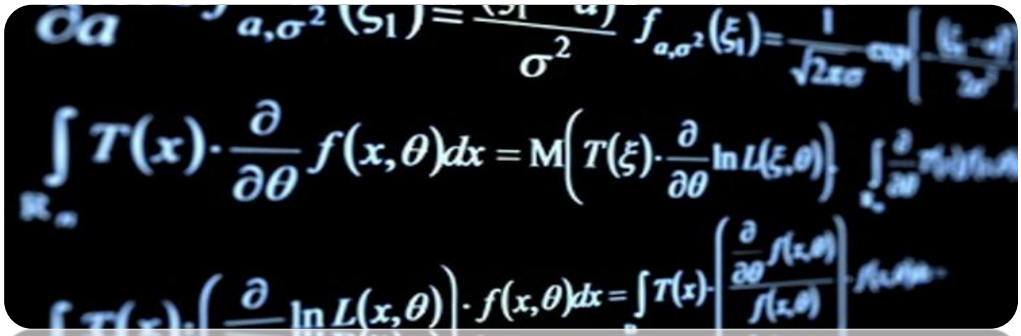
ALU SCHOOL OF MATHEMATICS



ALU MATHS NEWS

Volume 1, Issue 9 **News Letter** *Since: 11/01/2017*

We are delighted to bring to you this issue of ALU Mathematics News, a monthly newsletter dedicated to the emerging field of Mathematics. This is the first visible —output from the Department of Mathematics, Alagappa University. We are committed to make ALU Mathematics News a continuing and effective vehicle to promote communication, education and networking, as well as stimulate sharing of research, innovations and technological developments in the field. However, we would appreciate your feedback regarding how we could improve this publication and enhance its value to the community. We are keen that this publication eventually grows beyond being a mere —news letter to become an invaluable information resource for the entire Mathematics community, and look forward to your

Dr. N. Anbazhagan

1) Always End With 1089

Add two number together and always end with 1089. Here is How:

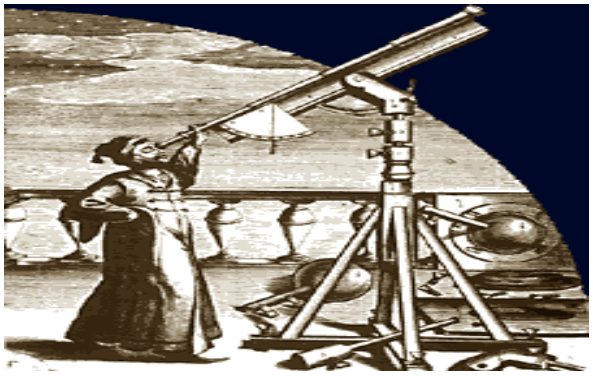
Pick a three digit number. **The three numbers used must be different***. i.e. 123 → Reverse that number. 123 becomes 321

Take the smallest three digit number from the largest. 321 − 123 = 198 → Take the answer and reverse that number. 198 becomes 891

Add that number to the answer of the subtraction. 891 + 198 = 1089 → **The answer will be 1089**

2) MATHEMATICS: THE BEAUTIFUL LANGUAGE OF THE UNIVERSE

Mathematics is the language in which God has written the universe- **Galileo Galilei**



A defining moment for humanity: Galileo turning his spyglass towards the sky.

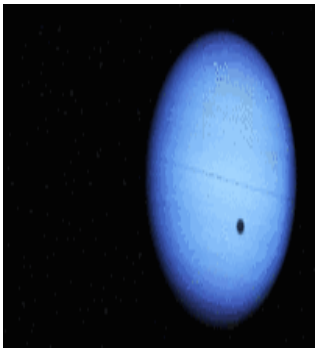
Johannes Kepler used mathematics to model his observations of the planets.

$$P^2 = \left[\frac{4\pi^2}{G(M+m)}\right] a^3$$

Gravitational constant G, and M and m representing the masses of the two bodies in question

URBAIN LE VERRIER

French mathematician who discovered the planet Neptune by using only mathematics.



French mathematician **Urbain Le Verrier** who sat down and worked through the mathematical equations of the orbit of Uranus.

He was using Newton's mathematical equations backwards, realizing that there must be an object out there beyond the orbit of Uranus that was also orbiting the sun.

Confident of his mathematical calculations, he took his numbers to the **New Berlin Observatory**, where the astronomer **Johann Gottfried Galle** looked exactly where Verrier's calculations told him to look, and there lay the 8th and final planet of our solar system, less than 1 degree off from where Verrier's calculations said for him to look.

This was an incredible confirmation of Newton's gravitational theory and proved that his mathematics were correct.

Neptune is the only planet to be discovered using mathematics rather than just observation.

3) Mathematical Illutions

Given $a = b$

$a^2 = ab$

$a^2 - b^2 = ab - b^2$

$(a + b)(a - b) = b(a - b)$

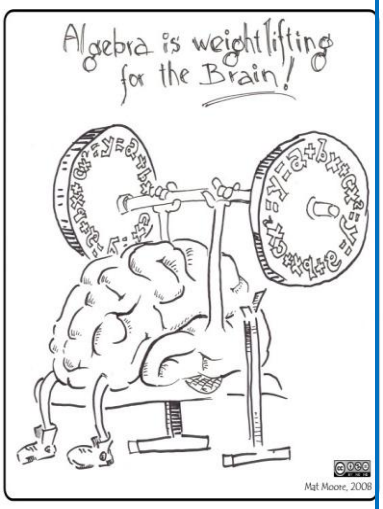
$a + b = b$

$a + a = a$

$2a = a$

$2 = 1$

HOW????



Maths facts

- **Zero** is the only number that can't be represented in Roman numerals. The Latin word "nulla" would have been used instead.
- $(6 \times 9) + (6 + 9) = 69.$
- The word **hundred** is derived from the word "**hundrath**", which actually means120 and not 100.
- **555** is used by some in Thailand as slang for "**hahaha**", because the word for "**five**" is pronounced "ha".

4) What is Infinity?

Infinity ...

... it's not big ...

... it's not huge ...

... it's not tremendously large ...

... it's not extremely humongously enormous ...

... it's ...

Endless!

Infinity has no end

Infinity is the idea of something that has no end.

In our world we don't have anything like it. So we imagine traveling on and on, trying hard to get there, but that is not actually infinity.

So don't think like that (it just hurts your brain!). Just think "endless", or "boundless".

If there is no reason something should stop, then it is infinite.

Infinity does not grow

Infinity is not "getting larger", it is already fully formed.

Sometimes people (including me) say it "goes on and on" which sounds like it is growing somehow. But infinity does not **do** anything, it just **is**.

Infinity is not a real number

Infinity is not a real number, it is an idea. An idea of something without an end.

Infinity cannot be measured.

Even these faraway galaxies can't compete with infinity.

Conclusion

Infinity is a simple idea: "endless". Most things we know have an end, but infinity does not.

5) Big Numbers

There are some really impressively big numbers.

A Googol is 1 followed by one hundred zeros(10^{100}):

10,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000

A Googol is already bigger than the number of elementary particles in the known Universe, but then there is the **Googolplex**. It is 1 followed by *Googol zeros*

10,000,000,000,000,000,000,000,000,000,000,000,000,000, ... (Googol number of Zeros)

For example, a Googolplex can be written as power tower: $10^{10^{100}}$ But imagine an even bigger number like $10^{10^{10^{1000}}}$ (which is a **Googolplexian**).

Finite

All of these numbers are "finite", we could eventually "get there".

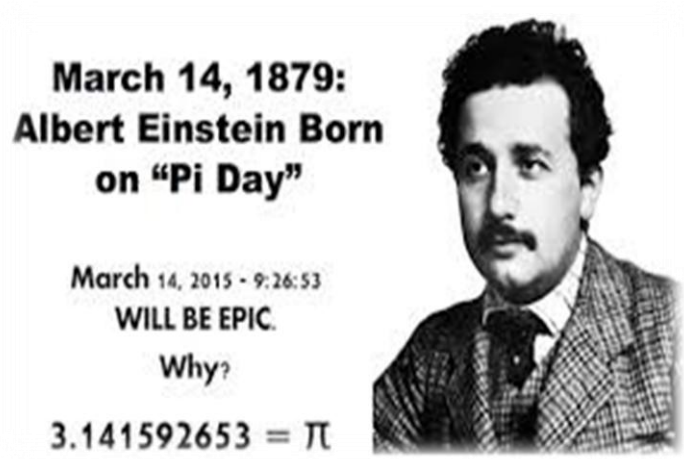
But none of these numbers are even close to infinity. Because they are finite, and infinity is ... **not finite!**

6) Pi day

Pi Day is an annual celebration of the mathematical constant **π** (pi).

Pi Day is observed on **March 14** (3/14 in the *month/day* date format) since 3, 1, and 4 are the first three significant digits of **π**.

Pi Approximation Day is observed on July 22 (22/7 in the *day/month* date format), since the fraction $^{22}/_{7}$ is a common approximation of **π**, which is accurate to two decimal places and dates from Archimedes.



7) Square Root Day

Square Root Day is celebrated on days when both the day of the month and the month are the **square root** of the last two digits of the year.

For example, the last Square Root Day was **April 4, 2016** (4/4/16), and the next Square Root Day will be **May 5, 2025** (5/5/25). The final Square Root Day of the century will occur on **September 9, 2081**. Square Root Days fall upon the same nine dates each century.

Full list of Square Root Days

Square Root Day occurs on the following dates each century:

- 1/1/01
- 2/2/04
- 3/3/09
- 4/4/16
- 5/5/25
- 6/6/36
- 7/7/49
- 8/8/64
- 9/9/81

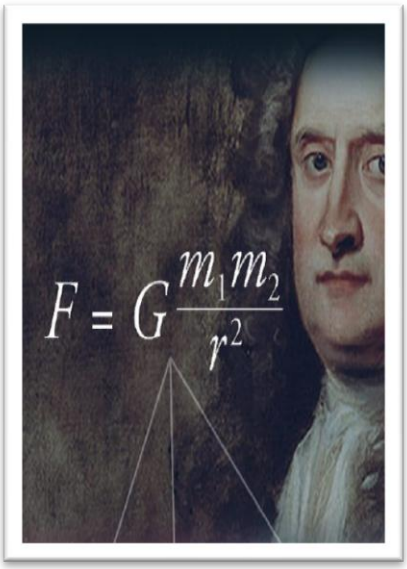
8) TEN EAUATIONS THAT CHANGED THE WORLD

The brightest minds in history have used mathematics to lay the foundation for how we measure and understand our universe. Time to time again, we have proved that it only takes one simple formula to alter the course of humanity.

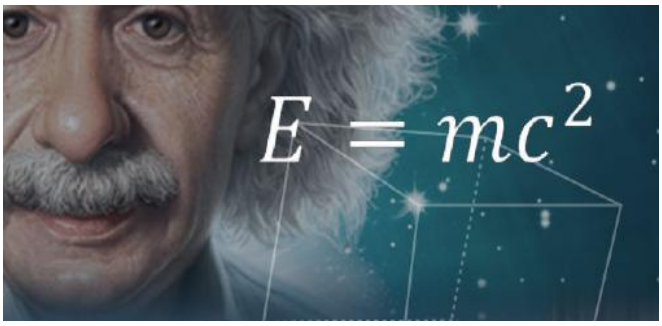
Here are ten equations that did just that.

I. ISAAC NEWTON'S LAW OF UNIVERSAL GRAVITATION

Newton's law explains why the planets move the way they do , and how gravity works , both on earth and throughout the universe . First published in **THE PRINCIPIA in july 1687** , the law of universal Gravitation was the defacto reference equation for nearly 200 years untill Einstein's Theory of General relativity replaced it.

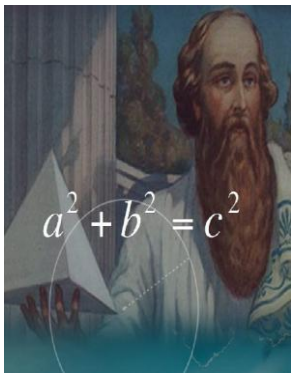


II. ALBERT EINSTEIN'S THEORY OF RELATIVITY



Einstein's most famous understanding is the generally accepted theory on the relationship between space and time. First proposed in 1905, the theory of relativity has both radically altered the course of physics, and depended our knowledge of the universe's part, present, and future.

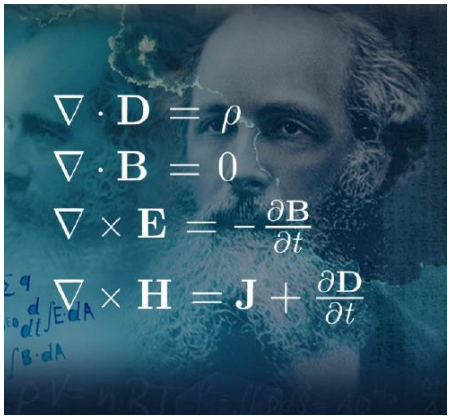
III. THE PYTHAGOREAN THEOREM



This ancient theorem first recorded area 570-495 BC is a fundamental principle in Euclidean geometry, and the basis for the definition of distance between two points. Pythagoras' theorem also describes the relationship between the sides of a right triangle on a flat plane.

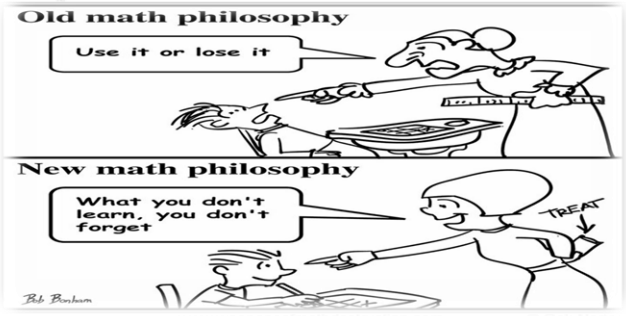
IV. MAXWELL'S EQUATION

James clerk Maxwell's set of equations describe how electric and magnetic fields are generated and altered, both by each other and by charges and currents. First published between 1861 and 1862, they are to classical electromagnetism what Newton's laws of motion and universal gravitation are to classical mechanics.



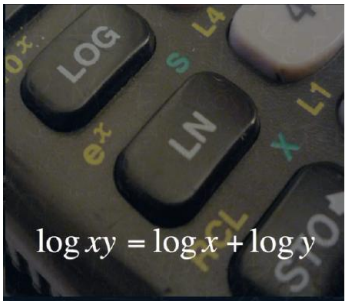
V. THE SECOND LAW OF THERMODYNAMIC

Rudolf calusius' law states that energy always flows from higher concentration to lower concentration. Formulated in 1865, it has led to the development of technologies like internal combustion engines, cryogenics, and electricity generation.



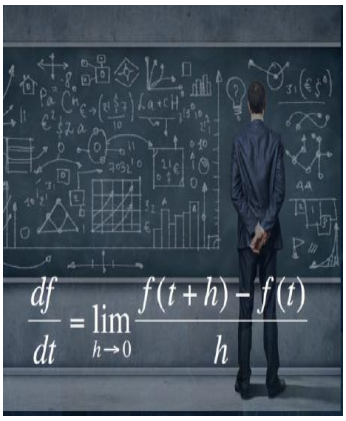
VI. LOGARITHMS

Logarithms were introduced by John Napier in the early 17th century as a way to simplify calculations.



They answer the question," How many of X number do we multiply to get Y number?". Logarithms were adopted by early navigators , scientists and engineers. Today, scientific calculators and digital computers do the work for us.

VII. CALCULUS

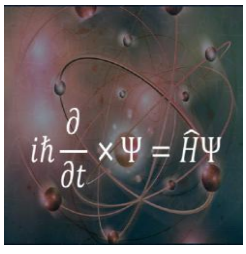


The derivative measures the rate at which a quantity is changing.

In the 1600s, Newton used calculus to develop his law of motion and gravitation.

VIII. SCHRODINGER'S EQUATION

Developed by Austrian physicist ERWIN SCHRODINGER in 1926, it governs the behavior of atoms and subatomic particles in quantum mechanics. Schrodinger's Equation paved the way for nuclear power, Microchips, electro microscopes, and quantum computing.



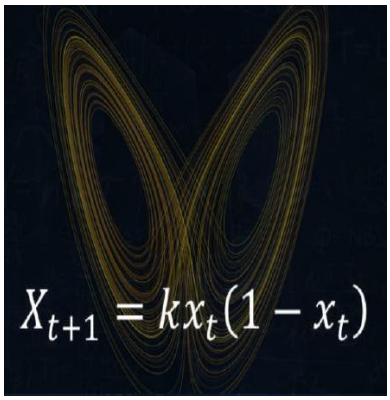
IX. INFORMATION THEORY

Information theory is a branch of mathematics that studies the coding of information in the form of sequences of symbols, and the speed at which that information can be transmitted.

Research in the field was also instrumental in the development of the internet and mobile phones.

X. CHAOS THEORY

Chaos theory is a branch of mathematics that studies complex systems whose behavior is extremely sensitive to slight changes in conditions.



Chaos Theory has applications just about everywhere - Meteorology, sociology, physics, computer science, Engineering, Economics, Biology and Philosophy .