

# Solving Systems of Equations by Substitution Practice

Name Key

Class Period \_\_\_\_\_

## Steps

1. One equation will have either  $x$  or  $y$  by itself, or can be solved for  $x$  or  $y$  easily.
2. Substitute the expression from Step 1 into the other equation and solve for the other variable.
3. Substitute the value from Step 2 into the equation from Step 1 and solve.
4. Your solution is the ordered pair formed by  $x$  and  $y$ .
5. Check the solution in each of the original equations.

Solve the following systems of equations by using the substitution method.

1.  $x = -4$   
 $3x + 2y = 20$

$$\begin{array}{r} 3(-4) + 2y = 20 \\ -12 + 2y = 20 \\ \hline +12 \qquad +12 \end{array}$$

$$\frac{2y}{2} = \frac{32}{2}$$

$$y = 16$$

$$\boxed{(-4, 16)}$$

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

$$\begin{array}{r} x + (x - 1) = 3 \\ 2x - 1 = 3 \\ 2x = 4 \\ x = 2 \end{array} \quad \begin{array}{r} y = 2 - 1 \\ y = 1 \end{array}$$

$$\boxed{(2, 1)}$$

3.  $3x + 2y = -12$   
 $y = x - 1$

$$\begin{array}{r} 3x + 2(x - 1) = -12 \\ 3x + 2x - 2 = -12 \\ 5x - 2 = -12 \end{array} \quad \begin{array}{r} y = -2 - 1 \\ y = -3 \end{array}$$

$$5x = -10$$

$$x = -2$$

$$\boxed{(-2, -3)}$$

4.  $x = \frac{1}{2}y - 3$   
 $4x - y = 10$

$$\begin{array}{r} 4\left(\frac{1}{2}y - 3\right) - y = 10 \\ 2y - 12 - y = 10 \end{array}$$

$$y - 12 = 10$$

$$y = 22$$

$$\boxed{(8, 22)}$$

$$x = \frac{1}{2}(22) - 3$$

$$x = 11 - 3$$

$$x = 8$$

$$5. \begin{cases} x = -5y + 4 \\ 3x + 15y = -1 \end{cases}$$

$$3(-5y + 4) + 15y = -1$$

$$-15y + 12 + 15y = -1$$

$$12 \neq -1$$

No Solution

$$6. \begin{cases} 2x - 5y = 29 \\ x = -4y + 8 \end{cases}$$

$$2(-4y + 8) - 5y = 29$$

$$-8y + 16 - 5y = 29$$

$$-13y + 16 = 29$$

$$-13y = 13$$

$$y = -1$$

$$x = -4(-1) + 8$$

$$x = 4 + 8$$

$$x = 12$$

(12, -1)

$$7. \begin{cases} x = 5y + 10 \\ 2x - 10y = 20 \end{cases}$$

$$2(5y + 10) - 10y = 20$$

$$10y + 20 - 10y = 20$$

$$20 = 20$$

Infinitely Many  
Solutions

$$8. \begin{cases} 2x - 3y = -24 \\ x + 6y = 18 \end{cases}$$

$$\begin{array}{r} x + 6y = 18 \\ -6y \quad -6y \\ \hline \end{array}$$

$$x = -6y + 18$$

$$2(-6y + 18) - 3y = -24$$

$$-12y + 36 - 3y = -24$$

$$-15y + 36 = -24$$

$$-15y = -60$$

$$y = 4$$

$$x = -6(4) + 18$$

$$x = -24 + 18$$

$$x = -6$$

(-6, 4)