

# WEDNESDAY, APRIL 3, 2019

## Warm Up

Solve for  $y$  and get it by itself on one side:

$y =$  all real numbers

$$\begin{aligned} & \bullet \quad \left. \begin{array}{l} 2x - 4y = 4 \\ -2x \end{array} \right\} \begin{array}{l} -2x \\ -4y \end{array} \\ & \qquad \qquad \qquad \left. \begin{array}{l} -4y \\ -4 \end{array} \right\} \begin{array}{l} 4 \\ -2x \end{array} \\ & \qquad \qquad \qquad \frac{-4y}{-4} = \frac{4}{-4} - \frac{2x}{-4} \\ & \qquad \qquad \qquad y = -1 + \frac{1}{2}x \end{aligned}$$

$$\begin{aligned} & \bullet \quad \left. \begin{array}{l} y + 2x = y + 2 \\ -y \end{array} \right\} \begin{array}{l} y \\ 2x \end{array} \\ & \qquad \qquad \qquad \left. \begin{array}{l} -y \\ 2x \end{array} \right\} \begin{array}{l} y \\ 2 \end{array} \end{aligned}$$

## Solving Systems by Substitution

# SOLVING SYSTEMS BY SUBSTITUTION

$$y = y$$

Form 1

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

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

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

$$\begin{aligned} x &= -1 + 2 \\ x &= 1 \\ & (1, 1) \end{aligned}$$

$$\begin{array}{r} x + 2 = -3x - 2 \\ -x + 2 = -3x - 2 \end{array}$$

$$(-1, 1)$$

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

$$\frac{5y}{5} = \frac{5}{5}$$

$$y = 1$$

$$\frac{4}{-4} = \frac{-4x}{-4}$$

$$-1 = x$$

**Content Objective:** I will use the substitution method to successfully solve systems of linear equations (SOLE).  
**Language Objective:** I will clearly write the steps for solving a SOLE by the substitution method.  
**Social Objective:** I will work in my group to successfully solve a SOLE word problem using the substitution method and present four representations of our solution to the class.

# BRAIN BREAK

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# SOLVING SYSTEMS BY SUBSTITUTION

Form 2

$$y = -2x + 3$$

$$x = y + 3$$

$$x - 3 = y$$

$$2 - 3 = y$$

$$-1 = y$$

$$\begin{array}{r} -2x + 3 \\ + 2x \quad + 3 \\ \hline 6 = 3x \end{array}$$

$$\frac{6}{3} = \frac{3x}{3}$$

$$2 = x$$

$$(2, -1)$$

$$\begin{array}{l} y = -3x + 5 \\ 5x - 4y = -3 \end{array}$$

$$-5x \quad -5x$$

$$\frac{-4y}{-4} = \frac{-3 - 5x}{-4} = \frac{3 + 5x}{4}$$

$$y = \frac{3}{4} + \frac{5}{4}x$$

$$\begin{array}{l} y = -3(1) + 5 \\ y = -3 + 5 \end{array}$$

$$y = 2$$

$$\begin{array}{r} -12 \\ 4 \\ \hline -3x + 5 = \frac{3}{4} + \frac{5}{4}x \\ -5x - 5 \quad -20 - 5 \quad -\frac{5}{4}x \\ \hline -4 \\ 4 \\ \hline -\frac{17}{4}x = -\frac{17}{4} \quad -4 \\ \hline \frac{17}{4}x = \frac{17}{4} \quad -4 \\ \hline x = 1 \end{array}$$

$$x = 1$$

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# SOLVING SYSTEMS BY SUBSTITUTION

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

$$+5x$$

$$y = -2 + 5x$$

$$y = -2 + 5(0)$$

$$y = -2$$

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

$$-3x + 6y = -12$$

$$+3x$$

$$\frac{6y}{6} = \frac{3x - 12}{6}$$

$$y = \frac{1}{2}x - 2$$

$$-2 + 5x = \frac{1}{2}x - 2$$

$$+2 \quad -\frac{1}{2}x \quad -\frac{1}{2}x$$

$$\frac{4.5x}{4.5} = \frac{0}{4.5}$$

$$x = 0$$

$$(0, -2)$$

Form 3  $x = 5 - 1(-2)$

$$x + 3y = 1$$

$$-3x - 3y = -15$$

$$y - 3y = 5 - 1y$$

$$+1y \quad -1 + 1y$$

$$-2y = 4$$

$$\frac{-2y}{-2} = \frac{4}{-2}$$

$$y = -2$$

$$(7, -2)$$

$$x + 3y = 1$$

$$-3y \quad -3y$$

$$x = 1 - 3y$$

$$-3x - 3y = -15$$

$$+3y \quad +3y$$

$$-3x = -15 + 3y$$

$$\frac{-3x}{-3} = \frac{-15 + 3y}{-3}$$

$$x = 5 - 1y$$

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# PRACTICE

Substitution

A.  $5x - 2y = 3$   $(3, 6)$   
 $y = 2x$

C.  $x + 7y = 24$   $(3, 3)$   
 $x - 9y = -24$

B.  $y = 6x + 11$   $(-1, 5)$   
 $2y - 4x = 14$

D.  $7x - 4y = -7$   $(3, 7)$   
 $5x + y = 22$

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