Solving Systems of Equations Using Elimination Method

Objective is to **"ELIMINATE"** one of the variables by either adding or subtracting the two equations.

EXAMPLE #1:

$$-4x + 3y = -4$$
$$4x - y = 12$$

STEPS...

1) Put equations in the Standard Form.

Ax + By = C

NOTE: Number the equations!!!

2) **Multiply equation(s) to get a common coefficient for either x or y terms.**

3) Add OR Subtract equations to ELIMINATE the terms.

4) SOLVE remaining equation for unknown

5) Back substitute to get other unknown

EXAMPLE #2:

$$-2x + 6y = -18 \quad (1)$$
$$+\ 4x - 6y = 12 \quad (2)$$

$$\frac{2x}{2} = \frac{-6}{2}$$

$$x = -3$$

(2) $4x - 6y = 12$

$4(-3) - 6y = 12$

$-12 \overset{+12}{-} 6y = 12 \overset{+12}{}$

$\frac{-6y}{-6} = \frac{24}{-6}$

$y = -4$

* opposite signs → you add
* same signs you have to subtract

EXAMPLE #3 - Coefficients are the same sign...

$$\begin{array}{r} 3x - y = -11 \\ -\ 3x - 5y = -7 \\ \hline \end{array}$$

$-1y - (-5y)$

$4y$

$-11 - (-7)$

$\frac{4y}{4} = \frac{-4}{4}$

$y = -1$

$3x - y = -11$

$3x - (-1) = -11$

$3x + 1 = -11$

-1 -1

$\frac{3x}{3} = \frac{-12}{3}$

$x = -4$

Example #5 - Getting a common coefficient

$2x + 4y = -8$ ①

$-5x + 3y = 7$ ②

① X 5

$5(2x + 4y = -8)$

$10x + 20y = -40$ ①

② X 2

$2(-5x + 3y = 7)$

$-10x + 6y = 14$ ②

$$\begin{array}{r} 10x + 20y = -40 \quad ① \\ +\ -10x + 6y = 14 \quad ② \\ \hline \end{array}$$

$\frac{26y}{26} = \frac{-26}{26}$

$y = -1$

$2x + 4y = -8$

$2x + 4(-1) = -8$

$+4 \quad +4$

$2x - 4 = -8$

$\frac{2x}{2} = \frac{-4}{2}$

$x = -2$

$-14y = 10x + 18$ ①

$-x - y + 1 = 0$ ②

① $-10x - 14y = 18$

② $-x - y = -1$

② $\times 10$

$10(-x - y = -1)$

$-10x - 10y = -10$ ②

$$\begin{array}{r} -10x - 14y = 18 \quad ① \\ -(-10x - 10y = -10 \quad ②) \\ \hline -4y = 28 \end{array}$$

$\frac{-4y}{-4} = \frac{28}{-4}$

$y = -7$

$-x - y + 1 = 0$

$-x - (-7) + 1 = 0$

$-x + 7 + 1 = 0$

$\frac{-x}{-1} = \frac{-8}{-1}$

$x = 8$

$3y = -4x - 6$ ①

$\frac{1 \cdot 12}{4}y - \frac{1 \cdot 12}{6}x = 1 \cdot 12$ ②

$\frac{12}{4}y - \frac{12}{6}x = 12$ ②

$3y - 2x = 12$ ②

$-(3y + 4x = -6$ ①$)$

$-6x = 18$

$\frac{-6x}{-6} = \frac{18}{-6}$

$x = -3$

$3y = -4x - 6$

$3y = -4(-3) - 6$

$3y = 12 - 6$

$\frac{3y}{3} = \frac{6}{3}$

$y = 2$

PRACTICE PROBLEMS...

Worksheet - Solve by Elimination.pdf

Do #1-12

17, 19, 29

Attachments

Worksheet - Solve by Elimination.pdf