

System of Equations Walkthrough

Substitution Method - Example #2

In this example, we will be using the substitution method to solve a system of equations.

In the substitution method, we find an easily isolated variable in one of the equations and solve for it. In this example, all of the variables have a coefficient in front of the variable which hypothetically sets them at the same level of difficulty. In this case, you look for the number which will be easiest to divide by, which would be -2.

After we isolate the variable, we take the rearranged equation and plug it into the other equation.

$$\begin{cases} -2x + 6y = 6 \\ -7x + 8y = -5 \end{cases}$$

isolation of variable

$$\begin{array}{r} -2x + 6y = 6 \\ -6y - 6y \end{array}$$

$$\frac{-2x}{-2} = \frac{6-6y}{-2}$$

$$x = -3 + 3y$$

$$\begin{cases} x = -3 + 3y \\ -7x + 8y = -5 \end{cases}$$

$$-7(-3 + 3y) + 8y = -5 \quad \text{Distribute the } -7$$

$$21 - 21y + 8y = -5$$

$$\begin{array}{r} -13y + 21 = -5 \\ -21 \quad -21 \end{array}$$

$$\frac{-13y}{-13} = \frac{-26}{-13}$$

Combine like terms on the same side of the equation

Isolate the variable.

Divide by the coefficient.

$$y = 2$$

$$x = -3 + 3(2)$$

$$-7x + 8(2) = -5$$

$$-7x + 16 = -5$$

$$\begin{array}{r} -7x + 16 = -5 \\ -16 \quad -16 \end{array}$$

$$\frac{-7x}{-7} = \frac{-21}{-7}$$

$$x = 3$$

Plug variable back into one of the equations to solve for other variable.

Solve the equation.

Write answer in coordinate format:

$$(x, y)$$

$$(3, 2)$$