



Math Virtual Learning

Grade 8

Equation of a Line from a Graph

May 13, 2020



Math 8

Lesson: May 13, 2020

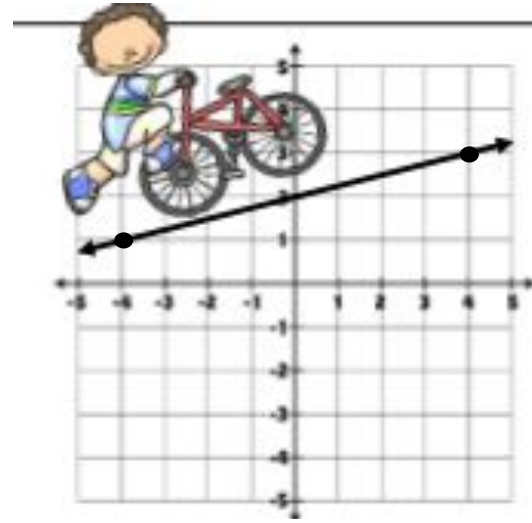
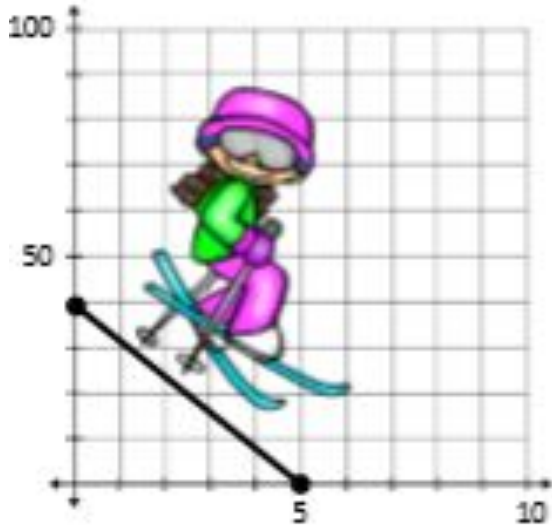
Objective/Learning Target:

I can write an equation from a graph.

Warm-Up:

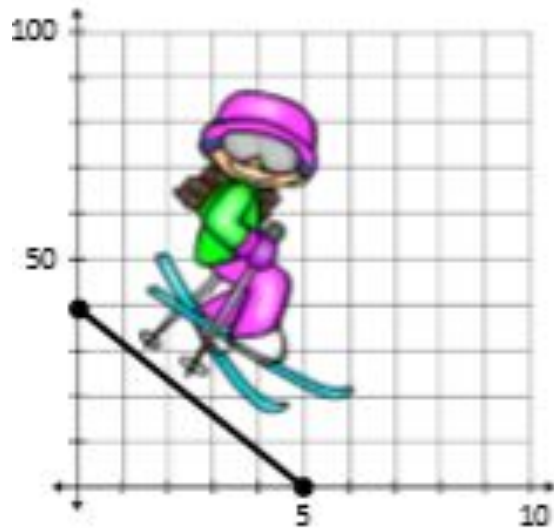
Answers on next slide

Find the slope of each line. *(Remember to simplify / reduce the fraction.)*

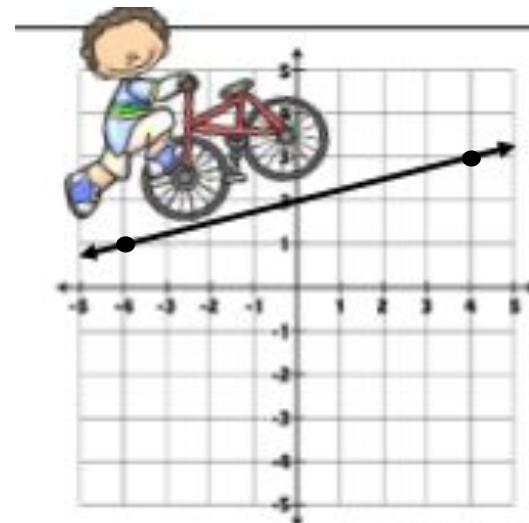


Notice the scale of the y-axis goes by 10!

Warm-Up: *Answer Key*



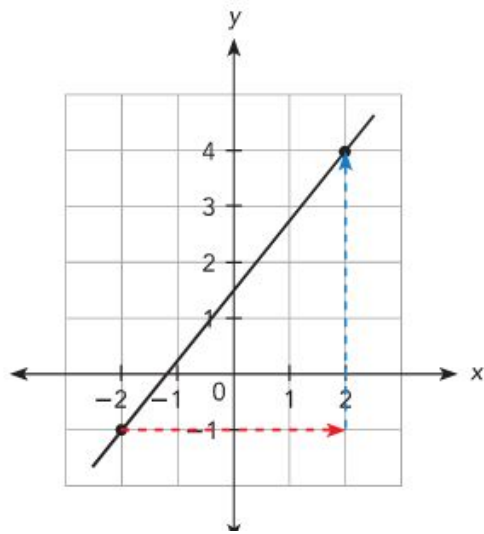
-8



$\frac{1}{4}$

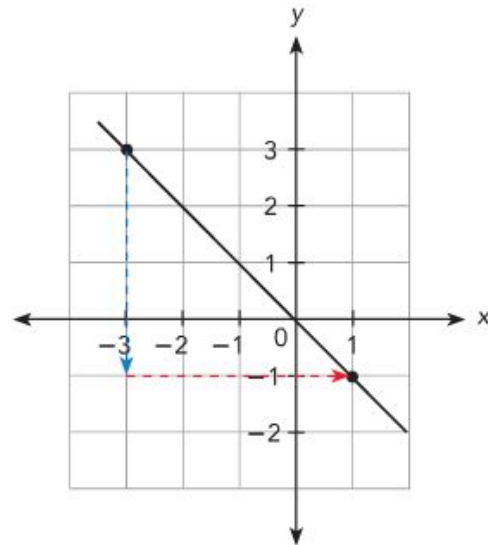
Review: How to Count Slope from a Graph

a)



The graph passes through the points $(-2, -1)$ and $(2, 4)$.

$$\begin{aligned}\text{Slope} &= \frac{\text{Rise}}{\text{Run}} \\ &= \frac{4 - (-1)}{2 - (-2)} \\ &= \frac{5}{4}\end{aligned}$$



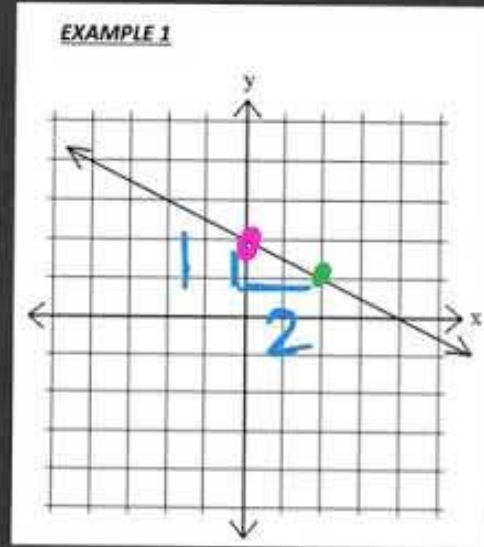
The graph passes through the points $(-3, 3)$ and $(1, -1)$.

$$\begin{aligned}\text{Slope} &= \frac{\text{Rise}}{\text{Run}} \\ &= \frac{-1 - 3}{1 - (-3)} = \frac{-4}{4} = -1\end{aligned}$$

The slope is -1 .

Video:

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



b

Step 1: $2 = b$

Step 2:

Step 3: rise -1

Step 4: run 2

m

Step 5: $-\frac{1}{2}$

Equation: $y = mx + b$

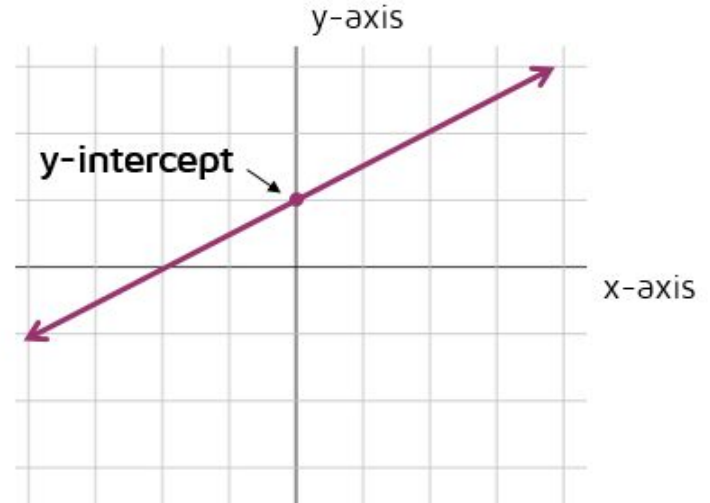
$y = -\frac{1}{2}x + 2$

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.



Slope-Intercept Form Equation

$$y = mx + b$$

↑ ↑
slope y-intercept

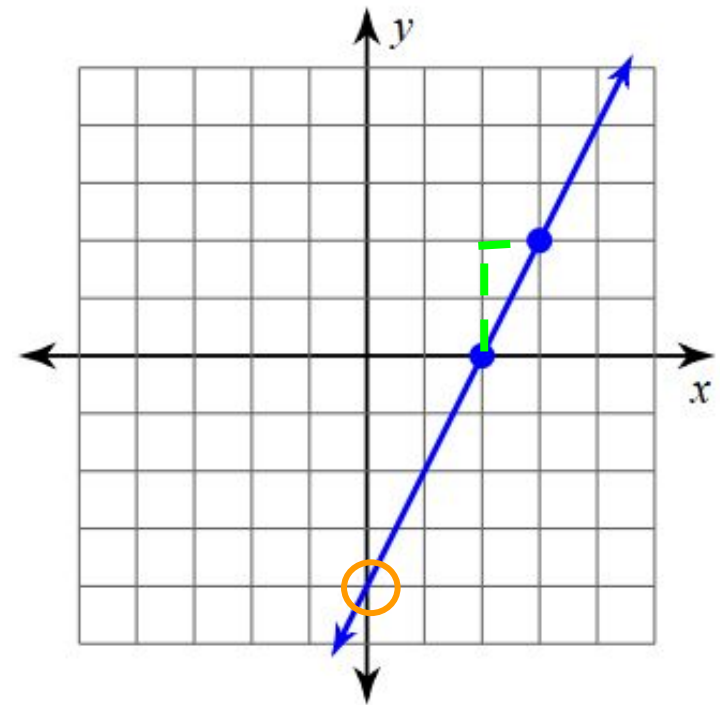
Example:

$$y = 2x + 3$$

↑ ↑
slope y-intercept

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

How To: Write an Equation of a Line *from a Graph*



- ① Count the **slope**.

For this line, we can use the two points given to find the slope is $2/1$ or just 2

- ② Find the **y-intercept** (where the line crosses the y-axis).

For this line, we can see it crosses the y-axis where the orange circle is: at $(0, -4)$.

- ③ Write the **equation** in slope-intercept form.

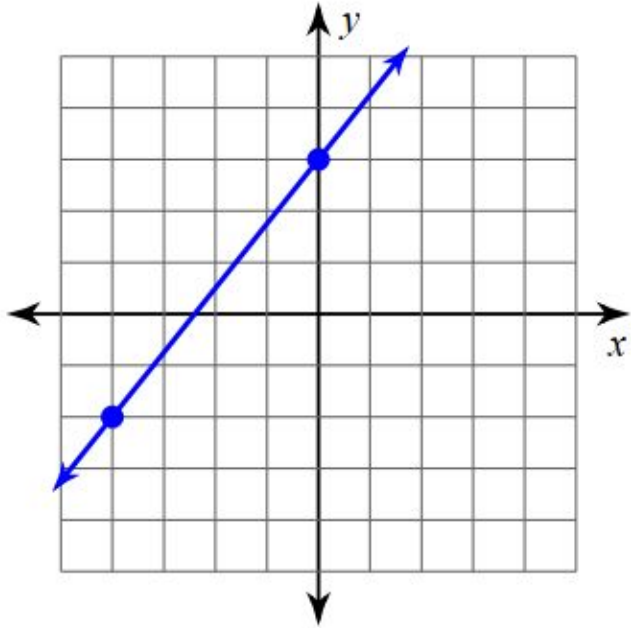
$$y = 2x - 4$$

You can check that your equation is correct by plugging in any point on the line into the equation. For example, we can plug in the point $(1, -2)$ using $x=1$ and $y=-2$.

So: $-2 = 2(1) - 4$, and $-2 = -2$ ★

Example 1:

Write the equation of the line.



① Count the **slope**.

$$\frac{5}{4}$$

② Find the **y-intercept**.

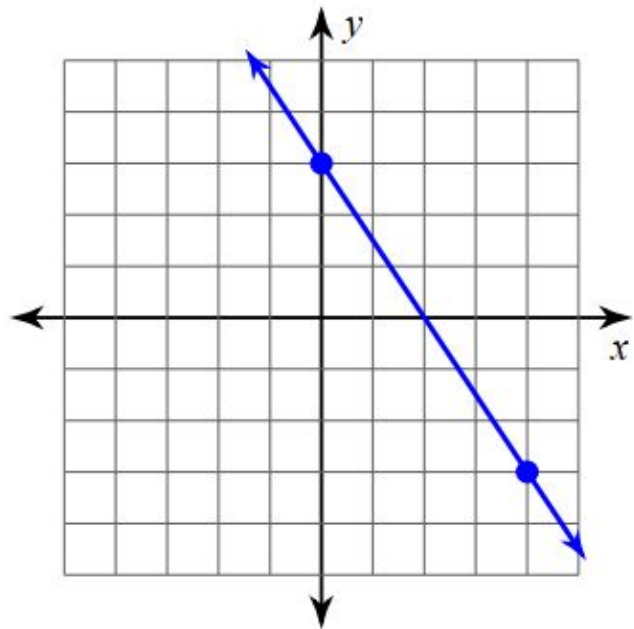
$$(0, 3)$$

③ Write the **equation** in slope-intercept form.

$$y = \frac{5}{4}x + 3$$

Example 2:

Write the equation of the line.



① Count the **slope**.

$$\frac{-6}{4} = \frac{-3}{2}$$

② Find the **y-intercept**.

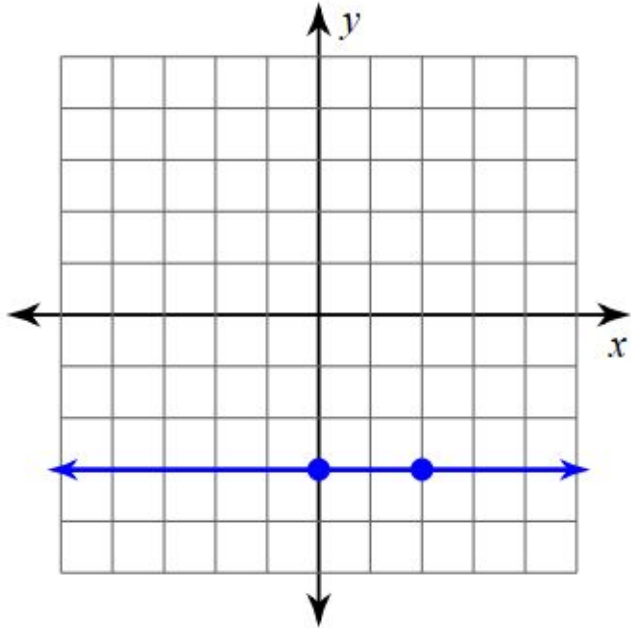
$$(0, 3)$$

③ Write the **equation** in slope-intercept form.

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

Example 3:

Write the equation of the line.



① Count the **slope**.

0

② Find the **y-intercept**.

$(0, -3)$

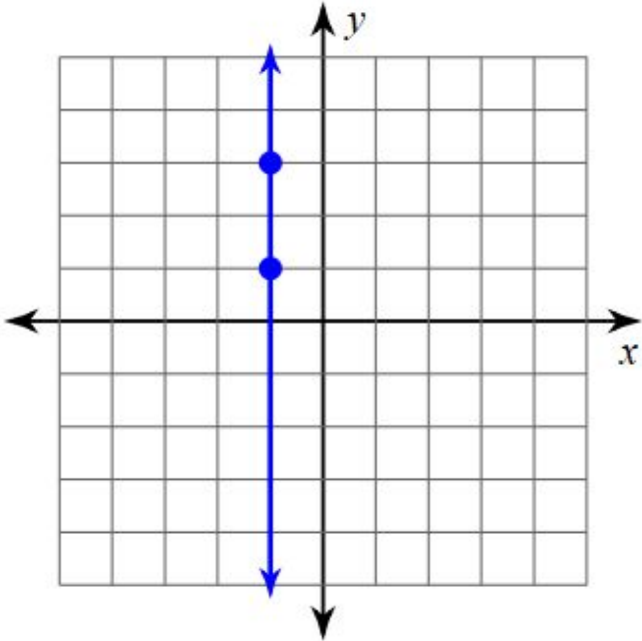
③ Write the **equation** in slope-intercept form.

$$y = 0x - 3 \quad \text{or}$$

$$y = -3$$

Example 4:

Write the equation of the line.



① Count the **slope**.

undefined

② Find the **y-intercept**.

There isn't one!

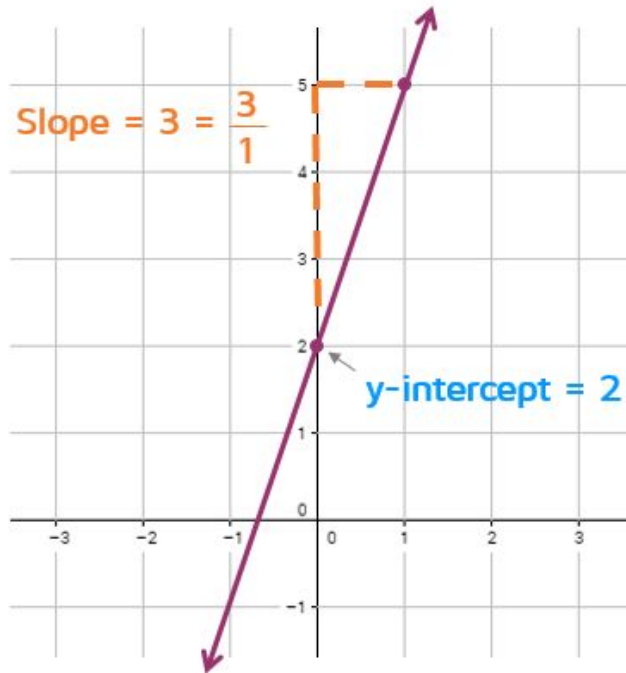
③ Write the **equation** in slope-intercept form.

This is a special case. Because there is not a y-intercept, we can't put it in slope-intercept form. However, it does have an x-intercept at $(-1, 0)$. The equation for this undefined line looks like:

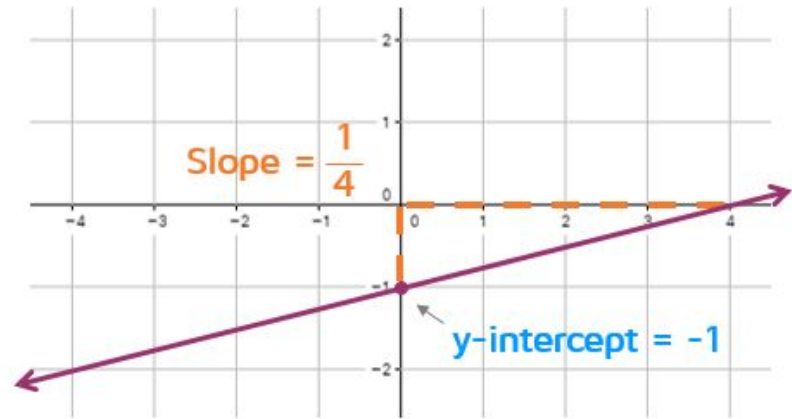
$$x = -1$$

Take a Look at This:

Graph of $y = 3x + 2$



Graph of $y = \frac{1}{4}x - 1$



$$y = \frac{1}{4}x - 1$$

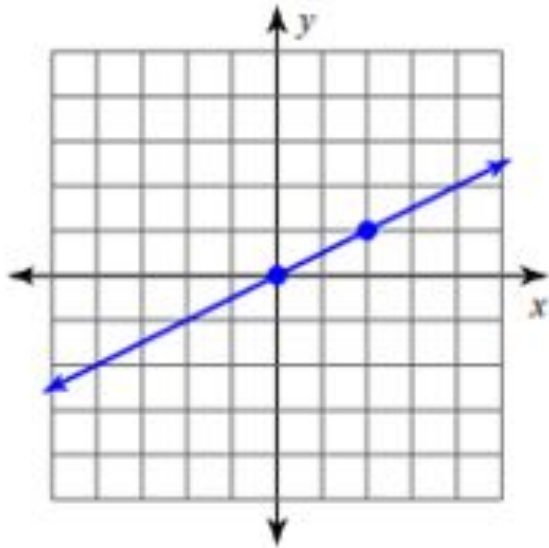
slope y-intercept

Practice 1:

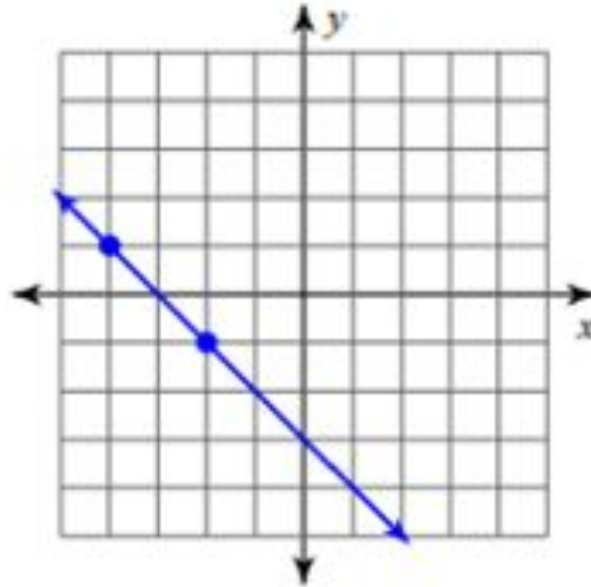
Answers on next slide

Write the equation for each line in slope-intercept form.

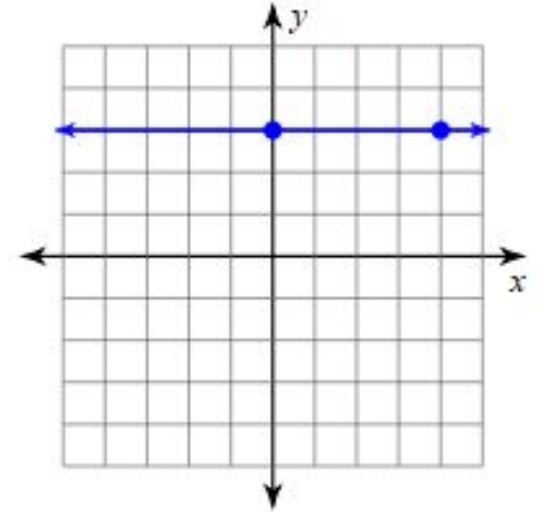
①



②



③



Practice 1:

Answer Key

$$\textcircled{1} \quad y = \frac{1}{2}x + 0$$

or

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

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

or

$$y = -x - 3$$

$$\textcircled{3} \quad y = 0x + 3$$

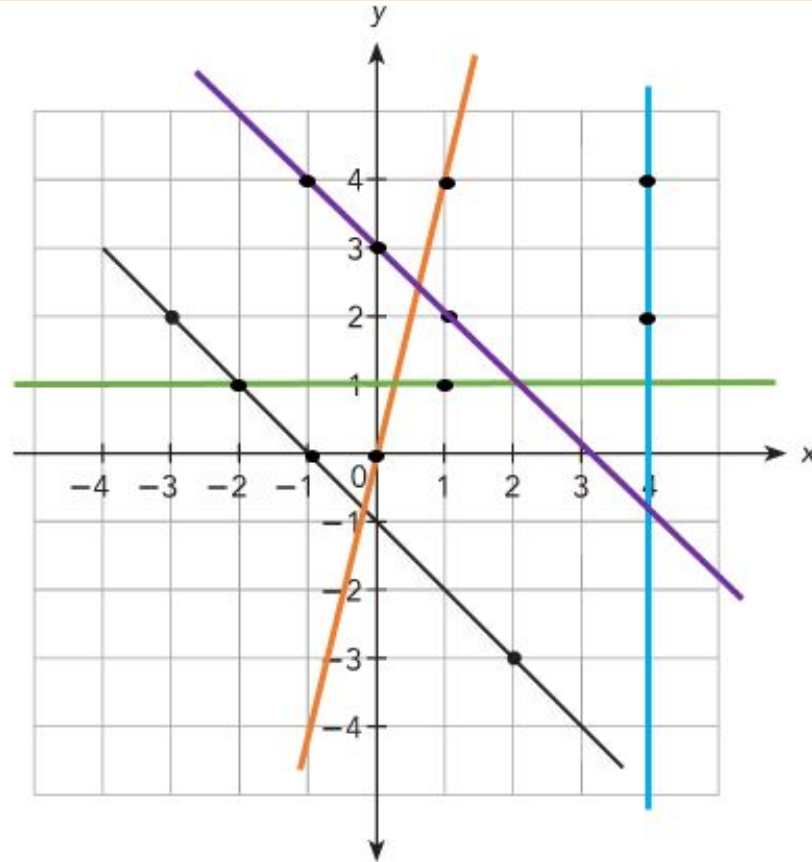
or

$$y = 3$$

Practice 2:

Answers on next slide

Write an equation for each of the lines below.



Exit Ticket:

Answer Key

Orange Line: $y = 4x + 0$ or $y = 4x$

Black Line: $y = -1x - 1$ or $y = -x - 1$

Purple Line: $y = -1x + 3$ or $y = -x + 3$

Blue Line: $x = 4$

Green Line: $y = 0x + 1$ or $y = 1$

Additional Resources:

[Slope Intercept from Two Points Practice](#)

[Y-intercept Practice](#)

[Slope-intercept form: write an equation from a graph](#)

[Slope of a Line from a Graph](#)