

Substitution



You can use substitution to solve a system of equations.

To use substitution, one of the equations needs to have a variable alone on one side. In this system, neither equation has a variable alone.	$x - 3y = 16$ $x + 2y = 26$
Solve either equation for one of the variables. Choose the equation you think would be easier to solve. Let's solve the first equation for x . Add $3y$ to both sides.	$x - 3y = 16$ $x = 16 + 3y$
Since $x = 16 + 3y$, you can substitute $16 + 3y$ for x in the second equation. Then solve for y .	$x + 2y = 26$ $16 + 3y$ + $2y = 26$ $16 + 5y = 26$ $5y = 10$ $y = 2$
Now that you know y , you can find x . Substitute 2 for y in either equation to solve for x . Let's use the second equation, $x + 2y = 26$.	$x + 2y = 26$ $x + 2(\mathbf{2}) = 26$ $x + 4 = 26$ $x = 22$
Finally, write the solution as an ordered pair. Since $x = 22$ and $y = 2$, the solution is (22, 2) .	

Practice! Solve each system of equations using substitution.

$$\begin{aligned} y &= 3x \\ x + y &= 20 \end{aligned}$$

$(\underline{5}, \underline{15})$

$$\begin{aligned} x &= 3 \\ -5x + 2y &= 1 \end{aligned}$$

$(\underline{3}, \underline{8})$

$$\begin{aligned} 3x + 5y &= 4 \\ y &= -x - 2 \end{aligned}$$

$(\underline{-7}, \underline{5})$

$$\begin{aligned} y &= 6x - 12 \\ y &= -6x \end{aligned}$$

$(\underline{1}, \underline{-6})$

$$\begin{aligned} x - 2y &= 22 \\ x + y &= 10 \end{aligned}$$

$(\underline{14}, \underline{-4})$

$$\begin{aligned} y &= 3x + 12 \\ y &= -4x + 5 \end{aligned}$$

$(\underline{-1}, \underline{9})$

$$\begin{aligned} 2x - y &= 1 \\ 3x + 4y &= 40 \end{aligned}$$

$(\underline{4}, \underline{7})$

$$\begin{aligned} x + 2y &= -16 \\ 3x - 5y &= -15 \end{aligned}$$

$(\underline{-10}, \underline{-3})$

$$\begin{aligned} 5x + 7y &= 16 \\ 2x + y &= 10 \end{aligned}$$

$(\underline{6}, \underline{-2})$