

#4: Number of Solutions

When solving equations it is possible to have one solution, no solutions, or infinite solutions.

Example 1

$$\begin{array}{r} x + y = 4 \\ -x \quad -4 \\ \hline x = 0 \end{array}$$

It is ok to have \emptyset as a solution

There is only one possible number (\emptyset) that will ever make this equation true.

Example 2

$$\begin{array}{r} 5x - 2 = 2x + 8 + 3x \\ 5x - 2 = 5x + 8 \\ -5x \quad -5x \\ \hline -2 \neq 8 \end{array} \quad \leftarrow \text{all variables cancel out}$$

"Negative 2 does not equal 8."

No Solution \leftarrow No value of x will ever make this equation true.

Example 3

$$\begin{array}{r} 1 - 2x + 5 = -2(x - 3) \\ 1 - 2x + 5 = -2x + 6 \\ -2x + 6 = -2x + 6 \\ +2x \quad +2x \\ \hline 6 = 6 \end{array} \quad \leftarrow \text{all variables cancel out}$$

$b = b$ \leftarrow True Statement

Infinite Solutions \leftarrow Every value will make this equation true.