Date:_____

LEARNING OBJECTIVE: We will solve linear equations with variables on both sides of the equal sign. (G8M4L3)

CONCEPT DEVELOPMENT:

Four Properties of Equality are used in solving linear equations

Addition Property of Equality

If
$$A = B$$
, then $A + C = B + C$

Examples:

If
$$(x-2) = 7$$
, then $x-2+2 = 7+2$

Subtraction Property of Equality

If
$$A = B$$
, then $A - C = B - C$

Examples:

If
$$x + 3 = 18$$
,
then $x + 3 - 3 = 18 - 3$

Multiplication Property of Equality

If
$$A = B$$
, then $A \times C = B \times C$

Examples:

$$\begin{array}{ccc}
A & B \\
\text{If } \frac{1}{3}x = 6,
\end{array}$$

then
$$\left(\frac{1}{3}x\right) \times 3 = 6 \times 3$$

Division Property of Equality

If
$$A = B$$
 (and $C \neq 0$), then $\frac{A}{C} = \frac{B}{C}$

Examples:

If
$$3x = 12$$
,

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

Solving Equations: Review and Tips

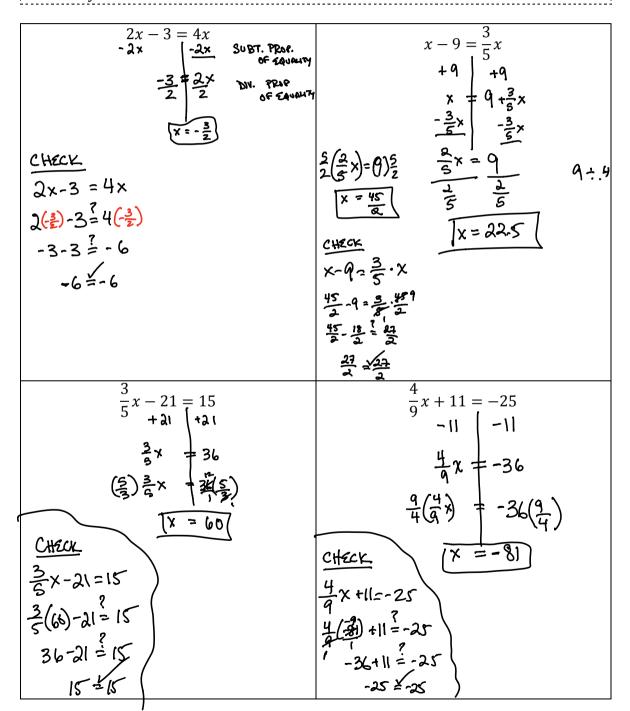
- When solving an equation, your ultimate goal is to "solve for x" or "isolate the variable." You will perform a sequence of moves in order to get your variable to equal to a constant term.
- It will often be easier to **combine like terms** and get simpler expressions on each side of your equation prior to beginning your math moves.
- You must keep both sides of your equation (on either side of the equal sign) **in balance**. See properties of equality above.

Date:

GUIDED PRACTICE:

Steps for Solving Linear Equations with Variables on Both Sides

- 1. Use the properties of equality to get all of your variable terms on one side of the equation, and your constant terms on the other side.
- 2. Combine like terms.
- 3. Use the properties of equality to isolate your variable.
- 4. Check your solution.



Date:_____

9.5 45 To 3

$$\frac{1}{5}x + 13 + x = 1 - 9x + 22$$

$$\frac{1}{5}x + 13 = -9 \times + 23$$

$$+ 9x$$

$$\frac{5}{5}x + 13 = -9 \times + 23$$

$$+ 9x$$

$$\frac{5}{5}x + 13 = -9 \times + 23$$

$$+ 10$$

$$\frac{1}{5}x + 13 + x = 1 - 9x + 22$$

$$\frac{1}{5}x + 13 + \frac{1}{5}x + \frac{1}{5}$$

$$\frac{x+6+x+8}{2x+14} = -26-2x$$

$$\frac{2x+14}{4x+14} = -26$$

$$\frac{-26}{-14}$$

$$\frac{4x}{4} = -40$$

$$\frac{4x}{4} = -40$$

$$\frac{-40}{4}$$

$$\frac{-40}{4} = -40$$

$$\frac{-26+14}{2} = -26 - 2(-10)$$

$$-26+14 = -26$$

$$-6 = -6$$

$$2(3x+2) = 2x - 1 + x$$

$$6x+4 = 3 \times -1$$

$$6x+5 = 3x$$

$$-6x$$

$$5 = -3x$$

$$-3$$

$$x^2 - \frac{5}{3}$$

$$-4(3x-6) = 2(x+14) + 2x$$

$$-12x + 24 = 2x + 28 + 2x$$

$$-12x + 24 = 4x + 28$$

$$-24 = -24$$

$$-12x = 4x + 4$$

$$-4x = 4$$

$$-16x = 4$$

$$-16 = -16$$

$$x = -\frac{1}{4}$$

INDEPENDENT PRACTICE:

$$3x + 2 - x = 11x + 9$$

$$\frac{1}{3}x - 5 = x - 171$$

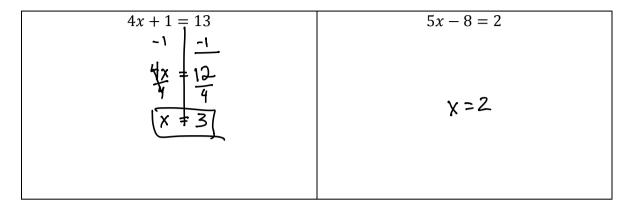
$$29 - 3x = 5x + 5$$

$$3(x+10) + 4x = 6(4x-1) + 2$$

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ACTIVATING PRIOR KNOWLEDGE:

We know how to solve two step equations



CLOSURE:

Is there a mistake? If so, where?

Step #	Equation
	2x - 3 - 8x = 14 + 2x - 1
1	-6x - 3 = 2x + 13
2	-6x - 3 + 3 = 2x + 13 + 3
3	-6x = 2x + 16
4	-6x + 2x = 16
5	-4x = 16
6	$\frac{-4x}{-4} = \frac{16}{-4}$
7	x = -4

TEACHER NOTES:

Lesson 4 in ENY Mod 4 HW: Khan Solving EVBS