

In Lesson 4.1.2, you developed Equal Values Method of solving a system of equations.  You set both of the equations equal to the same variable.  Today you will develop a more efficient method of solving systems that are too messy to solve by setting the equations equal to each other.

**WARM UP .** Review what you learned in Lesson 4.1.2 as you solve the system of equations below.  Use the equal values method to solve the systems and check your solution.

a. 6*x* + 3*y* = 9 b. *y* = **+ 5

 *y* = 7*x* – 6  *y* = 2*x* − 9

**4-31.**  Set up the following system of equations to solve using the equal values method

*y* = −*x* − 7

5*y*+ 3*x* = −13

**4-32.** AVOIDING THE MESS

A new method, called the **Substitution Method**, can help you solve the system in problem 4-31 without using fractions.  This method is outlined below.



* 1. If *y* = −*x* − 7, then does −*x* − 7 = *y*? That is, can you switch the *y* and the −*x* − 7? Why or why not?
	2. Since you know that *y* = −*x* − 7, can you replace the *y* in the second equation with −*x* − 7 from the top equation? Why or why not?



* 1. Once you replace the  *y*  in the second equation with −*x* − 7, you have an equation with only one variable, as shown below.  This is called **substitution** because you are substituting for (replacing) *y* with an expression that it equals.  Solve this new equation for *x* and then use that result to find *y* in either of the original equations.

5(−*x* − 7) + 3*x* = −13

**4-33.** Use the Substitution Method to solve the systems of equations below.

a. *y* = 3*x* b. *x* − 4 = *y*
 2*y* − 5*x* = 4 −5*y* + 8*x* = 29

c. 2*x* + 2*y* = 18 d. *c* = −*b* − 11
 *x* = 3 – *y*  3*c* + 6 = 6*b*

**4-34.** When Mei solved the system of equations below, she got the solution *x* = 4, *y* = 2. *Without solving the system yourself*, can you tell her whether this solution is correct? How do you know?

4*x* + 3*y* = 22

*x* − 2*y* = 0