King Edward VI Camp Hill School for Girls

Maths Department Newsletter

21st June 2017

36 is the only triangular number whose square root is also triangular[1]

News

This summer, after 17 years at Camp Hill, we are sorry to say that Mrs Palmer is retiring from teaching. I know you probably think she doesn't look old enough to retire, but we wouldn't put it in the maths newsletter if it wasn't true. Anyway, we thought we had better take this opportunity to ask Mrs Palmer what her favourite maths-related things are, as we might not get another chance.

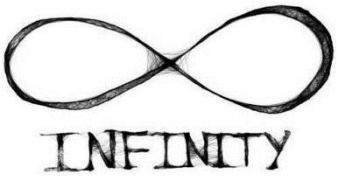
Fibonacci Numbers

Mrs Palmer has spent much of her life thinking about mathematics and God, and for her the two are closely related.[2] For her, the elegant mathematical structure that underlies the universe suggests that it is the product of an intelligent mind. This view is obviously not held by everyone, but it is not at all uncommon.

One example of a mathematical structure in nature is the Fibonacci sequence that can be found in all kinds of places, such as in the arrangement of the petals on a sunflower. There are lots of videos on the internet about this. Why not look one up?

Maths Word

Infinity is an abstract concept describing something that is bigger than any number. Infinity is not a number but it sometimes behaves like one.



People are often surprised to discover that there is more than one infinity. There are in fact an infinite number of different infinities. This sounds a bit strange but it is no longer the controversial idea that it was when it was first suggested. Mrs Palmer finds the idea of infinity fascinating, particularly infinite series that add up to a finite total, like this one.

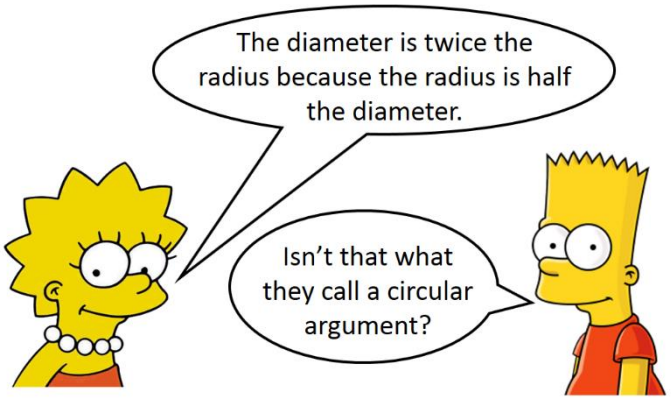
$$\pi = \frac{4}{1} - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \cdots$$

Some infinite series are even more fascinating, like

$$1 - 1 + 1 - 1 + 1 - 1 + \ldots = ?$$

What do you think this series adds up to? Is it 0, or 1, or ½ ? Why not ask your maths teacher to explain the answer? ☺

Joke



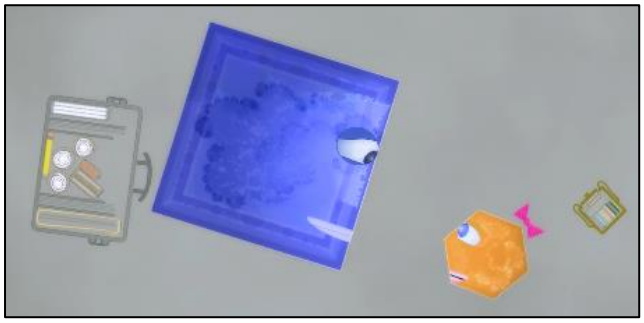
1. Apart from the number 1, which is boring, so in maths we call that a 'trivial solution'. They're not interesting.
2. If you have watched *The Man Who Knew Infinity*, you may remember Ramanujan saying something similar.

Maths Quote

"God is an infinite sphere, whose centre is everywhere and whose circumference is nowhere." Blaise Pascal [3]

Flatland

In 1884, a book called *Flatland* was published. Written by a school teacher called Edwin A. Abbott, it is partly a social satire based on Victorian culture, but more importantly for us, it is a book about dimensions.



The idea is that we can, from our limited three-dimensional point of view, understand what a four dimensional world might be like, by thinking about how our three-dimensional world might appear to creatures who live only in two dimensions. In the story, when the sphere enters Flatland, it appears as a circle whose diameter starts as a point, grows larger and larger to a maximum size, then contracts down to a point again and disappears. To Mrs Palmer, this idea is very similar to the idea of an infinite God entering our finite world. Many people cannot see or believe in a supreme being, just as they cannot see four-dimensional objects, but many other people believe that there is plenty of evidence for the existence of God, just like there is evidence for the existence of higher dimensions in the physical universe. This is why maths is often considered to be quite a spiritual thing.

Puzzle

Here's a puzzle from Mrs Palmer. Move one number to make the following statement true:

62 – 63 = 1

Hexagons and Cakes

Mrs Palmer loves hexagons so much that, when she got married, she had a hexagonal wedding cake. She likes the way they tessellate and how you find them in lots of places such as in bee hives, chicken wire, and goal nets.

Over the years, Mrs Palmer has been asked lots of interesting maths questions. Somebody once asked her, "Is it possible to cut a square cake with side length 4 inches out of a circular cake with diameter 6 inches?" What's the answer?

Puzzle

One of Mrs Palmer's favourite numbers is 36. She likes the way that 36 can be made by adding four particular numbers, such that if you add 2 to one of the numbers, subtract 2 from one of the others, divide one of the others by 2, and multiply the last one by 2, the resulting four numbers will also add up to 36. Can you work out what the original four numbers were that add up to 36?

If you can, go and tell Mrs Palmer and she'll give you a house point.[4] While you're there, you might also like to wish her well for her retirement.

3. Blaise Pascal is just as famous for his philosophy as he is for his mathematics. A famous argument called "Pascal's Wager" is a question relating probability to belief in God. Why not look it up?
4. For 3 house points, can you work out how many solutions this puzzle has, and whether it works for any numbers other than 36.