Math In One TEX

Just basicly a open-sourced, TeX-Based documentation of lots of math

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1 Introduction

Math In One TEX aims to document as much mathematic knowledge in one TeX file (.tex) as possible. It is completely open-sourced, and all are welcome to modify and improve.

2 Basic Constant Arithmatic

This section covers basic arithmatic operations that is applied to most constants.

2.1 Addition

2.1.1 Definition

Addition of two or more value "results in the total amount or sum of those values combined."[add, 2022] It is the first operation, way back the stone age. There's a long ago story that tells of a shepherd who invented addtion for counting sheeps.

2.1.2 Pronunciation & Notation

$$a + b + c + ...$$

The example above can be pronouced as:

- a plus b plus c plus ...
- The sum of a, b, c, ...

2.1.3 Laws & Principles

$$a + b = b + a \qquad \text{Commutative Law of Addition}$$
$$a + (b + c) = a + b + c \qquad \text{Associative Law of Addition}$$

2.2 Subtraction

2.2.1 Definition

Subtraction "represents the operation of removing objects from a collection.", and "can also represent removing or decreasing physical and abstract quantities." [sub, 2022] It is the reverse operation of Addition.

2.2.2 Pronunciation & Notation

$$a - b - c - ...$$

The example above can be pronouced as:

- a minus b minus c minus ...
- a subtracted by b subtracted by c subtracted by ...
- c less then b less then a...

2.2.3 Laws & Principles

$a - b = a + (-b)$	Basic Principle of Subtraction
$a - b = -(b - a)$	Opposite of s Subtraction Polynomial

2.3 Multiplication

2.3.1 Definition

Multiplication derived from addition. Consider

$$a \times b$$

It means

$$\underbrace{a + a + a + ...}_{b\ a's}$$

Similarly

$$a \times b \times c \times ....$$

Means

$$\underbrace{\underbrace{a + a + a + ...}_{b\ a's} + \underbrace{a + a + a + ...}_{b\ a's} + \underbrace{a + a + a + ...}_{b\ a's}}_{c\ (a \times b)}$$

2.3.2 Pronunciation & Notation

$$a \times b \times c \times ...$$

The example above can be pronouced as:

- a times b times c

The example above can be notated as:

- $a \times b \times c \times ...$
- $a \cdot b \cdot c \cdot ...$
- $abc...$

2.3.3 Laws & Principles

$a \cdot b = b \cdot a$	Commutative Law of Multiplication
$a(b \cdot c) = a \cdot b \cdot c$	Associative Law of Multiplication

2.4 Division

2.4.1 Definition

Division is the reverse operation of Multiplication. It is "the process of calculating the number of times one number is contained within another."[div, 2022] Consider

$$a \cdot b = c$$

We can infer from the equation that b time a's value equals to c. Therefore, we can infer that

$$\begin{cases} c \div b = a \\ c \div a = b \end{cases}$$

2.4.2 Pronunciation & Notation

$$a \div b \div c \div ...$$

The example above can be pronouced as:

- a divided by b divided by c ...
- one c^{th} of one b^{th} of one a^{th} of ...

The example above can be notated as:

- $a \div b \div c \div ...$
- $\frac{\frac{a}{b}}{\frac{c}{...}}$

2.4.3 Laws & Principles

$$a \div b = a \cdot \frac{1}{b} \qquad \text{Basic Principle of Division}$$

$$a \div b = \frac{1}{a \div b} \qquad \text{Reciprocal of a Rational Expression}$$

References

[sub, 2022] (2022).

[div, 2022] (2022).

[add, 2022] (2022). Addition.