

SYSTEMS OF EQUATIONS

System: 2 or More Equations

TYPES OF SOLUTIONS

1. No Solution
2. One Solution
3. Infinitely Many

SYSTEMS OF EQUATIONS: ELIMINATION

STEPS

1. Make something cancel.
2. Solve for 1st Variable
3. Substitute & Solve for 2nd Variable.

EXAMPLE #1

$$\begin{aligned} x - 3y &= 7 \\ 3x + 3y &= 9 \end{aligned}$$

"y" will cancel
↓

$$\begin{aligned} x - 3y &= 7 \\ + 3x + 3y &= 9 \end{aligned}$$

$$\begin{aligned} 4x + 0 &= 16 \\ 4x &= 16 \\ \frac{4x}{4} &= \frac{16}{4} \end{aligned}$$

$$(4, -1) \quad \begin{aligned} x &= 4 \\ y &= -1 \end{aligned}$$

"y"

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

EXAMPLE #2

$$2x - 3y = 11$$

$$5x - 3y = 14$$

$(1, -3)$

$-3y - -3y$

$$\begin{array}{r}
 2x - 3y = 11 \\
 -5x - 3y = 14 \\
 \hline
 -3x = -3 \\
 \hline
 \frac{-3}{-3} = \frac{-3}{-3} \\
 x = 1
 \end{array}$$

"y"

$$\begin{array}{r}
 2(1) - 3y = 11 \\
 2 - 3y = 11 \\
 -2 \quad -2 \\
 \hline
 -3y = 9 \\
 \hline
 \frac{-3y}{-3} = \frac{9}{-3} \\
 y = -3
 \end{array}$$

EXAMPLE #3

The sum of two numbers
is 70 and their difference is 24. Find
the numbers.

x - 1st # y - 2nd #

$$\begin{array}{r} x + y = 70 \\ + x - y = 24 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{94}{2}$$

"y"

$$\begin{array}{r} x + y = 70 \\ 47 + y = 70 \\ -47 \quad -47 \\ \hline y = 23 \end{array}$$

$$\begin{array}{l} x = 47 \\ y = 23 \end{array}$$