Tajima HS Solis IM1

Solving Equations – Part 1

Name _____ PER_____ DATE_____

DO NOW (complete in your PRACTICE NOTEBOOK)

Using the equations below, solve for x using ***two different methods***. Work neatly and compare your work to the person sitting next to you.

$4(x + 3) = 20$	$4(x + 3) = 20$

3-109. SOLVING BY REWRITING

David wants to solve for x in the equation $4(x + 3) = 20$. He said, "*I can rewrite this equation by distributing the 4 on the left side*." After distributing, what should his new equation be? Solve this equation using David's method.

3-110. SOLVING BY UNDOING

Juan says, "*I see the whole thing a different way*." Here is how he explains his approach to solving $4(x + 3) = 20$, which he calls "undoing": "*Instead of distributing first, I want to eliminate the 4 from the left side by undoing the multiplication*."

a. What can Juan do to both sides of the equation to remove the 4? Why does this work?

Read the ***Properties of Equality*** below. Then answer the questions that follow in your **NOTES NOTEBOOK**!

Properties of Equality

Addition Property of Equality

Words When you add the same number to each side of an equation, the two sides remain equal.

Numbers $6 + 4 = 6 + 4$

$10 = 10$

Algebra $x - 5 + 5 = 3 + 5$

$x = 8$

Subtraction Property of Equality

Words When you subtract the same number from each side of an equation, the two sides remain equal.

Numbers $7 - 2 = 7 - 2$

$5 = 5$

Algebra $y + 3 - 3 = 1 - 3$

$y = -2$

Multiplication Property of Equality

Words When you multiply each side of an equation by the same nonzero number, the two sides remain equal.

Numbers $\frac{6}{3} \cdot 3 = 2 \cdot 3$

$6 = 6$

Algebra $\frac{z}{3} \cdot 3 = 2 \cdot 3$

$z = 6$

Division Property of Equality

Words When you divide each side of an equation by the same nonzero number, the two sides remain equal.

Numbers $6 \cdot 2 \div 2 = 12 \div 2$

$6 = 6$

Algebra $\frac{2w}{2} = \frac{12}{2}$

$w = 6$

1. What similarities do the properties of equality all share?

2. Which rule does Juan use in **3-110**. How do you know?

3. Suppose we followed David's advice and 'distributed the 4 in the left side. Which property listed above must we use next? Why?

Independent Practice (*after Whiteboard Practice*)

Please copy the equation and show your work for the equations below. Title the practice "Solving Equations Practice". For each step, list the property being used

1 **Solve.**

12. $3n + 16 = 7n$

13. $8x - 3 = 11 - 6x$

14. $5n + 3 = 14 - 6n$

15. $3(2x + 11) = 6x + 3$

16. $6x + 3 = x + 8$

17. $7y - 8 = 5y + 4$

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(AREIA1) Solving Equations – QUICK CHECK

Name _____ PER_____ DATE_____

Carmen is asked to solve this linear equation for x. She completes these steps.

What is the justification for the math used to complete each step?

Original equation: $-\frac{1}{4}(x+4) = -\frac{3}{4}x + 2$	
Step 1: $-\frac{1}{4}x - 1 = -\frac{3}{4}x + 2$	**Step 1:**
Step 2: $\frac{2}{4}x - 1 = 2$	**Step 2:**
Step 3: $\frac{2}{4}x = 2 + 1$	**Step 3:**
Step 4: $\frac{1}{2}x = 3$	**Step 4:**
Step 5: $x = 6$	**Step 5:**

Properties of Equalities (NOTE: Some may be used more than once. Some may not be used at all!)

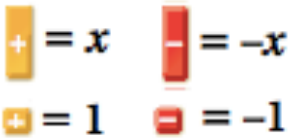
Addition Property of Equality	Multiplication Property of Equality	Distributive Property
Subtraction Property of Equality	Division property of Equality	Like Terms can be combined

Hands-On LAB 3-4

Model Equations with Variables on Both Sides

KEY

Algebra tiles



REMEMBER

Adding or subtracting zero does not change the value of an expression.

Activity

1 Model and solve the equation $-x + 2 = 2x - 4$.

	=			
	=			
	=			
	=			
	=			
	=			
	=			

Try This

Model and solve each equation.

Create the diagrams with algebra tiles here OR solve the equation algebraically in your PRACTICE NOTEBOOK!

1. $x + 3 = -x - 3$

	=			
	=			
	=			
	=			

2. $3x = -3x + 18$

	=			
	=			
	=			
	=			

Here are two more to try in your PRACTICE NOTEBOOK!

3. $6 - 3x = -4x + 8$ **4.** $3x + 3x + 2 = x + 17$