Activity

2-3 Standard Form

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EXPLORE & REASON

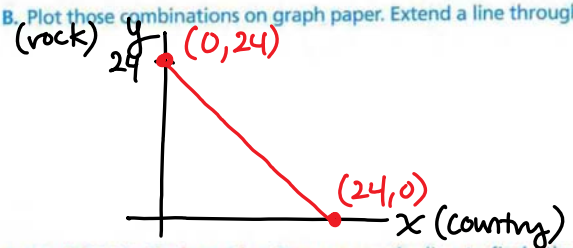
Jae makes a playlist of 24 songs for a party. Since he prefers country and rock music, he builds the playlist from those two types of songs.

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

2 country & 22 rock

10 country & 14 rock

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



C. **Model With Mathematics** Can you use the line to find other meaningful points? Explain. MP.4

Yes... values: integers

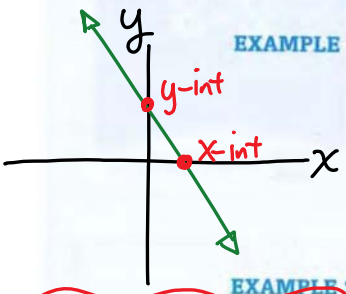
HABITS OF MIND

Use Appropriate Tools Why is it helpful to use a graph rather than a table to answer the question? Are there any disadvantages to using a graph? MP.5

Notes

Where the line crosses the x-axis... $Ax+By=C$

Assess



EXAMPLE 1 **Try It! Understand Standard Form of a Linear Equation**

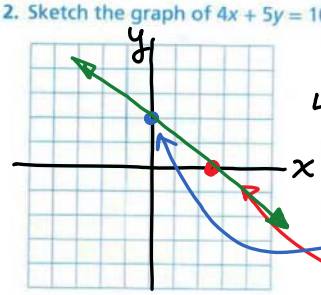
1. Is it easier to find the x-intercept of the graph of the equations in Part B using slope-intercept or standard form? Explain.

$y=mx+b$ $Ax+By=C$

EXAMPLE 2 **Try It! Sketch the Graph of a Linear Equation in Standard Form**

- x & y intercepts → the other variable = 0

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



x-int: set $y=0$; $4x+5(0)=10$; $\frac{4x}{4}=\frac{10}{4}$; $x=\frac{5}{2}$ or 2.5

y-int: set $x=0$; $4(0)+5y=10$; $\frac{5y}{5}=\frac{10}{5}$; $y=2$

EXAMPLE 3 **Try It! Relate Standard Form to Horizontal and Vertical Lines**

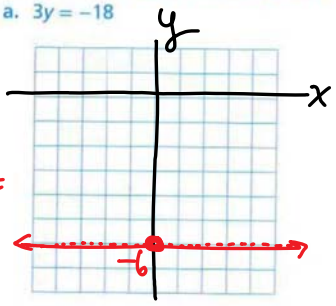
3. Sketch the graph of each equation.

"Make a Cross"

a. $3y = -18$

$\frac{3y}{3}=\frac{-18}{3}$

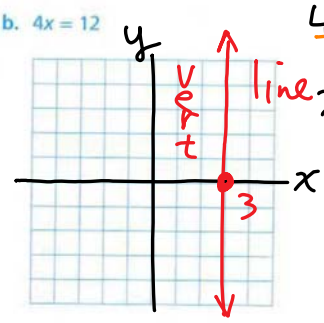
$y=-6$ horiz line



b. $4x = 12$

$\frac{4x}{4}=\frac{12}{4}$

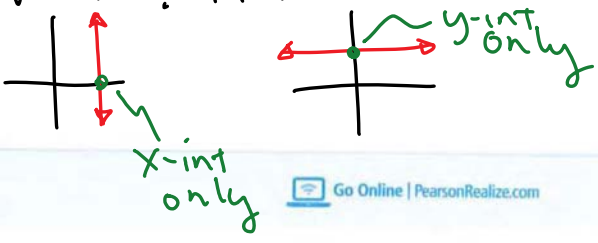
$x=3$ vert line



HABITS OF MIND

Generalize Given a linear equation in standard form, can you always find the x- and y-intercepts? Explain. MP.8

Vert & Horiz Lines



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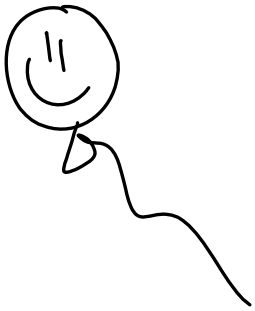
Notes

Assess

EXAMPLE 4 **Try It! Use the Standard Form of a Linear Equation**

4. 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?



HABITS OF MIND

Model With Mathematics How can you tell when every point on the graph is a solution to the problem? MP.4

Do You UNDERSTAND?

1. **ESSENTIAL QUESTION** What information does the standard form of a linear equation reveal about a line?

2. **Communicate Precisely** How is the standard form of a linear equation similar to and different from the slope-intercept form? MP.6

3. **Error Analysis** Malcolm says that $y = -1.5x + 4$ in standard form is $1.5x + y = 4$. What is the error that Malcolm made? MP.3

4. **Use Structure** Describe a situation in which the standard form of a linear equation is a more useful than the slope-intercept form. MP.7

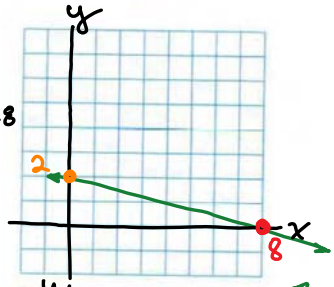
Do You KNOW HOW?

Use the x- and y-intercepts to sketch a graph of each equation.

5. $x + 4y = 8$

x-int
• set $y = 0$
$x + 4(0) = 8$
$x = 8$

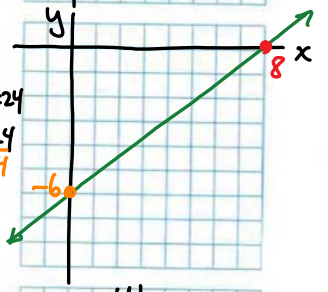
y-int
set $x = 0$
$(0) + 4y = 8$
$\frac{4y}{4} = \frac{8}{4}$
$y = 2$



6. $3x - 4y = 24$

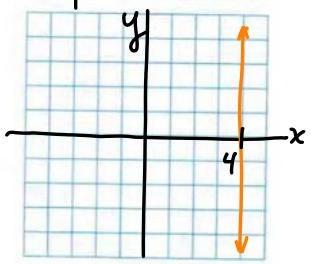
x-int
• set $y = 0$
$3x - 4(0) = 24$
$\frac{3x}{3} = \frac{24}{3}$
$x = 8$

y-int
• set $x = 0$
$3(0) - 4y = 24$
$\frac{-4y}{-4} = \frac{24}{-4}$
$y = -6$



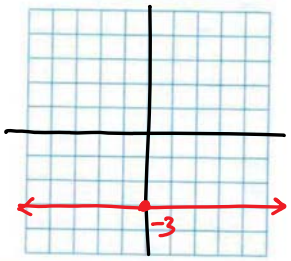
7. $\frac{5x}{5} = \frac{20}{5}$

$x = 4$



8. $\frac{-3y}{-3} = \frac{9}{-3}$

$y = -3$



9. Deondra has $12 to spend on a mixture of green and red grapes. What equation can she use to graph a line showing the different amounts of green and red grapes she can buy for $12?

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