Solving Systems of Equations by Substitution

Algorithm

1. Solve one of the equations for one of the variables*
2. Substitute that expression into the other equation
3. Solve the resulting equation
4. Substitute that value into one of the given equations to find the value of the other variable
5. Write the solution as an ordered pair.

***Hint: Choose the variable whose coefficient is 1**

Example Solve by substitution

$$5x - 2y = 4$$
$$y = 4x - 11$$

1. Already solved for y
2. $5x - 2(4x - 11) = 4$
3. $5x - 8x + 22 = 4$
   $-3x + 22 = 4$
   $-3x = -18$
   $x = 6$
4. $y = 4(6) - 11 = 13$
5. $(6, 13)$

Solve the following systems of equations by substitution.

1. $y = 2x - 1$
   $x + 4y = 23$

2. $2x + 3y = -1$
   $x = 3y - 23$

3. $y = 4x - 6$
$5x + 3y = -1$

4. $2x + 5y = -1$
$y = 3x + 10$

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

6. $3x + y = 5$
$2x + 3y = 1$

7. $3x + y = 6$
$5x - 3y = -4$

8. $3x - y = 2$
$x + 2y = 10$

9. $x + 2y = 6$
$3x - 4y = 28$

10. $4x + 5y = 11$
$y - 3x = -13$

11. $x - 3y = -9$
$5x - 2y = 7$

12. $y = 2x - 4$
$6x - 3y = 12$