# Lesson 2.3 – Standard Form

**Explore and Reason**

Jae makes a playlist of 24 songs for a party. Since he prefers country and rock music, he builds the playlist from those two types of songs.

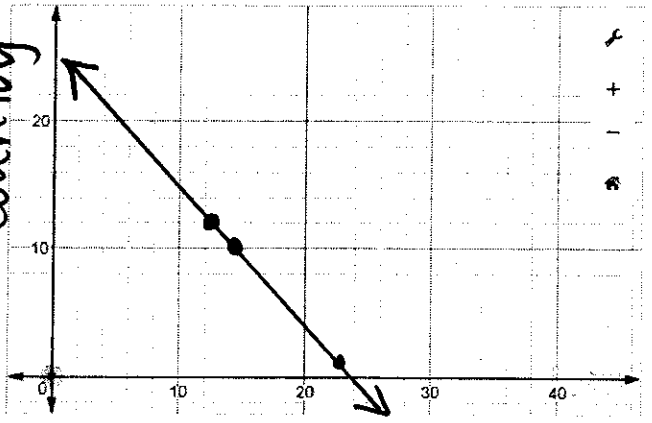
**A.** Determine two different combinations of country and rock songs that Jae could use for his playlist.

12 rock
12 country = 24

14 rock
10 country = 24

**B.** Plot those combinations on the graph. Extend a line through the points.

Playlist




**C.** Can you use the line to find other meaningful points? Explain.

constant (total # of songs)

STANDARD FORM $ax + by = C$

**EXAMPLE 1**

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?

x: reserved tickets (# bought)

y: Gen. admission (# bought)

$$25x + 10y = 150$$

Find the x-intercept and interpret the meaning.

$y = 0$ ↑ $y = 0$

$25x + 10(0) = 150$

$\frac{25x}{25} = \frac{150}{25}$

$x = 6$

(6, 0)

If Hanna buys 6 reserved tix, she buys Ø GA tix

Find the y-intercept and interpret the meaning.

$x = 0$ ↑ $x = 0$

$25(0) + 10y = 150$

$\frac{10y}{10} = \frac{150}{10}$

$y = 15$

(0, 15)

Hanna can buy 15 GA tix if she doesn't buy any reserved

**EXAMPLE 2**

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

**Step 1** Find x- and y-intercepts

x-int (y=0)

$3x - 2(0) = 9$

$\frac{3x}{3} = \frac{9}{3}$

$x = 3$

$(3, 0)$

y-int (x=0).

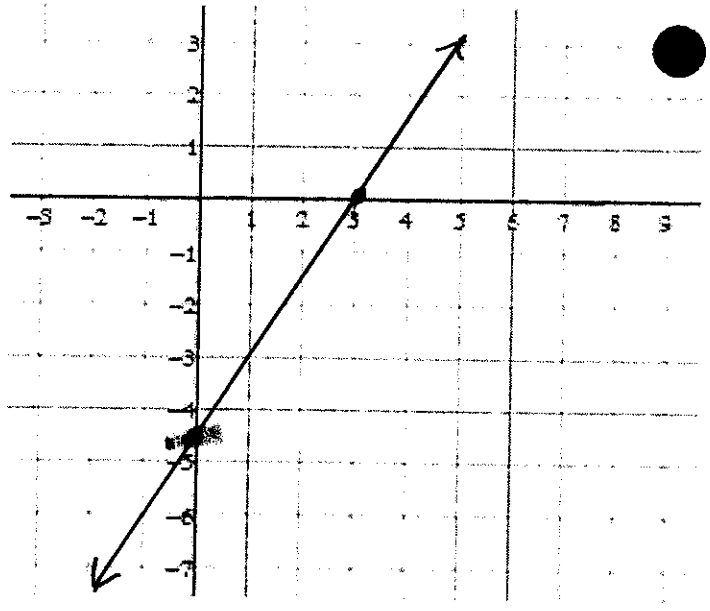
$3(0) - 2y = 9$

$\frac{-2y}{-2} = \frac{9}{-2}$

$y = -4.5$

$(0, -4.5)$

**Step 2** Plot the two points draw line with arrows



**Try it...** What is the graph of $4x + 5y = 10$ ?

x-int (y=0)

$4x + 5(0) = 10$

$\frac{4x}{4} = \frac{10}{4}$

$x = 2.5$

$(2.5, 0)$

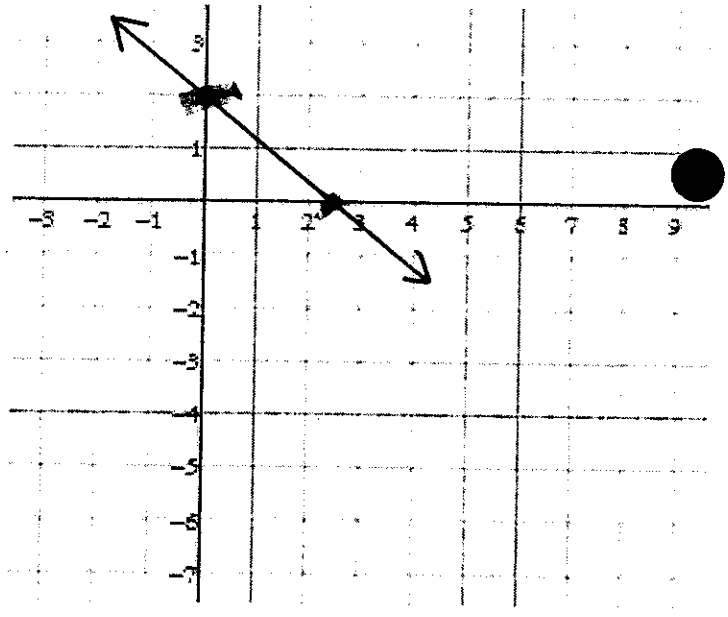
y-int (x=0).

$4(0) + 5y = 10$

$\frac{5y}{5} = \frac{10}{5}$

$y = 2$

$(0, 2)$



**EXAMPLE 3**

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

$(0)x + By = C$

$By = C$

$\frac{3y}{3} = \frac{9}{3}$ $y = 3$

$\frac{-2y}{-2} = \frac{4}{-2}$

$y = -2$

$B \neq 0$

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

$Ax + 0(y) = C$

$Ax = C$

$\frac{3x}{3} = \frac{9}{3}$

$\frac{-2x}{-2} = \frac{-4}{-2}$

$x = 2$

$A \neq 0$