

**ELIMINATION METHOD** Another algebraic method that you can use to solve a system of equations is the **elimination method**. The goal of this method is to eliminate one of the variables by adding equations.

## KEY CONCEPT

*For Your Notebook*

### The Elimination Method

- STEP 1** **Multiply** one or both of the equations by a constant to obtain coefficients that differ only in sign for one of the variables.
- STEP 2** **Add** the revised equations from Step 1. Combining like terms will eliminate one of the variables. Solve for the remaining variable.
- STEP 3** **Substitute** the value obtained in Step 2 into either of the original equations and solve for the other variable.



### EXAMPLE 2 Use the elimination method

Solve the system using the elimination method.

$$3x - 7y = 10 \quad \text{Equation 1}$$

$$6x - 8y = 8 \quad \text{Equation 2}$$

#### Solution

**STEP 1** **Multiply** Equation 1 by  $-2$  so that the coefficients of  $x$  differ only in sign.

$$\begin{array}{rcl} 3x - 7y = 10 & \xrightarrow{\times -2} & -6x + 14y = -20 \\ 6x - 8y = 8 & & 6x - 8y = 8 \\ \hline & & 6y = -12 \\ & & y = -2 \end{array}$$

**STEP 2** **Add** the revised equations and solve for  $y$ .

**STEP 3** **Substitute** the value of  $y$  into one of the original equations. Solve for  $x$ .

$$3x - 7y = 10 \quad \text{Write Equation 1.}$$

$$3x - 7(-2) = 10 \quad \text{Substitute } -2 \text{ for } y.$$

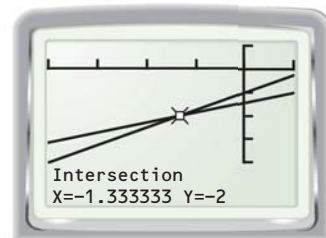
$$3x + 14 = 10 \quad \text{Simplify.}$$

$$x = -\frac{4}{3} \quad \text{Solve for } x.$$

▶ The solution is  $(-\frac{4}{3}, -2)$ .

**CHECK** You can check the solution algebraically using the method shown in Example 1. You can also use a graphing calculator to check the solution.

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#### SOLVE SYSTEMS

In Example 2, one coefficient of  $x$  is a multiple of the other. In this case, it is easier to eliminate the  $x$ -terms because you need to multiply only one equation by a constant.



### GUIDED PRACTICE for Examples 1 and 2

Solve the system using the substitution or the elimination method.

1.  $4x + 3y = -2$   
 $x + 5y = -9$

2.  $3x + 3y = -15$   
 $5x - 9y = 3$

3.  $3x - 6y = 9$   
 $-4x + 7y = -16$