Vocabulary

Variable -   It is a *letter* that stands for an unknown number.

$$x$$

Numerical Expression - A mathematical expression built from <u>numbers</u> and <u>operations</u>.

$$15 + 7$$

Algebraic Expression - A mathematical expression built from <u>numbers</u>, <u>variables</u>, and <u>operations</u>.

$$x + 3 \quad or \quad 2x$$

Equation -   It is a sentence that states that two mathematical expressions are <u>equal</u>.

$$x + 1 = 12$$

$$5x = 105$$

Section 1:   **New Vocabulary**

Equation -   It is a sentence that states that two mathematical expressions are <u>equal</u>.
Examples: $x + 1 = 12$ $5x = 105$

Inverse operations -   You solve equations using inverse operations. Inverse operations are operations that <u>undo</u> each other... they are opposite.

The inverse operation of **addition** is ___ $-$ ___.
The inverse operation of **subtraction** is ___ $+$ ___.
The inverse operation of **multiplication** is ___ $\div$ ___.
The inverse operation of **division** is ___ $\times$ ___.

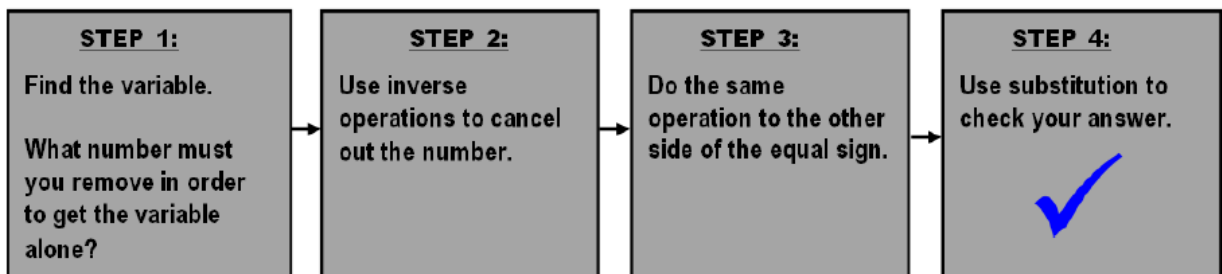**Section 2:**   **Solving Equations**

When asked to solve an equation, you are being asked to find the <u>exact</u> value of the *variable* in the equation.

Our MISSION: Is to get the variable **alone** on one side of the equal sign!

Key Concepts to Remember: Whatever you do to one side of an equation, you <u>must</u> do the same to the other side!
This keeps the balance!

STEP 1:	STEP 2:	STEP 3:	STEP 4:
Find the variable.	Use inverse operations to cancel out the number.	Do the same operation to the other side of the equal sign.	Use substitution to check your answer.
What number must you remove in order to get the variable alone?			✓

Example 1: $x + 7 = 10$
$\quad -7 \quad -7$
$\qquad x \quad = \quad 3$

Check: $x + 7 = 10$
$3 + 7 = 10$
$10 = 10$ ✓

Example 2: $w - 24 = 119$
$\quad +24 \quad +24$
$\qquad w \quad = \quad 143$

Check: $w - 24 = 119$
$143 - 24 = 119$
$119 = 119$ ✓

STEP 1:	STEP 2:	STEP 3:	STEP 4:
Find the variable. What number must you remove in order to get the variable alone?	Use inverse operations to cancel out the number.	Do the same operation to the other side of the equal sign.	Use substitution to check your answer. ✔
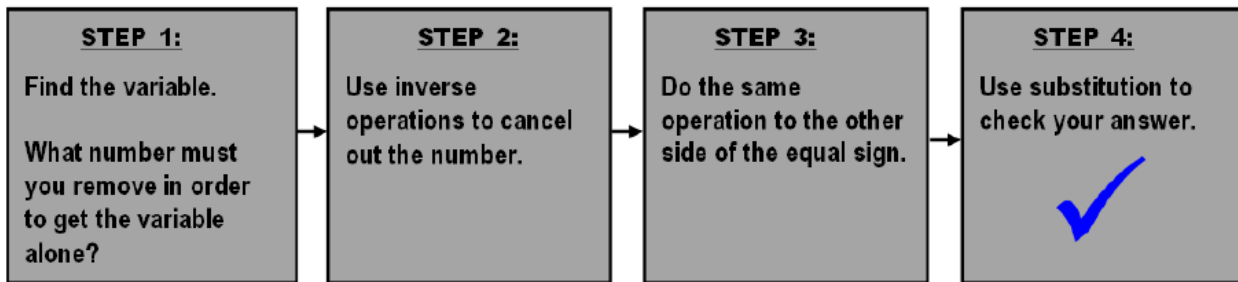
Example 3: $5x = 15$

$$\frac{5x}{5} = \frac{15}{5}$$

$x = 3$

Check: $5x = 15$

$5(3) = 15$

$15 = 15$ ✔

Example 4: $\frac{x}{6} = 8$

$$\frac{x}{6}(6) = 8(6)$$

$x = 48$

Check: $\frac{x}{6} = 8$

$\frac{48}{6} = 8$

$8 = 8$ ✔

Solve each equation. Please show where you use inverse operations. Check your answer.

Teacher Guided Practice

$x + 165 = 512$
$\quad -165 \quad -165$
$\overline{\;X \qquad = 347\;}$

$347 + 165 = 512$
$512 = 512$ ✔

$p - 47 = 57$
$\quad +47 \quad +47$
$\overline{\;P \qquad = 104\;}$

$104 - 47 = 57$
$57 = 57$ ✔

$\dfrac{3b}{3} = \dfrac{24}{3}$
$b = 8$

$3(8) = 24$
$24 = 24$ ✔

$\dfrac{w}{9} = 13 \ (9)$
$W = 117$

$\dfrac{117}{9} = 13$
$13 = 13$ ✔

You Try!!

$x + 73 = 100$
$\quad -73 \quad -73$
$\overline{\;X \qquad = 27\;}$

$27 + 73 = 100$
$100 = 100$ ✔

$p - 15 = 48$
$\quad +15 \quad +15$
$\overline{\;P \qquad = 63\;}$

$63 - 15 = 48$
$48 = 48$ ✔

$\dfrac{4b}{4} = \dfrac{32}{4}$
$b = 8$

$4(8) = 32$
$32 = 32$ ✔

$\dfrac{w}{16} = 4 \ (16)$
$W = 64$

$\dfrac{64}{16} = 4$
$4 = 4$ ✔