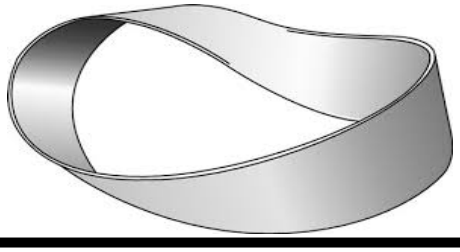
Mathematics at Lister Community School

The Möbius Strip



Issue 2 July 2019

The Möbius Strip

The Möbius strip has only one side. You can travel indefinitely in a loop on the surface of the strip.

This mathematics newsletter got its name because of the infinite nature of learning and the resilience required to improve.

This month:

- Pythagoras;
- More puzzles;
- More really funny maths jokes;
- Andrew Wiles
- Fermat's last Theorem
- Why I love Maths
- What's Going on?

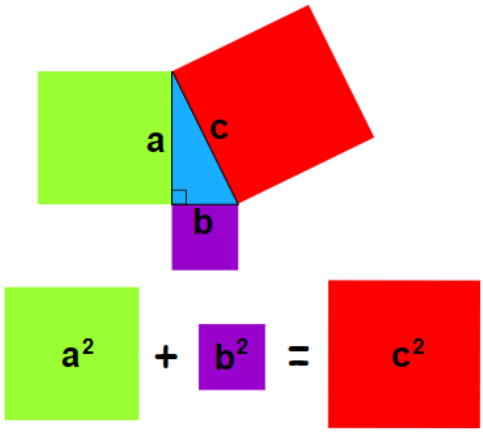
Q: What do you call friends who love maths?
A: Algebros

Q: What do you call a number that can't keep still?
A: A roamin' numeral

Welcome The Möbius Strip is slowly being read by pupils across the school. If you have read it and enjoyed it, let others know. The Möbius Strip can also be found in our amazing library. The biggest complement paid was when I was reading it with a class of Year 8 pupils. When I asked Troy B what he thought of it, he replied,

"It's calm sir".

Pythagoras' theorem



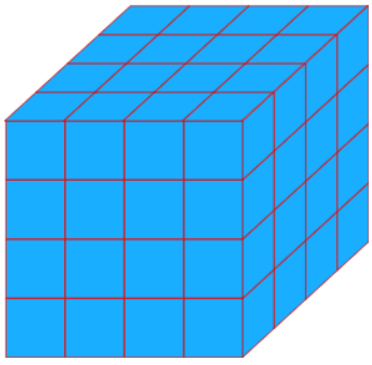
What is Pythagoras' theorem?

When I was at school and learning maths we were told, "the square of the hypotenuse is equal to the sum of the squares on the... ". It was enough to put you asleep. And it did. I just learned to use a formula. Nothing more.

Now, had they shown me a wonderful diagram like the one just to the left of here I would have got it immediately. Now, imagine squares whose sides are the same length as each side of a right angled triangle. Yes?

Pythagoras, said that the area of the big square (which is on the side opposite the right angle, and called the hypotenuse) is equal to the total area of the other two squares. $a^2 + b^2 = c^2$. It's simply writing one square number as the sum of two other square numbers. Apparently it has been proven that there are an infinite number of solutions. Pretty clever really. (Turn over for more on this relationship.)

Puzzle Corner



A solid 4cm cube of wood is coated with blue paint on all six faces. Then the cube is cut into smaller one cm cubes.

These new 1 cm cubes will have either, three blue faces, two blue faces, one blue face or no blue faces.

How many of each will there be?

A summer challenge: What if it were a 3cm cube? Or a 5cm cube? Can you find a general solution for any size cube?

Why I love maths

Mr Hindes (English) on why he loves maths: "For me, maths has always been a powerful way of helping to understand the world around me. I like to think about it as similar to the force in Star Wars. Maths surrounds us and penetrates us. It binds the galaxy together. Most importantly it helps us to understand and conceptualise our own lives. In a very real way maths actually shapes our understanding - did you know for instance that dogs don't understand the concept of zero because they don't need to? Bees on the other hand do understand it because it helps them to know when to stop visiting flowers with no nectar. Why do we love that number? By being interested in maths my life has been exponentially improved because maths takes away the fear of numbers and encourages us to embrace them into our lives. We shouldn't be scared of numbers, we should celebrate the way they shape us. To paraphrase Master Yoda 'my ally is maths and a powerful ally it is.'

Do you want to write about why you love maths? Let me know. Mr Sozomenou

What's Going On ?

Ms Yasmin's Year 10s have just finished their final maths exams for the year! They have a big responsibility as they are now the oldest pupils in the school. We are currently working on histograms (a way of representing grouped data), a very challenging topic in Maths. Well done to Sumaiya J, Aminul, Tanvir and Thuksana for making great progress and always giving 100%! Let's keep working hard in Maths and challenging ourselves to be the best version of ourselves .

Two number puzzles

Solve the following (each letter represents a particular digit 0 to 9): You must only use each digit once. There are 2 possible solutions.
ABC + DEF = GHIJ

Use the digits **1, 9, 9 and 6** exactly in that order to make the following numbers:

28, 32, 35, 38, 72, 73, 76, 77, 100 and 1000
You can use the mathematical symbols :

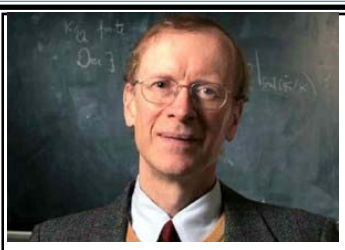
+, -, ×, /, √, ^ (power or index symbol) & brackets.
Examples: **1×9+9×6 = 63 or 19 + 9 - 6 = 22**

Or 1x9 + 9^6 = 9 + 531,441 = 531,450

Andrew Wiles (born 1953)

Andrew Wiles was born in Cambridge. He was always interested in mathematics; from a very young age. He used to find new maths problems in library books that would challenge him. He studied at Cambridge and Oxford and was a professor at Princeton University. He is most famous for proving Fermat's Last Theorem (or conjecture) which he read about when he was just 10 years old.

Pierre de Fermat stated (1637) that no 3 positive integers a, b, and c satisfy the equation $a^n + b^n = c^n$ for any integer value of n greater than 2. The cases $n = 1$ and $n = 2$ have been known, since ancient times, to have an infinite number of solutions. For example we know of many Pythagorean triples. Fermat, and other mathematicians, had proofs to show that there were no solutions for when n=4. Later, between (1637–1839) various mathematicians proved Fermat's *conjecture* for n=3, 5 and 7. We had to wait until 1994 , 358 years, for Wiles to *prove* Fermat's Last Theorem.



Some Pythagorean triples

$3^2 + 4^2 = 5^2$ $5^2 + 12^2 = 13^2$

$8^2 + 15^2 = 17^2$ $20^2 + 21^2 = 29^2$

Andrew Wiles proved that there are no integers (when n>2) that can make the equation $a^n + b^n = c^n$ work. Imagine, to ***prove*** that out of an infinite number of integers, that the equation only works for when n=1 and n=2. Amazing.

Solutions to June Edition : Strategy was required—like in many puzzles!

Magic Square: Place the zero in the middle square and either side place numbers that sum to zero. That will start you off. **Puzzle corner:** 2 solutions are: to make the opposing digits add to 8 and to 7. **Riddle:** The riddle can be written as an equation: x + 2 = 2(x—5). x is my current age. Beautiful stuff.

Have a great, safe summer. ***Mr Sozomenou***