

## Warm Up

10/10/18

1. Solve using substitution:

$$3x + y = 13$$

$$5x - 2y = 18$$

$$y = -3x + 13$$

$$5x - 2(-3x + 13) = 18$$

$$5x + 6x - 26 = 18$$

$$11x - 26 = 18$$

$$+ 26 \quad + 26$$

$$\frac{11x}{11} = \frac{44}{11}$$

$$x = 4$$

$$(4, 1)$$

$$3(4) + y = 13$$

$$12 + y = 13$$

$$y = 1$$

2. Write the equation of a line perpendicular to  $y = 5x - 3$  that passes through  $(-2, 7)$

$$m = -\frac{1}{5}$$

$$y - 7 = -\frac{1}{5}(x + 2)$$

$$y + 7 = -\frac{1}{5}x - \frac{2}{5}$$

$$y = -\frac{1}{5}x + \frac{33}{5}$$

3. Are the following parallel, perpendicular or neither?

Line A:  $8x - 4y = 7$

$$\frac{-4y}{-4} = \frac{-8x + 7}{-4}$$

$$y = 2x - \frac{7}{4}$$

Line B:  $8y - 4x = 24$

$$\frac{8y}{8} = \frac{4x + 24}{8}$$

$$y = \frac{1}{2}x + 3$$

Systems of Equations

ELIMINATION  
METHOD

## Steps to Solve

1. Make sure the equations are lined up!
2. ADD or SUBTRACT the equations to eliminate the variable with common coefficients.
3. Solve for the remaining variable.
4. Plug in your answer into either original equation and solve for the other variable.

#1

$$\begin{cases} y = 3x + 4 \\ y = x - 2 \end{cases}$$

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$$\frac{2x = 6}{2} \quad \frac{6}{2}$$

$$x = 3$$

$$y = 3 - 2$$

$$y = 1$$

(3, 1)

#2

$$\begin{array}{r} \cancel{x} + 4y = 13 \\ - \quad \cancel{x} - y = 3 \\ \hline \end{array}$$

$$\frac{5y}{5} = \frac{10}{5}$$

$$y = 2 \quad (5, 2)$$

$$\begin{array}{r} x - 2 = 3 \\ + 2 \quad + 2 \\ \hline x = 5 \end{array}$$

#3

$$\begin{cases} \cancel{3x} - 10y = 14 \\ \cancel{3x} - 9y = 15 \end{cases}$$

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$$\begin{array}{r} -y = -1 \\ \hline -1 \quad -1 \end{array} \quad (8, 1)$$
$$y = 1$$

$$3x - 9(1) = 15$$

$$\begin{array}{r} 3x - 9 = 15 \quad x = 8 \\ +9 \quad +9 \end{array}$$

$$\begin{array}{r} \hline 3x = 24 \\ \hline \frac{3x}{3} = \frac{24}{3} \end{array}$$

#4

$$\begin{cases} 4x + 2y = 6 \\ -2x + 2y = 18 \end{cases}$$

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

$$x = -2$$

$(-2, 7)$

$$\begin{array}{r} 4(-2) + 2y = 6 \\ -8 + 2y = 6 \\ +8 \qquad \qquad +8 \\ \hline \end{array}$$

$$\begin{array}{r} 2y = 14 \\ \underline{2} \quad \underline{2} = 7 \\ y = 7 \end{array}$$

## No common coefficients?

*Multiply one or both equations by  
some number to create opposite or  
identical terms*



1.

$$\begin{cases} -2(x+3y=6) \\ 2x-7y=-1 \end{cases}$$

$$\begin{aligned} x+3(1) &= 6 \\ x+3 &= 6 \\ x &= 3 \end{aligned}$$

$$\begin{array}{r} -2x - 6y = -12 \\ + \quad 2x - 7y = -1 \\ \hline \end{array}$$

$$\boxed{(3, 1)}$$

$$\begin{array}{r} -13y = -13 \\ \hline -13 \quad -13 \end{array}$$

$$y = 1$$

2.

$$9x + 3y = 12$$

$$-3(2x + y = 5) \quad 2(-1) + y = 5$$

$$\begin{array}{r} + \quad 9x + 3y = 12 \\ -6x - 3y = -15 \\ \hline 3x = -3 \end{array} \quad \begin{array}{r} -2 + y = 5 \\ +2 \quad \quad +2 \\ \hline y = 7 \end{array}$$

$$\frac{3x}{3} = \frac{-3}{3} \quad (-1, 7)$$
$$x = -1$$

3.

$$\begin{array}{l} -5(3x - y = 14) \\ 3(5x + 4y = 12) \end{array}$$

$$\begin{array}{r} + \\ \hline \cancel{-15x} + 5y = -70 \\ \cancel{15x} + 12y = 36 \\ \hline \end{array}$$

$$\begin{array}{r} 17y = -34 \\ \hline 17 \\ y = -2 \end{array}$$

$$\begin{array}{r} 3x + 2 = 14 \\ -2 \quad -2 \\ \hline \end{array}$$

$$\frac{3x}{3} = \frac{12}{3}$$

$$x = 4$$

$$(4, -2)$$

4.

$$\begin{cases} x + y = -3 \\ 5x - 2y = -50 \end{cases}$$

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

$$x = -8$$

$$\begin{array}{r} -5x - 5y = 15 \\ + \quad 5x - 2y = -50 \\ \hline \end{array}$$

$$-7y = -35$$

$$\begin{array}{r} -7 \quad -7 \\ \hline \end{array}$$

$$y = 5$$

$$(-8, 5)$$

5.  $(-4, -3)$

$$\begin{array}{r} \boxed{\begin{array}{l} 3x - 3y = -3 \\ 2x - y = -5 \end{array}} \\ -3 \left( \begin{array}{l} 3x - 3y = -3 \\ 2x - y = -5 \end{array} \right) \\ \hline \begin{array}{l} 3x - 3y = -3 \\ -6x + 3y = 15 \end{array} \\ \hline \begin{array}{l} -3x = 12 \\ \underline{-3} \quad \underline{-3} \\ x = -4 \end{array} \end{array} \quad \begin{array}{l} 2(-4) - y = -5 \\ -8 - y = -5 \\ \underline{+8} \quad \underline{+8} \\ -y = 3 \\ \underline{-1} \quad \underline{-1} \\ y = -3 \end{array}$$

6.

$$\begin{cases} 3x + y = 2 \\ 6x + 2y = 4 \end{cases}$$

11.

$$\begin{cases} 2x + 4y = 6 \\ 3x = 12 - 6y \end{cases}$$