Charls Babbage

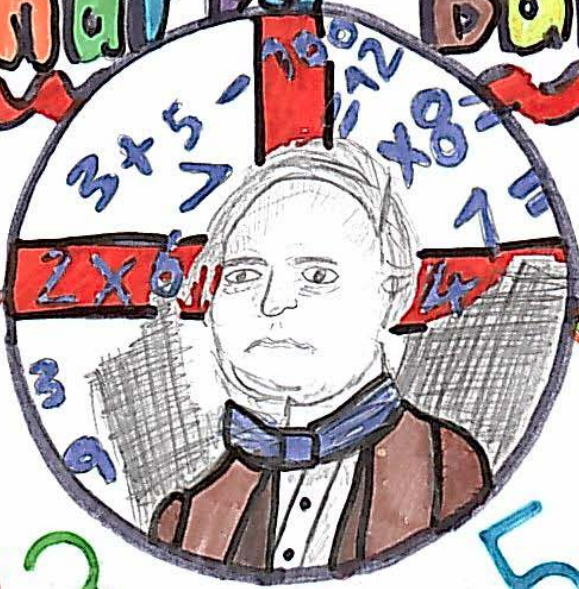Born 26 December 1791 London England

Died 18 October 1871 (aged 79) London England

Mathematician

In 1824 Charles won the gold medal of the Royal Astronomical Society "for his invention of an engine for calculating mathematical and astronomical tables". He was a founding member of the society and one of it's oldest living members on his death in 1871.

Charls married Georgiana Whitmore and had eight children. Charls engineered the central heating system.

Charls sought a method by which mathematical tables could be calculated mechanically, removing the high rate of human error.

He is known for Mathematics and computing.

by Hanna Crooks

Sir George Gabriel Stokes
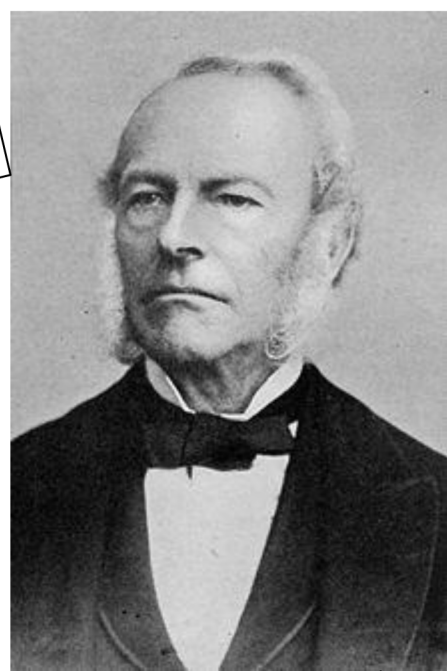
In content his work is distinguished by a certain definiteness and finality, and even of problems which, when he attacked them, were scarcely thought amenable to mathematical analysis, he has in many cases given solutions which once and for all settle the main principles. This fact must be ascribed to his extraordinary combination of mathematical power with experimental skill. From the time when in about 1840 he fitted up some simple physical apparatus in his rooms in Pembroke College, mathematics and experiment ever went hand in hand, aiding and checking each other. In scope his work covered a wide range of physical inquiry, but, as Marie Alfred Cornu remarked in his Rede lecture of 1899, the greater part of it was concerned with waves and the transformations imposed on them during their passage through various media.

Fluid dynamics

His first published papers, which appeared in 1842 and 1843, were on the steady motion of incompressible fluids and some cases of fluid motion. To the theory of sound he made several contributions, including a discussion of the effect of wind on the intensity of sound and an explanation of how the intensity is influenced by the nature of the gas in which the sound is produced. These provided a key not only to the explanation of many natural phenomena, such as the suspension of clouds in air, and the subsidence of ripples and waves in water, but also to the solution of practical problems, such as the flow of water in rivers and channels, and the skin resistance of ships.

Light

Perhaps his best-known researches are those which deal with the wave theory of light. His optical work began at an early period in his scientific career. His first papers on the aberration of light appeared in 1845 and 1846, and were followed in 1848 by one on the theory of certain bands seen in the spectrum.

In 1849 he published a long paper on the dynamical theory of diffraction, in which he showed that the plane of polarization must be perpendicular to the direction of propagation. Two years later he discussed the colours of thick plates.

Chemical analysis

The identification of organic bodies by their optical properties was treated in 1864; and later, in conjunction with the Rev. William Vernon Harcourt, he investigated the relation between the chemical composition and the optical properties of various glasses, with reference to the conditions of transparency and the improvement of achromatic telescopes. A still later paper connected with the construction of optical instruments discussed the theoretical limits to the aperture of microscope objectives.

Fluorescence

In 1852, in his famous paper on the change of wavelength of light, he described the phenomenon of fluorescence, as exhibited by fluorspar and uranium glass, materials which he viewed as having the power to convert invisible ultra-violet radiation into radiation of longer wavelengths that are visible. The Stokes shift, which describes this conversion, is named in Stokes' honor. A mechanical model, illustrating the dynamical principle of Stokes's explanation was shown. The offshoot of this, Stokes line, is the basis of Raman scattering.

Polarization

In the same year, 1852, there appeared the paper on the composition and resolution of streams of polarized light from different sources, and in 1853 an investigation of the metallic reflection exhibited by certain non-metallic substances. The research was to highlight the phenomenon of light polarization. About 1860 he was engaged in an inquiry on the intensity of light reflected from, or transmitted through, a pile of plates; and in 1862 he prepared for the British Association a valuable report on double refraction, a phenomenon where certain crystals show different refractive indices along different axes. Perhaps the best known crystal is Iceland spar, transparent calcite crystals.

By Henry Simm

Fibonacci

Key Facts:

Born in 1170 in Italy

He published a book inventing the digits 0-9, and also invented place value.

The reason his sequence was so special was because it occurs huge amount in nature.

His full name was Leonardo Pisano Bigollo.

He died in 1250.

His main discovery was the a sequence which he named after himself—The Fibonacci Sequence.

The Fibonacci Sequence:

It worked by adding the previous two numbers together. So if there are the two numbers **3 and 5, then the next will be 8**. It occurs an incredible amount in nature. For example, in your hands, the length of each finger bone increases in the same way as the Fibonacci Sequence, or maybe the number of diamonds on the side of a pinecone or pineapple. It was discovered when he thought about breeding rabbits, and found the pattern in the number of babies produced.

Matt Anderson

By Jonathan Naylor

21/10/10
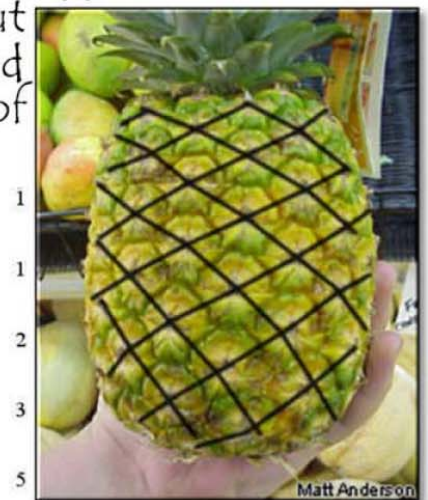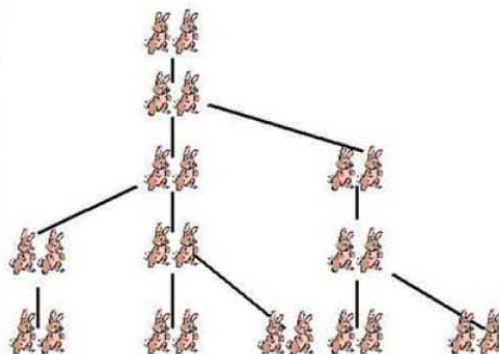
BORN IN 1889

DIED IN 1971
☺

I LOVE CODES!

Agnes Meyer Driscoll!!

The Cryptanalyst!!!

LIVED THROUGH BOTH WORLD WARS!!
☺

She got a degree in Mathematics, Physics, Foreign Languages and Music!!
☺

Her nicknames were: Miss Aggie, or Madame X
☺

She was an American cryptanalyst World War I and World War II.
☺

Betty Meyer ☺ Agnes' sister:

In 2000 she was inducted into the National Security Agency's Hall of Honour.
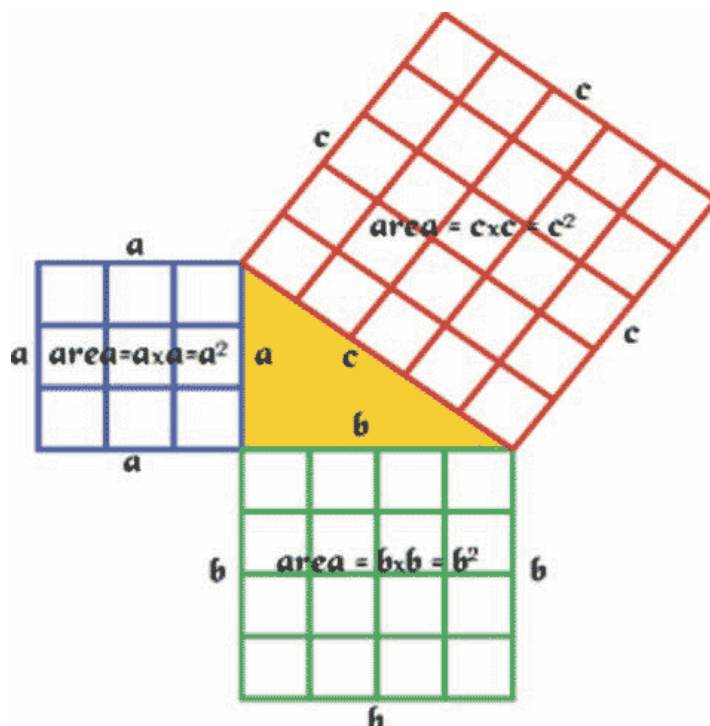☺

Some of the codes she decoded:

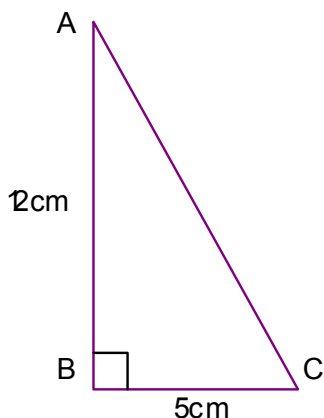Betty Meyer

By Aisling Strachan!!

♥

Pythagoras' Theorem

Pythagoras' theorum states that in a right-angles triangle the square of the hypotenuse is equal to the sum of the squares of the ther two sides.

Did you know, Pythagoras' was a Greek philosopher and mathematician who lived around 2500 years ago?

$area = c \times c = c^2$

$area = a \times a = a^2$

$area = b \times b = b^2$

Pythagoream Theorem: $c^2 = a^2 + b^2$

For example:

Did you know that Pythagoras' Theorem was first used thousands of years ago by the ancient egyptians?

$AC^2 = AB^2 + BC^2$

$AC^2 = 12^2 + 5^2$

$AC^2 = 144 + 25$

$AC^2 = 169$

$AC = 13cm$

A

12cm

B

C

5cm

The hypoteneuse is the longest side on a right-angled triangle.

YOU MAY BE RIGHT, PYTHAGORAS, BUT EVERYBODY'S GOING TO LAUGH IF YOU CALL IT A "HYPOTENUSE."

by Charlie Sussemilchh
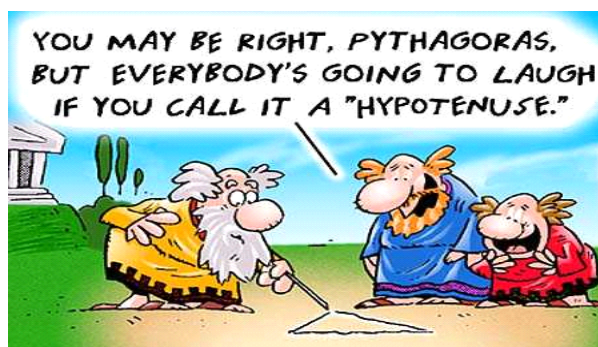
By Tamah Gayle-Morris

Leonhard Euler

Born: 15 April 1707 in Basel, Switzerland
Died: 18 Sept 1783 in St Petersburg, Russia

At the age of 13 he matriculated from the University of Basel, and in 1723, at the age of 17, he received the degree of Masters of Arts with a dissertation that compared the philosophies of Descartes and Newton

Interesting Facts:

1735 he lost much of his vision in the right eye because he had looked into the sun for too long.

In 1720 Euler began his studies at the University of Basel. There Euler met Daniel and Nikolaus Bernoulli, who noticed Euler's skills in mathematics. In 1727 Euler was called to St. Petersburg by Catherine I. and became professor of physics in 1730. Finally in 1733 he became professor of mathematics. His work was both in physics and mathematics. Euler was the first to publish a systematic introduction to mechanics in 1736.
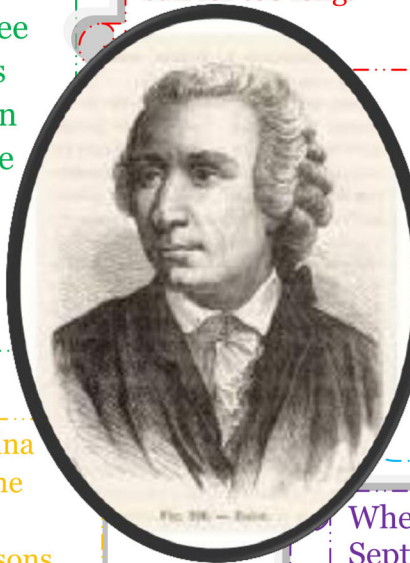
In 1733, (Aged 26), he marries Katharina Gsell, the daughter of the director of the academy of arts. They had 13 children together but unfortunately only three sons and two daughters survived. The descendants of these children, however, were in high positions in Russia in the 19th century.

When Euler died on 18th of September 1783 the mathematician and philosopher Marquis de Condorcet said ``...et il cessa de calculer et de vivre" (and he stopped calculating and living).

'Mathematicians have tried in vain to this day to discover some order in the sequence of prime numbers, and we have reason to believe that it is a mystery into which the human mind will never penetrate.'

by Tamah Gayle-Morrish

Carl Gustav Jacob Jacobi
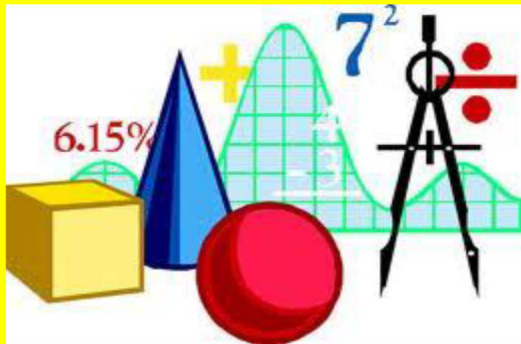
German Mathematician. Born December 10, 1804 at Potsdam, Kingdom of Prussia. He is known Jacobi's elliptic functions, Jacobian, Jacobi symbol and Jacob Identity. He invented Jacob the Determinant.

Jacobi's most important contributions to mathematics were in the field of elliptic functions. Niels Hendrik Abel had partially anticipated some of Jacobi's work, but the two were equally important in the creation of this subject. Jacobi also worked on Abelian functions and discovered the hyperelliptic functions. He applied his work in elliptic functions to number theory.

by Alyssa Rollan
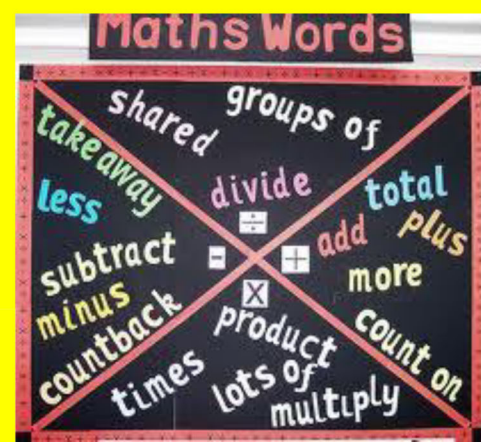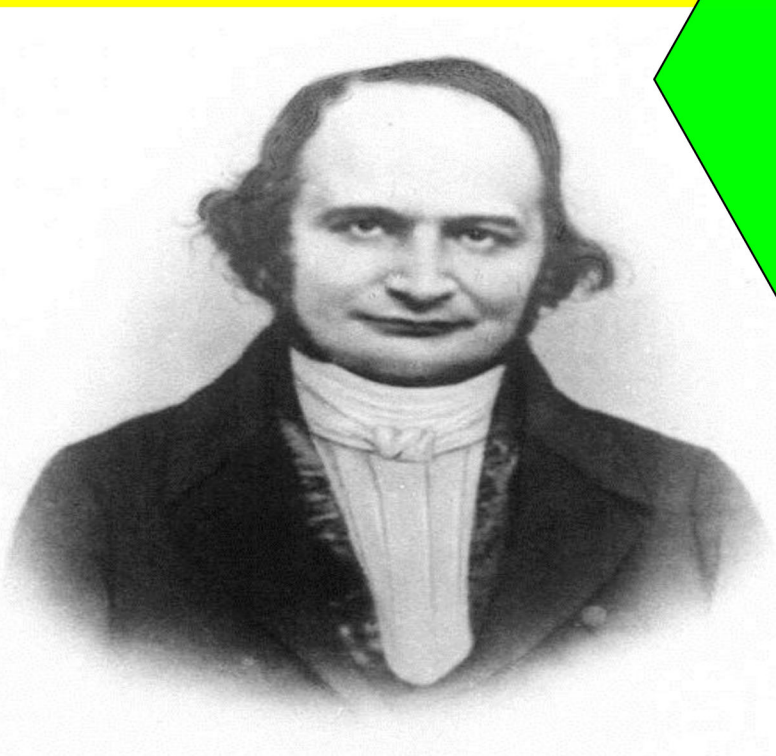
Hypatia of Alexandria

Hypatia of Alexandria was born about 370 In Alexandria, Egypt.

Hypatia was the first woman to make a substantial contribution to the development of mathematics.

- Hypatia was the daughter of the mathematician and philosopher Theon of Alexandria and it is fairly certain that she studied mathematics under the guidance and instruction of her father.

- Hypatia came to symbolise learning and science which the early Christians identified with paganism. However, among the pupils who she taught in Alexandria there were many prominent Christians.

- Most historians believe that Hypatia surpassed her father's knowledge at a young age. However, while Hypatia was still under her father's discipline, he also developed for her a physical routine to ensure for her a healthy body as well as a highly functional mind.

- She edited the work *On the Conics of Apollonius*, which divided cones into different parts by a plane.

- Hypatia lived in Alexandria when Christianity started to dominate over the other religions. In the early 390's, riots broke out frequently between the different religions.

- Hypatia's life ended tragically, however her life's work remained. Later, Descartes, Newton, and Leibniz expanded on her work. Hypatia made extraordinary accomplishments for a woman in her time. Philosophers considered her a woman of great knowledge and an excellent teacher.

by Kirsty Munroe

Leonardo Da Vinci

If you like Maths, then <u>this is</u> the poster for you!
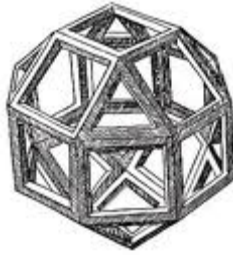
Leonardo Da Vinci was always a lover of maths, yet he did not know how to express his feelings for the higher equalities. So for the first time in maths history, he made maths but with geographical shapes. His expressions were a wonderful piece of maths.

Leonardo loved wrapping his mind through, what seemed like imposable puzzles and problems. Leonardo also had never had a proper education and his maths was nothing to do in the Italian schools. His speciality was his shapes.
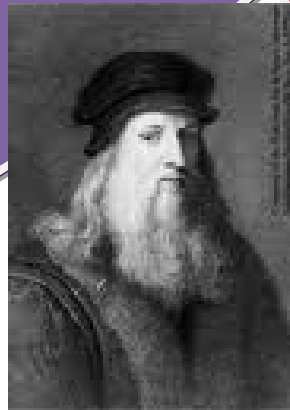
He picked up the writings and calculations of the ancient civilisations as they used shapes to.

It was an unexpected discovery that his maths was actually included in his music and his paintings!

He used his mathematical proportions in his other work like his inventions he planned out. One of his most famous inventions was a machine gun. It's strange but true. This was made on cogs of rotation. With proportions of the cogs was able to spin faster.

In the music his maths created rhythmic patterns or beats. Only recently, the maths found in his painting, The Last Supper; if you measure by equal units the painting measures 6 by 12 units, the back wall 4 units and the windows 3 units.

The Mona Lisa; another masterpiece of art is all around the golden rectangle. If you look at the face then you can see a rectangle that he drew the base of the face around and the same with the eyes if you draw a line in-between them.

by Matthew Mathieson

Hertha Marks Ayrton

1854-1923

She was also active in devising and solving mathematical problems, many of which were published in "Mathematical Questions and Their Solutions" from the Educational Times.

This is a picture from Hertha Ayrton 1926 biography, institution: Hertha Ayrton 1854-1923: A Memoir, by Evelyn Sharp (London: 1926)

Ayrton invented a draftsman's device that could be used for dividing a line into equal parts as well as for enlarging and reducing figures.

Hertha was born with the name Phoebe Sarah Marks, but when a teenager changed it to Hertha Marks Ayrton. This was after completing the Cambridge University Examination for Women with honours in English and mathematics.

Sir Isaac Newton

Isaac was born just a short time after the death of **Galileo**, one of the

Born in 1643
Lincolnshire, England

Isaac thought the universe worked like a machine and that a few simple

Galileo had proved that the planets revolve around the sun, not the earth as people thought

THE 3 LAWS

1. **The First Law** states that an object that is not being pushed or pulled by some force will stay still, or will keep moving in a straight line at a steady speed.

2. **The Second Law** explains how a force acts on an object. An object accelerates in the direction the force is moving it.

3. **The Third Law** states

He formulated laws of *motion* and *gravitation.* These laws are math formulas that explain how objects move

Newton understood that GRAVITY was the force of attraction between two objects.

Sir Isaac Newton

...was one of the best scientists in the world because he took his ideas and the ideas of earlier scientists like Galileo and combined them into a unified picture of how

Blaise Pascal

Blaise Pascal was a French philosopher, physicist, and of course mathematician. Pascal demonstrated his abilities at a very early age, under the guidance of his father, but lived a short life (he died at age 39).

Pascal is famous for his contributions to probability. In fact, he is considered to have been at the forefront of field.

In addition to professional gamblers, many economists gained valuable information from Pascal, particularly actuarial scientists.

If you have heard of Pascal it is probably because of **Pascal's Triangle**. Pascal's triangle has many interesting mathematical connections, but Pascal discovered its connection to the binomial coefficients. Each number is generated by adding the two numbers above it... Look below.

Pascal's Triangle
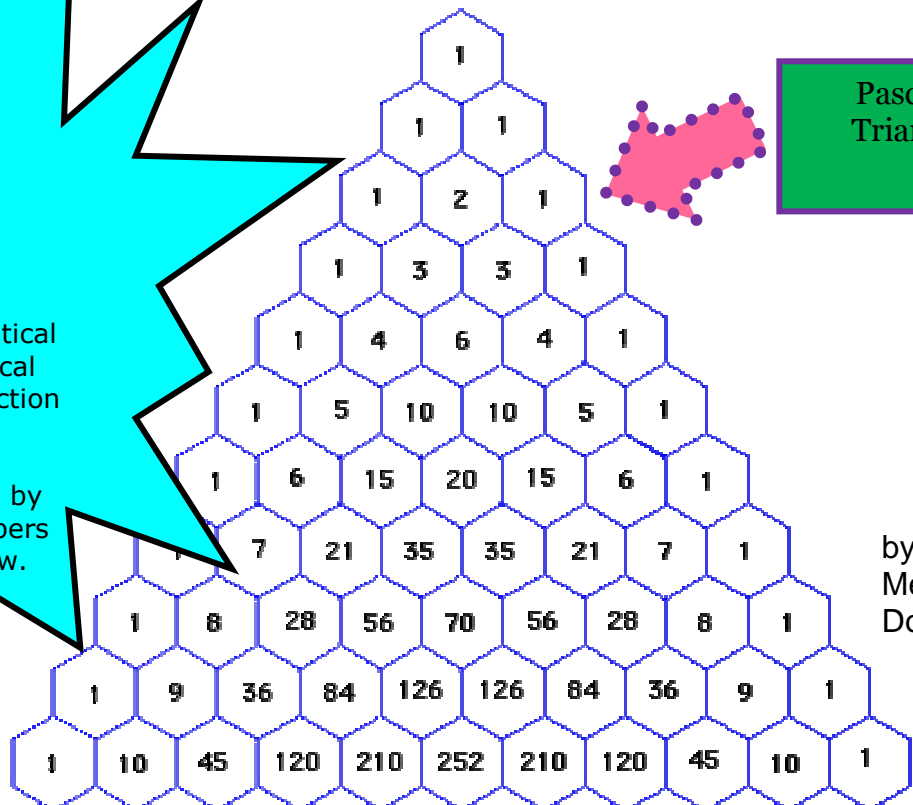
by
Meg Isabella
Dowthwaite

```
                          1
                       1     1
                    1     2     1
                 1     3     3     1
              1     4     6     4     1
           1     5    10    10     5     1
        1     6    15    20    15     6     1
     1     7    21    35    35    21     7     1
  1     8    28    56    70    56    28     8     1
1     9    36    84   126   126    84    36     9     1
1    10    45   120   210   252   210   120    45    10    1
```

PYTHAGORAS

This is what Pythagoras was supposed to have looked like.

Pythagoras was a Greek philosopher and mathematician. He was born on the Greek island of Samos over 2000 years ago.

Nowadays there are a series of statues of Pythagoras many of which look like this:
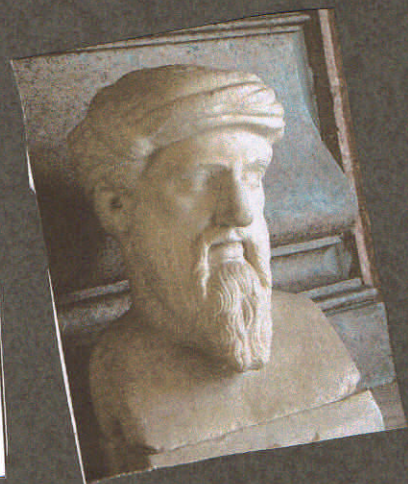
As a child Pythagoras was well educated, and in 530 B.C. he moved to Croton and started a religious group. Here he developed many rites and rituals, he gained some followers too.

Pythagoras is most well known for his mathematics. He had a theory shown below. This was called Pythagoras's Theorem.

$$c^2 = a^2 + b^2$$
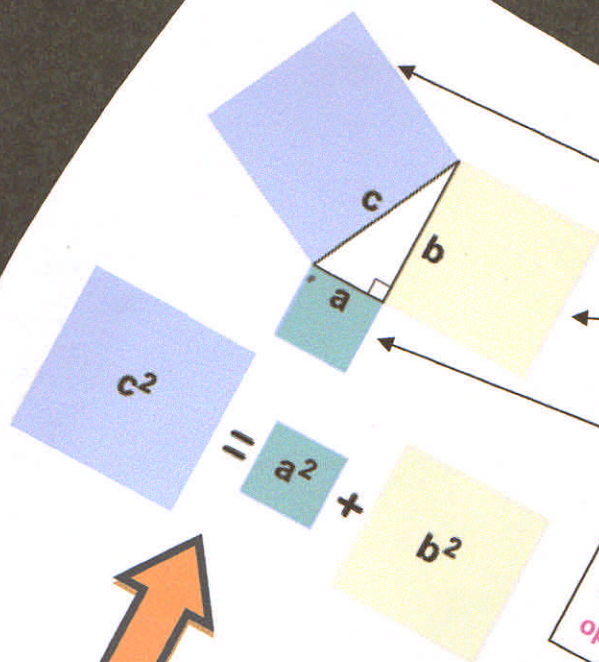
Pythagoras's Theorem was this: If you had a right angled tri-angle and added squares on each side of the tri-angle it would look like this. Plus, he found that the area of the squares of the shorter sides would fit into the square of the bigger side. The square on the bigger side is called the Hypotenuse and is easy to spot because it is always opposite the right angle.

He made an Equation out of this and this is what it looks like. If you have the length of two sides of the Tri-angle you can find the other side's length by following this
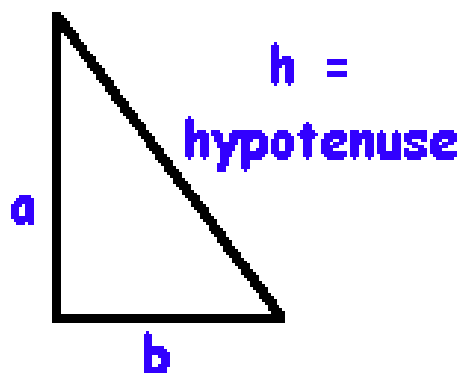
There is not much reliable information about Pythagoras because all the information was written about him many years after his death.

Pythagoras

Pythagoras is a famous mathematician who lived from 570 BC – 495 BC. He is known for "Pythagoras' Theorem". This Theorem helps us with triangles and their right angles. Pythagoras found out that:

$$a^2 + b^2 = h^2$$

h = hypotenuse

This helps us to find the shorter sides of a right angled triangle and helps us find the longer side (the hypotenuse).

At the moment we haven't found any of Pythagoras' writings and findings as they rotted away but there were some written about him and that's how we know about him and his findings.

Pythagoras was born on Samos which is a eastern Greek island with his dad, his mother and a brother. On that island Pythagoras found discoveries. He didn't just found out about triangles, he also found out about music, astronomy and more.
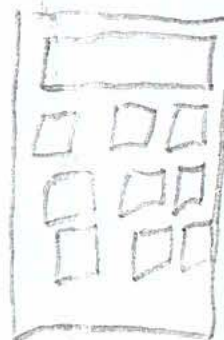
Hypotenuse

$$a^2 + b^2 = c^2$$

by Charlie Pullan
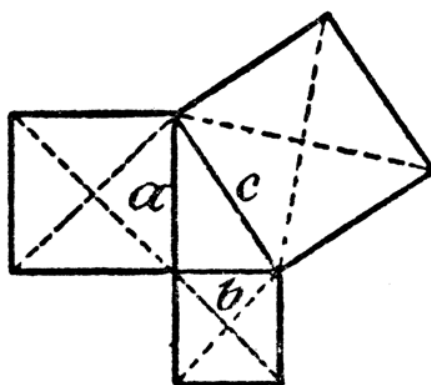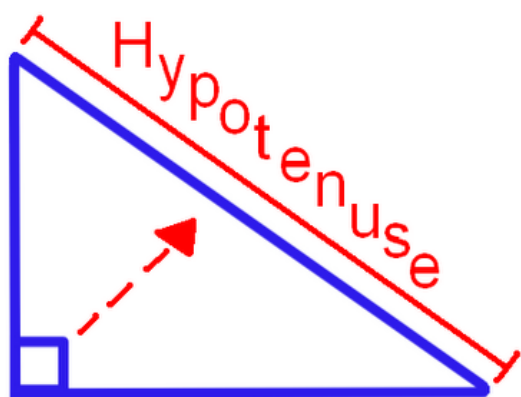
John Napier
University

Napier

he was
born in
1550

wa wa
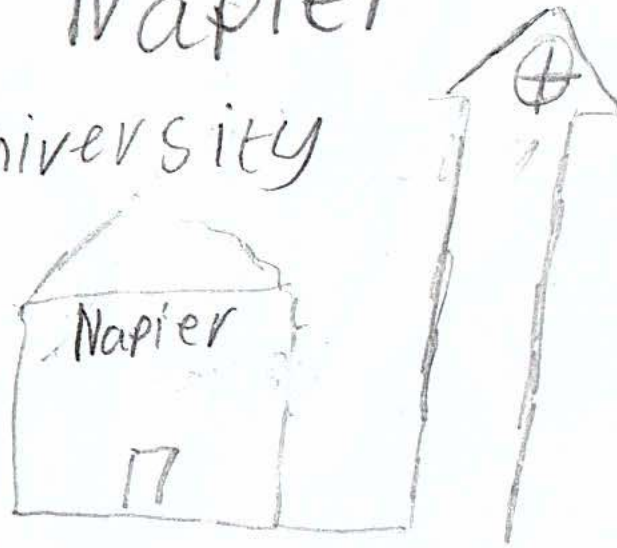
he invented
the batteryless
calculator

he died in

by Callum Scotland
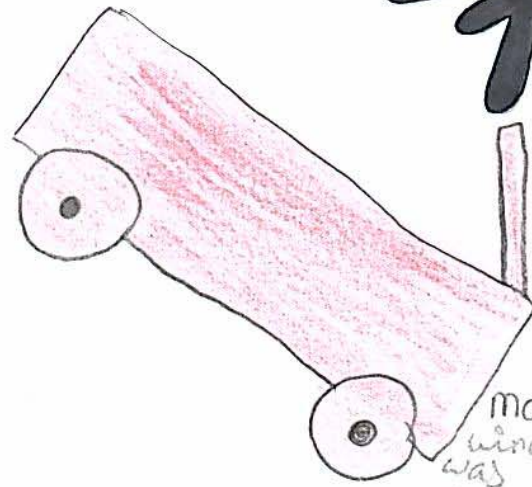
ISAAC NEWTON

1642 - 1727

Invented the cat flap but didn't have a cat

didn't have a wife or children

Discovered Gravity

(Was) Sitting under an apple tree when an apple fell on his head so he decided to do some tests

Discovered the reflecting telescope in (1672)

Isaac Newton made carts and windmills when he was a small boy all the moving parts actually worked.

by Laura Campbell

Sir Andrew Wiles

Sir Andrew John Wiles was born 11 April 1953 and is age 57. He is most famous for proving Fermat's Last Theorem.

Andrew Wiles is married to Nada Canaan Wiles and they have three daughters: Clare, Kate and Olivia. He and his family currently live in Princeton, New Jersey.

Interesting

- Andrew Wiles was appointed to the rank of Knight Commander of the Order of the British Empire in the United Kingdom in 2000.

- The asteroid 9999 Wiles was named for Andrew Wiles in 1999.

- Andrew Wiles was mentioned in an episode of Star Trek for his proof of

Theorem- a theoretical proposition, statement, or formula embodying something to be proved from other propositions or formulas.

by Finn Milo Devoy McIntosh

GEORG CANTOR

Georg Ferdinand Ludwig Cantor was best known for his invention of a whole branch of mathematics with his set theory. It is useful for analysing difficult concepts in maths and logic. It is important as it can help mathematicians with infinity. Set theory collects objects into sets, but they don't have to be mathematical objects! Venn Diagrams are a basic form of set theory.

A   B

A∩B
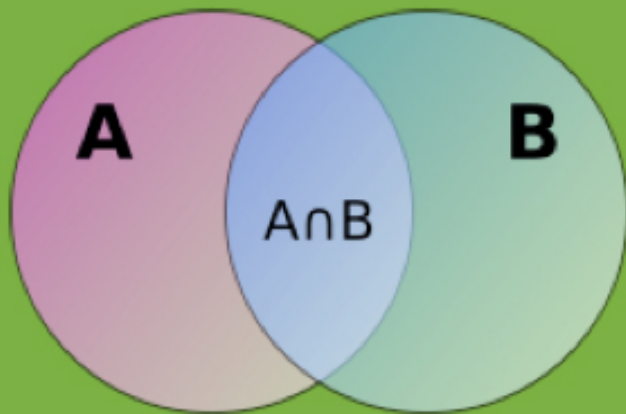
OTHER SKILLS: Cantor was a skilled violinist and was thought to have inherited the skills from his mother and father who were both musical.

Cantor's continuum hypothesis remains unsolved to this day.

$$2^{\aleph_0} = \aleph_1$$
$$2^{\aleph_a} = \aleph_{a+1}$$

Cantor was born in the city of Saint Petersburg, Russia in 1845. He grew up there until he was eleven, when his family left the city to go to Germany, trying to find warmer summers. He went to several universities and taught later on in his life. He taught at the University of Halle, where he took a permanent position. He had many disputes with other mathematicians and had serious bouts of depression. In 1899 Rudolph, his son, died suddenly while he was giving a lecture. After that he said he had 'lost all passion for mathematics' but continued to work until 1913. He attended many talks and lectures but due to his illness he missed awards and they had to be sent to him. His public celebration of his seventieth birthday had to be cancelled in 1916 due to World War One. He died in 1918 in a sanatorium.

by Toby Sanderson

Juan-Philip Marx

Leonardo Pisano Fibonacci

Lead Story Headline

Leonardo Pisano Fibonacci was approximately born in the 13th century around 1170 and that he died around 1250.

Fibonacci was born in Italy but was educated in North Africa. Most of the information we are taught about was actually by his own autobiographical notes, we also did not have any pictures or drawings of him.

Fibonacci is considered to be one of the most talented mathematicians for the Middle Ages. Not many people realize that it was Fibonacci that gave us our decimal number system (0-9) which replaced the Roman Numeral system. When he was studying mathematics, he used the Hindu-Arabic (0-9) symbols instead of Roman symbols. He shows how to use our current numbering system in his book Liber abaci.

Fibonacci wrote this problem in his book called Liber abaci:

A certain man put a pair of rabbits in a place surrounded on all sides by a wall. How many pairs of rabbits can be produced from that pair in a year if it is supposed that every month each pair begets a new pair, which from the second month on becomes productive?

This is how Fibonacci discovered the famous Fibonacci Numbers and Fibonacci Sequence. The sequence is 1, 1, 2, 3, 5, 8, 13, 21, 34, 55... This sequence, shows that each number is the sum of the two numbers before it.

The Fibonacci Sequence defines the curves of natural spirals. Examples can be snail shells and even the pattern of seeds in plants.

The name was given in by a French mathematician named Edouard Lucas in the 1870's.


A sketch of Fibonacci by Kristin Palm

Special points of interest:

- Fibonacci was born in Italy but educated in Northern Africa

- He gave us our decimal number system (0-9)

- He wrote 4 books

- It has been said that the Fibonacci numbers are Nature's numbering system and apply to the growth of living things, including cells, petals on a flower, wheat, honeycomb, pine cones and much more.

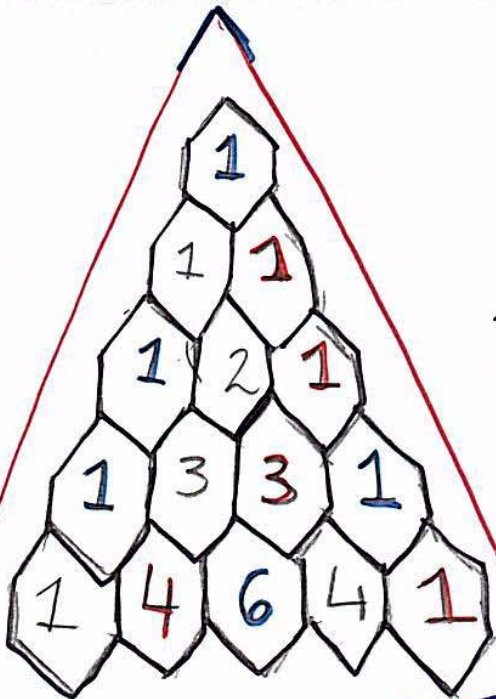FIBONACCI PIGEONS

by Juan-Philip Marx
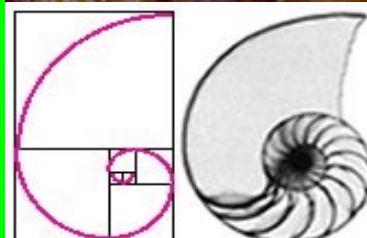
Blaise Pascal

June 19th 1623
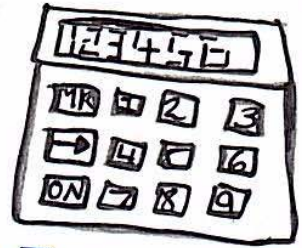
August 14th 1662

He was a French mathematician, physisist and writer. He was also Roman Catholic.

Pascal was born in Clemont, France and died 2 months after 39th Birthday because of a diseise called Tuberculosis.

In 1654 he devoted himself to phylosophey, which was when he invented a Probability theory, now called Pascal's Triangle.
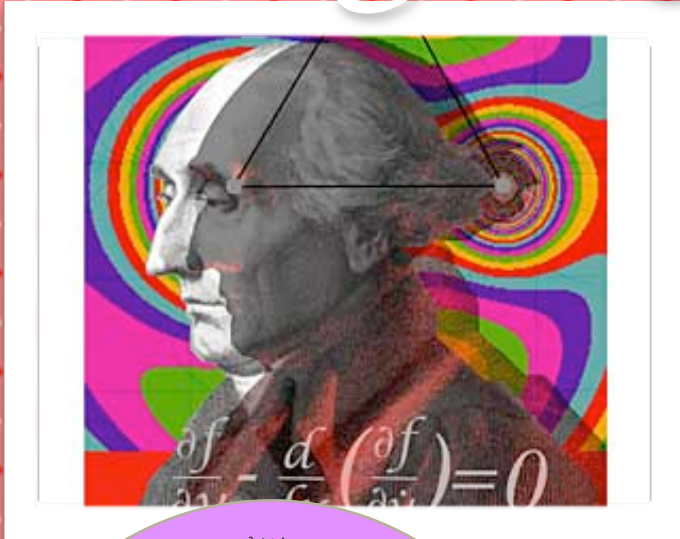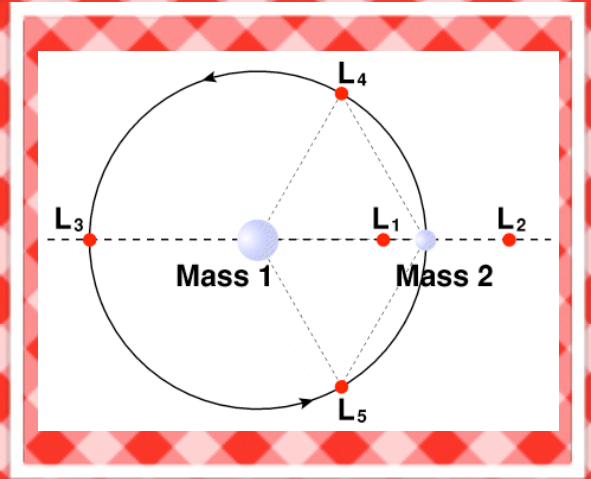

Each number is the sum of the 2 above!

In 1642 Pascal started work on calculating machines.
- 3 years later and after 50 prototypes
- Blaise Pascal invented the machine calculator!!!

by Victoria Munro Brown

Joseph Louis Lagrange

$$a^{p-1} - 1 \equiv 0 \pmod{p},$$

Mass 1   Mass 2

L_1, L_2, L_3, L_4, L_5
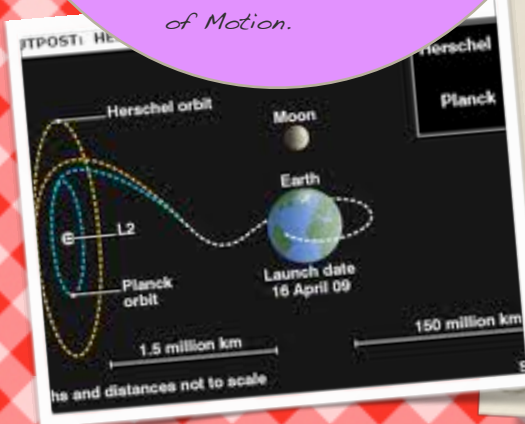
$$a^{p-1} - 1 \equiv 0 \pmod{p},$$

While in Prussia, he published the 'Mécanique Analytique' which is considered to be his monumental work in the pure maths. His most prominent influence was his contribution to the the metric system and his addition of a decimal base. Some refer to Lagrange as the founder of the Metric System. Lagrange is also known for a great deal of work on planetary motion. He was responsible for developing the groundwork for an alternate method of writing Newton's Equations of Motion.

REPUBLIQUE FRANÇAISE
POSTES
8F
1736 LAGRANGE 1813

FACTS...

Joseph Louis Lagrange, the greatest mathematician of the eighteenth century, was born at Turin on January 25, 1736, and died at Paris on April 10, 1813. Joseph-Louis Lagrange is usually considered to be a French mathematician, but he was born in Italy. He studied at the College of Turin, and his favorite subject was classical Latin. At first he had no great enthusiasm for mathematics, finding Greek geometry rather dull. Lagrange's interest in mathematics began when he read a copy of Halley's 1693 work on the use of algebra in optics.

Herschel orbit
Moon
Earth
Launch date 16 April 09
L2
Planck orbit
1.5 million km
150 million km

"Before we take to sea we walk on land, Before we create we must understand."

by Anna Diab

Leonhard Euler

Born 15th of April 1707
Died 18th December 1783

$$e^{i\pi} + 1 = 0$$

$$i\pi + 1 = 0$$

At the age of thirteen he enrolled at the University of Basel.

Leonhard's Equation

He lost sight in one of his eyes most likely due to observing the sun without taking proper precaution

He was a Swiss mathematician. Born and educated at Basel, where he knew the Bernoullis, he went to St. Petersburg (1727) at the invitation of Catherine I.

as a kind and generous man who enjoyed the simple pleasures of life. His simple pleasures included growing vegetables in his garden and telling stories of his 13 children and playing with his many grandchildren. (Dunham, 1990) He is possibly the most prolific writer in mathematics history.

Alicia Petrie

Isaac Newton

Isaac (Sir) **Newton** (1642-1727) England
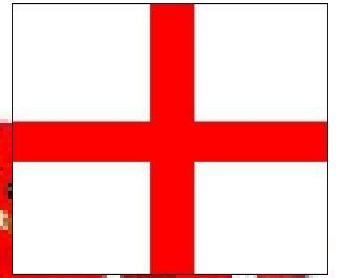
I. Every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it

II. The relationship between an object's mass m, its acceleration a, and the applied force F is $F = ma$. Acceleration and force are vectors (as indicated by their symbols being displayed in slant bold font); in this law the direction of the force vector is the same as the direction of the acceleration vector.

III. For every action there is an equal and opposite reaction.

Newton believed God was invisible but influenced every part of people's lives.

Isaac's father could hardly write his name.

Newton at only age 26 became a professor of math.

Newton's discoveries about light and movement of planets were used to make the first flights to the moon possible.

Newton oversaw the recoinage of the whole country.

Newton earned the title of Warden of the Royal Mint.

Issac was born on Christmas day.

by Katlin Wright

David Hilbert..

David Hilbert is recognized for one of the most influential and universal mathematicians of the 19th and early 20th century. Hilbert was the first of 2 children and only son of Otto and Maria. Hilbert, was born in the Province of Prussia.

Why is David Hilbert Famous?.....

The finiteness Theorem, Acclimatization of Geometry, The 23 problems, formalism, functional analysis, physics, and the number theory are is biggest accomplishments.
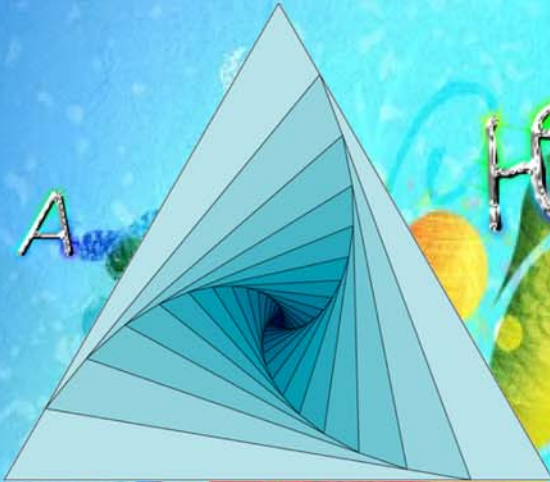
Born-January 23rd 1862

Died-14th Febuary 1943

By Emily MacSween
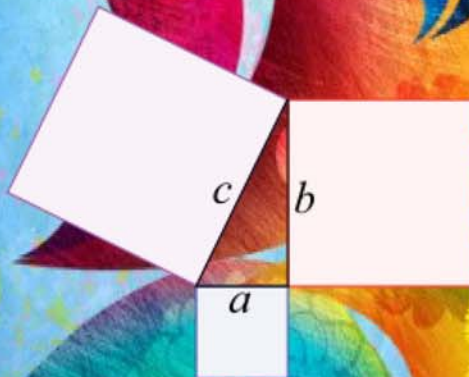
A SQUARED + B SQUARED + H SQUARED

Pythagorean theorem

A

H²

B

c

b

a

The sum of the squares of the lengths of the sides of a right triangle is equal to the square of the length of the hypotenuse

Pythagoras of Samos was a famous Greek mathematician and philosopher, born between 580 and 572 BC, and died between 500 and 490 BC. He is known best for the Pythagorean Theorem, which is an important theorem about right triangles. He started a group of mathematicians, called the Pythagoreans, who worshiped numbers and lived like monks.

The Pythagorean Theorem says that the area of a square on the hypotenuse is equal to the sum of the areas of the squares on the legs. In this picture, the area of the blue square added to the area of the red square makes the area of the purple square. It was named after the Greek mathematician Pythagoras: If the lengths of the legs are a and b, and the length of the hypotenuse is c, then, a squared + b squared = c squared. Then you square root c to find the length of the hypotenuse.

Pythagoras was a Greek philosopher who made important developments in mathematics, astronomy, and the theory of music. The theorem now known as Pythagoras's theorem was known to the Babylonians 1000 years earlier but he may have been the first to prove it.

Religion was important to the Pythagoreans. They swore their oaths by "1+2+3+4" (which equals 10). They also believed that the soul is immortal and goes through a cycle of rebirths until it can become pure. They believed that these souls were in both animal and plant life. Pythagoras himself claimed to remember having lived four different lives. He also told of hearing the voice of a dead friend in the howl of a dog being beaten, and was then attacked by an angry mob.

by Saskia Campbell

ADA
LOVELACE
DAY
24th MARCH

ADA BYRON, LADY LOVELACE
1815–1852

SHE HAD A GREAT IMPACT ON BERNOULLI NUMBER IN SOLVING SUMS AND POLNOMIALS USED TO CALCULATE FUNCTIONS AND ALSO TO FIND THE RADIUS CONVERGENCE AND POWER SERIES

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

IN 1980, THE COMPUTER LANGUAGE ADA, CREATED BY THE U.S. DEFENCE DEPARTMENT WAS NAMED IN HER HONOUR

THE LOVELACE MEDAL WAS ESTABLISHED BY THE BRITISH COMPUTER SOCIETY IN 1998, FOR HER CONTRIBUTION TO COMPUTER SCIENCE.

bcs
The Chartered Institute for IT

DESPITE BEING A WOMAN, ADA DEFIED VICTORIAN SOCIETY IN HER PURSUIT FOR KNOWLEDGE AND BECAME RECOGNISED AS THE FIRST COMPUTER PROGRAMMER AS WELL AS BEING A HIGHLY REPUTABLE MATHEMATICIAN

BABBAGES ANALYTICAL ENGINE IDEAS
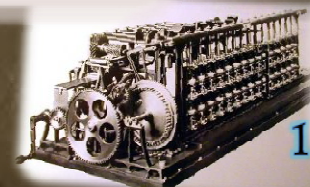1834

+

MENABREA'S NOTES ON BABBAGE'S LECTURES
1842

+

ADA'S TRANSLATIONS OF THESE NOTES AND HER OWN "NOTES A–G", OUTLINED THE FIRST COMPUTER PROGRAM

+

BERNOULLI NUMBERS

$$\frac{z}{e^z - 1} = \sum_{n=0}^{\infty} B_n \frac{z^n}{n!}, \quad |z| < 2\pi$$
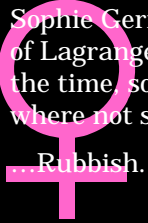
=

SCHEUTZ'S DIFFERENCE ENGINE
1853

by Portia Gumbs

Sophie Germain used the alias "M. LeBlanc," one of Lagrange's students, when submitting work. At the time, social prejudice meant that women where not supposed to be smart.

...Rubbish.

SOPHIE GERMAIN

April 1st, 1779 – June 27th, 1831

Sophie Germain used to study at night when her parents where asleep as they didn't see it as fit for her to be studying; not only was she a woman but she was also middle-class. They went to extreme measures such as taking her clothes in the winter to make her stay in bed due to the cold. Still, she preserved, using candles and quilts for light and warmth until eventually, her parents gave up – Must have decided she was a lost cause!

Sophie Germain actually became a 'pen friend' of Carl Friedrich Gauss. At first, he did not know she was female; it wasn't till 1807 that he found out. Surprisingly (or not?) he was trilled by the knowledge that his friend was actually a very gifted woman!

Sophie won an award from the French Academy of Sciences for her "Memoir on the Vibrations of Elastic Plates," after entering 3 times (due to extended deadlines) and not being awarded due to lack of formal education (1st entry.) This helped her become one of the most prominent mathematicians of her time. She was also due to receive an honorary degree from the University of Gottingen, thanks to Gauss, another famous mathematician at the time. Unfortunately, she died of breast cancer before she could receive it.

"Germain proved that if x, y and z are intergers and if $x^5+y^5=z^5$, then either x, y, or z must be divisible by 5. Germain's theorem is a major step toward proving Fermat's last theorem for the case where n equals 5."

Surprisingly, Sophie Germain was actually inspired to take up mathematics from reading the story of Archimedes in her fathers' library… Archimedes was so engrossed in a geometrical problem that he ignored the roman soldier questioning him, and was subsequently speared to death. Sophie figured that it must be worth studying if you would ignore an armed soldier in favour of it!

And the moral of the story, kids, is…

Don't do maths, or you'll get speared to death by roman soldiers.

by Zara Rose Oakley

BABYLONIANS
462-538
And Algebra

Who invented algebra?

Many people think that inventions have a single inventor like Thomas Edison for the light bulb, but there wasn't a single inventor of Algebra. It was a group of people called The Babylonians who invented algebraic methods of solving equations.

examples of their work

E.g. $ax^3 + bx^2 = c$.

Step 1) they would multiply the equation by a^2 and dividing by b^3 which gives:

$$\left(\frac{ax}{b}\right)^3 + \left(\frac{ax}{b}\right)^2 = \frac{ca^2}{b^3}.$$

Step 2) then they would substitute

$y = \dfrac{ax}{b}$ which gives

$$y^3 + y^2 = \frac{ca^2}{b^3}$$

which could now be solved by looking up the $n^3 + n^2$ table to find the value closest to the right hand side.

how did they solve equations?

The Babylonians used the standard quadratic formula to solve a quadratic equation. They considered quadratic equations in the form of:

$$x^2 + bx = c$$

here b and c were not necessarily integers, but c was always positive. They knew that a solution to this form of equation is

$$x = -\frac{b}{2} + \sqrt{\left(\frac{b}{2}\right)^2 + c}$$

and they would use their tables of squares in reverse to find square roots.
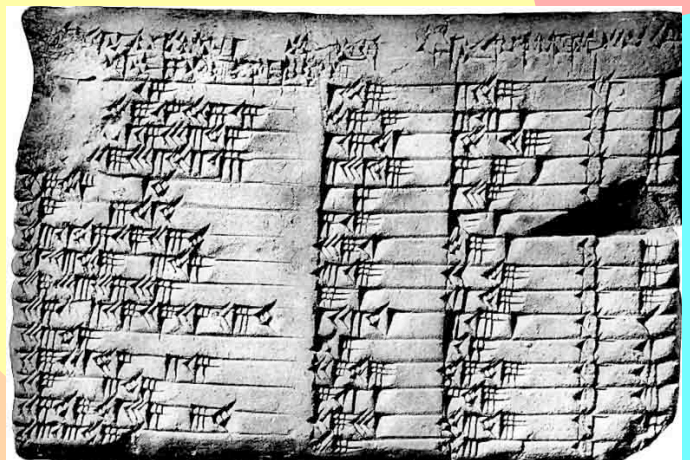
A clay tablet used to work out equations, fractions, etc

by Phoebe Jackson

233, 377, 610, 987, 1597, 2584, 4181,

Leonardo Fibonacci is famous for having described and promoted the sequence which borders this poster. This sequence is formed by adding the 2 previous numbers. It starts with 0 and 1, the Fibonacci numbers are found in many places in the pattern of rabbit breeding, the spirals in a cauliflower floret, In the bones your hand and in the petals on many flowers.   The Fibonacci Sequence!

Leonardo was born in Italy, in Pisa around the year 1200. His dad Guglielmo Fibonacci, was a merchant, who directed a trading post and some people think he was the consultant for Pisa. As a young boy Leonardo travelled around with his father it was with him he first learnt about the Hindu-Arabic numeral system Leonardo quickly realised that this was a much faster and simpler way of expressing long numbers and doing Maths...

Fibonacci's childhood

First draw a rectangle 13x8 then draw a square inside it at the 8th square so you have and 8 by 8 square and then in the rectangle you put a smaller 5x5 square then continue working down the Fibonacci sequence then with a compass join the squares!

The liber abaci (Book of calculation) is a book Leonardo wrote to promote and educate about the Hindu-Arabic numeral system.

The liber abaci
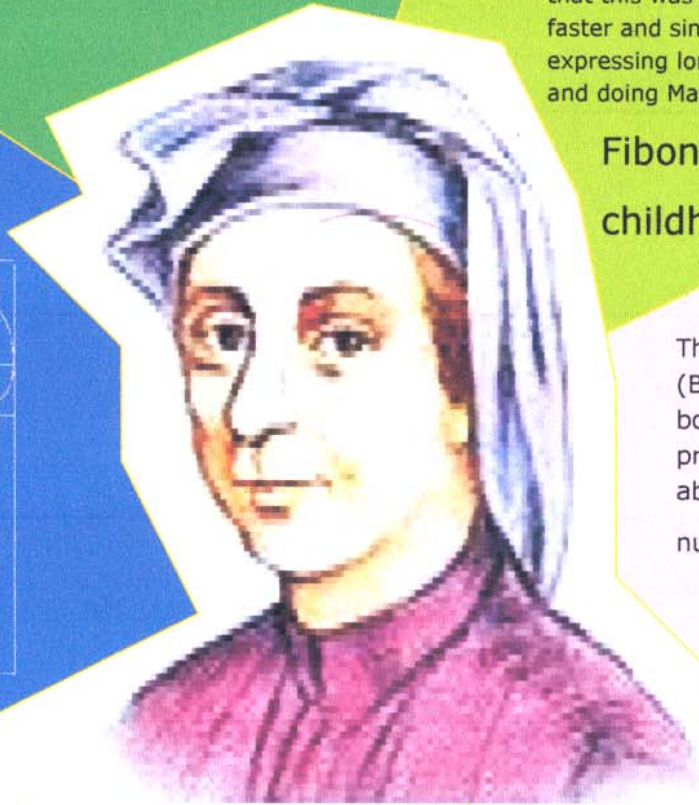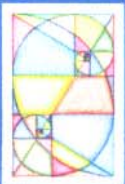
Leonardo Fibonacci

Leonardo Fibonacci was so popular that some things were named after him in the past 50 years:

- The fibonaccis are a rock band from the 1980's

- In *the da vinci code* The fibonacci seaquence is used as a code which confuses the characters!

Leonardo Fibonacci was Roman Catholic!

He is best known for spreading the Hindu-Arabic numeral system!

Also Known As: Leonardo of Pisa, Leonardo Pisano Bigollo, Leonardo Pisano, Leonardo Bonacci

Fun Facts

Things Named after him!

196418, 317811, 514229, 832040, 1346269, 2178309,

6765, 10946, 17711, 28657, 46368, 75025, 121393,

ALMONDBREAD PIONEERS THEORY OF CAULIFLOWER

With a Germanic name meaning "Almondbread", Benoit Mandelbrot was a Polish-born French mathematician, who spent most of his working life in the U.S.A. , where he pioneered a new field of mathematics called fractals.

Fractals are easily explained if you look closely at a head of cauliflower. The vegetable is made up of lumps, which are smaller copies of the whole. These self-similar shapes are called fractals.
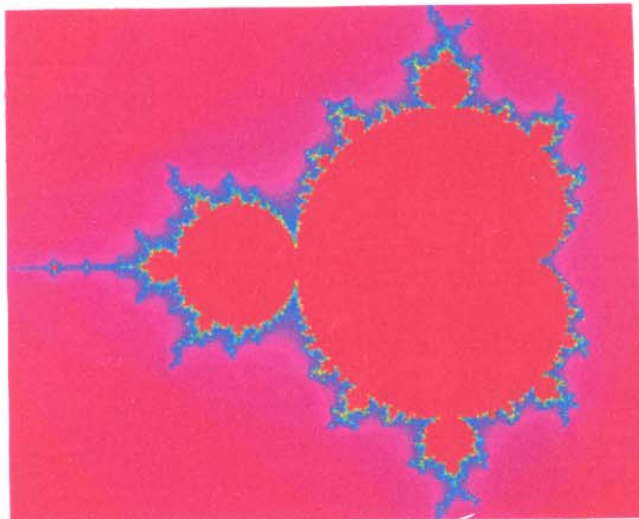
The Mandelbrot set is a shape which Mandelbrot came across when he repeatedly applied an algebraic formula and programmed a computer to draw it. The result was a blob surrounded by a few specks. When you zoom in on the specks, they turn out to be miniature copies of the whole image – baby Mandelbrot sets nestling inside their parents, just like these Russian dolls.

"Mountains are not cones, coastlines are not circles." Mandelbrot proved that a mountain peak is not just a triangle or a pyramid, but a jagged landscape composed of smaller peaks, which are themselves made of even smaller peaks. Benoit Mandelbrot died in October 2010, aged 85. Mathematics is impoverished by his loss.

By Ian Keir

He was an English natural philosopher!

Newton made many contributions to analytic geometry, algebra and calculus. He discovered the binomial theory!

In 1666 Newton discovered the famous apple calling out of an apple tree in his garden!

- He studied at Cambridge with a bachelor degree and no honours or distinction

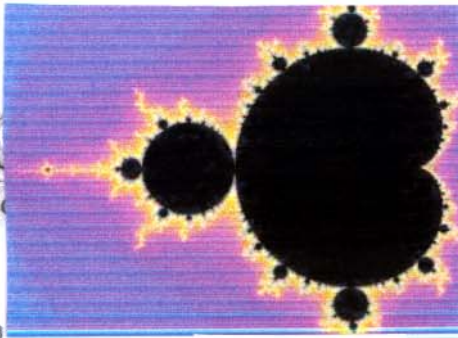- He died in London on March 20th, 1727

- He was knighted in 1705!

Newton

ISAAC

(1642 - 1727)
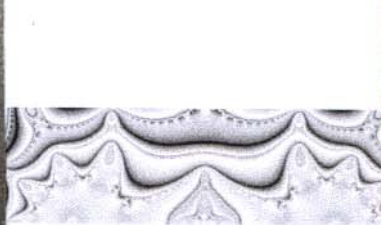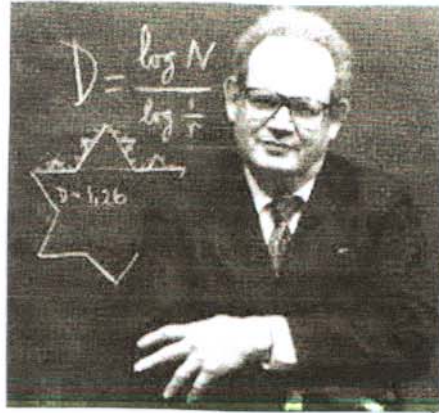
- Was born on 25th December!
- He was born in Woolsthorpe
- His childhood was horrible and throughout his life he had emotional breakdowns.
- He was taken out of school to be a farmer

by Kirsty McIntosh

BENOIT MANDELBROT

20 November 1924
Warsaw, Poland.

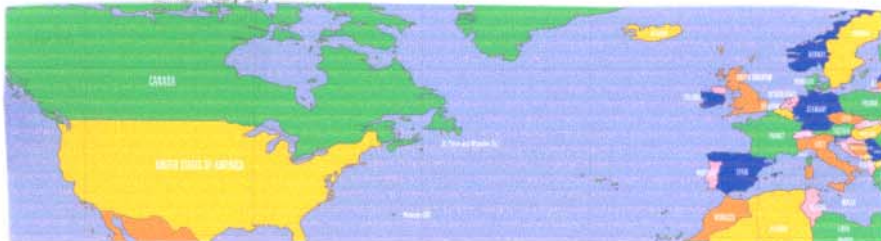Married Aliette Kagan
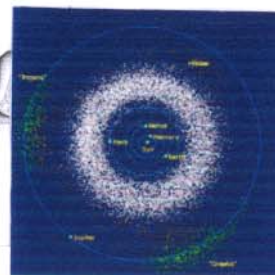France 1955

Two sons
Laurent and Didier

iBM - Thomas J. Watson Research Center

Yorktown Heights, New York.

Retired
2005

Poland 1924 – 1936, France 1936 – 1955,
Switzerland 1955 – 1958, USA 1958 – 2010.

27500 Mandelbrot

is a main-belt asteroid

14 October 2010

by Georgina Chinas

EUCLID

Euclid of Megara and Alexandria was a Greek mathematician. He was renowned as the 'Father of Geometry'. It is believed that he was born around 322BC and he died around 275 BC. He was the first to prove there infinitively many prime numbers; he stated and proved the factorisation theorem; he devised Euclid's algorithm for computing. He proved that there are only five "platonic solids" (Tetrahedron, Cube/Regular Hexahedron, Octahedron, Dodecahedron, Icosahedron), as well as theorems of Geometry far too numerous to summarise; among many with special historical interest is proof that rigid-compass constructions can be implemented with collapsing-compass construction.
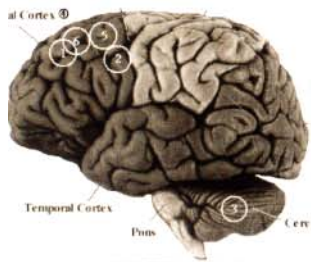
by Sam Kirkbright

A World of Fractals

Fractals are continuous patterns and are the same shape at different scales.

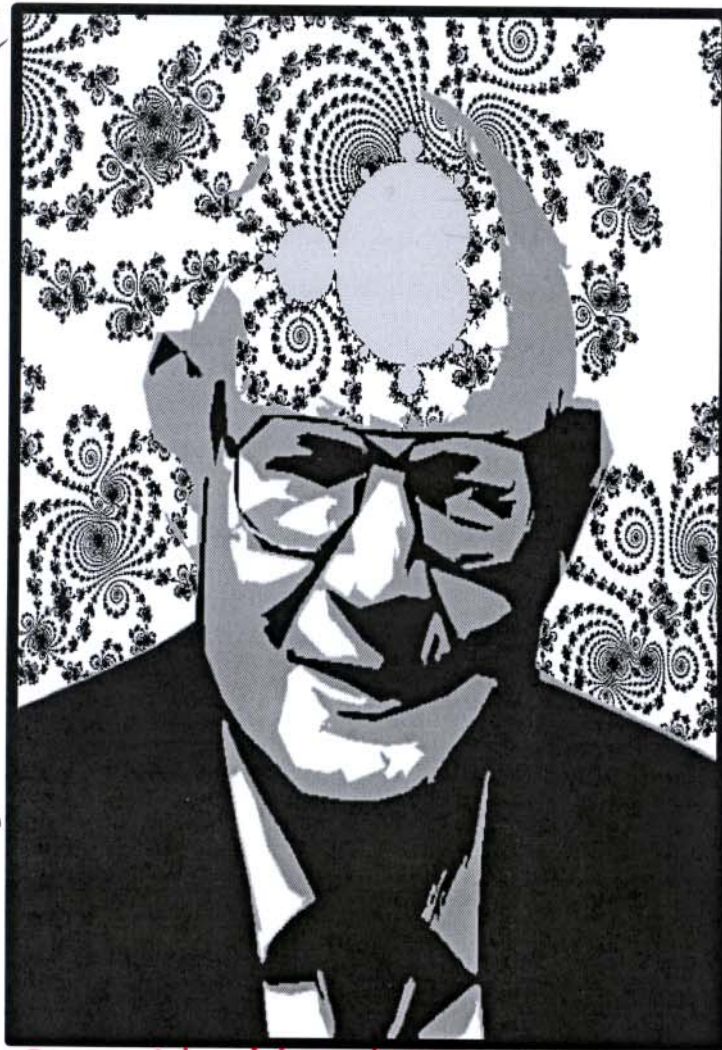Examples of natural Fractals ↓

a tree

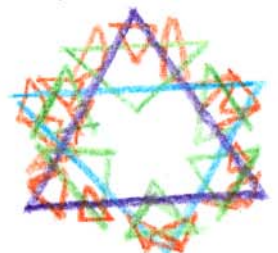a brain

Rocks

Make your own Fractals

Step1

Step2

Step3

Step4

Benoît MandelBrot

More Examples of natural Fractals ↓

Benoit B. Mandelbrot lived from the 20th November 1924 to the 14th October 2010. Benoit was a Franco-American Mathamatician that worked on his man-made Fractal (the Mandelbrot set, it's on his fore head). people thought he was crazy, but when he created his set he wrote Many book to publicise fractals. Before he didd, he won 30 awards; 25 awards he won because fractals. He was a visionary. His fractals theory change many fields of science & the way we view the world.

← Leafs →

Music →

by Marius Saunders

BLAISE PASCAL

He also looked at the points problem which asks how do you divide the stakes if a game of dice is incomplete. He solved it for a 2 player game but never got any further.

This is BLAISE PASCAL.
He was born on the 19th of June 1623.
he died on the 19th August 1662.

• At the age of 16, he presented a piece of paper to a Mersennes meeting. It contained a number of projective geometry theorems including his mystic hexagon.

He laid the foundation for the theory of probability. He considered **The Dice Problem.** this asks how many times you have to throw a dice before getting a double 6. He found the answer with the help of Fermat.

Pascal's last work was on the cycloid, the curve traced by the point on the circumference of a rolling circle. He also solved the problem of the volumes and surface area of the revolution formed by a rotating cycloid about the x-axis.
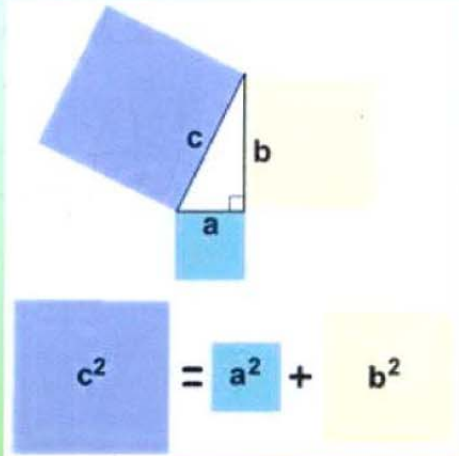
This is a Pascaline calculator which Pascal invented himsely in 3 years, making him the 2nd person to invent a mechanical calculator, the 1st been Schickard.

by Paige Wilson

$$c^2 = a^2 + b^2$$

He had a group of followers (like the disciples of Jesus) who followed him around and taught other people what he had taught them. Both men and women were Pythagoreans. Pythagoreans were interested in philosophy, but especially in music and mathematics , two ways of making order out of chaos. Music is noise that makes sense, and mathematics is rules for how the world works.
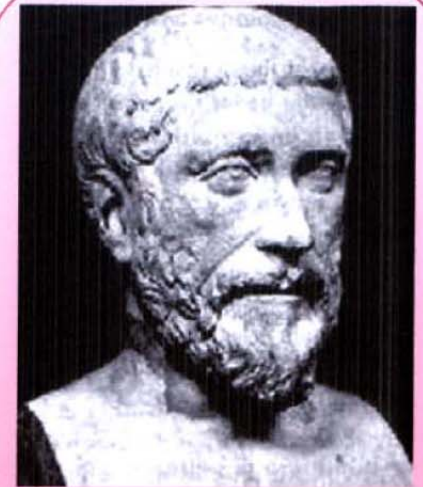

He lived in the 500`s BC and he was one of the first Greek mathematical thinkers.

He spent most of his life in the Greek colonies in Sicily and southern Italy!

PYTHAGORAS

Here is how to do the theory!

The Pythagorean Theorem says that in a right angle, the sum of the square of the two right-angle sides will always be the same as the square of the hypotenuse (the long side). $A^2 + B^2 = C^2$. Try it yourself: if Side A is 4 inches long, and Side B is 3 inches long, then 4x4=16, and 3x3=9, and 9+16=25, and so Side C will be 5 inches long. Try it with other size triangles and see if this is still true (you can use a calculator, or your computer, to figure out the square roots).

Rebecca Whitehouse
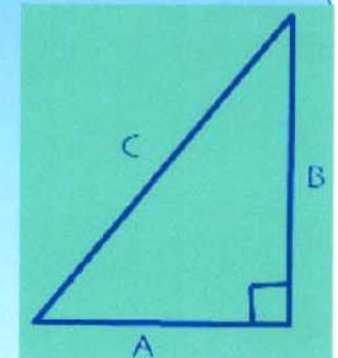
← möbius Strip →

August Ferdinand created the Möbius strip. Which is a strip of paper twisted in the middle and then stuck together with tape.

Born - November 17th 1790
Died - September 26th 1868

Möbius entered the University of Leipzig in 1809 and soon decided to concentrate on mathematics astronomy and physics.

Many mathematical concepts are named after him, including the Möbius transformations. The asteroid 28516 Möbius is also named after him.
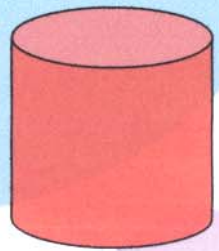
August Ferdinand Möbius

By Emily Hood.

GRIGORI PERELMAN

Grigori Perelman is one of the most famous Russian mathematicians. He was born on the 13th June 1966, Leningrad (now St. Petersburg) during the Soviet Union.

Grigori has a sister called Elena who grew up to be a maths teacher. When he was younger his father, who worked as an engineer, and his mum, who was also a maths teacher, used to give him brainteasers, which he worked out quickly by himself and from then on his family (who were Jewish) noticed that they had a gifted child!

Later on in his life, everybody seemed to know Grigori more as a mathematician than a friend! A couple of years ago, Grigori was offered a top award which was a field's medal that could potentially be worth $15,000 for his achievement of solving puzzles, but refused to accept this offer.
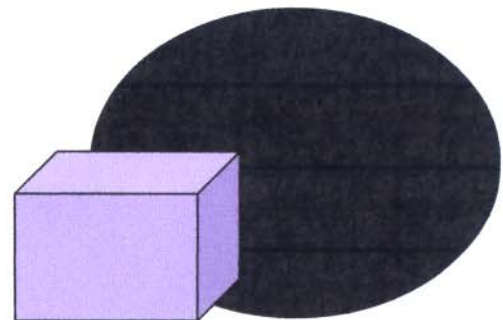
In 2010 Grigori was again under pressure to accept the first clay millennium prize problems award of $1,000,000 for solving the Poincaré conjecture, however he rejected this prize as he felt that U.S mathematician Richard Hamilton who starting the program that led to the solution was equally deserving.

by Linda Hall

STEPHEN HAWKING

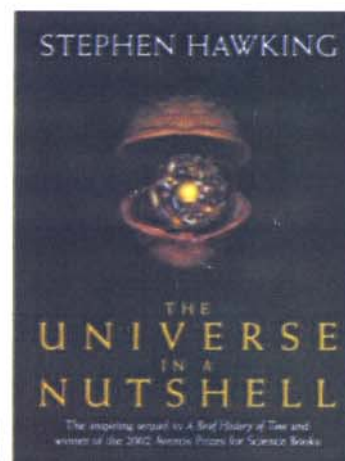## PROUD TO BE BRITISH

1942 TO PRESENT

Whilst trying to prove the Singularities and the Geometry of Space-Time he realised that the mathematical techniques needed to do his calculations didn't exist so he devised some new ones.

Before he was diagnosed with amyotrophic lateral sclerosis he enjoyed horse riding and rowing. He gradually lost the use of his arms, legs and voice

In 2009 he won the Presidential Medal of Freedom, the highest civilian honour in the United States.

STEPHEN HAWKING

THE UNIVERSE IN A NUTSHELL

The inspiring sequel to A Brief History of Time and winner of the 2002 Aventis Prizes for Science Books

"My goal is simple. It is a complete understanding of the universe, why it is as it is and why it exists at all."
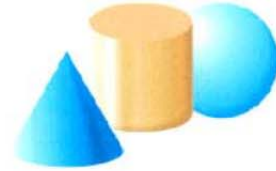
by Izzy Greenook

Archimedes

He was sent to Alexandria, Egypt to study mathematics and also to get away from the war that was going on at the time.

He made the formula for the area and volume of 3D shapes.

Syracuse, Sicily. Where Archimedes was born, in 287BC

He devised a new number system that was capable of showing larger numbers than the Greek number system.

Archimedes was an inventor as well as a mathematician. He created the Archimedes' screw. It was used to pump water out of ships because it could pump it to higher levels.
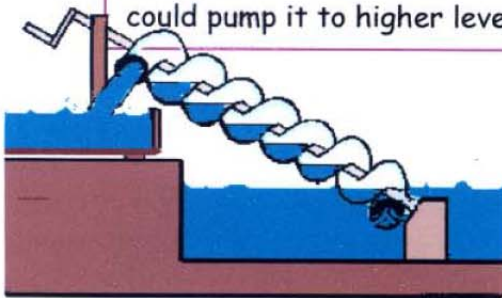
Archimedes is somewhat known for shouting, "Eureka!" whilst running down a street, naked. He did this after he found out how to tell the difference between a crown made out of pure gold and a crown mixed with other materials. "Eureka!" means, "I've found it!"

It is said that a Roman soldier killed Archimedes in war. They say that the soldier's shadow began to shade Archimedes' drawings in the soil. He supposedly said, "ΜΗΝ ΜΟΥ ΤΟΥΣ ΚΥΚΛΟΥΣ ΤΑΡΑΤΤΕ," which means, "Don't disturb the circles drawn by me. I am in deep thinking right now," before the Roman soldier murdered him.

DON'T DISTURB MY CIRCLES.

Archimedes once said, "Give me a place to stand on and I will move the earth." He said this after he found out the laws of the lever.

by Cassie Pill

Augustin Louis Cauchy

August 21 1789-23 May 1857

Background

Cauchy was born on 21 August 1789 in Paris and died on 23 May 1857. He was educated by his father. His first occupation was an Engineer in Cherbourg in 1810. He stopped being an Engineer because of health and devoted himself to mathematics.

Best known for

Cauchy was best known for a lot of things like the Theory of Functions, integral and differential calculus and Algebraic analysis just to name a few.
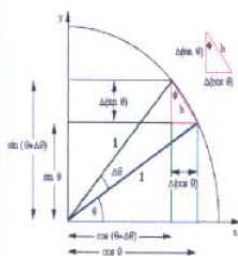
Mathematician

He was one of the most famous mathematicians of the 19th century. He was a professor at École Polytechnique. One of his great successes at that time was the proof of Fermat's polygonal number theorem.

Writing

Cauchy was a prolific writer, he wrote approximately eight hundred research articles and five complete textbooks.

The Polygonal Number Theorem

That states that every positive integer is a sum of at most n n-gonal numbers. Every positive number can be written as the sum of three or fewer triangular numbers and so on.

AN INTRODUCTION TO THE ART OF MATHEMATICAL INEQUALITIES

The
Cauchy–Schwarz
Master Class

J. Michael Steele

$17 = 10 + 6 + 1$ (*triangular numbers*)
$17 = 16 + 1$ (*square numbers*)
$17 = 12 + 5$ (*pentagonal numbers*).

Famous Sayings

Men Pass way,

But their deeds abide

By Sarah McKee
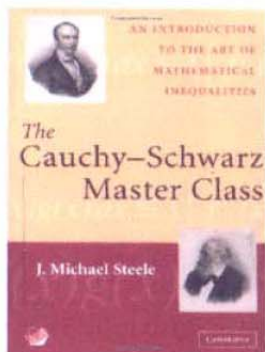
Leonhard Euler

1707-1783

Leonhard Euler was born in Basel, Switzerland in April 15 1707
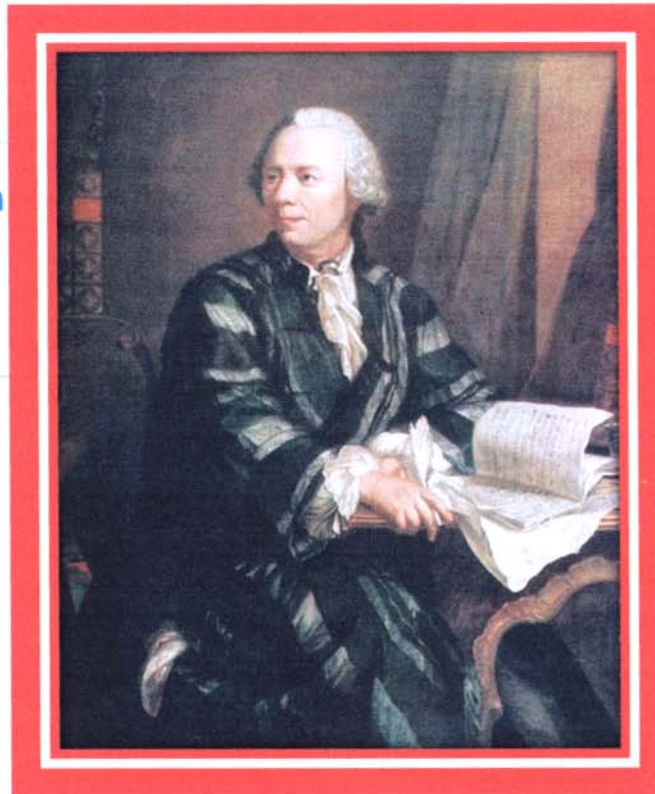
September 18, 1783 in St. Petersburg

Here Lies

Leonhard Euler

1707-1783

REST IN PEACE

**Leonhard Euler was responsible for the following:-**

+ **(x) for function notation**

+ **a, b, c for the sides of triangle ABC**

+ **i for the imaginary unit $\sqrt{-1}$**

+ **Σ for the summation sign**

+ **e for the base of natural logarithms**

His father was an amateur mathematician and he influenced Leonhard into becoming one. In 1727, on the invitation of Catherine I, Euler took up his residence in St. Petersburg.

He was married twice, his second wife being a half-sister of his first. He had 13 children; though all but five of them died young, he did a lot of his work with his children playing at his feet.
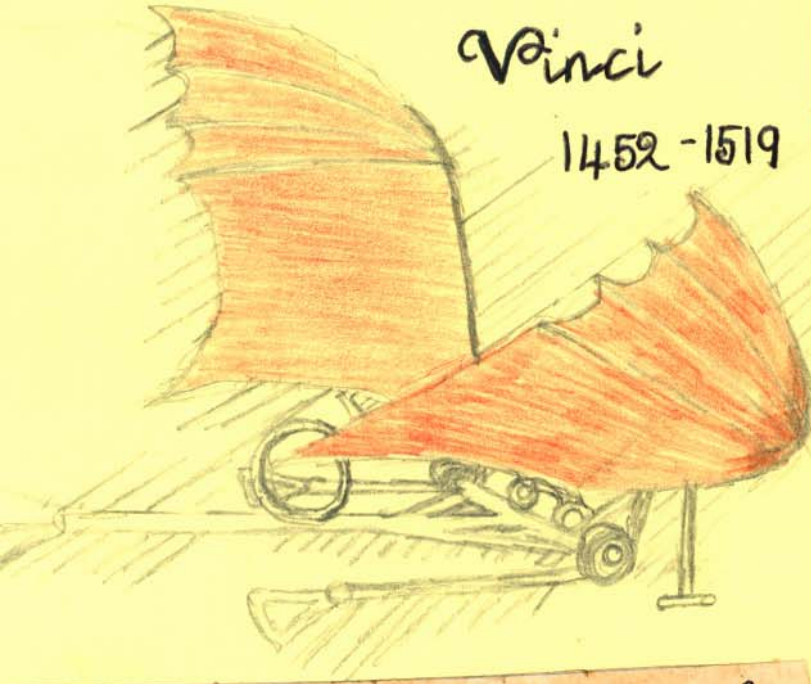
By Millie Collins

Isaac Newton

Wrote a book called Opticks which was about lights was published 1704

by Keris Douglas
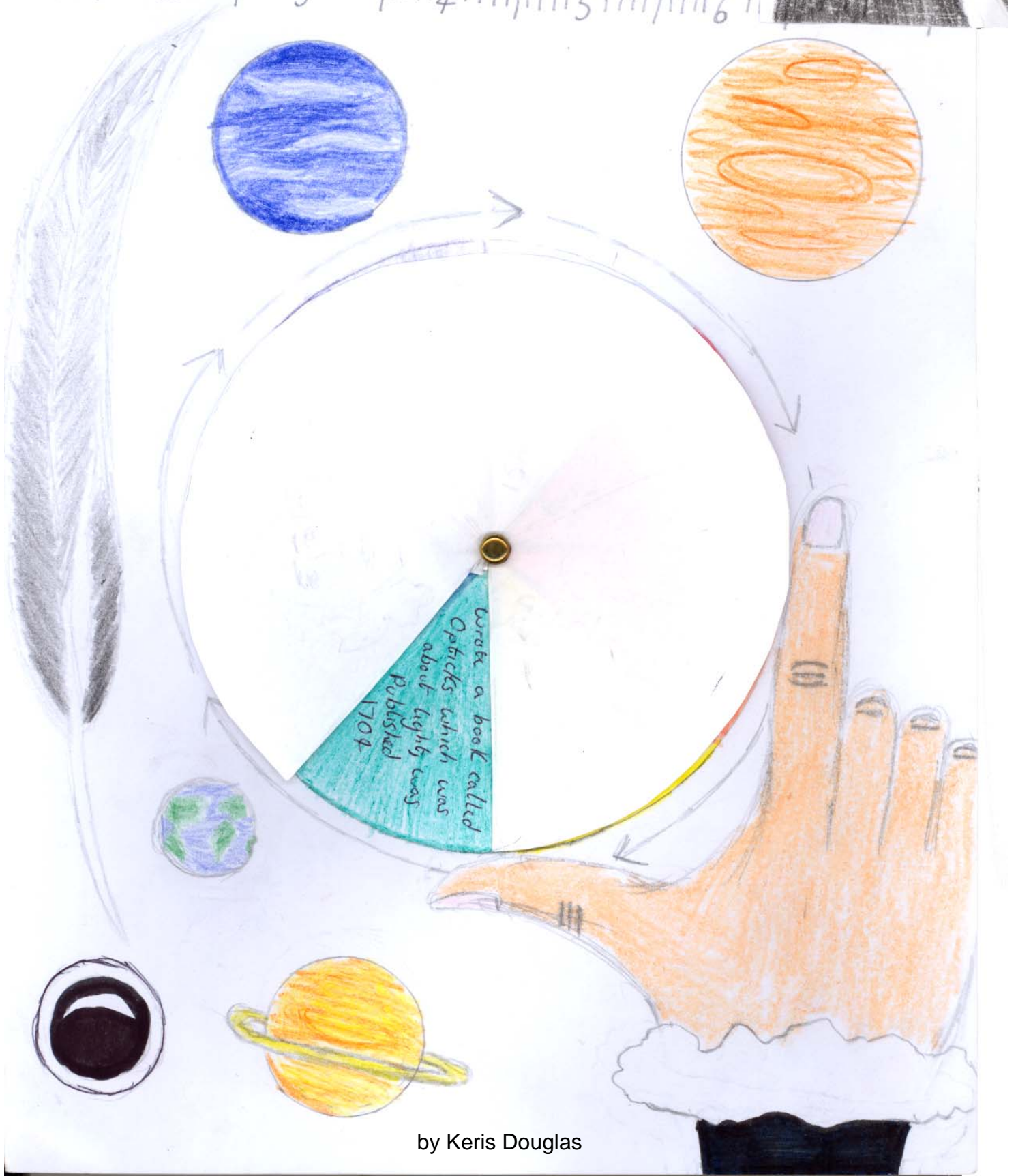
Leonardo Da Vinci
1452 - 1519

Leonardo wrote a series of scientific notebooks. The subjects covered were: maths, art, invention and the human body. He looked at the science of painting, architecture, mechanics, human anatomy, botany, geology, aerology, and hydrology. Leonardo's book's are distinctive because of the relation of illustration to text and his use of mirror writing. Leonardo never published his writing's. He was left handed and wrote from right to left so that his notes can only be read in a mirror. He may have been afraid that his opinions were against the church and beliefs at the time.

Leonardo spent years observing and analising the flight of insects and birds which helped him devise this flying machine above.

Leonardo was a genius. He believed that true knowledge came from "knowing how to see." Whenever he came across a problem he tried an experiment to solve it and would never accept what he read without checking with his own eyes.

The Mona Lisa was painted about 1502. This demonstrates Leonardo's famous invention called sfumato (blured outline and mellow colours which leave something to our imagination.

by Rosemary McDonald

$x + - \div = \sqrt{} \quad x + - \div = \sqrt{} \quad x + - \div = \sqrt{}$

A R C H I M E D E S

His name in Greek!

ΑΡΧΙΜΗΔΗΣ

EUREKA!!

Archimedes wanted to find out if he could be the first person to weigh things without scales. So one day he went in the bath and noticed the water level rose because of his weight. He jumped out of the bath and ran down the street (FULLY NAKED!) and shouted Eureka because he was so, so Exited!

Archimedes of Syracuse was a Greek mathematician, physicist, Engineer, inventor and astronomer.

Although few details of his life, he is regarded as one of the leading scientists in classical antiquity.

He used the method of Exhaustion to calculate the area under the arc of a parabola with the summation of an infinate series, and gave a remarkably accurate approximation of PI.
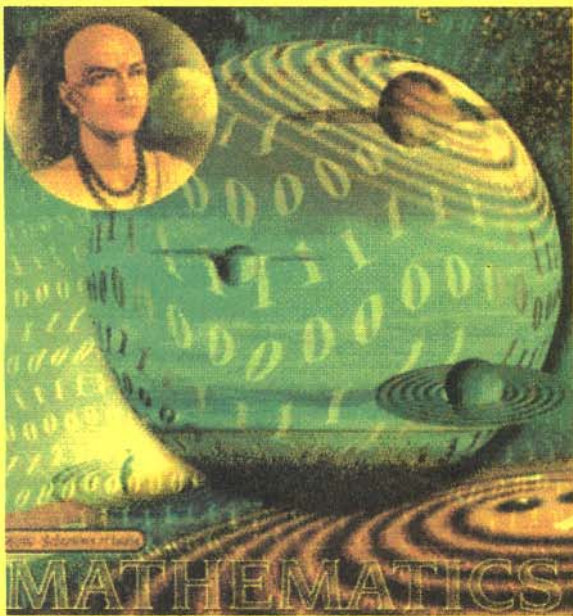
OF SYRACUSE!!

by Jordan Todd

Aryabhata

(476-550 A.D.)

- Aryabhata wrote mathematical and astronomical theories which are used in modern mathematics.
- He discovered Pi to four decimal places (3.1416) which was very close to the actual value of Pi (3.14159).

MATHEMATICS

- He calculated the circumference of the earth as 24835 miles which is close to modern day calculation of 24900 miles.
- He contributed to arithmetic, algebra and trigonometry.
- History suggests that he made a huge contribution to the discovery of zero, without which there would not be, much maths to teach today!

Not much is known about Aryabhata's life although it is speculated that Aryabhata might have been the head of the Nalanda University as well. It is also thought that he set up an observatory at the Sun temple in Taregana, Bihar.

by Sharan Maiya

PYTHAGORAS

Pythagoras was born in Greece in 500BC, the son of a Gem Merchant. He played the lyre and was very well educated and interested in mathematics, philosophy, astronomy and music.

I don't like to boast but I was the very first pure mathematician and discovered Pythagorean Theorem!

I don't like the look of that mob!
(Pythagoras was believed to have been killed by an angry mob)

$a^2 + b^2 = c^2$
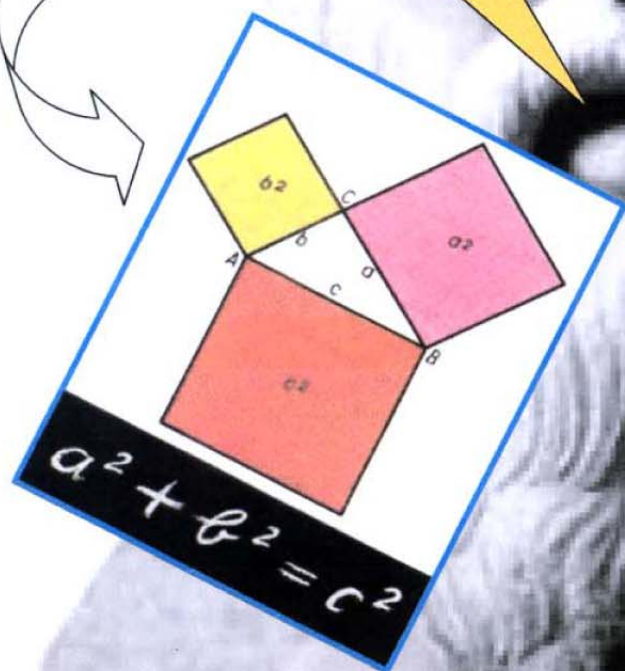
LIFETIME DIARY

535BC: I moved to Egypt to study with the Priests but was taken prisoner and sent to Babylon ... a fine welcome I must say!

520BC: Finally I was freed and went back home to Greece. Opened a school ... called it The Semicircle ... Feeling better already.

518BC: Settled in Crotona in Italy and founded the school of Philosophy and Religion.

His followers were called 'Pythagoreans'.
They lived by strict rules and held mystical views of numbers

by Thomas Broster

Pythagoras

Born: 570 BC   Died: 495 BC

He had a group of followers who followed him around and taught other people what he had taught them.

Pythagoras was a Greek philosopher who made developments in mathematics, astronomy an the theory of music

$$A^2 + B^2 = C^2$$

The theorem can be written as an equation relating the lengths of the sides a, b, and c. Often called the Pythagorean equation. C represents the length of the hypotenuse and a and b represent the lengths of the other two sides.

C

A

B

by Daryn Toomey
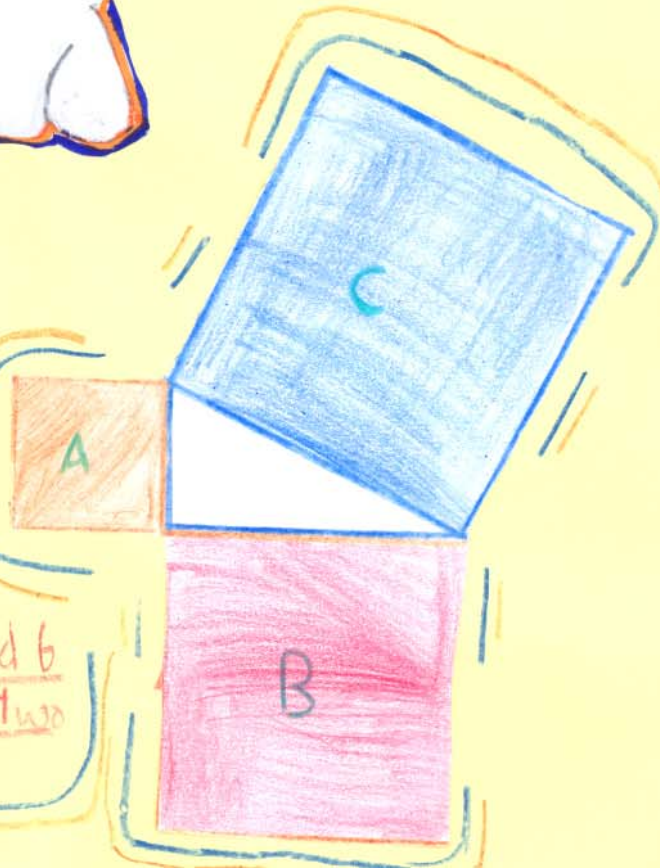
Leonardo Pisano Fibonacci

"The greatest mathematician of the middle ages!"

He was born in Pisa in Italy. Therefore he got the name Pisano!

He died in the 1240's but there is a statue commemorating him in Pisa.

He studied and wrote about the 'nine Indian figures' for a long time.

His famous book was 'Liber Abori' which means 'The Book of calculations'.

He took an interest in the Hindu-Arabic system and was one of the first people to introduce this system into Europe.
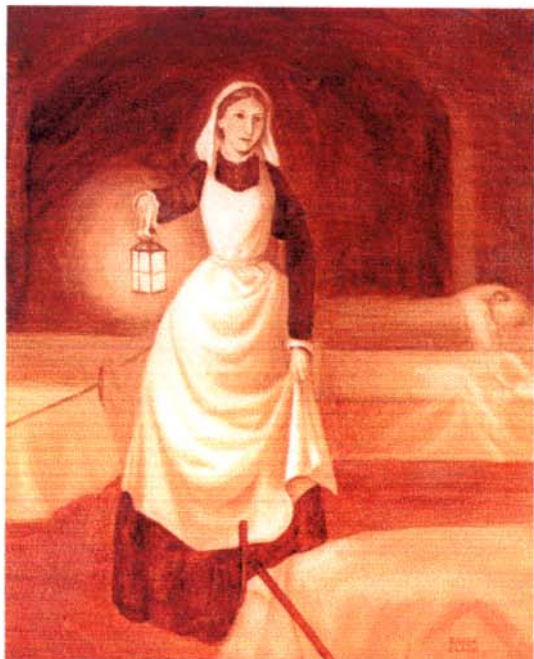
Fibonacci Numbers

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987...
This is the pattern Fibonacci invented where each number is the sum of the two previous numbers. For example:
$1+1=2 \rightarrow 1+2=3 \rightarrow 3+2=5 \rightarrow 5+3=8 \rightarrow 8+13=21$ ect...

By Katie Thornton

Florence Nightingale

Born 1820 Died 1910

Florence Nightingale was born in Italy on 12th May 1820. She was taught at home by her Father, who believed that girls were just as worthy of a good education as boys. Florence Nightingale is most famously known as the 'Lady with the Lamp'. She led the nurses caring for thousands of soldiers during the Crimean War and helped save the British army from medical disaster.

She used graphs and tables to record the incidence of preventable deaths in the military. She was innovative in her collection, recording, interpretation, and graphical display of information she collected from patients. She developed the "polar-area diagram" to highlight the needless deaths of soldiers caused by unsanitary conditions and the need for healthcare reform and an improvement of sanitary methods. With her analysis, Florence Nightingale showed that social conditions could be measured and analysed mathematically.

Causes of Mortality in the Army in the East
April, 1854 to March 1855

Non-Battle
Battle
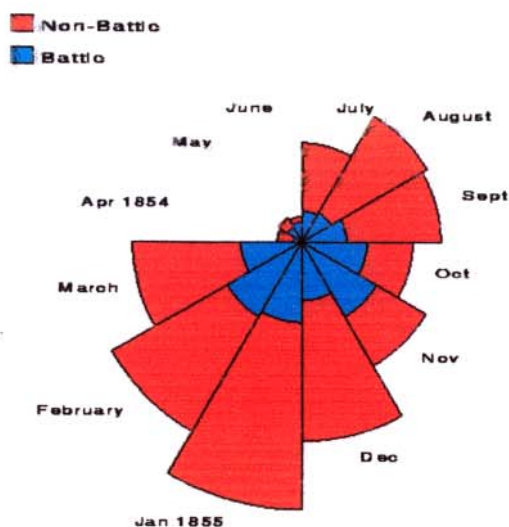
From: F. Nightingale, "Notes on Matters Affecting the Health, Efficiency and Hospital Administration of the British Army", 1858

It was her work during the Crimean War that created the legend of the Lady with the Lamp and it was her experience here that drove her to continue researching, writing and campaigning for better healthcare conditions for hospital patients.

Her writings continue to be a resource for nurses, health managers and planners to this day.

by Alexandra Black