

Warm Up

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What is the easiest / most efficient way to solve this system?

$$2x + 4y = -2$$

$$3x + y = 7$$

Substitution!

$$\begin{array}{l} 2x + 4y = -2 \\ 3x + y = 7 \end{array} \rightarrow \begin{array}{r} 3x + y = 7 \\ -3x \quad -3x \\ \hline y = -3x + 7 \end{array}$$

$$2x + 4(-3x + 7) = -2$$

$$2x - 12x + 28 = -2$$

$$-10x + 28 = -2$$

$$\frac{-28 \quad -28}{-10x = -30}$$

$$\frac{-10x = -30}{-10 \quad -10}$$

$$x = 3$$

$$3x + y = 7$$

$$3(3) + y = 7$$

$$9 + y = 7$$

$$\frac{-9 \quad -9}{y = -2}$$

$$y = -2$$

$$(3, -2)$$

Is there another additional way besides graphing?

Equivalent Expressions

$$\begin{array}{r} 2x + 4y = -2 \\ -2x \quad -2x \\ \hline 4y = -2x - 2 \end{array}$$

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

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

$$3x + y = 7$$

$$\frac{-3x \quad -3x}{y = -3x + 7}$$

$$y = -3x + 7$$

$$2 \left[ -\frac{1}{2}x - \frac{1}{2} = -3x + 7 \right]$$

$$-x - 1 = -6x + 14$$

$$\frac{+6x \quad +6x}{5x - 1 = 14}$$

$$5x - 1 = 14$$

$$\frac{+1 \quad +1}{5x = 15}$$

$$\frac{5x = 15}{5 \quad 5}$$

$$x = 3$$

## Homework Questions?

Solve.

$$\begin{array}{l} 1. y = 3 - 2x \\ y = 2 - 3x \end{array} \quad (-1, 5)$$

$$\begin{array}{l} 2. x + y = 5 \\ x = y + 7 \end{array} \quad (6, -1)$$

$$\begin{array}{l} 3. x - y = 1 \\ 2x + y = 8 \end{array} \quad (3, 2)$$

$$\begin{array}{l} 4. 3x - y = 9 \\ y = x + 5 \end{array} \quad (7, 12)$$

$$\begin{array}{l} 5. 3x + 4y = 26 \\ -2x + y = 1 \end{array} \quad (2, 5)$$

$$\begin{array}{l} 6. y = 2x + 3 \\ y = 4x + 4 \end{array} \quad (-\frac{1}{2}, 2)$$

$$\begin{array}{l} 7. 2x + 7y = 8 \\ x + 5y = 7 \end{array} \quad (-3, 2)$$

$$\begin{array}{l} 8. y = 4x + 4 \\ y = 2x + 8 \end{array} \quad (2, 12)$$

$$\begin{array}{l} 9. x + 3y = 17 \\ 2x + 3y = 22 \end{array} \quad (5, 4)$$

$$\begin{array}{l} 10. 4x - 7y = 9 \\ y = x - 3 \end{array} \quad (4, 1)$$

$$\begin{array}{l} 11. 8x - 5y = 9 \\ y = 2x - 4 \end{array} \quad (\frac{11}{2}, 7)$$

$$\begin{array}{l} 12. 2x + 4y = -2 \\ 3x + y = 7 \end{array} \quad (3, -2)$$

$$\begin{array}{l} 13. 3x + y = 5 \\ 2x + 3y = 8 \end{array} \quad (1, 2)$$

$$\begin{array}{l} 14. 2x + 6y = 24 \\ x - 4y = -2 \end{array} \quad (6, 2)$$

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$$\begin{array}{l} 8x - 5y = 9 \\ y = 2x - 4 \end{array}$$

$$8x - 5(2x - 4) = 9$$

$$8x - 10x + 20 = 9$$

$$\begin{array}{r} -2x + 20 = 9 \\ -20 - 20 \end{array}$$

$$\hline -2x = -11$$

$$x = \frac{11}{2}$$

$$y = 2x - 4$$

$$y = 2\left(\frac{11}{2}\right) - 4$$

$$y = 11 - 4$$

$$y = 7$$

$$\left(\frac{11}{2}, 7\right)$$

**Solve the following Systems of Equations using Substitution**

1.  $y + 11 = 6x$   
 $-2x - 3y = -7$

2.  $6x + 6y = -6$   
 $5x + y = -13$

3.  $3x + y = 5$   
 $5x - 4y = -3$

4.  $-3x + 3y = 4$   
 $-x + y = 3$

5.  $-3x - 3y = 3$   
 $5x + y = -17$

6.  $x + 3y = 1$   
 $3x + 3y = 15$

7.  $y = -2$   
 $4x - 3y = 18$

8.  $2x + y = 20$   
 $6x - 5y = 12$

9.  $-4x + y = 6$   
 $-5x - y = 21$

10.  $-5x + y = -3$   
 $3x - 8y = 24$

# Homework

Finish classwork