

KEY

1. Substitute
2. Simplify

Name: _____ Date: _____ Period: _____

3. Solve \rightarrow Algebraic Method

Solving using substitution:

Example 1: Find the value of y if $(5, y)$ is a solution to the equation $2x + 6y = 16$.

$$2(5) + 6y = 16$$

$$10 + 6y = 16$$

$$\begin{array}{r|l} \cancel{10} + 6y & = 16 \\ -10 & -10 \\ \hline 6y & = 6 \\ \frac{6y}{6} & = \frac{6}{6} \end{array}$$

$y = 1$

Example 2: What is x if $(x, -3)$ is a solution to the equation $2x + 3y = -17$.

$$2x + 3(-3) = -17$$

$$2x - 9 = -17$$

$$\begin{array}{r|l} 2x - 9 & = -17 \\ +9 & +9 \\ \hline 2x & = -8 \\ \frac{2x}{2} & = \frac{-8}{2} \end{array}$$

$x = -4$

Example 3: What is the value of x in the equation $4x - 5y = -16$ if the solution is $(x, 3)$?

$$4x - 5(3) = -16$$

$$4x - 15 = -16$$

$$\begin{array}{r|l} 4x - 15 & = -16 \\ +15 & +15 \\ \hline 4x & = -1 \\ \frac{4x}{4} & = \frac{-1}{4} \end{array}$$

$x = -\frac{1}{4}$ or -0.25

Practice:

What is x if $(x, 5)$ is a solution to the equation $3x + 3y = 27$?

$$3x + 3(5) = 27$$

$$3x + 15 = 27$$

$$\begin{array}{r|l} 3x + 15 & = 27 \\ -15 & -15 \\ \hline 3x & = 12 \\ \frac{3x}{3} & = \frac{12}{3} \end{array}$$

$x = 4$

What is x if $(x, 9)$ is a solution to the equation $x + 3y = -17$?

$$x + 3(9) = -17$$

$$x + 27 = -17$$

$$\begin{array}{r|l} x + 27 & = -17 \\ -27 & -27 \\ \hline x & = -44 \end{array}$$

$x = -44$

What is the value of x in the equation $4x - 8y = -16$ if the solution is $(x, 3)$?

$$4x - 8(3) = -16$$

$$4x - 24 = -16$$

$$\begin{array}{r|l} 4x - 24 & = -16 \\ +24 & +24 \\ \hline 4x & = 8 \\ \frac{4x}{4} & = \frac{8}{4} \end{array}$$

$x = 2$

What is the value of x in the equation $2x - 5y = 16$ if the solution is $(x, 4)$?

$$2x - 5(4) = 16$$

$$2x - 20 = 16$$

$$\begin{array}{r|l} 2x - 20 & = 16 \\ +20 & +20 \\ \hline 2x & = 36 \\ \frac{2x}{2} & = \frac{36}{2} \end{array}$$

$x = 18$

Find the value of y if $(5, y)$ is a solution to the equation $2x + 4y = -20$.

$$2(5) + 4y = -20$$

$$10 + 4y = -20$$

$$\begin{array}{r|l} \cancel{10} + 4y & = -20 \\ -10 & -10 \\ \hline 4y & = -30 \\ \frac{4y}{4} & = \frac{-30}{4} \end{array}$$

$y = -7.5$

Find the value of y if $(-10, y)$ is a solution to the equation $2x + 6y = 6$.

$$2(-10) + 6y = 6$$

$$-20 + 6y = 6$$

$$\begin{array}{r|l} \cancel{-20} + 6y & = 6 \\ +20 & +20 \\ \hline 6y & = 26 \\ \frac{6y}{6} & = \frac{26}{6} \end{array}$$

$y = \frac{13}{3}$

$y = \frac{-15}{2}$