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Mr. Rogove Date: __________

LEARNING OBJECTIVE: We will identify the steps used in solving equations and understand a few steps we CANNOT take when solving equations. (Alg1M1L6)

ACTIVATING PRIOR KNOWLEDGE:

We understand different properties used in math.

Why do the equations $(x-1)(x+3)=17+x$ and $(x+3)(x-1)=17+x$ have the same solution set? COMMUTATIVE PROPERTY.
Why do the equations $(x-1)(x+3)=17+x$ and $x^2+2x-3=17+x$ have the same solution set? DISTRIBUTIVE PROPERTY
Why do equations $(x-1)(x+3)=17+x$ and $(x-1)(x+3)+500=517+x$ have the same solution set? PROP. OF EQUALITY FOR ADDITION
Why do the equations $(x-1)(x+3)=17+x$ and $3(x-1)(x+3)=51+3x$ have the same solution set? PROP. OF EQUALITY FOR MULTIPLICATION

CONCEPT DEVELOPMENT:

Solving Equations Requires us to make use of the Commutative, Associative and Distributive Properties AS WELL AS use properties of equality to find a solution for a variable.

Example: $x(1-x)+2x-4=8x-24-x^2$

1	$x-x^2+2x-4=8x-24-x^2$	Distributive property
2	$x+2x-4=8x-24$	Added x^2 to both sides of the equation Prop. of Eq. +
3	$3x-4=8x-24$	Collected like terms
4	$3x+20=8x$	Added 24 to both sides of the equation
5	$20=5x$	Subtracted $3x$ from both sides of the equation
6	$x=4$	Divided both sides of the equation by 5

What is the common solution to all 6 equations listed above? How do we know?

x will always = 4. In each step, WE MAINTAINED equality.

We manipulated expressions

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What are some things we need to look out for when applying the rules of equality and rules of arithmetic?

$$\frac{x}{12} = \frac{1}{3}$$

1. If we do something the left side of the equation, we have to do the same thing to the right side, correct?? What about eliminating both denominators and just saying that $x = 1$. Why doesn't that work? $X=1$

$12 \neq 3$

2. What about squaring both sides of the equation so that $\frac{x^2}{144} = \frac{1}{9}$.

$$\frac{x^2}{144} = \frac{1}{9}$$

Does this change the solution to the equation? $\left(\frac{x}{12}\right) = \left(\frac{1}{3}\right)$

$$\frac{9x^2}{9} = \frac{144}{9}$$

$$x^2 = 16$$

$$\boxed{x=4}$$

$$\boxed{x=-4}$$

GUIDED PRACTICE:

Steps for Solving Equations AND Identifying the Steps Taken

1. Simplify your equation step by step using properties of equality and properties of arithmetic.
2. Identify each step along the way.
3. Check your solution by substituting your simplified answer into your original equation.

Solve for x and describe the operation used in each step along the way.

$7x - [4x - 3(x - 1)] = x + 12$

$7x - (4x - 3x + 3) = x + 12$ → DISTRIBUTIVE PROP.

$-x \qquad -x$ → PROP. OF EQUALITY −

$7x - (5x - 3x + 3) = 12$

$7x - 5x + 3x - 3 = 12$ → DISTRIB PROP.

$5x - 3 = 12$ → COMBINE LIKE TERMS

$+3 \quad +3$ → PROP. OF EQUALITY +

$\frac{5x}{5} = \frac{15}{5}$ → PROP. OF EQUALITY ÷

$\boxed{x=3}$

$\{3\}$

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Solve for *x* and describe the operation used in each step along the way.

$2[2(3 - 5x) + 4] = 5[2(3 - 3x) + 2]$

$2(6 - 10x + 4) = 5(6 - 6x + 2)$ Distrib. Prop.

$12 - 20x + 8 = 30 - 30x + 10$ Distrib. Prop.

$-20x + 20 = -30x + 40$ CLT

$+30x \quad +30x$

$10x + 20 = 40$ → Prop. of Eq. +

$-20 \quad -20$ → Prop. of Eq. -

$\frac{10x}{10} = \frac{20}{10}$ $\{2\}$ → " " " ÷

$x = 2$

Solve for *x* and describe the operation used in each step along the way.

$\frac{1}{2}(18 - 5x) = \frac{1}{3}(6 - 4x)$

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Independent Practice:

1. Consider the equations $x + 1 = 4$ and $(x + 1)^2 = 16$.

a. Verify that $x = 3$ is a solution for both equations.

b. Find a second solution for the second equation.

c. What effect does squaring both sides of an equation seem to have on the solution set?

2. Consider the equation $x - 3 = 5$.

a. Multiply both sides of the equation by a constant, and show that the solution set did not change.

b. Now multiply both sides by x. $x(x - 3) = 5x$

Show that $x = 8$ is still a solution to the equation.

c. Show that $x = 0$ is also a solution to the new equation.

d. Now multiply both sides by the factor $(x - 1)$. $(x - 1)x(x - 3) = 5x(x - 1)$

Show that 8 is still a solution to the new equation.

e. Show that $x = 1$ is also a solution.

Closure:
Closure is exit ticket to be collected…homework if necessary?

Notes:
This lesson maps to Lesson 12 and 13 in Algebra 1, Mod 1 of ENY.
Homework (inclass??) should be exit ticket for exit 13