

Topic: Solving systems using elimination

In order to use the elimination method
2 conditions must be met

- 1) All terms must be aligned
- 2) At least one of the variables must be opposites

(ex)

$$\begin{array}{r} 2x - 3y = 6 \\ 5x + 3y = 4 \end{array}$$

Solving systems by elimination

(ex)

$$\begin{array}{r} + \quad 2x + 3y = 11 \\ - \quad 2x + 5y = 13 \\ \hline 8y = 24 \\ \underline{8} \quad \underline{8} \end{array}$$

- ✓ 2 conditions
- ✓ alignment
- ✓ opposites

Steps

- 1) Eliminate (add equations)
- 2) solved
- 3) substitute
- 4) solve
- 5) solution

③

$$2x + 3y = 11$$

④

$$2x + 3(3) = 11$$

$$2x + 9 = 11$$

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

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

$$x = 1$$

⑤

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

* 2 conditions
 ✓ alignment
 ✓ opposites *

ex $-1 \cdot (4x + 3y = 2)$
 $5x + 3y = -2$

* need to make opposites

① $+ \begin{matrix} -4x - 3y = -2 \\ 5x + 3y = -2 \end{matrix}$
 ② $x = -4$

- 1) Eliminate
- 2) solve
- 3) substitute
- 4) solve
- 5) solution →

③ $4x + 3y = 2$
 ④ $4(-4) + 3y = 2$
 $-16 + 3y = 2$
 $+16 \quad +16$
 $3y = 18$
 $\frac{3y}{3} = \frac{18}{3}$
 $y = 6$

⑤ $(-4, 6)$

* since there were not opposite variables, we need to multiply one or both equations to create them.

ex $3x + 4y = -6$
 $2y = 3x + 6$
 $-3x \quad -3x$

* need to align terms

① $+ \begin{matrix} -3x + 2y = 6 \\ 3x + 4y = -6 \end{matrix}$
 ② $6y = 0$
 $\frac{6y}{6} = \frac{0}{6}$
 $y = 0$

* 2 conditions
 ✓ alignment *
 ✓ opposites

- 1) Eliminate
- 2) solved
- 3) substitute
- 4) solve
- 5) solution

③ $3x + 4y = -6$
 ④ $3x + 4(0) = -6$
 $3x = -6$
 $\frac{3x}{3} = \frac{-6}{3}$
 $x = -2$

* Since the terms were not aligned, we needed to use algebra to move the terms around

⑤ $(-2, 0)$