

Geometry 9/27

Warm Up
AIMS Web 1

0-8 Solving Systems of Linear Equations by Substitution

I can solve a system of linear equations by substitution

Substitution

An algebraic method of solving systems of equations that finds the exact solution.

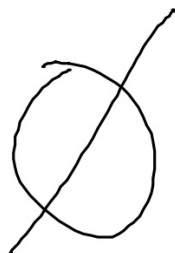
Ex. 1 Solve the equation by substitution

$$2x + 5y = 25 \text{ when } x = 2 \text{ and } y = -3$$

$$2 \cdot 2 + 5 \cdot -3 = 25$$

$$4 + -15 \stackrel{?}{=} 25$$

$$\cdot -11 \neq 25$$


No Solution

I can solve a system of linear equations by substitution

Substitution is used when graphing does not work well, the equations intersect at noninteger values.

Ex. 1 Solve the system by substitution

$$x = -2y + 8$$

$$-5x + 3y = 12$$

$$-5(-2y + 8) + 3y = 12$$

$$10y - 40 + 3y = 12$$

$$13y - 40 = 12$$

$$\frac{13y}{13} = \frac{52}{13} \quad y = 4$$

$$x = -2 \cdot 4 + 8$$

$$x = -8 + 8$$

$$x = 0$$

$$(0, 4)$$

I can solve a system of linear equations by substitution

Ex. 2 Solve the system by substitution

$$y = -3x + 9$$

$$y = x - 7$$

$$\begin{array}{r} -3x + 9 = x - 7 \\ -1x \qquad -x \\ \hline -4x + 9 = -7 \\ -9 \qquad -9 \\ \hline -4x = -16 \\ -4 \qquad -4 \end{array}$$

$$x = 4$$

$$y = 4 - 7$$
$$y = -3$$

$$(4, -3)$$

I can solve a system of linear equations by substitution

You may need to solve one equation for a variable 1st

Ex. 3 Solve the system by substitution

$$\begin{aligned} y + 5x &= -3 \\ 3y - 2x &= 8 \end{aligned}$$

$$\begin{array}{r} y + 5x = -3 \\ -5x \quad -5x \\ \hline \end{array}$$

$$y = -5x - 3$$

$$3(-5x - 3) - 2x = 8$$

$$-15x - 9 - 2x = 8$$

$$\begin{array}{r} -17x - 9 = 8 \\ +9 \quad +9 \\ \hline \end{array}$$

$$\begin{array}{r} -17x = 17 \\ -17 \quad -17 \\ \hline \end{array}$$

$$x = -1$$

$$y = -5(-1) - 3$$

$$y = 5 - 3$$

$$y = 2$$
$$\boxed{(-1, 2)}$$

I can solve a system of linear equations by substitution

Hmwk Wkst
odds or evens
+ IXL Algebra 1
U.8