

7.1 Solve Linear Systems by Graphing

TEKS A.8.A, A.8.B



- Before**
- Now**
- Why?**

You graphed linear equations.
 You will graph and solve systems of linear equations.
 So you can analyze craft fair sales, as in Ex. 33.

Key Vocabulary

- system of linear equations
- solution of a system of linear equations
- consistent independent system

A **system of linear equations**, or simply a *linear system*, consists of two or more linear equations in the same variables. An example is shown below.

$$x + 2y = 7 \quad \text{Equation 1}$$

$$3x - 2y = 5 \quad \text{Equation 2}$$

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

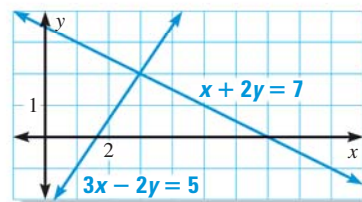
One way to find the solution of a linear system is by graphing. If the lines intersect in a single point, then the coordinates of the point are the solution of the linear system. A solution found using graphical methods should be checked algebraically.

EXAMPLE 1 Check the intersection point

Use the graph to solve the system. Then check your solution algebraically.

$$x + 2y = 7 \quad \text{Equation 1}$$

$$3x - 2y = 5 \quad \text{Equation 2}$$



Solution

The lines appear to intersect at the point (3, 2).

CHECK Substitute 3 for x and 2 for y in each equation.

$x + 2y = 7$	$3x - 2y = 5$
$3 + 2(2) \stackrel{?}{=} 7$	$3(3) - 2(2) \stackrel{?}{=} 5$
$7 = 7 \checkmark$	$5 = 5 \checkmark$

► Because the ordered pair (3, 2) is a solution of each equation, it is a solution of the system.

TYPES OF LINEAR SYSTEMS In Example 1, the linear system has exactly one solution. A linear system that has exactly one solution is called a **consistent independent system** because the lines are distinct (are independent) and intersect (are consistent). You will solve consistent independent systems in Lessons 7.1–7.4. In Lesson 7.5 you will consider other types of systems.