Math Virtual Learning

Pre-Algebra
Equation of a Line Using a Point & Slope

May 18, 2020

Pre-Algebra
Lesson: May 18, 2020
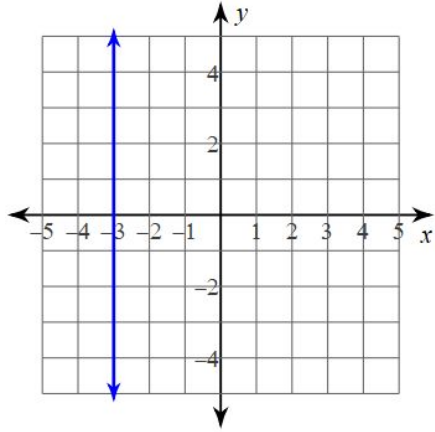
Objective/Learning Target:
I can write an equation given a point and a slope.
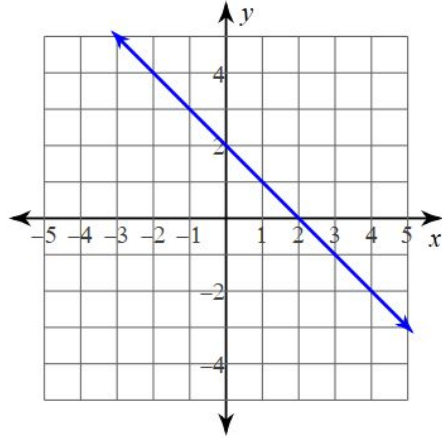
Warm-Up:

Match each graph below with its equation.

①　　　　②　　　　③　　　　④

(a)　　　　(b)　　　　(c)　　　　(d)

$y = 2x + 3$　　　$y = -x + 2$　　　$x = -3$　　　$y = 2x + 2$
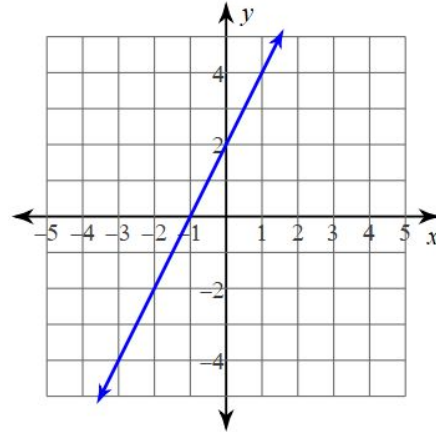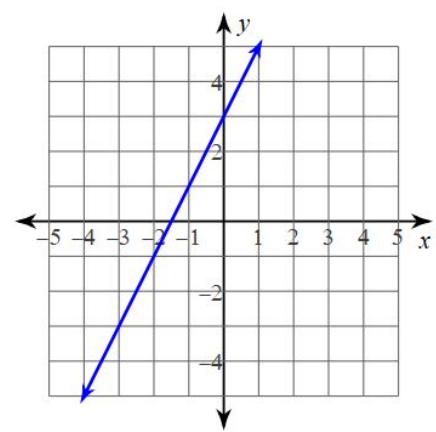
1)
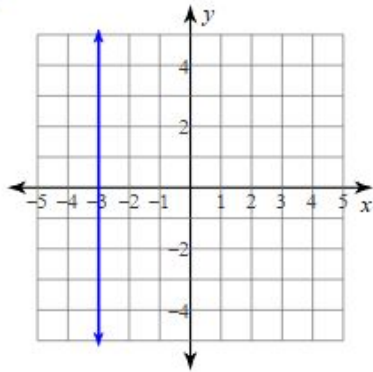
$x = -3$

2)
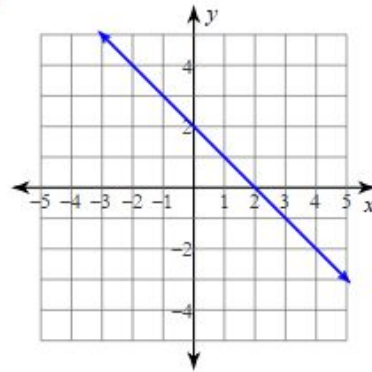
$y = -x + 2$

3)
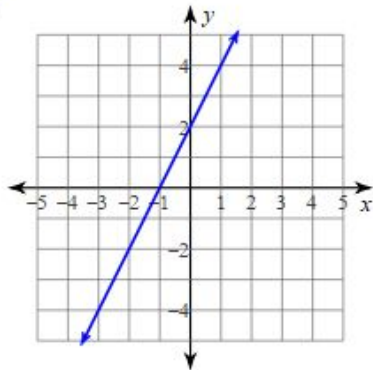
$y = 2x + 2$

4)
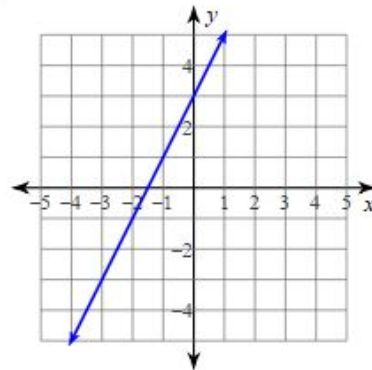
$y = 2x + 3$

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.
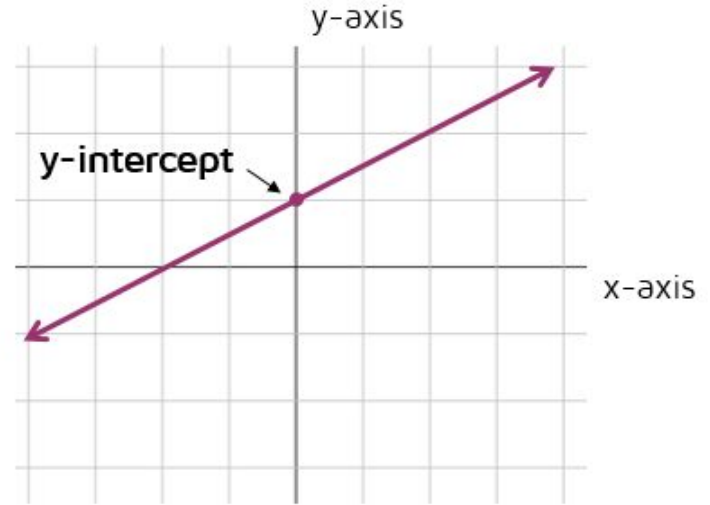
Review: Equation in Slope-Intercept Form

$$y = mx + b$$

slope   y-intercept

Example:
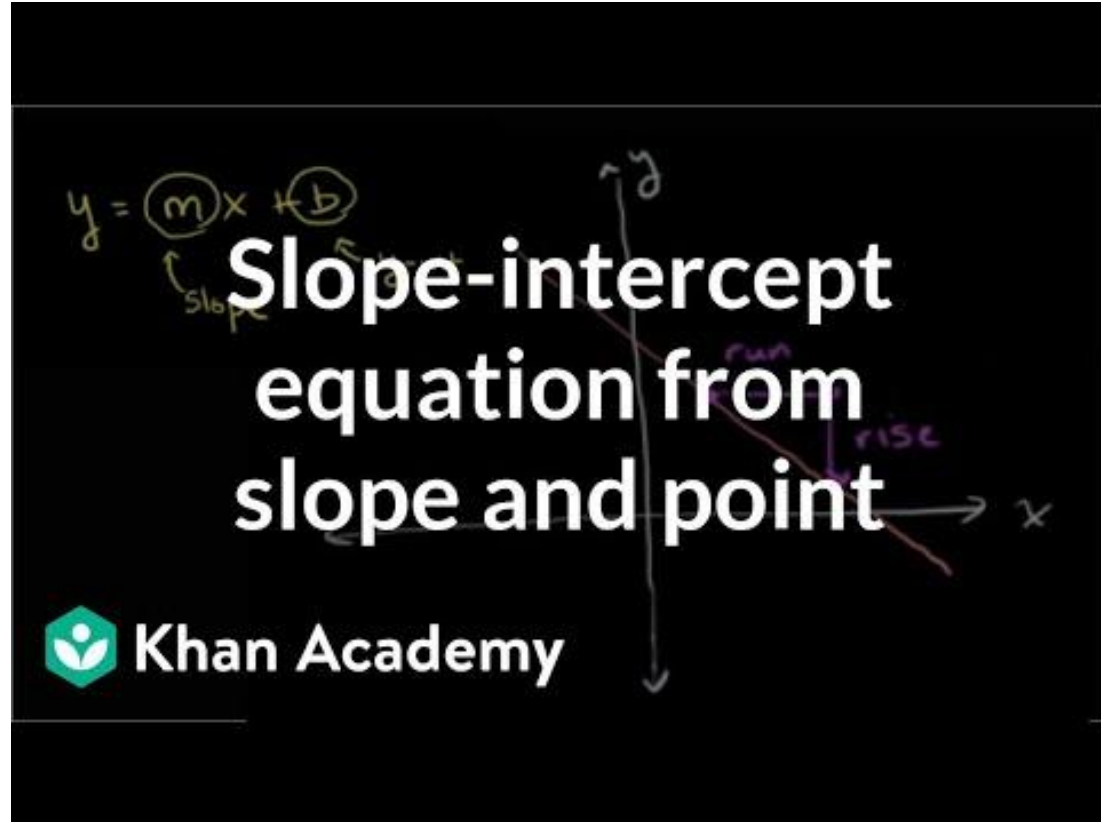
$$y = 2x + 3$$

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.

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

Given a point at (0,−5) and given m = ⅕ , write the equation.

①   y = ⅕x + b

②   y = ⅕x − 5

① **Use the equation of a line in <u>slope-intercept form</u>. Plug in the slope given.**
    The equation is y = mx + b
    For this example, the slope is 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 = − ⅔ , write the equation.

① $y = -\frac{2}{3}x + b$

② $-3 = -\frac{2}{3}(3) + b$

③ $-3 = -\frac{2}{3}(3) + b$

        $-3 = -2 + b$

        $+2 \qquad +2$
_____
        $-1 = \qquad b$

① **Use the equation of a line in <u>slope-intercept form</u>. Plug in the** <mark>slope</mark> **given.**
    The equation is y = mx + b
    For this example, the slope is 2/3

② **Plug in the given point into the equation - use the** <mark>x and y values</mark> **from the given point.**
    The point given is (3,−3). That means x = 3 and y = −3.

③ <mark>**Solve for b**</mark> **to find the <u>y-intercept</u>. Then, complete the equation in <u>slope-intercept form</u>.**

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

Example 1:

Given a point at *(3, 1) and given m = − ⅓* , write the equation.

① $y = -\tfrac{1}{3}x + b$

② $1 = -\tfrac{1}{3}(3) + b$

③ $1 = -\tfrac{1}{3}(3) + b$

        $1 = -1 + b$
        +1   +1
        ⎯⎯⎯⎯⎯⎯⎯⎯
        $2 = \quad b$

① **Use the equation of a line in <u>slope-intercept form</u>. Plug in the slope given.**
    *The equation is **y = mx + b***
    For this example, the slope is −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 <u>y-intercept</u>. Then, complete the equation in <u>slope-intercept form</u>.**

Answer: $y = -\tfrac{1}{3}x + 2$

Practice 1:

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

①   **m = 2**   **(−2,1)**

②   **m = 1**   **(3,−2)**

③   **m = −½**   **(0,0)**

④   **m = ¾**   **(0,8)**

⑤   **m = ⅙**   **(5, −2)**

⑥   **m = 0**   **(4, 2)**

Practice 1:   *Answer Key*

①   **y = 2x + 5**

②   **y = 1x − 5**
       or
    y = x − 5

③   **y = −½x**

④   **y = ¾x + 8**

⑤   **y = ⅕x −3**

⑥   **y = 0x + 2**
       or
    y = 2

Additional Resources:

Writing Equations in Slope-Intercept Form - Lesson & Practice Problems

Writing Equations with Slope and Intercept