

L12 Solving Systems by Elimination

Scheduled Review

Make a system of equations which has a solution of

$$x = 5$$

$$y = 2$$

$$x = -3$$

$$y = 8$$

Check by solving your system by graphing.

To solve a linear system by elimination means to eliminate one variable by adding or subtracting the two equations. Choose addition or subtraction based on which operation will eliminate one variable.

Note: the numerical coefficient of one variable must be the same in both equations.

$$\begin{array}{r} 3x - 5y = -9 \\ + \quad 4x + 5y = 23 \\ \hline \end{array}$$

$$7x + 0 = 14$$

$$\frac{7x}{7} = \frac{14}{7}$$

$$\boxed{x=2}$$

Sub $x=2$ into Eqn 2.

$$4x + 5y = 23$$

$$4(2) + 5y = 23$$

$$8 + 5y = 23$$

$$5y = 23 - 8$$

$$\frac{5y}{5} = \frac{15}{5}$$

$$\boxed{y=3}$$

$$\begin{aligned} 8x - 3y &= -2 \\ \underline{8x + 7y} &= \underline{38} \end{aligned}$$

Sometimes one equation must be multiplied in order to have the numerical coefficient of one variable the same in both equations.

$$\begin{array}{r} 1x - 2y = 7 \\ 3x + 4y = 1 \end{array} \quad \begin{array}{l} \times 2 \rightarrow 2x - 4y = 14 \\ + 3x + 4y = 1 \\ \hline 5x + 0 = 15 \\ \frac{5x}{5} = \frac{15}{5} \\ \boxed{x = 3} \end{array}$$

Sub $x=3$ into Eqn 1

$$\begin{aligned} x - 2y &= 7 \\ 3 - 2y &= 7 \\ -2y &= 7 - 3 \\ \frac{-2y}{-2} &= \frac{4}{-2} \\ \boxed{y = -2} \end{aligned}$$

$$\begin{aligned}2x + 3y &= 32 \\ 3x - 2y &= -17\end{aligned}$$

$$\begin{aligned}2x + 3y &= 32 \\ 3x &= -17 + 2y\end{aligned}$$

$$\frac{x}{2} + \frac{4y}{3} = \frac{4}{1} \quad \times 6 \rightarrow \frac{6x}{2} + \frac{24y}{3} = 24 \rightarrow 3x + 8y = 24$$

$$3x + 5y = 6$$

$$\begin{array}{r} 3x + 8y = 24 \\ - 3x + 5y = 6 \\ \hline 0 + 3y = 18 \end{array}$$

Sub $y=6$ into Eqn 2:

$$3x + 5y = 6$$

$$3x + 5(6) = 6$$

$$3x + 30 = 6$$

$$3x = 6 - 30$$

$$\begin{array}{r} \cancel{3}x = -\cancel{24} \\ \cancel{3} \quad \quad \quad \cancel{3} \\ \hline \boxed{x = -8} \end{array}$$

$$\begin{array}{r} \cancel{3}y = \frac{18}{\cancel{3}} \\ \hline \boxed{y = 6} \end{array}$$

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