



# Systems of Equations: Substitution

Today's Learning Targets:

6.4 - I can use substitution to solve simple systems of linear equations.

Evaluate.

$$3x - 12 \quad \text{when } x = -2$$

$$-12(y - 4) + 2 \quad \text{when } y = -1$$

$$7 - (x + 9) \quad \text{when } x = 6$$

# Substitute one equation into the other!

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_

4. \_\_\_\_\_  
\_\_\_\_\_

5. ✓ \_\_\_\_\_  
\_\_\_\_\_

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

$$x = y - 1$$

$$x + 2y = 8$$

$$y = x - 1$$
$$2x - y = 0$$

# Weird stuff...

$$\begin{aligned}x &= -3y + 4 \\6y + 2x &= 8\end{aligned}$$

$$\begin{aligned}2y - 8x &= 12 \\4x - 9 &= y\end{aligned}$$

$$\begin{aligned} * 3y + 4x &= 14 \\ -2x + y &= -3 \end{aligned}$$



1 Solution:

- $x = 3, y = 0$  (3, 0)
- Solution works in both equations.

No Solution:

- $3 \neq 4$
- **no** (x, y) that make both equations true.
- Write "no solution" or the symbol  $\emptyset$ .
- Parallel Lines!

Infinitely Many Solutions:

- $5 = 5$  or  $x = x$
- Any ordered pair that works in 1 equation will work in the other.
- Write "Inf. Many Sol." or the symbol  $\infty$ .
- Same Line!

# Substitute one equation into the other!

1. I.D. one variable that is by itself

\*circle the other side.

2. Send in substitute for x (or y)

\*put circled part into other equation for lone variable.

3. There should only be one variable now

\*solve for the variable that's left

4. Plug answer into an equation.

\*find the other variable

5. ✓ the solution in both equations