Date: _____

6.2 The Equation of a Line in Standard Form: Ax + By + C = 0

When we are speaking, we know that there is usually more than one way to say something without changing the meaning of what we are saying. For example:

> "I really like the new Avengers movie!" and "The new Avengers movie is awesome!" mean the same thing, but are stated differently.

The same idea holds true in math. When we write the equation of a line, we can write in more than one way without changing the meaning of the equation (the graph will look the same).

Technology Interruption:

On your phone (or whatever device you have available), download the Desmos app, or go to desmos.com. Once you have the graphing calculator open, follow along and we will graph:

$$y = -3x + 5 \text{ and } 3x + y - 5 = 0$$

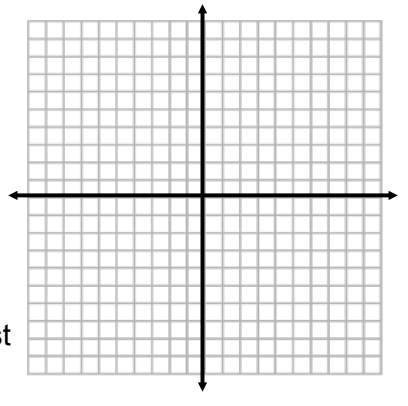
What do you notice?

Why do you think that this happened?

The equation 3x + y - 5 = 0 still represents a line (linear relation), it is just in STANDARD FORM. For an equation to be in standard form, Ax + By + C = 0, A, B, and C must be integers (no fractions), and A must be positive.

To write an equation in y = mx + b form in standard form, we just apply opposite operations to rearrange the equation. For example,

Write $y = {}^{1}/_{3}x + 1$ in standard form.

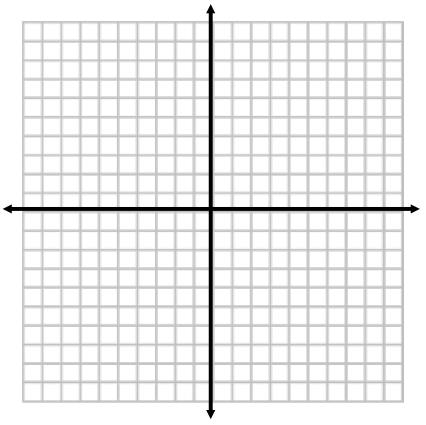


Graph the line from the example. Which form is easiest to use?

Changing Standard Form to Slope y-Intercept Form

Standard from does not tell us a whole lot about the characteristics of the line. It is the final form that mathematicians like to see equations written in. Slope y-intercept form, on the other hand, is incredibly useful as it tells us everything we need to know about a line.

Example: Write 5x - 3y + 9 = 0 in slope y-intercept form, and then state the slope and y-intercept and graph the line.



Practice Problem:

The cost to rent the pool at the Vollmer for a birthday party is modelled by the equation C = 5n + 300, and the cost to rent the pool at the Windsor Aquatic Center is modelled by the equation 10n - C + 200 = 0.

a) Express the aquatic center equation in slope y-intercept form.

b) Identify the fixed cost and the variable cost for each place.

c) What is the cost for each pool if you want to have 30 people there with you?

d) Use Desmos to graph both lines. Where do they cross? What is the significance of this point?