Day 10/11 Guided Notes

Name:_____**Key**_____

Date:_____

Day 10:

We will be able to compare and contrast equations that have ___**one**___

solution, ___**NO**___ solutions, or ___**infinitely**___ many solutions.

Equation with ONE Solution

- You can tell an equation has ONE solution if you solve it and get a

  ___**variable**___ equal to a ___**number**___ that makes the

  equation true.

- Ex: $6x - 3 = 21$

  $$+3 \qquad +3$$
  $$6x = 24$$
  $$\div 6 \qquad \div 6$$
  $$x = 4$$

Equation with NO Solution

- There does not exist **a** ___**value**___ for the ___**variable**___ that

  makes the equation ___**true**___.

- An equation does not have a solution if you substitute your

  ___**calculated**___ ___**value**___ and get a ___**false**___

  statement

- Ex: $5x + 7 = \boxed{3x} + 4 + \boxed{2x}$

  $$5x + 7 = 5x + 4$$
  $$-7 \qquad\qquad -7$$
  $$5x = 5x - 3$$
  $$-5x \quad -5x$$
  $$0 \neq -3$$

Equation with INFINITE Solutions

- An equation has infinitely many solutions if for __any__ value for the __variable__, then that value makes the __equation__ true

  - → Equations are __always__ true for the variable.

- This implies that for any solution to the __variable__ the equation will be true and when substituting the value, the value will always be equal to __itself__.

- Ex: $4 + 5 + 7x = 2x + 5x + 9$

$$9 + 7x = 7x + 9$$
$$-9 \qquad\qquad -9$$

$$\frac{7x}{\div 7} = \frac{7x}{\div 7}$$

$$x = x$$

Exercise: Thinking About Solutions

Let's solve and sort the equations into whether they have <u>ONE</u> solution, <u>NO</u> solutions, or <u>Infinite</u> Solutions:

1. $n = n$	☐ Variable = Number? → *One Solution* ☐ Is the equation a false statement? → *No Solution* ☑ Is the variable/number equal to itself? → *Infinite Solution*
2. $5 + 3x = -10 + 2x$	☒ Variable = Number? → *One Solution* ☐ Is the equation a false statement? → *No Solution* ☐ Is the variable/number equal to itself? → *Infinite Solution*
3. $2v + 2 = 2v - 2$	☐ Variable = Number? → *One Solution* ⬤ Is the equation a false statement? → *No Solution* ☐ Is the variable/number equal to itself? → *Infinite Solution*

PRACTICE PROBLEMS:

$12x - 36 + 18 \rightarrow 12x + 18 = \underline{\hspace{2cm}}$

1. Consider the unfinished equation: $12(x - 3) + 18 = \underline{\hspace{2cm}}$.

   Match the following expressions with the number of solutions the equation would have with that expression on the right-hand side.

   a. $6(2x - 3)$ 1. one solution

   b. $4(3x - 3)$ 2. no solution

   c. $4(2x - 3)$ 3. Infinite solutions

   HINT: Try solving each of the following expressions and substitute your solution into the original equation!

a) $12x - 18 = 6(2x - 3)$
$12x - 18 = 12x - 18$

b) $12x - 18 = 4(3x - 3)$
$12x - 18 \overset{?}{=} 12x - 12$
$\neq$

c) $12x - 18 = 4(2x - 3)$
$12x - 18 = 8x - 12$
$12x = 8x + 6$
$4x = 6$
$x = \frac{6}{4} = \boxed{\frac{3}{2}}$

Day 11: Structures of Equations to Determine Solutions

Teacher Modeling:

Sample Card:

Determine whether the following equation has
    a. one solution - if there exists one solution, solve for it
    b. no solution
    c. infinite solutions

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

$$6x - 1 = 8x - 4$$

$$6x = 8x - 3$$

Written Explanation:

$$-2x = -3$$
$$x = \frac{3}{2}$$

_____

_____

_____

Scratch Paper for Card Exercises:

1. For each set of equations, determine whether it has no solutions, exactly one solution, or has infinitely many solutions + **describe how and why you determined it.** If an equation has one solution, solve to find the value of that makes the statement true:

a. $6x + 8 = 7x + 13$

$x = -5$

one solution

b. $6x + 8 = 2(3x + 4)$

Infinite solutions

$6x + 8 = 6x + 8$

c. $6x + 8 = 6x + 13$

$\neq$

No solution

Lin was looking at the equation $2x - 32 + 4(3x - 2462) = 14x$. She said, "I can tell right away there are no solutions, because on the left side, you will have $2x + 12x$ and a bunch of constants, but you have just $14x$ on the right side." Do you agree with Lin? Explain your reasoning.

2.

yes because

$2x - 32 + 4(3x - 2462) = 14x$

$2x - 32 + 12x - 9848 = 14x$

$14x - 9880 = 14x$

$-9880 \neq 0$