LESSON 7.1

NAME _____ DATE _____

Reteaching with Practice

For use with pages 398–403

GOAL **Solve a system of linear equations by graphing and model a real-life problem using a linear system**

VOCABULARY

Two equations in two variables form a **system of linear equations** or simply a **linear system.**

A **solution of a system of linear equations** in two variables is an ordered pair (x, y) that satisfies each equation in the system.

EXAMPLE 1 Using the Graph-and-Check Method

Solve the linear system graphically. Check the solution algebraically.

$-3x + y = -7$ Equation 1

$2x + 2y = 10$ Equation 2

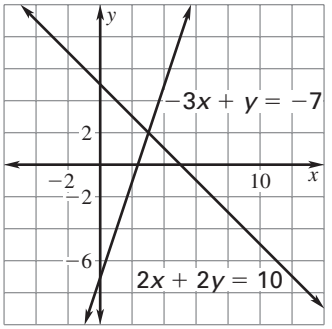
SOLUTION

Write each equation in slope-intercept form.

$y = 3x - 7$ Slope: 3, y-intercept: -7

$y = -x + 5$ Slope: -1, y-intercept: 5

Graph each equation. The lines appear to intersect at $(3, 2)$.



To check $(3, 2)$ as a solution algebraically, substitute 3 for x and 2 for y in each original equation.

EQUATION 1	EQUATION 2
$-3x + y = -7$	$2x + 2y = 10$
$-3(3) + 2 \stackrel{?}{=} -7$	$2(3) + 2(2) \stackrel{?}{=} 10$
$-7 = -7$	$10 = 10$

Because $(3, 2)$ is a solution of each equation in the linear system, it is a solution of the linear system.

Exercises for Example 1

Graph and check to solve each linear system.

1. $y = -x + 5$
$y = x + 1$

2. $2x - y = 2$
$x = 4$

3. $2x + y = 2$
$x - y = 4$

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EXAMPLE 2 Using a Linear System to Model a Real-Life Problem

Tickets for the theater are \$5 for the balcony and \$10 for the orchestra. If 600 tickets were sold and the total receipts were \$4750, how many tickets were sold for the orchestra?

SOLUTION

Verbal Model

Number of balcony tickets + Number of orchestra tickets = Total number of tickets

Price of balcony tickets · Number of balcony tickets + Price of orchestra tickets · Number of orchestra tickets = Total receipts

Labels

Price of balcony tickets = 5 (dollars)

Number of balcony tickets = x (tickets)

Price of orchestra tickets = 10 (dollars)

Number of orchestra tickets = y (tickets)

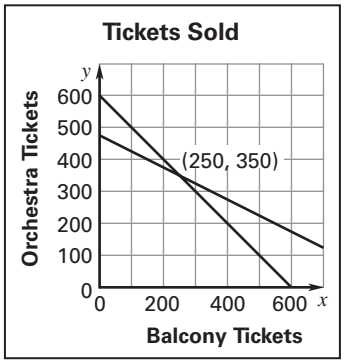
Total number of tickets = 600 (tickets)

Total receipts = 4750 (dollars)

Algebraic Model

$x + y = 600$ Equation 1 (tickets)

$5x + 10y = 4750$ Equation 2 (receipts)



Graph the system.

Check the solution:

$250 + 350 = 600$ and $5(250) + 10(350) = 1250 + 3500 = 4750$.

350 orchestra tickets were sold.

Exercises for Example 2

4. Rework Example 2 if 800 tickets were sold.

5. Rework Example 2 if total receipts were \$3500.