Algebra 2
Lesson 1-1, Part 2: Properties of Real Numbers

The set of real numbers consists of two subsets: the set of rational numbers and the set of irrational numbers. This set of numbers works with eight (8) properties that govern all operations.

Additive Identity Property
The sum of zero (0) and any number yields the original number eg.: 5+0=0 .

Additive Inverse Property
The sum of a number and its opposite equals zero (0), eg.: $5 + (-5) = 0$.

Multiplicative Identity Property
The product of any number and 1 equals the original number, eg.: $5 \cdot 1 = 5$.

Multiplicative Inverse Property
The product of a nonzero number and its reciprocal equals 1, eg: $5 \cdot \frac{1}{5} = 1$

Closure Property
The sum or product of any two real numbers is a real number, eg: $a + b \in R$, $a \cdot b \in R$

Commutative Property
You can add or multiply real numbers in any order and the answer remains the same,
eg.: $a + b = b + a$, $a \cdot b = b \cdot a$

Associative Property
The sum or product of three or more real numbers is unchanged, regardless of the order the numbers are grouped, eg:
$(a + b) + c = a + (b + c)$, $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Distributive Property
When multiplying a sum by a number, the result is the same, whether you add first and then multiply or multiply each number first and then add the numbers, eg.: $a(b + c) = ab + ac$,
$(b + c) \cdot a = ba + ca$