## 3.2 Graphing with Intercepts

**Definition 3.2.1** ($x$-intercept)

- the point at which the graph of the equation crosses the $x$-axis
- found by setting $y = 0$ and solving for $x$
- written as the point $(x, 0)$

**Definition 3.2.2** ($y$-intercept)

- the point at which the graph of the equation crosses the $y$-axis
- represents the initial or starting amount in word problems
- found by setting $x = 0$ and solving for $y$
- written as the point $(0, y)$

**Example 3.2.1**
Find both intercepts of the equation $y = 6x - 2$.

**Definition 3.2.3** (Standard Form of a Linear Equation)

- written as $Ax + By = C$ where A, B, and C are integers and $A > 0$
- exponents on x,y must be 1

**Example 3.2.2**
Find both intercepts of the standard form equation below.

$$4x - 3y = 12$$

**Example 3.2.3**
Rewrite the following equation into standard form.

$$y = \frac{3}{4}x + \frac{7}{2}$$

## Using Intercepts to Graph Equations

1. find and plot the $x$-intercept
2. find and plot the $y$-intercept
3. connect the dots

**Example 3.2.4**
Graph $2x + 3y = 6$ using the $x$ and $y$-intercepts.

**Example 3.2.5**
Graph $x + 3y = 0$.

## Special Cases of Lines

### Horizontal Line

- written as $y = c$ where $c$ is any real number
- any value we choose as $x$ gives the same $y$ value

**Example 3.2.6**
Graph $y = 2$.

### Vertical Line

- written as $x = c$ where $c$ is any real number
- This $x$ value works for *every* $y$ value.

**Example 3.2.7**
Graph $x = 3$.