Goal: Standard Form of Linear Functions

Objectives: I can...

- Identify when an equation is in linear standard form.
- Identify the differences of standard form equations and slope-intercept form equations.
- Write standard form equations for a scenario.
- Graph standard form equations.
- Find the slope and intercepts from a standard form equation.
- Write standard form equations using integers.

Essential Questions

- When are standard form equations needed?
- How do you write standard form equations with integers?
- How do you graph standard form equations?
- How do you find the slope and intercepts from a standard form equation?

Linear Standard Form

$$Ax + By = C$$

This is another form for writing a linear function. It is used to represent situations where two variables are changing at a constant rate.

In this form, the A, B, and C do not represent the y-intercept or the slope of the graph.

Difference Between Standard and Slope-Intercept Form

Standard

When to use: Used when a situation has two constant rates of change and a total value.

Information from equation: The standard form equation does not tell you anything about the graph. You must convert it to a different form to attain useful graphical information.

Slope-Intercept

When to use: Used when a situation has one constant rate of change and an initial starting value.

Information from equation: The slope-intercept form equation tells the slope and y-intercept of the graph.

Determine which is a standard form problem and which is a slope-intercept and then write an equation for each.

Lebron James has 25,000 followers on Twitter and he gains 2,000 a week. Write an equation for his total amount of followers.

Jack gains 2 followers for each Tweet he makes and Jill gains 1 follower for each. Write an equation for the number of tweets each must make to gain 400 followers total.

Determine which is a standard form problem and which is a slope-intercept and then write an equation for each.

Kenny bikes 12 miles per hour and runs 8 miles per hour. Write an equation to represent how many hours he must bike and run to travel 26 miles.

Kenny loses 10 toys each year. He started with a room full of 68 toys when he was born. Write an equation for the number of toys he has in total.

Linear Standard Form

$$Ax + By = C$$

There is a "preferred" format for writing linear standard form equations. The rules are below:

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1. A, B, and C must be integers (integers are positive or negative whole numbers).
2. The "A" value is positive.

Note: This is not the only way to write a standard form equation it is just the most common.

Rewrite Each Standard Form Equation Using Integers

1. $\frac{1}{4}x + 5y = 2$

2. $-\frac{2}{3}x + \frac{6}{3}y = \frac{5}{3}$

3. $\frac{5}{2}x - \frac{1}{4}y = -6$

How do you suppose we can change slope-intercept form into standard form with integers?

1. $y = 13x - 7$

2. $y = \frac{-2}{9}x + 4$

3. $y = \frac{3}{2}x - \frac{1}{6}$

How do you suppose we can change standard form into slope-intercept form?

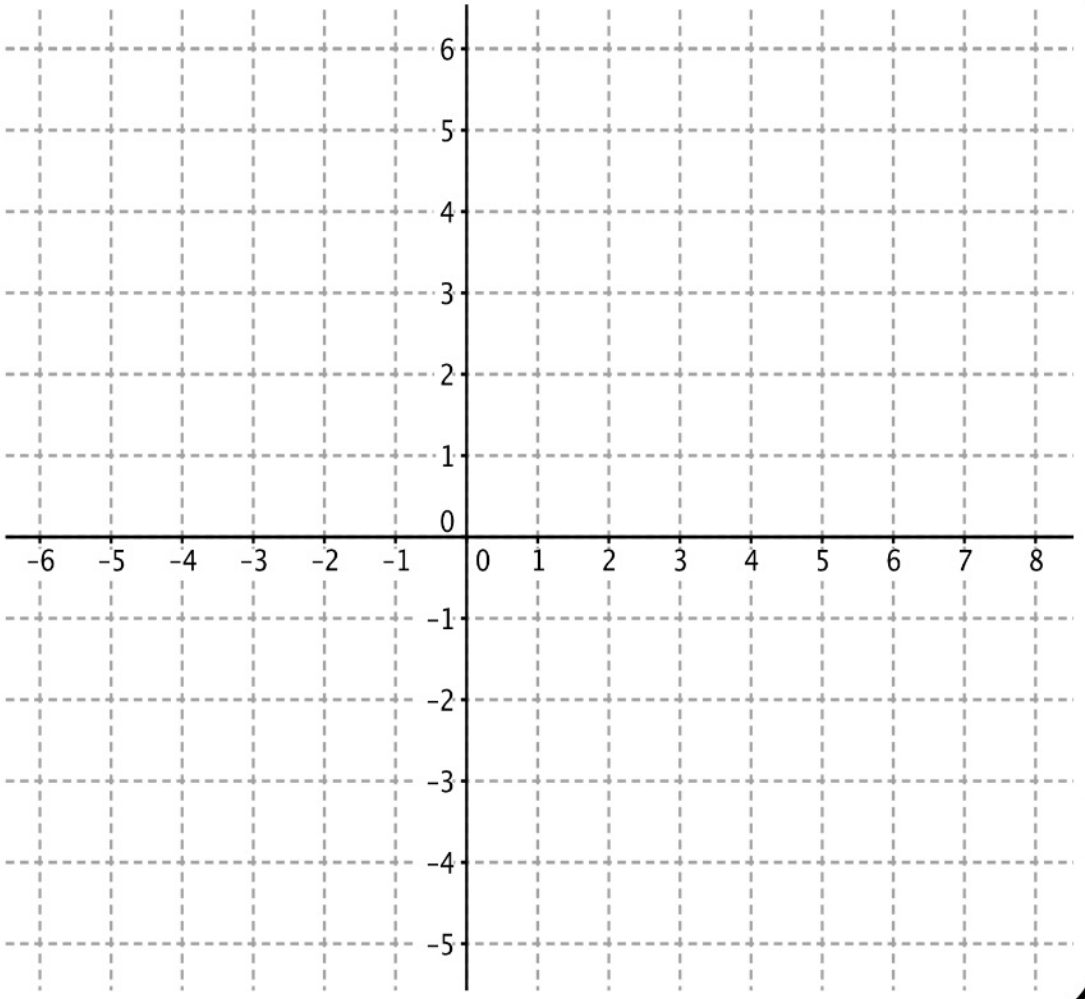
1. $11x - 3y = 8$

2. $-12x + 3y = 7$

3. $\frac{4}{3}x + 2y = 6$

Graphing Linear Standard Form

$4x - 8y = 24$



Now you try!

Graph the following:

1. $5x + 2y = 20$

2. $-6x + 2y = 13$

3. $1/2x - 7y = 7$

4. $-2/5x + 1/3y = 2$

More Practice

Find the slope and intercepts of each equation.

1. $4x - 5y = 20$

2. $13 = -6x + 2y$

3. $\frac{1}{2}x + 10y = 8$

More Practice

Determine if each set of lines is parallel, perpendicular, or neither.

1. $y = 2/3x - 1$
   $4x - 6y = 8$

2. $y = -7/3x + 4$
   $-9x + 21y = 3$

3. $8x - 2y = 5$
   $x - 4y = 12$

More Practice

Write a linear standard form equation for the table.

x	y
0	7
2	13
4	19
5	22
8	31
9	34

More Practice

Write a linear standard form equation for the table.

x	y
-2	-4
0	1
2	6
4	11
6	16
8	21

More Practice

Write a slope-intercept equation that is perpendicular to $6x - 5y = 10$ and has the same y-intercept as $12x + 9y = 8$.

Think about it...

Consider the function below.

$$Ax + By = C$$

Select values of A, B, and C for the equation so that each statement is true

-5	-4	-3	-2	-1	0
1	2	3	4	5	

The x-intercept is 2 and the y-intercept is -1.

A = ☐ B = ☐ C = ☐

The slope of the graph is 4/3.

A = ☐ B = ☐ C = ☐

The graph would be a vertical line.

A = ☐ B = ☐ C = ☐

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