Essential Question: How can we use the properties of equality to solve equations?

Do Now: Compare and Contrast A and B.

Compare	Contrast

A. 2x - 5 + 3x   B. 2x – 5 + 3x = 25

_____

Solving Equations

The **properties of equality** justify the series of **inverse operations** that are performed in order to solve an equation.

Addition Property of Equality	If a = b, then a + c = b + c
Subtraction Property of Equality	If a = b, then a – c = b – c
Multiplication Property of Equality	If a = b, then ac = bc
Division Property of Equality	If a = b, then $\dfrac{a}{c} = \dfrac{b}{c}, c \neq 0$

Examples:

Equation	Justification	Check
x + 9 = 17		
x – 10 = 50		

Equation	Justification	Check
4x = 68		
$\dfrac{x}{-3} = 2$		

More Examples:

1. $-y = 8$

2. $\dfrac{3}{4}x = 18$

3. $-5x - 4 = 16$

4. $2(3x - 5) = -4$

5. $\dfrac{1}{2}m + 4 - \dfrac{5}{2}m = -3$

6. $5x - 3(x - 1) = -15$

THINK ABOUT THIS....

The equation, 7(x – 9) = -42 is solved in two different ways. Examine each method below.

1ˢᵗ Method	2ⁿᵈ Method
7 (x – 9) = -42	$\dfrac{7(x-9)}{7} = \dfrac{-42}{7}$
7x – 63 = -42	x – 9 = -6
+ 63 +63	+9 +9
$\dfrac{7x}{7} = \dfrac{21}{7}$	x = 3
x = 3	

What steps were taken in each method? Does performing the steps in a different order affect the solution?

Looking at the second method used to solve the equation, how might this method help you solve the equation below?

$$\frac{3}{7}(5x-2)=12$$

TODAY'S TAKE AWAY...

We use _____ to solve

equations. The solution set to an equation is the value(s) of the variable

that makes the equation a _____ statement.

Find the value of x that makes each equation true. <u>Check your solution using your calculator</u>.

1. $3x - 2 = 14$

2. $3(x - 9) = 30$

3. $8 = 2 + 3(x - 1)$

4. $\frac{1}{2}(4x - 6) - 16 = 0$

5. Without using the distributive property, solve the equation below.
    Helpful Hint: Think about the multiplication property of equality.

$$\frac{7}{3}\left(x + 2\frac{4}{5}\right) = 21$$