EXAMPLE 2 Use the substitution method

Solve the linear system: $x - 2y = -6$ Equation 1
$4x + 6y = 4$ Equation 2

CHOOSE AN EQUATION
Equation 1 was chosen in Step 1 because x has a coefficient of 1. So, only one step is needed to solve Equation 1 for x.

Solution

STEP 1 **Solve** Equation 1 for x.

$x - 2y = -6$ Write original Equation 1.

$x = 2y - 6$ Revised Equation 1

STEP 2 **Substitute** $2y - 6$ for x in Equation 2 and solve for y.

$4x + 6y = 4$ Write Equation 2.

$4(2y - 6) + 6y = 4$ Substitute $2y - 6$ for x.

$8y - 24 + 6y = 4$ Distributive property

$14y - 24 = 4$ Simplify.

$14y = 28$ Add 24 to each side.

$y = 2$ Divide each side by 14.

STEP 3 **Substitute** 2 for y in the revised Equation 1 to find the value of x.

$x = 2y - 6$ Revised Equation 1

$x = 2(2) - 6$ Substitute 2 for y.

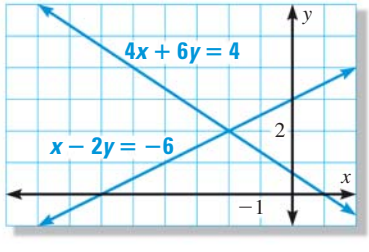
$x = -2$ Simplify.

▶ The solution is $(-2, 2)$.

CHECK Substitute -2 for x and 2 for y in each of the original equations.

Equation 1	Equation 2
$x - 2y = -6$	$4x + 6y = 4$
$-2 - 2(2) \stackrel{?}{=} -6$	$4(-2) + 6(2) \stackrel{?}{=} 4$
$-6 = -6$ ✓	$4 = 4$ ✓

CHECK REASONABLENESS When solving a linear system using the substitution method, you can use a graph to check the reasonableness of your solution. For example, the graph at the right verifies that $(-2, 2)$ is a solution of the linear system in Example 2.



GUIDED PRACTICE for Examples 1 and 2

Solve the linear system using the substitution method.

1. $y = 2x + 5$
$3x + y = 10$

2. $x - y = 3$
$x + 2y = -6$

3. $3x + y = -7$
$-2x + 4y = 0$