7.5 Solve Special Types of Linear Systems

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

Before You found the solution of a linear system.

Now You will identify the number of solutions of a linear system.

Why? So you can compare distances traveled, as in Ex. 39.

Key Vocabulary
- **inconsistent system**
- **consistent dependent system**
- **system of linear equations,** *p. 427*
- **parallel,** *p. 244*

A linear system can have no solution or infinitely many solutions. A linear system has no solution when the graphs of the equations are parallel. A linear system with no solution is called an **inconsistent system**.

A linear system has infinitely many solutions when the graphs of the equations are the same line. A linear system with infinitely many solutions is called a **consistent dependent system**.

EXAMPLE 1 A linear system with no solution

Show that the linear system has no solution.

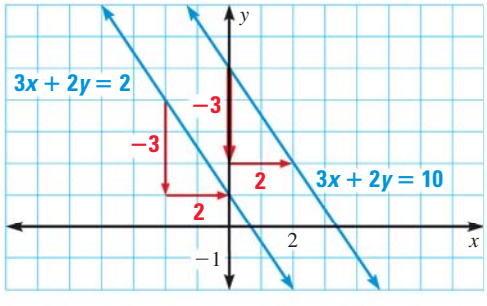
$3x + 2y = 10$ Equation 1
$3x + 2y = 2$ Equation 2

Solution

METHOD 1 Graphing

REVIEW GRAPHING
For help with graphing linear equations, see pp. 215, 225, and 244.

Graph the linear system.



▶ The lines are parallel because they have the same slope but different y-intercepts. Parallel lines do not intersect, so the system has no solution.

METHOD 2 Elimination

Subtract the equations.

$$\begin{array}{r} 3x + 2y = 10 \\ 3x + 2y = 2 \\ \hline 0 = 8 \end{array}$$ ← This is a false statement.

IDENTIFY TYPES OF SYSTEMS
The linear system in Example 1 is called an inconsistent system because the lines do not intersect (are not consistent).

▶ The variables are eliminated and you are left with a false statement regardless of the values of x and y. This tells you that the system has no solution.

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