

slope intercept equation
 $y = mx + b$ → y intercept
 ↓ slope (multiplier)

Focus:

1. To be able to convert a linear equation to general form.
2. To be able to use intercepts to graph a line.
3. To be able to relate the intercepts of a graph to the situation



Curricular Competencies

A6 I can think creatively

B4 I can solve problems with persistence and a positive attitude

General Form of a Linear Equation:

The **general form** of the equation of a line is an equation where all the terms are collected to the left side of the equation.

- A cannot be negative
- A, B, and C are integers.

no fractions!

$Ax + By + C = 0$

This form is also referred to as standard form.

Example 1:

Convert the following equations to general form.

a. $y = 5x - 8$
 $-y \quad -y$
 $0 = 5x - y - 8$

b. $y = \frac{2}{3}x + 7$
 $-y \quad -y$
 $(0 = \frac{2}{3}x - y + 7) \times 3$
 $0 = 2x - 3y + 21$

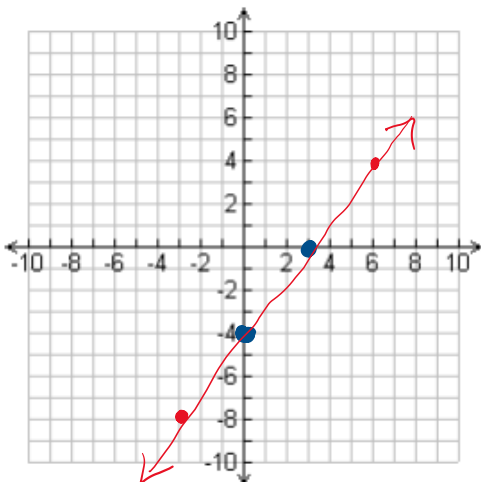
c. $y = -\frac{1}{4}x + \frac{3}{5}$
 $-y \quad -y$
 $(0 = -\frac{1}{4}x - y + \frac{3}{5}) \times 20$
 $0 = 5x + 20y - 12$

d. $y = 0.5x - 0.25$
 $-y \quad -y$
 $(0 = 0.5x - y - 0.25) \times 4$
 $(0 = \frac{1}{2}x - y - \frac{1}{4}) \times 4$
 $0 = 2x - 4y - 1$

Example 2:

Graph the following linear equations.

a) $4x - 3y - 12 = 0$



1. Substitute in either x or y values to determine any two points. (The intercepts are usually the easiest to determine.)

$4x - 3y - 12 = 0$

$-3y - 12 = 0$

$\frac{-3y - 12}{-3} = \frac{0}{-3}$
 $y = -4$

$4x - 12 = 0$

$+12 \quad +12$

$4x = 12$

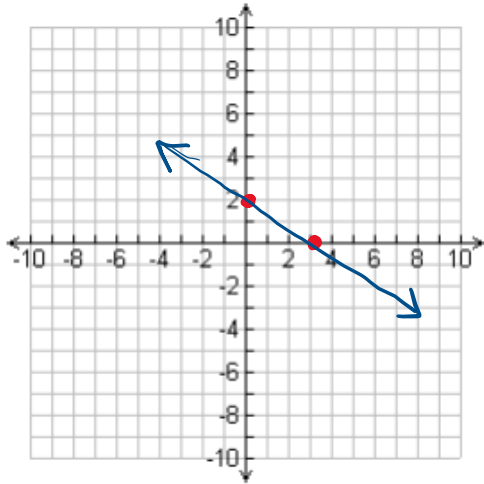
$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

2. Graph the two points

3. Connect the points to form a line.

b) $6x + 9y - 18 = 0$



$$\begin{aligned}
 6x + 9y - 18 &= 0 \\
 9y - 18 &= 0 \\
 9y &= 18 \\
 y &= 2
 \end{aligned}$$

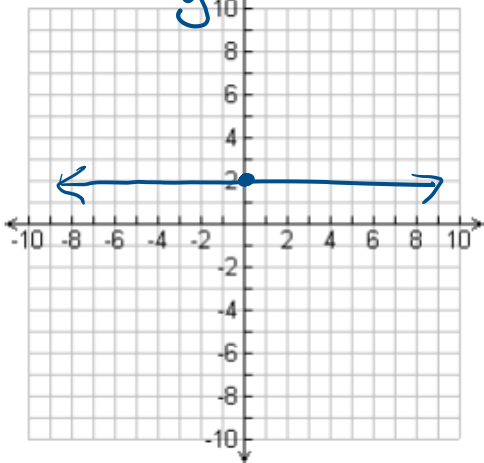
$$\begin{aligned}
 6x + 9y - 18 &= 0 \\
 6x - 18 &= 0 \\
 6x &= 18 \\
 x &= 3
 \end{aligned}$$

$$\begin{aligned}
 6x + 9y - 18 &= 0 \\
 -9y & \quad -9y \\
 \hline
 6x - 18 &= -9y \\
 -\frac{6}{9}x + 2 &= y \\
 -\frac{2}{3}x + 2 &= y
 \end{aligned}$$

Example 3:

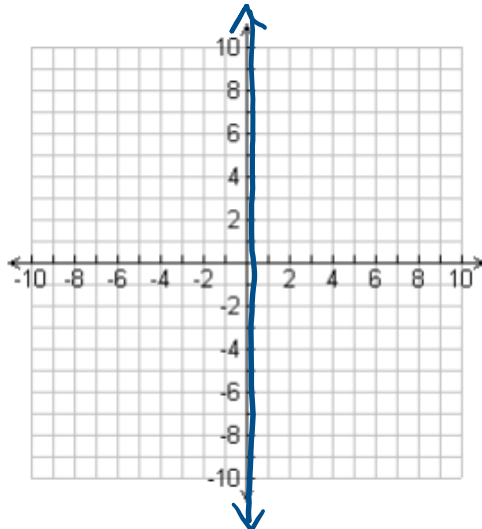
Sketch each linear relation and identify the intercepts. Then state the domain and range.

a) $y - 2 = 0$
 $\quad +2 \quad +2$
 $\quad y = 2$



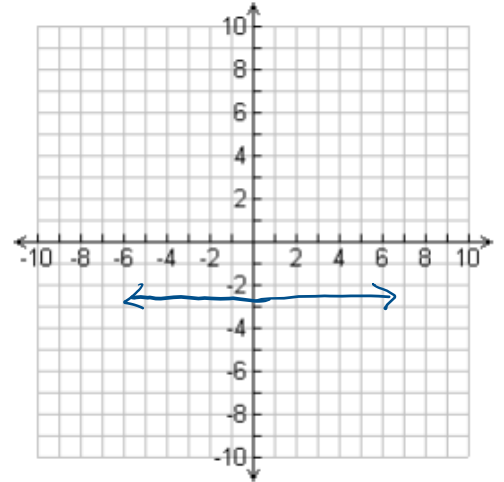
$x \text{ int} = \text{none}$
 $y \text{ int} = 2$
 $D (-\infty, \infty)$
 $R [2, 2]$

b) $x = 0$



$x \text{ int} = 0$
 $y \text{ int} = \infty$
 $D \{x \mid x = 0, x \in \mathbb{R}\}$
 $R \{y \mid y \in \mathbb{R}\}$

c) $y + 2.5 = 0$
 $\quad -2.5 \quad -2.5$
 $\quad y = -2.5$



$x \text{ int} = \text{none}$
 $y \text{ int} = -2.5$
 $D \{x \mid x \in \mathbb{R}\}$
 $R \{y \mid y = -2.5, y \in \mathbb{R}\}$

Summary:

1. The general form of a line can be expressed as $Ax + By + C = 0$ where A , B , and C are integers. A is usually positive.

2. In a vertical line:

- x values are the same ~ remain constant
- y values all real #s
- $x = a$ number can be used to describe its equation.

3. In a horizontal line:

- x values all real #s
- y values remain constant
- $y = a$ number can be used to describe its equation.

Assign: P 365 1, 2 ace, 3 ace, 4, 5ac, 6, 7bd, 8, 10, 14