Use of several notations & alphabets
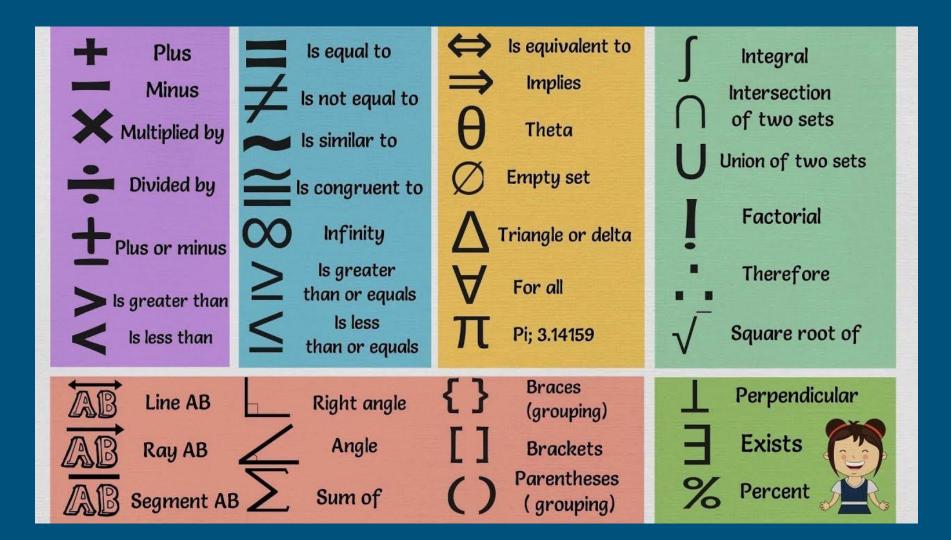
In Mathematics

Relation of origin of Maths

- Mathematics is as old as humanity itself.
- The focus of mathematical innovation moved to europe during the time of renaissance from asian countries like India and China.
- One of the oldest examples of geometric and algebraic calculations come from Babylon and Egypt in about 1750 BC.
- Known as the Rhind papyrus, which was copied in about 1550 BC. It contains brainteasers such as problem 24: - What is the size of the heap if the heap and one seventh of the heap amount to 19?

Relation of origin of Maths continued...

- The papyrus does introduce one essential element of algebra, in the use of a standard algebraic symbol - in this case *h* or *aha*, meaning 'quantity' - for an unknown number.
- The Pythagoreans can show that, whatever length of string a lute player starts with, if it is doubled the note always falls by exactly an octave (still the basis of the scale in music today).

List of common notations & alphabets:

GREEK LETTER	GREEK SYMBOL		USED TO DENOTE
	CAPITAL	SMALL	
Alpha	A	α	Angles, coefficients, attenuation constant, absorption factor, area
Beta	B	β	Angles, coefficients, phase constant
Gamma	Γ	γ	Complex propagation constant (cap), specific gravity, angles, electrical conductivity, propagation constant
Delta	Δ	δ	Incrment or decrement, determinant (cap), permittivity (cap), density, angles
Epsilon	E	ε	Dielectric constant, permittivity, electric intensity
Zeta	Z	ζ	Coordinates, coefficients
Eta	H	η	Intrinsic impedance, efficiency, surface charge density, hysteresis, coordinates
Theta	Θ	θ	Angular phase displacement, angles, time constant, reluctance
Iota	I	ι	Unit vector
Kappa	K	κ	Susceptibility, coupling coefficient, thermal conductivity
Lambda	Λ	λ	Permeance (cap), wavelength, attenuation constant
Mu	M	μ	Permeability, amplification factor (in valves/ vacuum tubes), prefix for the micro multiplier.
Nu	N	ν	Reluctivity, frequency
Xi	Ξ	ξ	Coordinates
Omicron	O	o	
Pi	Π	π	Universally used for 3.1416 . . . .
Rho	P	ρ	Resistivity, volume charge density, coordinates
Sigma	Σ	σ	Summation (cap), surface charge density, complex propagation constant, electrical conductivity, leakage coefficient, deviation
Tau	T	τ	Time constant, volume resistivity, time-phase displacement, transmission factor, density

Symbol	Meaning
+	Plus
−	Minus
×	Multiplied by
÷	Divided by
±	Plus or minus
>	Is greater than
<	Is less than

Symbol	Meaning
=	Is equal to
≠	Is not equal to
∼	Is similar to
≅	Is congruent to
∞	Infinity
≥	Is greater than or equals
≤	Is less than or equals

Symbol	Meaning
↔	Is equivalent to
⇒	Implies
θ	Theta
∅	Empty set
Δ	Triangle or delta
∀	For all
π	Pi; 3.14159

Symbol	Meaning
∫	Integral
∩	Intersection of two sets
∪	Union of two sets
!	Factorial
∴	Therefore
√	Square root of

Symbol	Meaning
AB (line)	Line AB
AB (ray)	Ray AB
AB (segment)	Segment AB
∟	Right angle
∠	Angle
∑	Sum of

Symbol	Meaning
{ }	Braces (grouping)
[ ]	Brackets
( )	Parentheses (grouping)

Symbol	Meaning
⊥	Perpendicular
∃	Exists
%	Percent

Mathematical notation created or popularized by Euler

e	the base of the natural logarithm, a constant equal to 2.71828...
i	the "imaginary unit", equal to the square root of -1
$f(x)$	the function f as applied to the variable or argument x
Σ	sigma, the sum or total of a set of numbers
a, b, c x, y, z	a, b, c are constants, such as the sides of a triangle; x, y, z are variables or unknowns in an equation
$sin, cos, tan,$ cot, sec, csc	trigonometric functions for sine, cosine, tangent, cotangent, secant, cosecant
π	pi, the ratio of a circle's circumference to its diameter

Why are Greek letters used?

- Greek is the oldest spoken and written language.
- It was spoken throughout the middle east, even stretching till India, especially during the Hellenistic period (330 BCE to 100 CE).
- Greece is the country of origin for mathematics, and hence it's natural for mathematics to involve Greek symbols and letters.
- Greek was the official language of the Byzantine Empire, which made great advancements in mathematics.

Connection to Mythology

- The early Christian writers used Greek and one passage says God is the "Alpha and Omega" (A and Ω, the first and last letters of the Greek alphabet) to mean he is the beginning and the end.

Complex Numbers

- Iota (i) is the lowercase form of the 9th Greek alphabets. In the Greek numeral system, iota has a value of 10.
- Initially Alexandria came up with the idea of imaginary numbers yet he deemed it impossible and gave up.
- In 1637 Descartes came up with a standard form a+ib and was the first to coin them as "imaginary numbers"
- In 1777, Euler gave i = √-1
- 1831, Gause took Descartes standard notation and named them "complex numbers" and popularized this idea to the world.

Evolution

- Galileo once said, "Mathematics is the language with which God wrote the Universe."
- Over the years, the symbols have become shorter and some effective (to meet the technological advancements.) In 1323 a frenchmen used "et" which is and in latin for the addition symbol instead of "+".
- Constants: Like pi, the value got more specific, in the 15th century we found it's value to the 16th decimal place and today, in the 21st century some computers have calculated the value to more than 22 trillion digits.

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