2.3 Standard Form

Monday, September 23, 2019 7:46 AM

Warm Up

Solve the following for $\boldsymbol{C}$.

$y = 13x + \boldsymbol{C}$

$42y = -16x + 2\boldsymbol{C}$

$\frac{8}{3}y = \frac{12}{5}x + 4\boldsymbol{C}$

$\frac{13}{12}y = \frac{13}{14}x + 13\boldsymbol{C}$

$-32y = \frac{9}{4}x + 8\boldsymbol{C}$

$\frac{2}{5}y = \frac{3}{5}x + \frac{6}{5}\boldsymbol{C}$

Essential Question

What information does the standard form a linear equation reveal about a line?

Needed Vocab:

- **Standard form of a Linear Equation**

Goal: "I can. . .

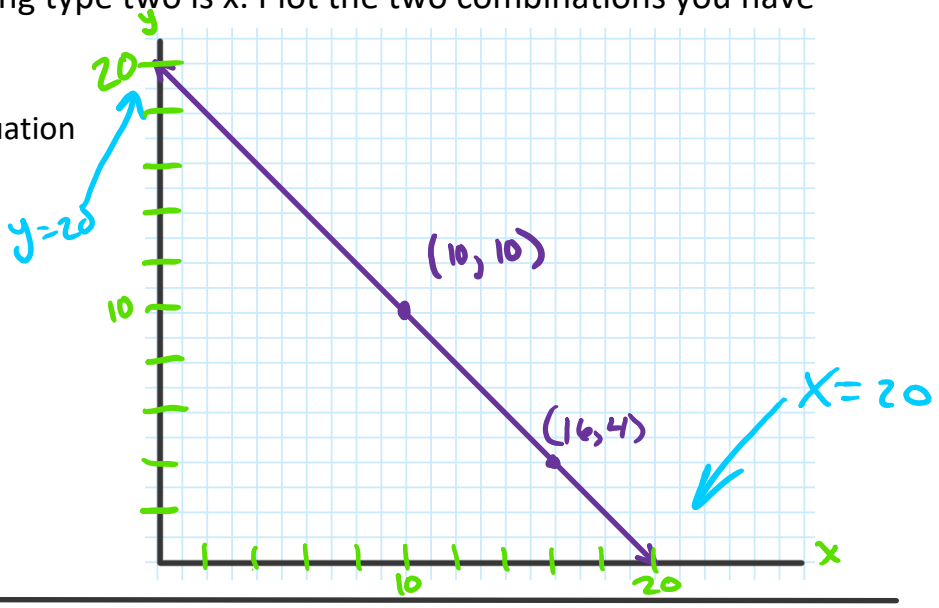
Write and Graph linear equations in Standard Form."

If you only like two different types of music and you are making your favorite songs playlist of 20 songs, what are two possible combinations of the two song types?

Let's say song type one is y and song type two is x. Plot the two combinations you have

types?

Let's say song type one is y and song type two is x. Plot the two combinations you have on a graph.



Based off your two points, find an equation of possible song combinations.

$y = -x + 20$

$x + y = 20$

Standard form

Example 1 Understand Standard Form of a Linear Equation

A. Hanna will spend $150 on music festival tickets. Reserved seat tickets cost $25 and general admission tickets cost $10. How can you represent the situation with a linear equation?

150 total $ $25/R. Seat x: reserved seat
$10/Gen. Ad. seat y: gen. seat

$25x + 10y = 150$

$25x$: 25/x; $10y$: 10/y; 150: total money.

Standard Form of a linear equation is $Ax + By = C$, where A, B, and C are integers, and A and B are not both equal to 0.

B. Hanna will spend $150 on music festival tickets. Reserved seat tickets cost $25 and general admission tickets cost $10. What information does the standard form give you that the slope-intercept form does not?

$25x + 10y = 150$

When $x = 0$: $0 + 10y = 150$, $y = 15$ ← max amount of each seat that can be bought.

When $y = 0$: $25x + 0 = 150$, $x = 6$ ← max amount of each seat that can be bought.

$(0, 15)$ ← y-int. $(6, 0)$ ← x-int.

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1. The equations $y = -2.5x + 15$ and $25x + 10y = 150$ represent Hanna's music festival situation. Is it easier to find the x-intercept of the graph of the equations using slope-intercept or standard form? Explain.

Example 2 Sketch the Graph of a Linear Equation in Standard Form

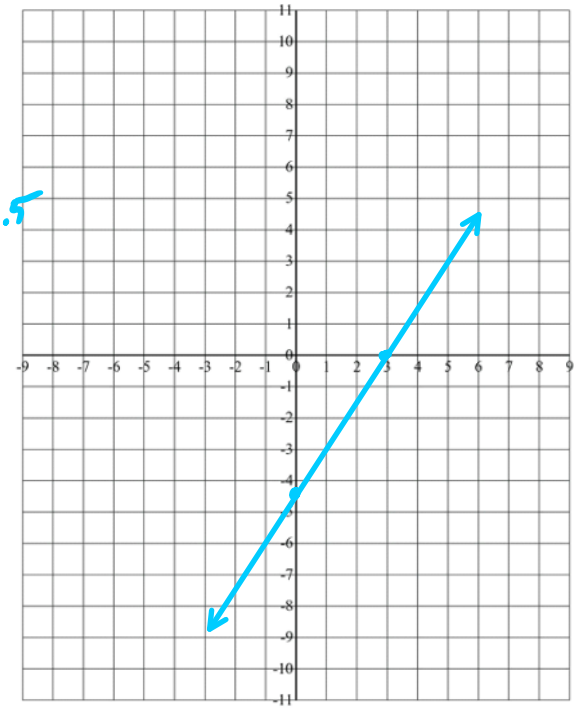
What is the graph of $3x - 2y = 9$?

$3x = 9$ $-2y = 9$

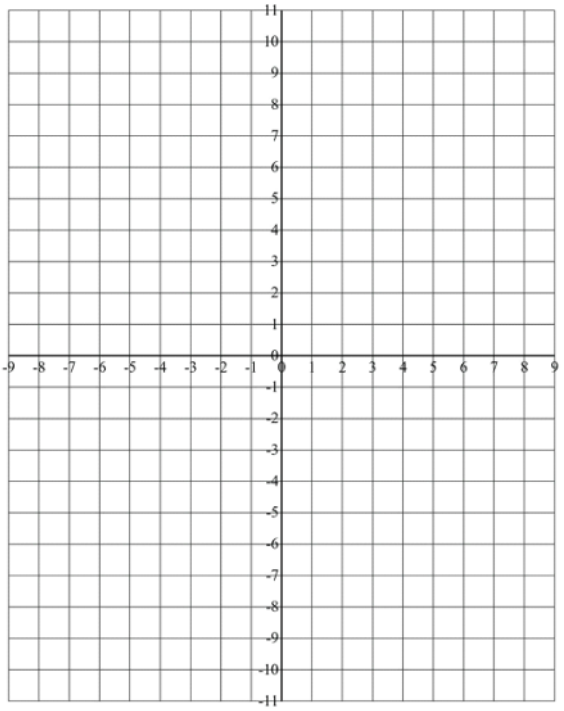
$x = 3$ $y = -4.5$

– plot intercepts

– draw line



2. Sketch the graph of $4x + 5y = 10$.



Example 3 Relate Standard Form to Horizontal and Vertical Lines

A. What does the graph of $Ax + By = C$ look like when $A = 0$?

$By = C$

$y = \frac{C}{B}$ Horizontal line

↖ y-intercept.

B. What does the graph of $Ax + By = C$ look like when $B = 0$?

$Ax = C$

$x = \frac{C}{A}$ vertical line

↑ x-intercept.

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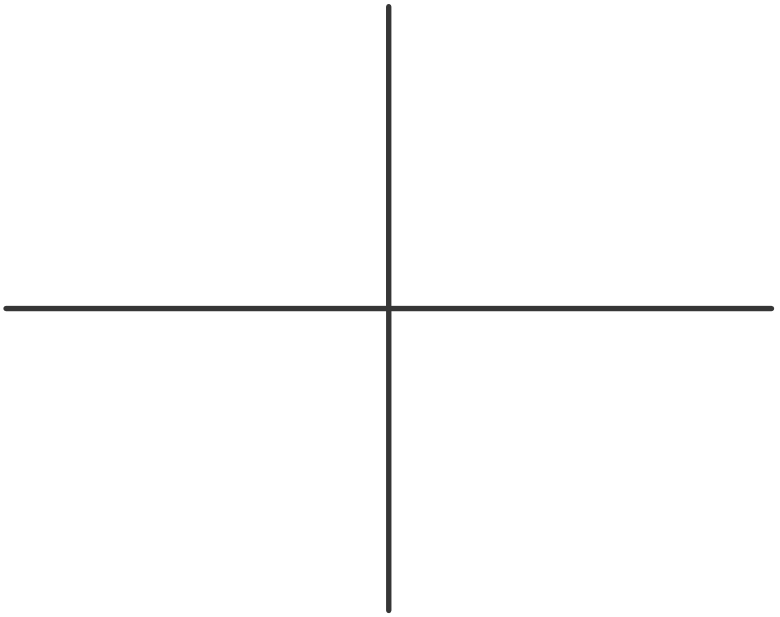
3. Sketch the graph of the equation.

a. $3y = -18$

b. $4x = 12$



Example 4

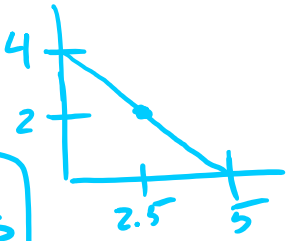
Tamira is making trail mix. She has $40 to spend on a mixture of almonds and cashews and wants about the same amount of almonds as cashews. How can she determine how many pounds of each kind of nut to buy?

$40 X Almonds y cashews

$40 = 8x + 10y

max
$40 = 8x
5 = x

max
$40 = 10y
4 = y



2 lbs cashews
2.5 lbs of Almonds

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4. Almonds cost $8 per pound and cashews cost $10 per pound. How does the equation change if Tamira has $60 to spend on a mixture of almonds and cashews? How many pounds of nuts can she buy if she buys only cashews? Only almonds? A mixture of both?

Standard Form of a Linear Equation

WORDS The standard form of a linear equation is useful

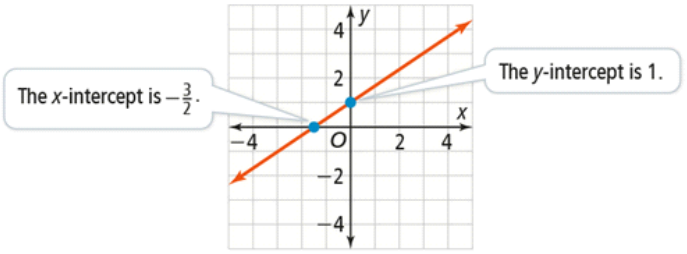
- to find the x- and y-intercepts easily.
- to write the equation of a vertical or horizontal line.

The x-intercept is the value of x when $y = 0$, and the y-intercept is the value of y when $x = 0$.

ALGEBRA $Ax + By = C$, where A, B, and C are integers, and A and B are not both equal to 0.

NUMBERS $2x - 3y = -3$

GRAPH



Homework

Pg. 73
10, 12, 13-21 odd, 23-29, 31, 34-40 even, 41, 45