31 000 BC

Earliest documented counting and measuring system

25 000 BC

First geometric shapes

3000 BC

First numerals
(Hieroglyphic)

1850 BC

Clay tablets dealing with fractions, algebra and equations

1650 BC

Rhind Papyrus
(instruction manual and problems)

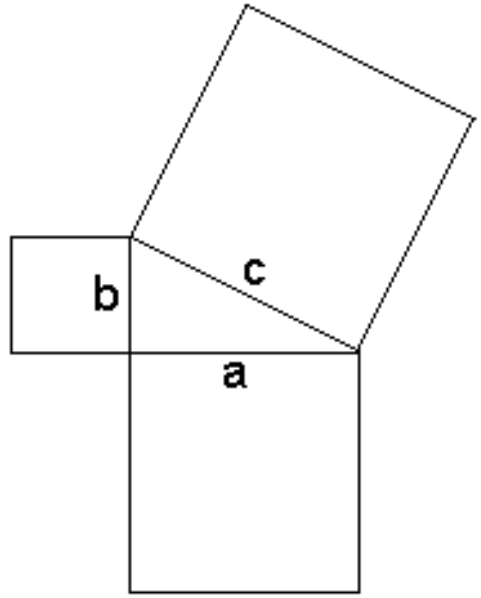
FUN FACT

The Rhind Papyrus is split into three parts:

1. Reference tables, 21 arithmetic problems, and 20 algebraic problems.
2. Geometry problems.
3. Remainder of the 91 problems, which are not mathematical.

580 BC

Pythagoras' Theorem proved



FUN FACT

Pythagoras tried to explain music in a mathematical way, and discovered that two tones sound “nice” together (consonant) if the ratio of their frequencies is a simple fraction.

FUN FACT

Pythagoras founded a school in Italy where he and his students worshipped mathematics almost like a religion, while following a number of bizarre rules.

The school was eventually burned down by their adversaries.

300 BC

Euclid’s Elements

250 BC

Archimedes determines area/volume by splitting a shape into an infinite number of infinitely small parts.

FUN FACT

While taking a bath, Archimedes discovered a way to determine the volume of irregular objects using the amount of water they displaced when submerged.

He was so excited by this discovery that he ran out on the street, still undressed, yelling “Eureka!”

36 BC

Preclassic Mayans developed the concept of zero by at least this time

500 AD

Aryabhatta defines trigonometric functions, and writes sine and versine tables

628 AD

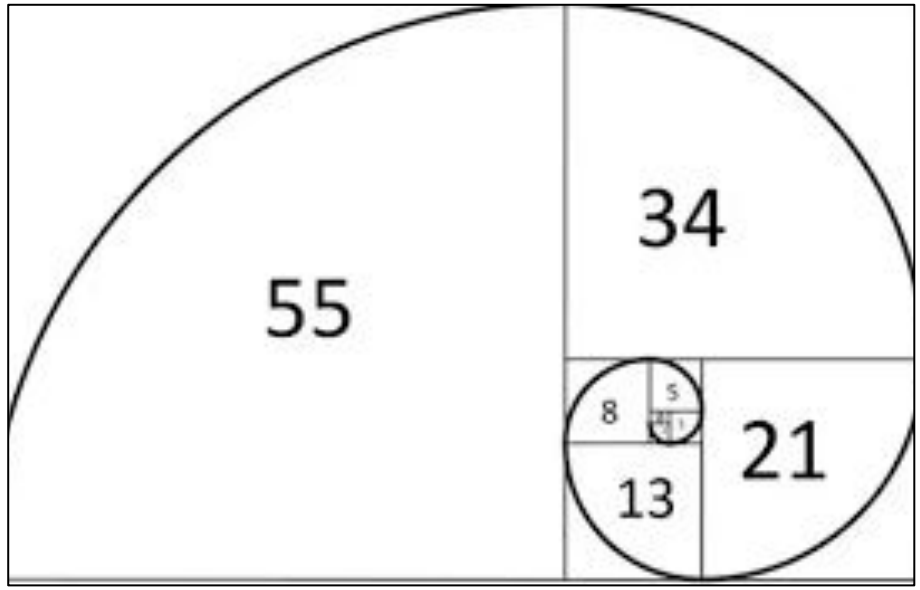
First explicit solution of the quadratic equation $ax^2 + bx = c$

830 AD

Al - Khawarizmi introduces modern algebra, including methods of “reduction” and “balancing”

1202 AD

Fibonacci introduced the ‘Fibonacci Sequence’ such that each number is the sum of the two preceding ones



FUN FACT

Black Star's song "Astronomy (8th Light)" features the Fibonacci sequence in the chorus:

Now everybody hop on the one, the sounds of the two. It's the third eye vision, five side dimension. The 8th Light, is gonna shine bright tonight.

1240 AD

Qin Jiushao finds solutions to quadratic, cubic and higher power equations using repeated approximations

1260 AD

Yang Hui worked on “magic” squares, circles and triangles, as well as an early version of Pascal’s Triangle

1390 AD

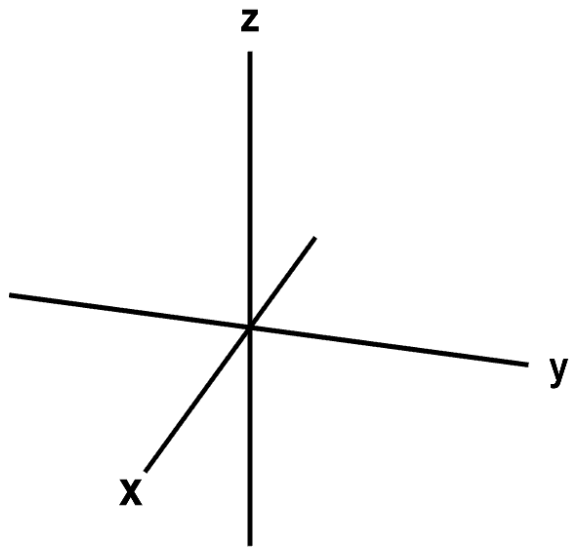
Madhava uses of infinite series of fractions to give an exact formula for π, sine formula and other trigonometric functions.

1536 AD

Mersenne Primes studied (prime numbers that are one less than a power of 2)

1600 AD

Descartes develops cartesian coordinates and analytic geometry (synthesis of geometry and algebra)



1614 AD

Napier invented natural logarithms and Napier's Bones tool for lattice multiplication

1654 AD

Pascal (with Fermat) worked on probability theory

FUN FACT

In 1637, Pascal wrote a note in the margin, claiming that the equation $a^n+b^n=c^n$ has no integer solutions for n>2, and that he had a "marvellous proof, which this margin is too narrow to contain".

This became known as Fermat's Last Theorem, and one of the most famous unsolved problems in mathematics – until it was finally proved in 1994.

1640 AD

Pierre de Fermat discovered many new numbers patterns and theorems (including Little Theorem, Two-Square Theorem and Last Theorem)

1675 AD

Isaac Newton developed infinitesimal calculus (differentiation & integration), which is the foundation for classical mechanics, generalized binomial theorem, and infinite power series

1822 AD

Fourier studied periodic functions and infinite sums in which the terms are trigonometric functions (Fourier series)

1840 AD

Devised Boolean algebra (using operators AND, OR and NOT), starting point of modern mathematical logic (development of computer science)

1850 AD

Riemann works on differential geometry in multiple dimensions and Riemann Hypothesis

1858 AD

Möbius strip discovered (a two-dimensional surface with only one side)

1900 AD

Hilbert's problems are 23 mathematical problems

The problems were all unsolved at the time

FUN FACT

- Problems 3, 7, 10, 11, 13, 14, 17, 19, 20, and 21 have a resolution that is accepted by consensus of the mathematical community.

- Problems 1, 2, 5, 9, 15, 18, and 22 have solutions that have partial acceptance, but there exists some controversy as to whether they resolve the problems.

FUN FACT

- Problems 8 (the Riemann hypothesis), 12 and 16 unresolved

- Problems 4 and 23 are too vague to ever be described as solved.

- Problem 6 is deferred as a problem in physics rather than in mathematics.

1917 AD

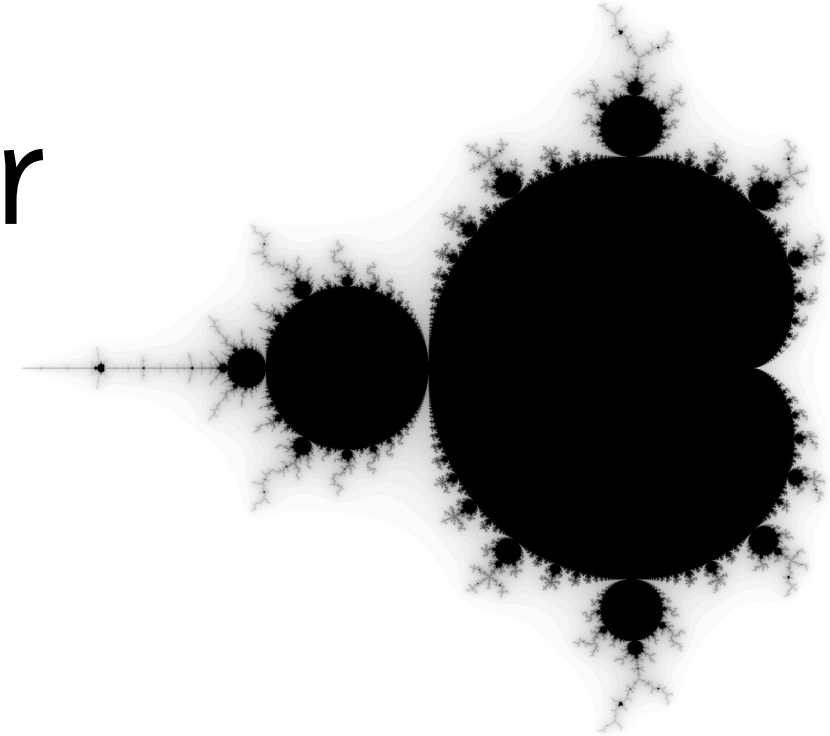
Ramanujan proved over 3,000 theorems, identities and equations, including on highly composite numbers, partition function and its asymptotics, and mock theta functions

1936 AD

Turing breaks the German enigma code, creates the Turing machine (logical forerunner of computer), and creates the Turing test of artificial intelligence

1978 AD

Mandelbrot set fractal, computer plottings of Mandelbrot and Julia sets



1994 AD

Wiles proved Fermat's last theorem for all numbers