

Warm Up

3/8/19

1. Solve using substitution:

$$\begin{aligned} 3x + y &= 13 \\ 5x - 2y &= 18 \end{aligned}$$

$3(4) + y = 13$
 $12 + y = 13$
 $y = 1$

$y = -3x + 13$

$$5x - 2(-3x + 13) = 18$$
$$5x + 6x - 26 = 18$$
$$11x - 26 = 18$$
$$\begin{array}{r} 11x - 26 = 18 \\ +26 \quad +26 \\ \hline 11x = 44 \end{array} \quad x = 4$$

$(4, 1)$

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

$$y - 7 = -\frac{1}{5}(x + 2)$$
$$y - 7 = -\frac{1}{5}x - \frac{2}{5}$$
$$\begin{array}{r} y - 7 = -\frac{1}{5}x - \frac{2}{5} \\ +7 \qquad \qquad +7 \end{array}$$
$$y = -\frac{1}{5}x + \frac{33}{5}$$

3. Are the following parallel, perpendicular or neither?

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

$$\begin{array}{r} -8x \quad -8x \\ \hline -4y = -8x + 7 \\ \hline -4 \quad -4 \quad -4 \\ y = 2x - \frac{7}{4} \end{array}$$

2

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

$$\begin{array}{r} +4x \quad +4x \\ \hline 8y = 4x + 24 \\ \hline \frac{1}{8} \quad \frac{1}{8} \quad \frac{1}{8} \\ y = \frac{1}{2}x + 3 \end{array}$$

$\frac{1}{2}$

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 Variable _____.
3. Solve _____ for the remaining variable.
4. Plug in _____ your answer into either original equation and Solve _____ for the other variable.

#1

$(-3, -5)$

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

$$\begin{array}{r} -3x + y = 4 \\ -x + y = -2 \\ \hline -2x = 6 \\ \frac{-2x}{-2} = \frac{6}{-2} \\ x = -3 \end{array}$$

$$x + y = \#$$

Identical terms \rightarrow
SUBTRACT

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

#2

(5, 2)

$$\begin{array}{r} \overline{} \\ \begin{array}{l} x+4y=13 \\ - \quad x-y=3 \\ \hline 5y=10 \\ \\ \\ y=2 \end{array} \end{array}$$

$$x+4(2)=13$$

$$x+8=13$$

$$x=5$$

#3

$(8, 1)$

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

$$\begin{array}{r} -10 - (-9) \\ -10 + 9 \\ -1 \end{array}$$

$$\begin{array}{r} -y = -1 \\ \underline{-1} \quad \underline{-1} \end{array}$$

$$y = 1$$

$$3x - 10(1) = 14$$

$$\begin{array}{r} 3x - 10 = 14 \\ +10 \quad +10 \end{array}$$

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

$$x = 8$$

#4

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

$$\begin{array}{r} + \quad \cancel{4x} + 9y = 5 \\ - \quad \cancel{4x} + 7y = 11 \\ \hline \end{array}$$

$$\frac{16y}{16} = \frac{16}{16}$$

$$y = 1$$

$$4x + 9(1) = 5$$

$$\cancel{4x} + \cancel{9} = 5$$

$$\underline{-9 \quad -9}$$

$$\begin{array}{r} \underline{4x} = -4 \\ \underline{4} \quad \underline{4} \end{array}$$

$$x = -1$$

opposites
→
ADD

$(-1, 1)$

$$\begin{array}{r} x + y = 10 \\ + \quad 3x + y = 18 \end{array} \quad (7, -3)$$

$$\frac{4x}{4} = \frac{28}{4}$$

$$x = 7$$

$$\begin{array}{r} 3(7) + y = 18 \\ 21 + y = 18 \\ -21 \quad -21 \\ \hline y = -3 \end{array}$$

No common coefficients?

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

1.

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

(3, 1)

$$\begin{array}{r} -2(x + 3y = 6) \\ + \quad \cancel{2x} - 6y = -12 \\ \quad \quad \cancel{2x} - 7y = -1 \\ \hline \end{array}$$

$$\begin{array}{r} x + 3(1) = 6 \\ x + 3 = 6 \\ x = 3 \end{array} \quad \begin{array}{r} -13y = -13 \\ \frac{-13y}{-13} = \frac{-13}{-13} \\ y = 1 \end{array}$$

2.

$$\begin{array}{r}
 (-1, 7) \quad -3 \begin{array}{l} 9x + 3y = 12 \\ 2x + y = 5 \end{array} \quad \begin{array}{l} 2(-1) + y = 5 \\ -2 + y = 5 \\ +2 \quad \quad +2 \\ \hline y = 7 \end{array} \\
 + \quad \begin{array}{r} 9x + 3y = 12 \\ -6x - 3y = -15 \\ \hline 3x = -3 \\ \frac{3x}{3} = \frac{-3}{3} \\ x = -1 \end{array}
 \end{array}$$