

A Basic Introduction to Numeric Properties

The next step after learning how numbers are classified is understanding how they interact. Now, I could start off here with the four most basic arithmetic operations, that being the following:

-ADDITION

-SUBTRACTION

-MULTIPLICATION

-DIVISION

However, seeing as this is an Algebra class, I would like to think that we are already pretty much up to speed with these basics right here. With that in mind, numbers do have specific Properties that they all must follow. Knowing these properties is an extremely important tool as they will show up repeatedly in math proofs and concepts and explanations for years. Yes, my dears, for years. They are fairly simple concepts though, so hopefully you don't stress over them too much.

The Commutative Property

(For Addition)

$$A + B = B + A$$

(For Multiplication)

$$A \times B = B \times A$$

For the record, this only works if a problem either has ONLY Addition or ONLY Multiplication and if both A and B are real numbers. It basically says that even if you move things around on one side of the equation, everything will always equal the same thing.

EXAMPLE

$$3 + 5 = 5 + 3$$
$$2 \times 10 = 10 \times 2$$

The Associative Property

(For Addition)

$$(A + B) + C = A + (B + C)$$

(For Multiplication)

$$(A \times B) \times C = A \times (B \times C)$$

For the record, this only works if a problem either has ONLY Addition or ONLY Multiplication and if both A and B are real numbers. It basically says that even if you group things together on one side of the equation, everything will always equal the same thing.

EXAMPLE

$$(1 + 2) + 3 = 1 + (2 + 3)$$
$$(3 \times 4) \times 5 = 3 \times (4 \times 5)$$

The Distributive Property

$$A(B + C) = AB + AC$$

If you cannot understand shorthand, this means A multiplied by the quantity B + C is equal to the sum of A multiplied by B and A multiplied by C. This again only works if A, B, and C are Real Numbers.

EXAMPLE

$$4(3 + 5) = 4(3) + 4(5)$$

The Identity Property

$$\text{(For Addition)} \quad A + 0 = A$$

$$\text{(For Multiplication)} \quad A \times 1 = A$$

“Identity” mainly means what will make it equal itself, pretty much. Anything plus zero will be itself, as well as anything multiplied by one.

EXAMPLE

$$3 + 0 = 3$$

$$3 \times 1 = 3$$

The Inverse Property

$$\text{(For Addition)} \quad A + -A = 0$$

$$\text{(For Multiplication)} \quad A \times \frac{1}{A} = 1$$

The sum of any real number and its inverse will always equal zero, while the product of any number and its inverse will always be one.

EXAMPLE

$$6 + -6 = 0$$

$$9 \times \frac{1}{9} = 1$$

The Zero Property

$$A \times 0 = 0$$

This Property is very simple, stating that anything multiplied by zero will always be zero. Always. Errytime. “But what about when yo-” “NO. ALWAYS.”

EXAMPLE

$$10 \times 0 = 0$$

The Negative Property

$$A \times -1 = -A$$

This Property is also simple. If you multiply a number by negative one, it will always have the opposite sign that it originally started with. We will go into more detail on negatives when we get to negatives, but since you all should already have some familiarity with negatives, know the property please.

EXAMPLE

$$7 \times -1 = -7$$