- Every graph has an equation!

Lesson 20: Every Line Is a Graph of a Linear Equation

Use $y = mx + b$

slope ↓   ↳ y-int.

Classwork

Opening Exercise

Figure 1

$y = \dfrac{2}{3}x - 3$

Figure 2

Slope $= \dfrac{\triangle y}{\triangle x}$

$y = -\dfrac{1}{4}x + 2$

engage^{ny}   S.116

NYS COMMON CORE MATHEMATICS CURRICULUM **Lesson 20** **8•4**
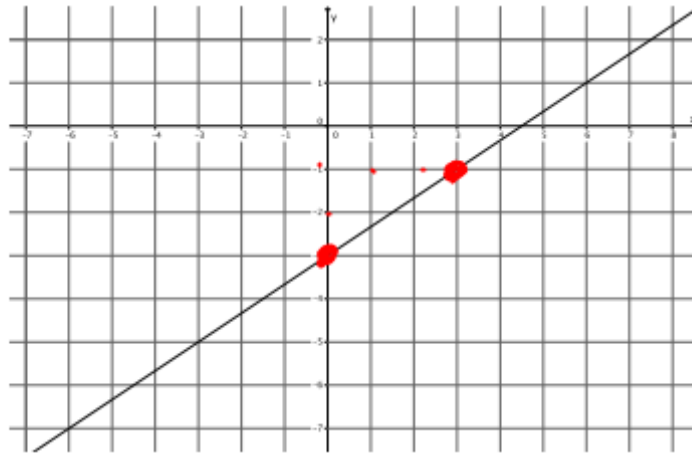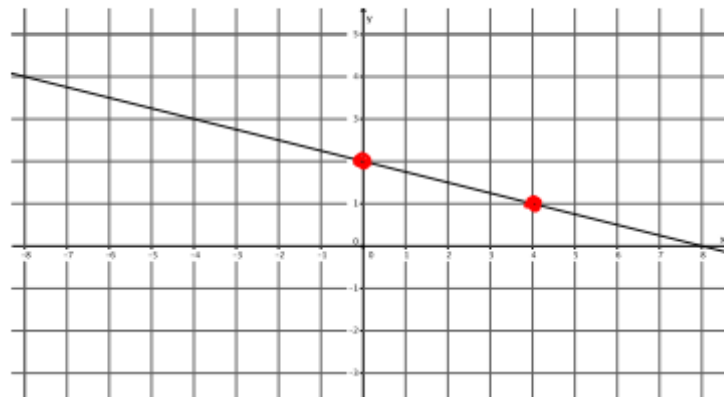
Exercises

1. Write the equation that represents the line shown.
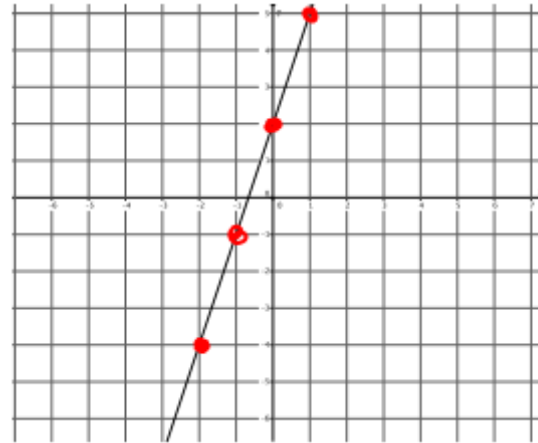
$$y = 3x + 2$$

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

$$y = 3x + 2$$
$$-3x \qquad -3x$$
$$-1 \; (-3x + y = 2)$$
$$3x - y = -2$$

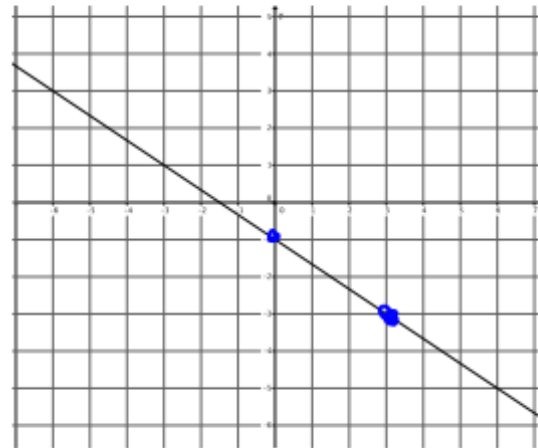2. Write the equation that represents the line shown.

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

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

$$y = -\frac{2}{3}x - 1$$
$$+\frac{2}{3}x \qquad +\frac{2}{3}x$$
$$3\left(\frac{2}{3}x + y = -1\right) \longrightarrow 2x + 3y = -3$$

* Multiply by the common denominator *

COMMON CORE

Lesson 20: Every Line Is a Graph of a Linear Equation
Date: 11/19/14

engage^ny S.117

3. Write the equation that represents the line shown.
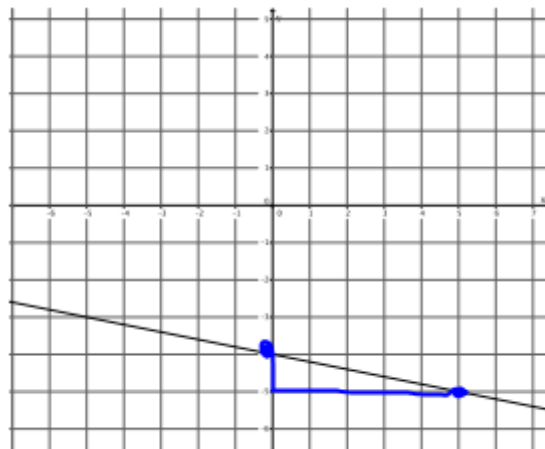
$$y = -\frac{1}{5}x - 4$$

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

$$y = -\frac{1}{5}x - 4$$

$$+\frac{1}{5}x \qquad +\frac{1}{5}x$$

$$\left(\frac{1}{5}x + y = -4\right)^{.5} \rightarrow x + 5y = -20$$

4. Write the equation that represents the line shown.
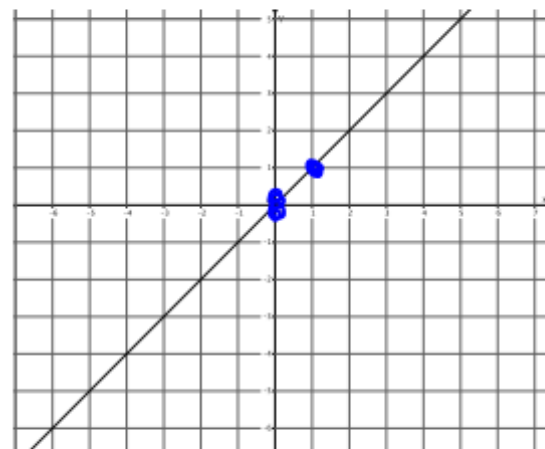
$$y = x$$

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

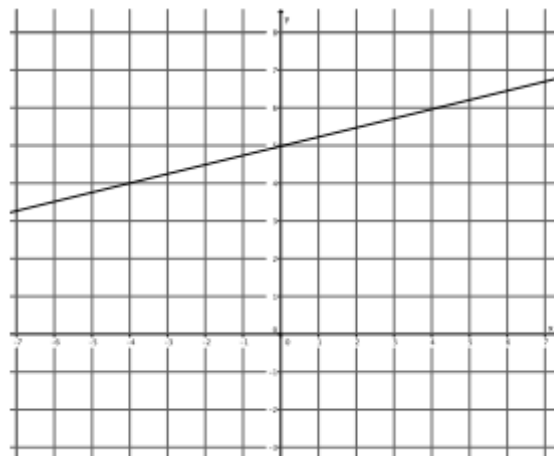$$-x \quad y = x \quad -x$$

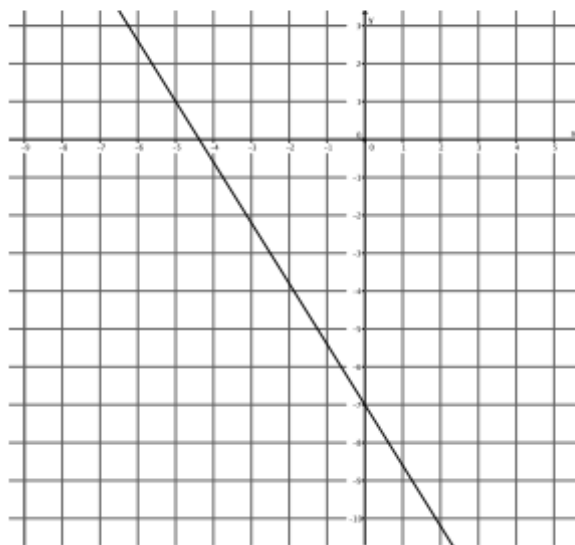$$\left(-x + y = 0\right)^{-1}$$

$$x - y = 0$$

5. Write the equation that represents the line shown.

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

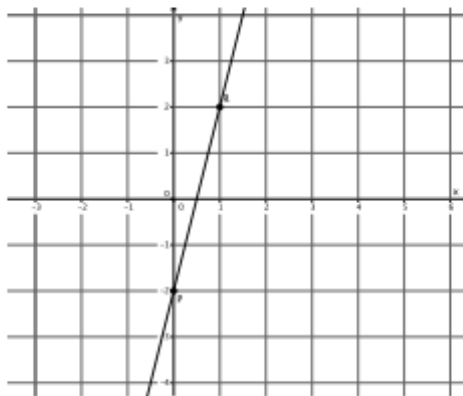6. Write the equation that represents the line shown.

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

Lesson Summary

Write the equation of a line by determining the y-intercept, $(0, b)$ and the slope, m, and replacing the numbers b and m into the equation $y = mx + b$.

Example:

The y-intercept of this graph is $(0, -2)$.

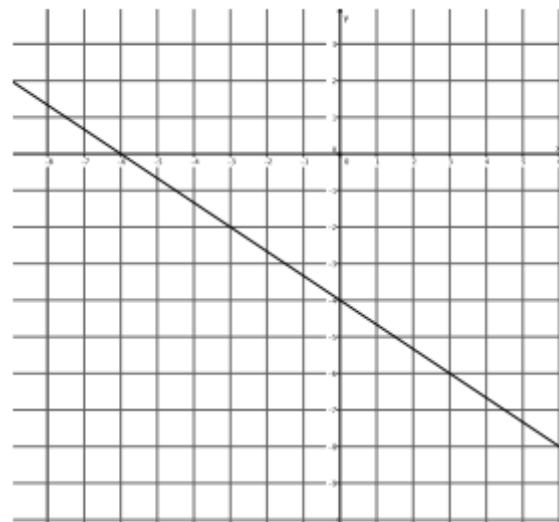The slope of this graph is $m = \frac{4}{1} = 4$.

The equation that represents the graph of this line is $y = 4x - 2$.

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers and a is not negative.
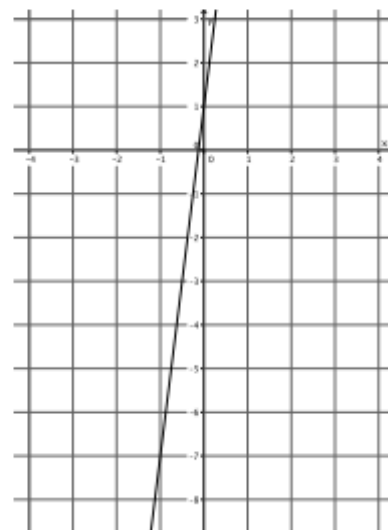
Problem Set

1. Write the equation that represents the line shown.

    Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.
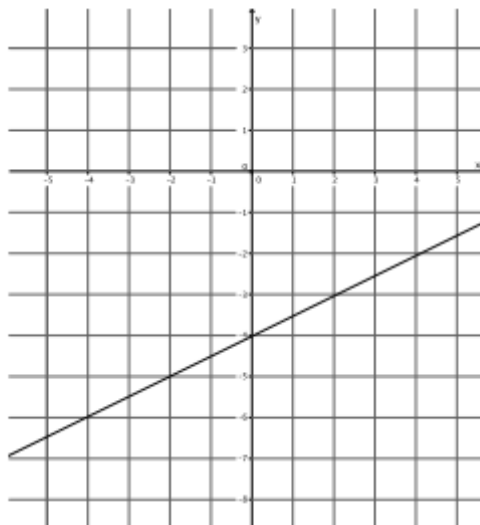
2. Write the equation that represents the line shown.

    Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

3. Write the equation that represents the line shown.

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.
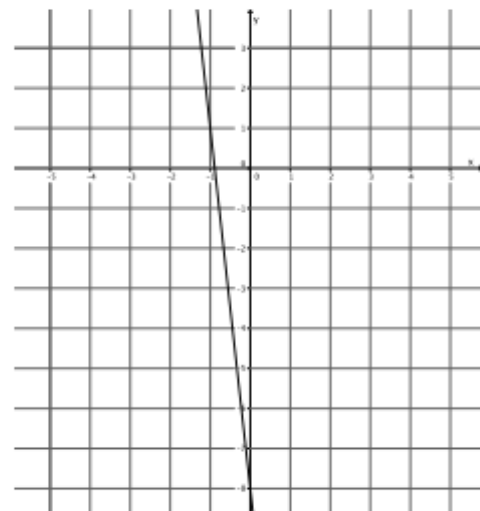
4. Write the equation that represents the line shown.

Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.
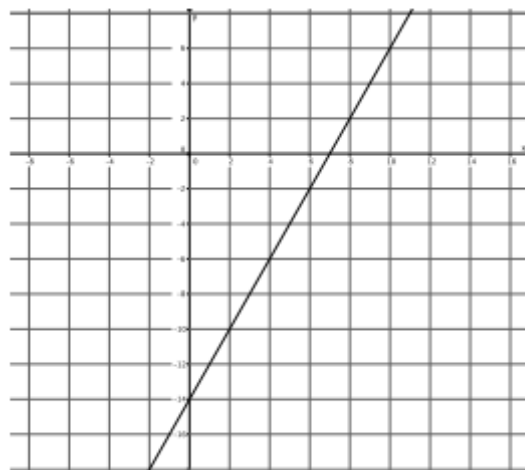
5. Write the equation that represents the line shown.

    Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.

6. Write the equation that represents the line shown.

    Use the properties of equality to change the equation from slope-intercept form, $y = mx + b$, to standard form, $ax + by = c$, where a, b, and c are integers, and a is not negative.