

## Solving Linear Systems in Two Variables

Solve the following systems of equations algebraically for x and y

1. 
$$\begin{aligned} -3(2x+4y &= -4) & 2x+4y &= -4 \\ 2(3x-2y &= -14) & 2x+4y &= -4 \\ \hline -6x-12y &= 12 & 2x+4y &= -4 \\ 6x-4y &= -28 & -4 &= -4 \\ \hline -16y &= -16 & 2x &= -8 \\ \frac{-16y}{-16} &= \frac{-16}{-16} & x &= -4 \end{aligned}$$

$y=1$   
 $(-4, 1)$

2. 
$$\begin{aligned} -2(5x-y &= -17) & 5x-y &= -17 \\ 5(2x-3y &= -12) & 5x-y &= -17 \\ \hline -10x+2y &= 34 & 5x-y &= -17 \\ 10x-15y &= -60 & x &= 12 \\ \hline -13y &= -26 & 5x &= 15 \\ \frac{-13y}{-13} &= \frac{-26}{-13} & x &= 3 \end{aligned}$$

$y=2$   
 $(-3, 2)$

3. 
$$\begin{aligned} 3(4x+y &= 10) & 4x+y &= 10 \\ 4(-3x-2y &= 0) & 4x+y &= 10 \\ \hline 12x+3y &= 30 & 4x+y &= 10 \\ -12x-8y &= 0 & +6 &= 6 \\ \hline -5y &= 30 & 4x &= 16 \\ \frac{-5y}{-5} &= \frac{30}{-5} & x &= 4 \end{aligned}$$

$y=-6$   
 $(4, -6)$

4. 
$$\begin{aligned} 2(5x+5y &= 15) & 5x+5y &= 15 \\ 5(-2x+3y &= -21) & 5x+5y &= 15 \\ \hline 10x+10y &= 30 & 5x+5y &= 15 \\ -10x+15y &= -105 & 45-15 &= 15 \\ \hline 25y &= -75 & 5x &= 0 \\ \frac{25y}{25} &= \frac{-75}{25} & x &= 0 \end{aligned}$$

$y=-3$   
 $(0, -3)$

5. 
$$\begin{aligned} 1(7x+2y &= -1) & x-y &= 5 \\ -7(x-y &= 5) & x-y &= 5 \\ \hline 7x+2y &= -1 & x-y &= 5 \\ -7x+7y &= -35 & -4 &= -4 \\ \hline 9y &= -36 & x &= 1 \\ \frac{9y}{9} &= \frac{-36}{9} & & \\ y &= -4 & & \\ & & (1, -4) & \end{aligned}$$

6. 
$$\begin{aligned} 5(-3x-2y &= 12) & -3x-2y &= 12 \\ 3(5x+y &= -13) & -3x-2y &= 12 \\ \hline -15x-10y &= 60 & -3x-2y &= 12 \\ +5x+3y &= -39 & -6 &= -6 \\ \hline -7y &= 21 & -3x &= 6 \\ \frac{-7y}{-7} &= \frac{21}{-7} & x &= -2 \end{aligned}$$

$y=-3$   
 $(-2, -3)$

$$\begin{aligned} -3x-2y &= 12 \\ -3x-2(-3) &= 12 \\ -3x+6 &= 12 \\ -3x &= 6 \\ \frac{-3x}{-3} &= \frac{6}{-3} & x &= -2 \end{aligned}$$

