MULTIPLICATION AXIOMS

TEXAN GLOBAL SCHOOL
Global Online Learning

MULTIPLICATION AXIOMS

CLOSURE LAW: This law indicates that the product of two real numbers ($\mathbb{R}$) will result in a real number. Hence:

$$\forall\, a \wedge b \in \mathbb{R}; a \cdot b \in \mathbb{R}$$

COMMUTATIVE LAW: This law indicates that the product of two numbers a·b is equivalent to multiply b·a. Hence: $\forall a \wedge b \in \mathbb{R}; a \cdot b = b \cdot a$

ASSOCIATIVE LAW: indicates that, given three Real numbers ($\mathbb{R}$), we can group two of those numbers (with grouping symbols) to multiply them; and the result is multiplied with the remaining number. Hence:

$$a, b \wedge c \in \mathbb{R}; (a \cdot b) \cdot c = a \cdot (b \cdot c) = b \cdot (a \cdot c)$$

EXISTENCE AND UNIQUENESS OF THE MULTIPLICATIVE NEUTRAL ELEMENT: there is one and only one element denoted as 1 such that, the product of that multiplicative neutral element with any real number results in the same real number. Hence: $\text{“1”} / \forall a \in \mathbb{R}; a \cdot 1 = a = 1 \cdot a$

EXISTENCE AND UNIQUENESS OF THE MULTIPLICATIVE INVERSE: For each real number "a", there is one and only one element denoted by "$a^{-1} = \frac{1}{a}$" in such a way that multiplying results in one. Hence:

$$\forall a \in \mathbb{R} \implies \frac{1}{a} / a \cdot \frac{1}{a} = 1 = \frac{1}{a} \cdot a$$

DISTRIBUTIVE LAW: For every number a, b, c that belongs to the set of Real numbers, the product between a real number and the sum of real numbers, is equal to the sum of the products of each addend by that number. Hence:

$$\forall a, b \wedge c \in \mathbb{R}; a(b + c) = ab + ac$$