

How Do You Solve a System of Equations by Elimination?

need to have opposite coefficient

$ax+by=c$
a, b, c are #'s

#1. Make sure equations are in standard form and then look at the coefficients and decide whether x or y would be easiest to eliminate by adding the two equations together. Otherwise, go to #2.

#2. Decide what to multiply each equation by so that when you add the two, a variable will be eliminated. Look for the least common multiple of the coefficients.

#3. Add the two equations together.

#4. Solve for the remaining variable.

#5. Substitute the value back into one of the original equations and solve for the other variable.

$3x + 2y = -6$	-2	\rightarrow	$-6x - 4y = 12$
$2x + 5y = 7$	3	\rightarrow	$6x + 15y = 21$
Eliminate x or y? _____			
		Multiply 1 st by _____ Multiply 2 nd by _____	

$-6x - 4y = 12$	$+$	$6x + 15y = 21$

Add		
$11y = 33$		

$11y = 33$

$y = \underline{\hspace{1cm}}$

$3x + 2(3) = -6$

$3x + 6 = -6$

$3x = -12$

$x = \underline{\hspace{1cm}}$

Choose x

$5x - 4y = 4$	\rightarrow	Multiply 1 st by _____
$2x + 4y = 10$	\rightarrow	Multiply 2 nd by _____
Eliminate x or y? <u>y</u>		

$5x - 4y = 4$	$+$	$2x + 4y = 10$

Add		
$7x = 14$		

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

$x = 2$

$2(2) + 4y = 10$

$4 + 4y = 10$

$\frac{4y}{4} = \frac{6}{4} \quad y = \frac{3}{2}$

Solution: $(2, \frac{3}{2})$
 $(2, 1.5)$

True statement: (ex. $0=0$) Infinite solutions
 untrue statement: (ex. $0=1$) NO solution

$5x + y = 14$ $2x + y = 5$ Eliminate x or y? <u>Y</u>	$\begin{matrix} \textcircled{1} \\ \textcircled{-1} \end{matrix}$	$5x + y = 14$ $-2x - y = -5$ Multiply 1 st by _____ Multiply 2 nd by _____	$5x + y = 14$ $-2x - y = -5$ Add $3x = 9$	$\frac{3x}{3} = \frac{9}{3}$ $x = 3$	$2(3) + y = 5$ $6 + y = 5$ $y = -1$ Solution: $(3, -1)$
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$3x - 2y = 6$ $6x - 4y = 12$ Eliminate x or y? <u>X</u>	$\begin{matrix} \textcircled{-2} \\ \textcircled{1} \end{matrix}$	$-6x + 4y = -12$ $6x - 4y = 12$ Multiply 1 st by _____ Multiply 2 nd by _____	$-6x + 4y = -12$ $6x - 4y = 12$ Add $0 = 0$		Infinite solutions Solution: _____
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$x + y = 1$ $x + y = 2$ Eliminate x or y? <u>X</u>	$\begin{matrix} \textcircled{-1} \\ \textcircled{} \end{matrix}$	$-x - y = -1$ $x + y = 2$ Multiply 1 st by _____ Multiply 2 nd by _____	$-x + y = -1$ $x + y = 2$ Add $0 \neq 1$		NO solution Solution: _____
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$x + 4y = 11$ $x - 6y = 11$ Eliminate x or y? <u>X</u>	$\begin{matrix} \textcircled{-1} \\ \textcircled{} \end{matrix}$	$-x - 4y = -11$ $x - 6y = 11$ Multiply 1 st by _____ Multiply 2 nd by _____	$-x - 4y = -11$ $x - 6y = 11$ Add $-10y = 0$	$-10y = 0$ $y = 0$	$x + 4(0) = 11$ $x + 0 = 11$ $x = 11$ Solution: $(11, 0)$
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Eliminate x or y? _____	$\begin{matrix} \textcircled{} \\ \textcircled{} \end{matrix}$	Multiply 1 st by _____ Multiply 2 nd by _____	Add _____		Solution: _____
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