Name: _____ Date: **Sept 5** Hour: __Alg 1__

Unit 1B Day 12: Solving ONE Step Equations

Focus Question: Can I solve a one step equation using inverse operations?

no variable ↓

A. Solve vs. Simplify

A: $4x + 6x$ B: $4x + 6$ C: $4x = 6$

10x

1. Only one of the above can be simplified. Which one? __A__ Explain. $4x \& 6x$ same variable & exponent

Simplify means **write in fewer symbols**

2. Only one of the above can be solved. Which one? __C__ Explain. its an equation

Solve means **isolate the variable**

B. The Additive Identity

1. Fill in each blank: $5 + 0 =$ **5** $0 + -6 =$ **−6** $a + 0 =$ **a**

2. Does adding zero to a number change the number? **No**

Zero is **the additive identity**: the number you can add to anything without changing the value.

The additive identity is created by doing the **inverse operation**.

The inverse of addition is **subtraction**.

The inverse of subtraction is **addition**. $0 = a = a$

When your teachers in the past have said "cancel," they meant "created the identity."

3. Fill in each blank $0 = -4 +$ **4** $0 = 10 -$ **10** $0 = -12 +$ **12**

The **addition property of equality** states that you can add the same number to both sides of an equation and the equality is still true. For example if a = b, then a **+ 2** = b **+ 2**. All properties of equality are used to help us solve equations.

4. Solve the following:

$x - 8 = 10$ $-4 = b - 9$ $-5 + k = 12$
   $+8 \quad +8$ $+9 \quad +9$ $+5 \quad +5$
$x + 0 = 18$ $5 = b$ $k = 17$
$x = 18$

The **subtraction property of equality** states that you can subtract the same number on both sides of an equation and the equality is still true. For example if a = b, then a **− 2** = b **− 2**.

5. Solve the following:

$y + 7 = -8$ $6 + r = 9$ $1 = h + 10$
   $-7 \quad -7$ $-6 \quad -6$ $-10 \quad -10$
$y = -15$ $r = 3$ $-9 = h$

C. The multiplicative Identity

1. Fill in each blank: $1 \cdot 4 =$ **4** $-3 \cdot 1 =$ **−3** $1x =$ **x**

2. Does multiplying a number by one change the number? **No**

One is **the multiplicative identity**: the number you can multiply anything by without changing the value.

The multiplicative identity is created by doing the **inverse operation**.

The inverse of multiplication is _division_.

The inverse of division is _multiply_.

3. Fill in each blank $1 = -6 \cdot \dfrac{o}{a}$ _-6_ $1 = \dfrac{1}{4} \cdot$ _4_ $1 = 12 \div$ _12_

The **multiplication property of equality** states that you can multiply the same number on both sides of an equation and the equality is still true. For example if a = b, then $a \cdot 2 = b \cdot 2$

4. Solve the following: **1.** $\dfrac{x}{7} = -3 \cdot 7$ **2.** $-\dfrac{a}{2} = -4 \cdot -2$ **3.** $12 = \dfrac{3f}{8} \cdot \dfrac{8}{3}$

$\boxed{x = -21}$ $\boxed{a = 8}$ $\boxed{32 = f}$

The **division property of equality** states that you can divide by the same number on both sides of an equation and the equality is still true. For example if a = b, then $\dfrac{a}{5} = \dfrac{b}{5}$

5. Solve the following: $\dfrac{6h}{6} = \dfrac{-24}{6}$ $\dfrac{18}{-2} = \dfrac{-2w}{-2}$ $\dfrac{4x}{4} = \dfrac{22}{4} \div 2$

$\boxed{h = -4}$ $\boxed{-9 = w}$ $\boxed{x = \dfrac{11}{2}}$

D. Solve vs Check your solution

1. Solve x + 8 = 12

$\dfrac{-8 \quad -8}{}$

$\boxed{x = 4}$

2. Check your solution to the previous problem   ← substitute & true

$4 + 8 = 12$

$12 = 12$ True so x = 4 is correct

When you solve you have to show _ALL_ your work to isolate the variable.

When you check your solution you _substitute_ your answer into the equation and PROVE your solution makes the equation true.

E. Solving Literal Equations:
   If you truly know what you are doing, then you can solve equations with multiple variables.

1) $C = \pi d$ solve for π

$\dfrac{C}{d} = \dfrac{\pi d}{d}$

$\boxed{\dfrac{C}{d} = \pi}$

2) $3x + y = 10$ solve for y

$\dfrac{-3x \qquad -3x}{}$

$\boxed{y = -3x + 10}$

3) $A = \ell w$ solve for ℓ

$\dfrac{A}{w} = \dfrac{\ell w}{w}$

$\boxed{\dfrac{A}{w} = \ell}$

Check:		Check:		Check:	

$C = \dfrac{C \cdot d}{d}$

$C = C$ true

$3x + y = 10$

$3x + -3x + 10 = 10$

$10 = 10$

True