Name _____

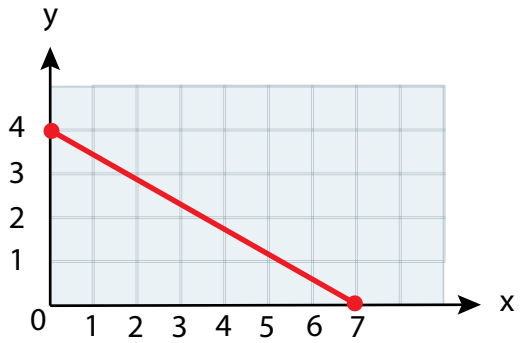
5-5 Standard Form

OBJECTIVE: **I can graph linear equations using intercepts to write linear equations in standard form**

Warm-Up

An athlete wants to make a snack mix of peanuts and cashews that will contain a certain amount of protein. Cashews have 4 g of protein per ounce, and peanuts have 7 g of protein per ounce. How many grams of protein will the athlete's mix contain?

What do the points (7, 0) and (0, 4) represent? Explain.



Essential Understanding

Essential Understanding One form of a linear equation, called standard form, allows you to find intercepts quickly. You can use the intercepts to draw the graph.

Key Concept:

The **standard form of a linear equation** is $Ax + By = C$, where A, B, and C are real numbers, and A and B are not both zero.

Example #1 Finding x- and y-Intercepts

What are the x- and y-intercepts of the graph of $3x + 4y = 24$?

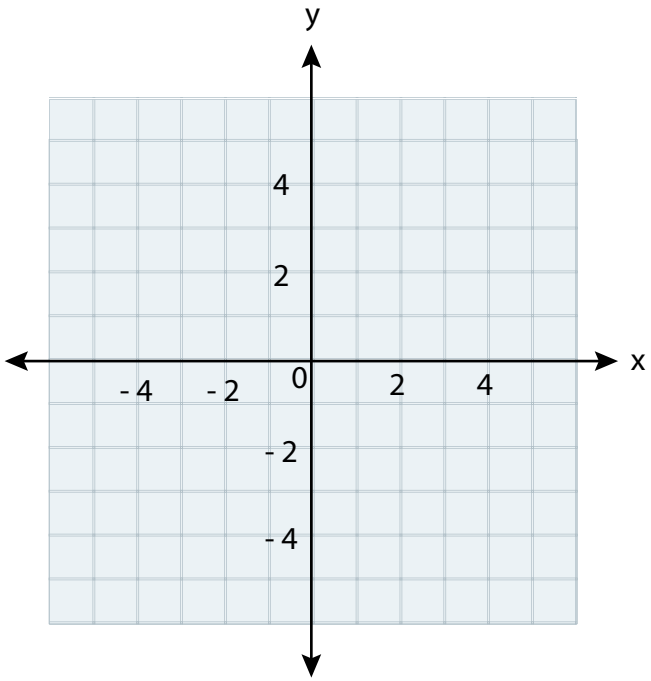
Your Turn to Work it Out

1. What are the x- and y-intercepts of the graph of each equation?

a. $3x + 8y = 12$

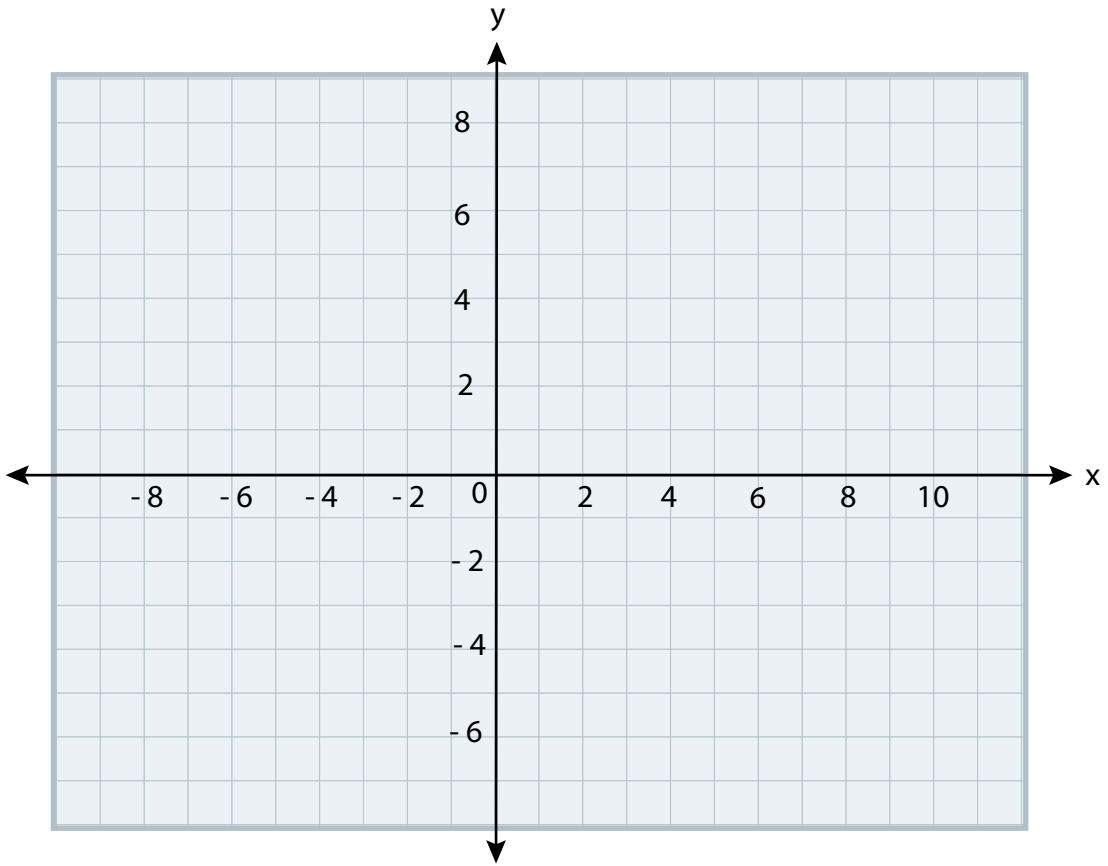
Example #2 Graphing a Line Using Intercepts

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



Your Turn to Work it Out

2. What is the graph of $2x + 5y = 20$?

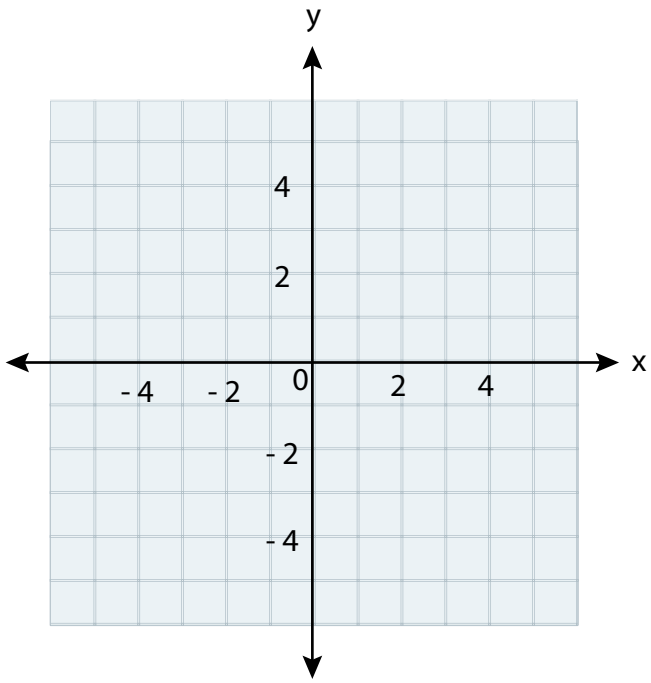


Example #3 Graphing Horizontal and Vertical Lines

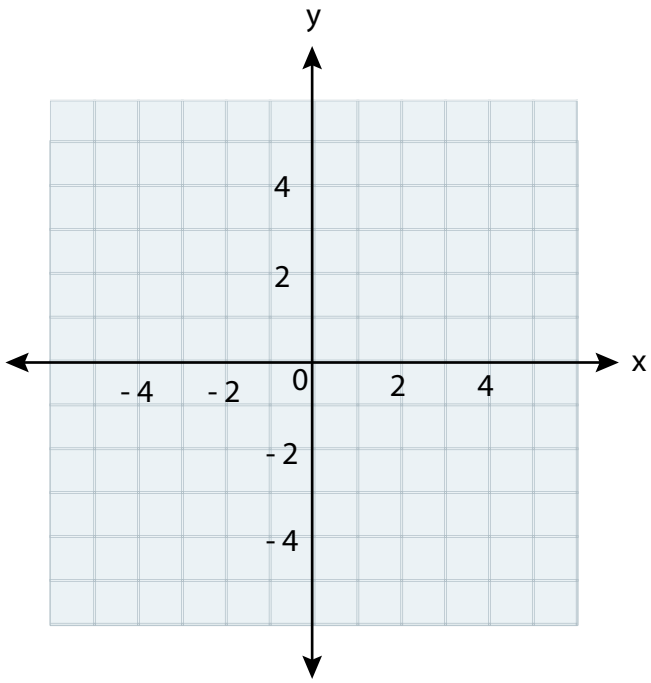
If A = 0 in the standard form Ax + By = C, then you can write the equation in the form y = b, where b is a constant. If B = 0, you can write the equation in the form x = a, where a is a constant. The graph of y = b is a horizontal line, and the graph of x = a is a vertical line.

What is the graph of each equation?

A x = 3



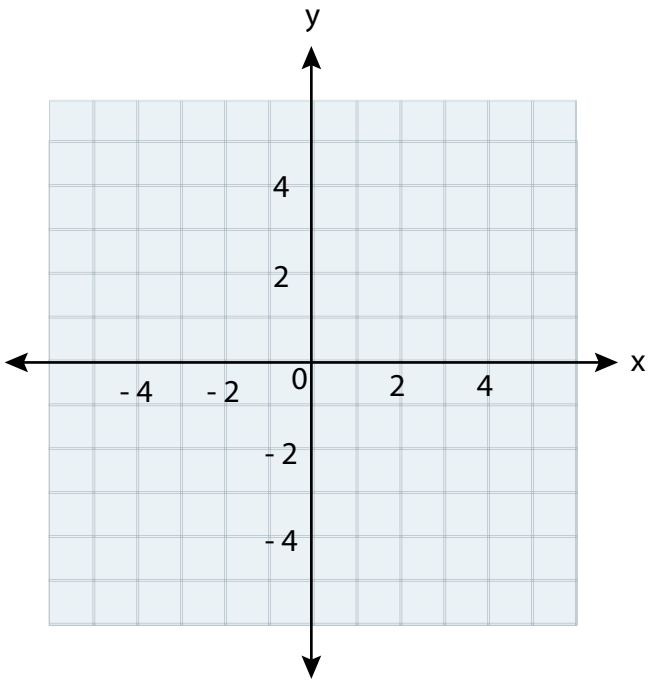
B y = 3



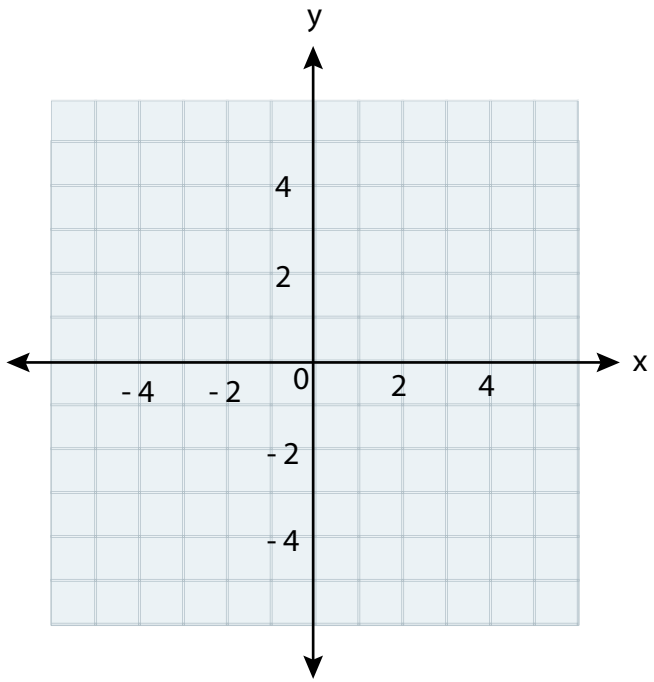
Your Turn to Work it Out

3. What is the graph of each equation?

a. $x = 4$



b. $y = -1$



Example #4 Transforming to Standard Form

What is $y = -\frac{3}{7}x + 5$ written in standard form using integers?

Your Turn to Work it Out

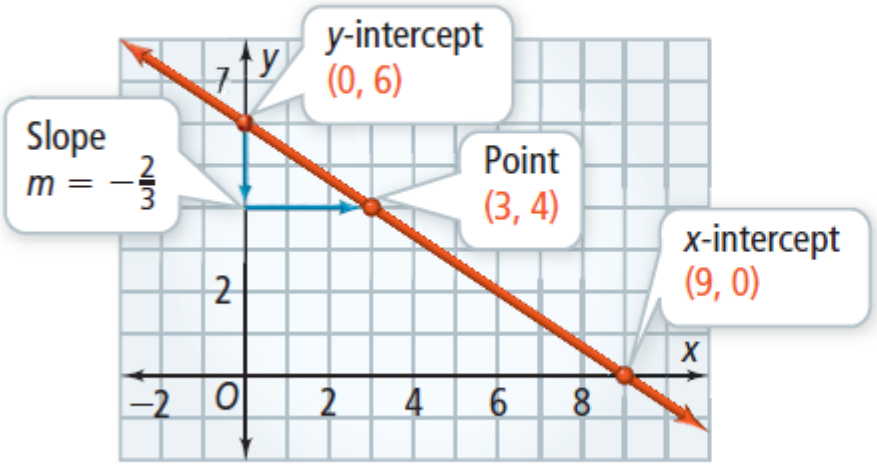
4. Write $y - 2 = -\frac{1}{3}(x + 6)$ in standard form using integers.

Concept Understanding

Concept Summary: Linear Equations

You can describe any line using one or more of these forms of a linear equation. Any two equations for the same line are equivalent.

Graph



Forms

Slope-Intercept Form

$y = mx + b$

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

Point-Slope Form

$y - y_1 = m(x - x_1)$

$y - 4 = -\frac{2}{3}(x - 3)$

Standard Form

$Ax + By = C$

$2x + 3y = 18$