Lesson 1.4 Warm Up (Clickers)

1. Which property is being illustrated below?

$9(3x - 4) + 9 = 27x - 36 + 9$

2. What number system does the following belong to (name all that apply)?

a. 7/9 b. 4 c. $-\sqrt{7}$

3. Solve the equation:

$5x + x + 1 = 13$

Lesson 1.4 Essential Understanding: You can use the properties of equality and inverse operations to solve equations.

Properties Properties of Equality

Assume a, b, and c represent real numbers.

Property	Definition	Example
Reflexive	$a = a$	$5 = 5$
Symmetric	If $a = b$, then $b = a$.	If $\frac{1}{2} = 0.5$, then $0.5 = \frac{1}{2}$.
Transitive	If $a = b$ and $b = c$, then $a = c$.	If $2.5 = 2\frac{1}{2}$ and $2\frac{1}{2} = \frac{5}{2}$, then $2.5 = \frac{5}{2}$.
Substitution	If $a = b$, then you can replace a with b and vice versa	If $a = b$ and $9 + a = 15$, then $9 + b = 15$
Addition	If $a = b$, then $a + c = b + c$.	If $x = 12$, then $x + 3 = 12 + 3$.
Subtraction	If $a = b$, then $a - c = b - c$.	If $x = 12$, then $x - 3 = 12 - 3$.
Multiplication	If $a = b$, then $a \cdot c = b \cdot c$.	If $x = 12$, then $x \cdot 3 = 12 \cdot 3$.
Division	If $a = b$, then $a \div c = b \div c$ (with $c \neq 0$).	If $x = 12$, then $x \div 3 = 12 \div 3$.

Ex. Solve $-27 + 6y = 3(y - 3)$

Ex. Solve: $8x - 4 - 2(3x + 5) = 20$

Ex. Solve $5x - 3 = 12x + 20 - 8x$

1 Solve: $-2(3x + 4) = 12x$

2 Solve: $8x - 6 - 3x = 20x + 9$

Ex. Flower carpets incorporate hundreds of thousands of brightly-colored flowers as well as grass, tree bark, and sometimes fountains to form intricate designs and motifs. The flower carpet below, from Grand Place in Brussels, Belgium, has a perimeter of 200 meters. What are the dimensions of the flower carpet?

Recall from algebra 1 when solving equations there are times when the variables will cancel--resulting in either true or false equations.

If the equation is true, for example 5 = 5, then the original equation has an infinite number of solutions, or all real numbers. It is also called an identity and will **always** be true.

If the equation is false, for example 5 = 3, then the original equation has no solutions. It will **never** be true.

Ex. Will the following equation always, sometimes, or never be true?

$12 + 6x = 2(3x - 5)$

3 Solve: $4 + 3x = 6x + 5 - 3x$

4 Solve: $6x + 5 - 2x = 4 + 4x + 1$

A literal equation is an equation that uses at least two different letters as variables. You can then solve for any of the variables in the equation.

Ex. The equation $C = \frac{5}{9}(F - 32)$ relates temperatures in degrees Fahrenheit F and degrees Celsius C. What is F in terms of C?

5 The equation K = C + 273 relates temperatures kelvins K and degrees Celsius C. What is C in terms of K?