LESSON 3.3

Study Guide

For use with the lesson "Graph Using Intercepts"

GOAL Graph a linear equation using intercepts.

> **Vocabulary**
>
> The *x*-coordinate of a point where a graph crosses the *x*-axis is an **x-intercept.**
>
> The *y*-coordinate of a point where a graph crosses the *y*-axis is a **y-intercept.**

EXAMPLE 1 ## Find the intercepts of the graph of an equation

Find the *x*-intercept and the *y*-intercept of the graph of $7x - 3y = 21$.

Solution

To find the *x*-intercept, substitute 0 for *y* and solve for *x*.

$7x - 3y = 21$	Write original equation.
$7x - 3(0) = 21$	Substitute 0 for *y*.
$x = \dfrac{21}{7} = 3$	Solve for *x*.

To find the *y*-intercept, substitute 0 for *x* and solve for *y*.

$7x - 3y = 21$	Write original equation.
$7(0) - 3y = 21$	Substitute 0 for *x*.
$y = \dfrac{21}{-3} = -7$	Solve for *y*.

The *x*-intercept is 3. The *y*-intercept is -7.

EXAMPLE 2 ## Use a graph to find the intercepts

Identify the *x*-intercept and *y*-intercept of the graph.

Solution

To find the *x*-intercept, look to see where the graph crosses the *x*-axis. The *x*-intercept is -2. To find the *y*-intercept, look to see where the graph crosses the *y*-axis. The *y*-intercept is 1.
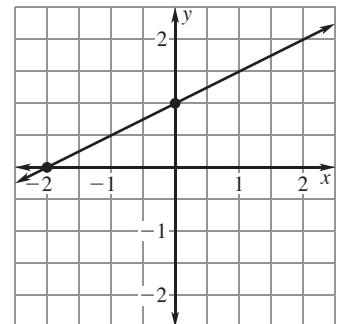
LESSON 3.3

LESSON 3.3

Study Guide *continued*

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EXAMPLE 3 ## Use intercepts to graph an equation

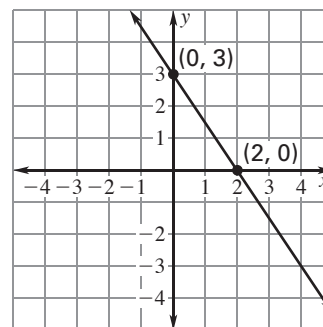**Graph $3x + 2y = 6$. Label the points where the line crosses the axis.**

Solution

STEP 1 Find the intercepts.

$$3x + 2y = 6$$
$$3x + 2(0) = 6$$
$$x = 2 \longleftarrow x\text{-intercept}$$

$$3x + 2y = 6$$
$$3(0) + 2y = 6$$
$$y = 3 \longleftarrow y\text{-intercept}$$

STEP 2 Plot the points that correspond to the intercepts. The *x*-intercept is 2, so plot and label the point (2, 0). The *y*-intercept is 3, so plot and label the point (0, 3).

STEP 3 Connect the points by drawing a line through them.

CHECK You can check the graph of the equation by using a third point. When $x = 4$, $y = -3$, so the ordered pair $(4, -3)$ is a third solution of the equation. You can see that $(4, -3)$ lies on the graph, so the graph is correct.

Exercises for Examples 1, 2, and 3

Find the *x*-intercept and the *y*-intercept of the graph of the equation.

1. $-4x + 3y = 24$

2. $5x - y = 15$

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

4. Graph $x - \frac{1}{2}y = 1$. Label the point where the line crosses the axis.

5. Identify the *x*-intercept and *y*-intercept of the graph.

LESSON 3.3