

11-14-19

Solve the following system of equations by elimination.

1. $2x + y = 6$
 $x - 3y = -11$

2. $3x + 5y = -17$
 $-7x - 4y = 55$

1. $2x + y = 6$ $\cdots\cdots\rightarrow$ $2x + y = 6$
 $-2(x - 3y = -11)$ \rightarrow $-2x + 6y = 22$

$$\begin{array}{r} 2x + y = 6 \\ + \quad -2x + 6y = 22 \\ \hline 7y = 28 \\ \frac{7y}{7} = \frac{28}{7} \\ \hline y = 4 \end{array}$$

$(1, 4)$

$$\begin{array}{r} 2x + 4 = 6 \\ - 4 \quad -4 \\ \hline 2x = 2 \\ \frac{2x}{2} = \frac{2}{2} \\ \hline x = 1 \end{array}$$

$$\begin{array}{l} 1 - 3(4) = -11 \\ 1 - 12 = -11 \\ -11 = -11 \checkmark \end{array}$$

$$\begin{array}{l}
 2 \cdot 4(3x + 5y = -17) \rightarrow 12x + 20y = -68 \\
 5(-7x - 4y = 55) \rightarrow -35x - 20y = 275
 \end{array}$$

$$\begin{array}{r}
 -23x = 207 \\
 \hline
 -23 \quad -23 \\
 \hline
 \end{array}$$

$$x = -9$$

$(-9, 2)$

$$-7(-9) - 4y = 55$$

$$\begin{array}{r}
 63 - 4y = 55 \\
 -63 \quad -63 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 -4y = -8 \\
 \hline
 -4 \quad -4 \\
 \hline
 \end{array}$$

$$y = 2$$

$$3(-9) + 5(2) = -17$$

$$-27 + 10 = -17$$

$$-17 = -17 \checkmark$$

Quiz Scores

A 15 - 13.5

B 13 - 12

C 11.5 - 10.5

D 10 - 9

F 8.5 - 0

Solving Systems of Equations by Substitution

$$y = 3x + 2$$
$$x + 2y = 11$$

$$x + 2(3x + 2) = 11$$
$$x + 6x + 4 = 11$$
$$7x + 4 = 11$$
$$\begin{array}{r} -4 \quad -4 \\ \hline 7x = 7 \\ \hline x = 1 \end{array}$$

$$y = 3(1) + 2$$
$$y = 3 + 2$$
$$y = 5$$

$$(1, 5)$$

check:

$$1 + 2(5) = 11$$
$$1 + 10 = 11$$
$$11 = 11 \checkmark$$

$$5 = 3(1) + 2$$
$$5 = 3 + 2$$
$$5 = 5 \checkmark$$

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

$$2(y + 3) - y = 5$$
$$2y + 6 - y = 5$$
$$y + 6 = 5$$
$$\begin{array}{r} -6 \quad -6 \\ \hline y = -1 \end{array}$$

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

$$(2, -1)$$

check:

$$2(2) - (-1) = 5$$
$$4 + 1 = 5$$
$$5 = 5 \checkmark$$

$$2 = -1 + 3$$
$$2 = 2 \checkmark$$

$$\begin{aligned} -5x + 3y &= 51 \\ y &= 10x - 8 \end{aligned}$$

$$-5x + 3(10x - 8) = 51$$

$$-5x + 30x - 24 = 51$$

$$\begin{array}{r} 25x - 24 = 51 \\ +24 \quad +24 \\ \hline \end{array}$$

$$\begin{array}{r} 25x = 75 \\ \underline{25} \quad \underline{25} \end{array}$$

$$x = 3$$

$$y = 10(3) - 8$$

$$y = 30 - 8$$

$$y = 22$$

$$(3, 22)$$

check:

$$\begin{aligned} -5(3) + 3(22) &= 51 \\ -15 + 66 &= 51 \\ 51 &= 51 \checkmark \end{aligned}$$

$$22 = 10(3) - 8$$

$$22 = 30 - 8$$

$$22 = 22 \checkmark$$

To solve systems of equations by substitution, I need to....

1. Take the equation that is single variable ($y =$ or $x =$) and substitute (replace) that into the other equation.

2. Solve for the variable.

3. Substitute the answer from step 2 into the $y =$ or $x =$ equation, then solve.

4. Check the solutions in both equations.