

Algebra I

Lesson 5-5

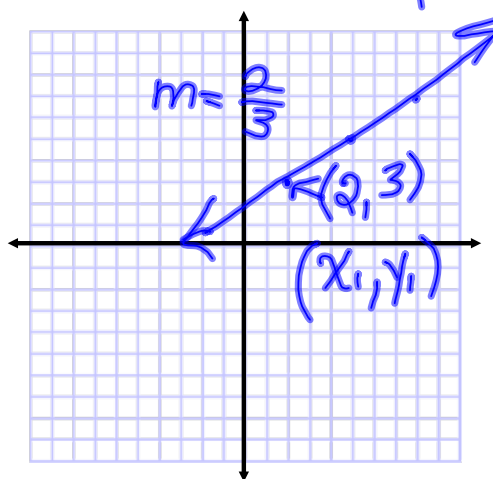
- I can write the equation of a line in point-slope form.
- I can write linear equations in different forms.



The linear equation $y - y_1 = m(x - x_1)$ is written in point-slope form, where (x, y) is a given point on a nonvertical line and m is the slope of the line.

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

$$y - 3 = \frac{2}{3}(x - 2)$$



Write the point-slope form of an equation for a line that passes through $(-1, 5)$ with slope -3 .

$$(x_1, y_1) = (-1, 5)$$

$$m = -3$$

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

$$y - 5 = -3(x + 1)$$

Write the point-slope form of an equation for a horizontal line that passes through $(6, -2)$.

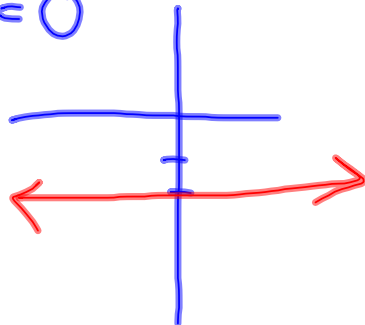
$$m = 0$$

$$(x_1, y_1) = (6, -2)$$

$$y - (-2) = 0(x - 6)$$

$$y + 2 = 0(x - 6)$$

$$y + 2 = 0$$



Forms of Linear Equations

Form	Equation	Description
Slope-Intercept	$y = mx + b$	m is the slope, b is the y -intercept
Point-Slope	$y - y_1 = m(x - x_1)$	m is the slope, (x_1, y_1) is a given point
Standard	$Ax + By = C$	$A \geq 0$, A and B are not both zero, GCF of A , B , & C is one

Write $y + 5 = -\frac{5}{4}(x - 2)$ in standard form.

$$Ax + By = C$$

$$4(y + 5) = 4\left(-\frac{5}{4}(x - 2)\right)$$

$$4y + 20 = -5(x - 2)$$

$$4y + 20 = -5x + 10$$

$$\begin{array}{r} 4y + 20 = -5x + 10 \\ \underline{-20} \qquad \qquad \underline{-20} \\ 4y = -5x - 10 \\ \underline{+5x} \quad \underline{+5x} \end{array}$$

$$5x + 4y = -10$$

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

$$y = mx + b$$

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

$$\begin{array}{r} +2 \\ \hline y = \frac{1}{2}x + 4\frac{1}{2} \end{array}$$

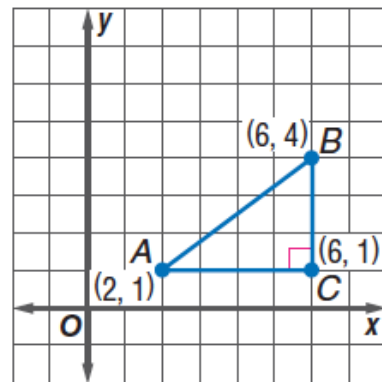
Write the point-slope form of the line containing the hypotenuse \overline{AB} .

$$m = \frac{4-1}{6-2} = \frac{3}{4}$$

$(2, 1)$

$(6, 4)$

$$y - 1 = \frac{3}{4}(x - 2) \quad y - 4 = \frac{3}{4}(x - 6)$$



Write the previous equation (point-slope form) in standard form.

$$\begin{array}{l}
 y-1 = \frac{3}{4}(x-2) \\
 4(y-1) = 4 \cdot \frac{3}{4}(x-2) \\
 4(y-1) = 3(x-2) \\
 4y-4 = 3x-6 \\
 \begin{array}{r}
 -4y \\
 -4 = 3x-4y-6 \\
 +6 \\
 \hline
 2 = 3x-4y
 \end{array}
 \end{array}$$

$$\begin{array}{l}
 y-4 = \frac{3}{4}(x-6) \\
 4(y-4) = 4 \cdot \frac{3}{4}(x-6) \\
 4(y-4) = 3(x-6) \\
 4y-16 = 3x-18 \\
 \begin{array}{r}
 -4y \\
 -16 = 3x-4y-18 \\
 +18 \\
 \hline
 2 = 3x-4y
 \end{array}
 \end{array}$$

$3x-4y=2$

Assignment:

Pgs. 289-290 #24-28 all;
38-40 all; 50-57 all

