PROPERTIES:

Equivalent expressions: **The things on one side equal the things on the other side.**

Key Points:

Commutative Property **- You change the ORDER of the #s.**

3 + 4 =   4 + 3

 5 * 6 = 6 * 5

** Only applies to addition and multiplication.

Associative Property **- You change the PARENTHESES.**

(2 + 3) + 4 = 2 + (3 + 4)

(5 * 6) * 7 = 5 * (6 * 7)

** Only applies to addition and multiplication.

Inverse Properties - the solution gets smaller.
Inverse Property of Addition (make it zero): 6 + inverse = 0

Inverse Property of Multiplication (make it = 1): $5 \times \dfrac{1}{5}$
5 * inverse = 1

Identity Properties - the solution stays the same:
Identity Property of Addition (add zero):   6 + zero   = 6

Identity Property of Multiplication (multiply by 1):
5 * one = 5

Zero Property of Multiplication: The product of anything multiplied by 0 = 0

5 * 0 = 0

Multiplication Property of -1: The product of anything multiplied by -1 will change the sign.

5 * -1 = -5 -4 * -1 = 4

Distributive property

$$4(3 + 7)$$

$$4 \cdot 3 + 4 \cdot 7$$

$$12 + 28 = \boxed{40}$$

CLOSURE Property:

Perform an operation on a type of number and you end up with the same type.

For example: What type of number do you end up with if you add 2 integers?

6 + 4 $= 10$

Your answer is an integer as well. You did not get an irrational number.

Example: If you multiply two real numbers, you will get another real number. Since this process is always true, it is said that the real numbers are "closed under the operation of multiplication". There is simply no way to escape the set of real numbers when multiplying.

Closure: When you combine any two elements of the set, the result is also included in the set.

Example: If you add two even numbers (from the set of even numbers),
                is the sum even?
Checking: $10 + 12 = 22$ Yes, 22 is even.

Since the sum (the answer) is always even, the set of even numbers is closed under the operation of addition.

ABSOLUTE VALUE: The number will always be positive.
It acts like parentheses in order of operations.

$$|3|$$
$$3$$

$$|-3|$$
$$3$$

$$|4-6| \ + \ |4| \ - \ |-13|$$

$$2 \ + \ 4$$

$$-13$$