

# Math In One **TEX**

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

# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Basic Constant Arithmetic</b>	<b>3</b>
2.1	Addition . . . . .	3
2.1.1	Definition . . . . .	3
2.1.2	Pronunciation & Notation . . . . .	3
2.1.3	Laws & Principles . . . . .	3
2.2	Subtraction . . . . .	3
2.2.1	Definition . . . . .	3
2.2.2	Pronunciation & Notation . . . . .	3
2.2.3	Laws & Principles . . . . .	4
2.3	Multiplication . . . . .	4
2.3.1	Definition . . . . .	4
2.3.2	Pronunciation & Notation . . . . .	4
2.3.3	Laws & Principles . . . . .	4
2.4	Division . . . . .	5
2.4.1	Definition . . . . .	5
2.4.2	Pronunciation & Notation . . . . .	5
2.4.3	Laws & Principles . . . . .	5

# **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 Arithmetic

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

### 2.1 Addition

#### 2.1.1 Definition

Addition "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 addition for counting sheeps.

#### 2.1.2 Pronunciation & Notation

$$a + b + c + \dots$$

The example above can be pronounced as:

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

#### 2.1.3 Laws & Principles

$a + b = b + a$	Commutative Law of Addition
$a + (b + c) = a + b + c$	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

$$a - b - c - \dots$$

The example above can be pronounced 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

$$\begin{array}{ll} a - b = a + (-b) & \text{Basic Principle of Subtraction} \\ a - b = -(b - a) & \text{Opposite of s Subtraction Polynomial} \end{array}$$

## 2.3 Multiplication

### 2.3.1 Definition

Multiplication derived from addition. Consider

$$a \times b$$

It means

$$\underbrace{a + a + a + \dots}_{b \text{ } a's}$$

Similarly

$$a \times b \times c \times \dots$$

Means

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

### 2.3.2 Pronunciation & Notation

$$a \times b \times c \times \dots$$

The example above can be pronounced as:

- a times b times c

The example above can be notated as:

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

### 2.3.3 Laws & Principles

$$\begin{array}{ll} a \cdot b = b \cdot a & \text{Commutative Law of Multiplication} \\ a(b \cdot c) = a \cdot b \cdot c & \text{Associative Law of Multiplication} \end{array}$$

## 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

$$a \div b \div c \div \dots$$

The example above can be pronounced 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:

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

### 2.4.3 Laws & Principles

$$a \div b = a \cdot \frac{1}{b}$$

Basic Principle of Division

$$a \div b = \frac{1}{\frac{1}{a \div b}}$$

Reciprocal of a Rational Expression

## References

[sub, 2022] (2022).

[div, 2022] (2022).

[add, 2022] (2022). Addition.