Warm Up:
Given the points (0, 1) and (2, 5).
Write an equation in slope-intercept form.

\[
\frac{5-1}{2-0} = \frac{4}{2} = 2 \\
y - 5 = 2(x - 2) \\
y - 5 = 2x - 4 \\
y = 2x + 1
\]

Learning Goal: I will be able to graph and write linear equations in standard form.

5.5 Standard Form

Standard Form:
Another form of a linear equation is Standard Form:

\[Ax + By = C\]

Where \(A\), \(B\), and \(C\) are not zero at the same time.

Standard Form:
Why can \(A\) and \(B\) not both be zero?

\[Ax + By = C\]

How would you write the equation \(y = 1\) in standard form?

\[0x + 1y = 1\]
Finding X and Y Intercepts:

Remember the Y-intercept is where the line crosses the Y-axis.

The X-intercept is where the line crosses the X-axis.

Examples 1 and 2:

Find the x- and y-intercepts of the graph of each equation.

\[ 3x + 4y = 24 \]
\[ 5x - 6y = 60 \]

Examples 3 and 4: (with your shoulder buddy)

Find the x- and y-intercepts of the graph of each equation.

\[ 3x + 4y = 12 \]
\[ 2x + 6y = 18 \]

Example 5:

Graph the following equation in standard form.

\[ 4x + y = 12 \]
Example 6:
Graph the following equation in standard form.

\[ 3x - 2y = -6 \]

X-int: \( x = \frac{6}{3} \), \( x = 2 \)

Y-int: \( y = \frac{-6}{-2} \), \( y = 3 \)

Examples 7 and 8:
For each equation, tell whether its graph is a horizontal line or a vertical line. Then sketch a graph.

\[ y = -1 \] horizontal

\[ x = 6 \] vertical

Writing in Standard Form:
Write the following in standard form:

\[ y = -\frac{3}{7}x + 5 \]

Step 1: Write the original equation

\[ y = -\frac{3}{7}x + 5 \]

Step 2: Multiply each side by 7

\[ 7y = -3x + 35 \]

Step 3: Use the Distributive property

\[ 3x + 7y = 35 \]

Step 4: Add 3x to each side

Example 9:
Write in Standard Form:

\[ y - 2 = \frac{-1}{3} (x + 6) \]

Step 1: Write the original equation

\[ 3y = -x + 0 \]

Step 2: Add 1x to each side

\[ 1x + 3y = 0 \] Standard
Example 10: (with your shoulder buddy)

Write in standard form:

\[ y = -3x + 4 \]

\[ 5y = -3x + 20 \]

\[ 3x + 5y = 20 \] (standard form)

Julie is in charge of selling tickets for the school musical. Adult tickets are $4.00 and student tickets are $2.00. She hopes that the total ticket sales will be about $600 in order to cover expenses. Write an equation in standard form to represent this situation.

Let \( x \) represent the number of adult tickets.
Let \( y \) represent the number of student tickets.

\[ 4.00x + 2.00y = 600 \]

Example 11:

Find the \( x \) and \( y \) intercepts of the line that passes through the given point.

\((5, 2)\) and \((4, 1)\)

\((2, -1)\) and \((2, 5)\)

Examples 12 and 13:

Find the \( x \) and \( y \) intercepts of the line that passes through the given point.

\(x_1, y_1\) and \(x_2, y_2\)

\(\frac{y_2 - y_1}{x_2 - x_1}\) (slope)

\(y_1 - y = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)\) (point-slope form)

\(x = \frac{y_2 - y_1}{x_2 - x_1}x + x_1\)

\(y = \frac{x_2 - x}{y_2 - y_1}x + y_1\) (standard form)

Summary

What is the standard form?

\[ Ax + By = C \]

What do you need to do to graph in standard form?

Find \( x \) and \( y \) intercepts

When given two points what are the steps to write an equation in standard form?

Find slope, point-slope, slope-intercept, standard form
Coursework:
Worksheet!!