Cornell Notes

Topic: **Solving for X**

Name: ______

Class: ______ Period: ______

Date:

Essential Question: Describe the process for solving for X in equations. Determine when you use order of operations and Inverse operations.

Questions/Main Ideas:

Notes:

Order of Operations - PEMDAS

1. First do operations in the parentheses
   a. If there are more than one operation in the parentheses, follow the order of operations as shown.
   b. If there are more than one set of parentheses, go from Left to Right.

   $6 * (5 + 3) =$ $6 \cdot (8) = \boxed{48}$

2. Exponents

   $5 * 2^2 =$ $5 \cdot 4 = \boxed{20}$

3. Then do multiplication and division.
   a. If there are more than one multiplication and division, do operations from Left to right

   $30 \div 5 * 2 + 1 =$
   $6 \cdot 2 + 1 =$
   $12 + 1 = \boxed{13}$

4. Last do addition and subtraction
   a. If there are more than one addition and subtraction, do the operations from Left to right

- An Equation is a mathematical sentence that uses an equal sign.
- A solution of an equation is the value for a variable that makes an equation true

Ex. $x + 50 = 75$ means that $x + 50$ must have the same value as 75

Solving Equations Using INVERSE Operations (opposite)

1. What you do on one side of the equal sign, you Must do to the other side.
2. Isolate the variable (Get it by itself)
3. Use Inverse operations (Opposites)

- The inverse of addition is subtraction
- The inverse of subtraction is addition
- The inverse of multiplication is division
- The inverse of division is multiplication

When solving equations, we do PEMDAS in Reverse order.

1-step equations examples

$5x = 10$

$\frac{5x}{5} = \frac{10}{5}$

$x = 2$

$4\left(\frac{x}{4}\right) = (7)4$

$x = 28$

$x + 5 = 12$

$-5 \quad -5$

$x = 7$

$12 = x - 3$

$+3 \quad +3$

$\boxed{15 = x}$

2-step equation examples

$2x + 1 = 5$

$-1 \quad -1$

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

$x = 2$

$\frac{x}{3} + 2 = 6$

$-2 \quad -2$

$3\left(\frac{x}{3}\right) = (4)3$

$x = 12$

$3x - 2 = 7$

$+2 \quad +2$

$\frac{3x}{3} = \frac{9}{3}$

$x = 3$

Summary:

E.Q. How many possible outcomes?
- 1 solution, 2 solutions
No solution, All solutions

- No Solution - occurs when the final statement is <u>FALSE</u>

ex. Solve: $\cancel{x} - 1 = -3 + \cancel{x}$

$$\begin{array}{rcl} \cancel{x} - 1 & = & -3 + \cancel{x} \\ -\cancel{x} & & -x \\ \hline -1 & \neq & -3 \end{array}$$

False, No SOLN

- ALL Solutions occur when the final statement is always <u>TRUE</u>

ex. solve:

$$\begin{array}{rcl} 2x + 2 & = & 2(x+1) \\ 2\cancel{x} + 2 & = & 2\cancel{x} + 2 \\ -\cancel{2x} & & -\cancel{2x} \\ \hline 2 & = & 2 \end{array}$$

True, All SOLN

$x = x$

Solving with fractions
when one fraction = fraction,
use CROSS MULTIPLICATION

ex. $\frac{3}{x} = \frac{9}{10}$

$$\frac{9x}{9} = \boxed{\frac{30}{9}}$$

$$x = 30/9 = \boxed{\frac{10}{3}}$$

Do Not use Cross multiplication when multiplying fractions

$$\frac{1}{2} \cdot \frac{3}{4} = \boxed{\frac{3}{8}}$$