{1}{5}x - 5$

- ① Use the equation of a line in slope-intercept form. Plug in the **slope** given.

The equation is $y = mx + b$

For this example, the slope is $\frac{1}{5}$

- ② Plug in the given **point** into the equation.

The point given is $(0, -5)$.

This is the y-intercept!!!

How To: Write an Equation *if Given a Slope & a Point*

Given a point at $(3, -3)$ and given $m = -\frac{2}{3}$, write the equation.

$$\textcircled{1} \quad y = -\frac{2}{3}x + b$$

$$\textcircled{2} \quad -3 = -\frac{2}{3}(3) + b$$

$$\textcircled{3} \quad -3 = -\frac{2}{3}(3) + b$$

$$\begin{array}{r} -3 = -2 + b \\ +2 \quad +2 \\ \hline -1 = \quad b \end{array}$$

- ① Use the equation of a line in slope-intercept form. Plug in the **slope** given.

The equation is $y = mx + b$

For this example, the slope is $\frac{2}{3}$

- ② Plug in the given point into the equation - use the **x and y values** from the given point.

The point given is $(3, -3)$. That means $x = 3$ and $y = -3$.

- ③ **Solve for b** to find the y-intercept. Then, complete the equation in slope-intercept form.

Answer:

$$y = -\frac{2}{3}x - 1$$

Example 1:

Given a point at $(3, 1)$ and given $m = -\frac{1}{3}$, write the equation.

① $y = -\frac{1}{3}x + b$

② $1 = -\frac{1}{3}(3) + b$

③ $1 = -\frac{1}{3}(3) + b$

✓

$$\begin{array}{r} 1 = -1 + b \\ +1 \quad +1 \\ \hline 2 = \quad b \end{array}$$

- ① Use the equation of a line in slope-intercept form. Plug in the **slope** given.

The equation is $y = mx + b$

For this example, the slope is $-\frac{1}{3}$

- ② Plug in the given point into the equation - use the **x and y values** from the given point.

The point given is $(3, 1)$. That means $x = 3$ and $y = 1$.

- ③ **Solve for b** to find the y-intercept. Then, complete the equation in slope-intercept form.

Answer:

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

Practice 1:

Answers on next slide

Find the equation of each line. (A slope and point are given.)

① $m = 2$ $(-2, 1)$

② $m = 1$ $(3, -2)$

③ $m = -\frac{1}{2}$ $(0, 0)$

④ $m = \frac{3}{4}$ $(0, 8)$

⑤ $m = \frac{1}{6}$ $(5, -2)$

⑥ $m = 0$ $(4, 2)$

Practice 1:

Answer Key

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

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

or

$$y = x - 5$$

$$\textcircled{3} \quad y = -\frac{1}{2}x$$

$$\textcircled{4} \quad y = \frac{3}{4}x + 8$$

$$\textcircled{5} \quad y = \frac{1}{5}x - 3$$

$$\textcircled{6} \quad y = 0x + 2$$

or

$$y = 2$$

Additional Resources:

[Writing Equations in Slope-Intercept Form - Lesson & Practice Problems](#)

[Writing Equations with Slope and Intercept](#)