



68 is the largest known number to be the sum of two primes in exactly two ways

News

You might remember, back in newsletter number 59 we talked about Captain Tom Moore, who had been in the news quite a lot around that time.



Well, on the 30th April he was made a Colonel by the Queen, then on 19th May it was announced that he was going to be knighted, which left everybody wondering would he now be Sir Colonel Tom Moore or Colonel Sir Tom Moore, which left us¹ all then wondering did it even matter, and if it did matter then why did it matter?

As it turns out, it does matter. He's Colonel Sir Tom Moore. They have to go in that order, which is a bit like maths really, isn't it? Usually, if you perform two functions on a number, the order in which you do them matters. A simple example of this would be to choose any number, double it, then add 1. Now, starting with the same number, add 1, then double your answer. Did you get the same answer both times? You probably didn't. This is because most pairs of functions are **non-commutative**. Can you think of any pairs of functions where the order in which you apply them does not matter?

1. Well, it left me wondering this. I don't know about you.
2. Or should it be a 'poke'? Does the order matter when you mash two words together to make a new word? Is there a rule? Is it a commutative operation? See if you can find out and let me know!
3. If you don't want a clue... not sure what we can do now about that. I've kind of spoilt it...

Maths Word

An operation is said to be **commutative** if you get the same answer no matter which way around the operation is carried out. Simple examples of this are addition and multiplication. For example

$$12 + 3 = 3 + 12 \text{ and } 12 \times 3 = 3 \times 12$$

Simple examples of **non-commutativity** are subtraction and division.

$$12 - 3 \neq 3 - 12 \text{ and } 12 \div 3 \neq 3 \div 12$$

Try to remember these words.

Juzzle

As you might know, a **juzzle** is a cross between a joke and a puzzle.² If you didn't know this, it's because I just made it up, so I suppose you can be forgiven.

Most of you probably won't understand this maths 'joke', because it's a bit advanced (mathematically, I mean – not comedically), so the 'puzzle' element is for you to try to find out what it means. Then you can laugh at it (if you like) in a knowledgeable way. If you want a clue, look up how to **integrate** some of the functions in the box.³

$$\begin{matrix}
 e^x & \frac{a}{b} & \sin \theta & x^2 \\
 & & \ln x & \\
 & & \pi & \log x \\
 & & \cos \gamma & \sqrt{x}
 \end{matrix}$$

No matter how hard e^x tried to integrate, it didn't seem to make any difference.

Expect more juzzles in future newsletters.

A Raging Robin

In last week's newsletter, I suggested that you might want to draw a picture of a very angry robin, but unfortunately nobody did. Miss Gouldsworthy did send me a photo of one though, so here it is.⁴



Now for some proper maths again...

Did You Know?

Any triangle can be used to make a tessellation?⁵

Myriad

You're probably familiar with using the word '**myriad**' when you want to say 'lots' or 'lots of'⁶ but you want to sound extra clever, poetic, interesting or pretentious.⁷ You might not know that a myriad originally meant ten thousand, and was the largest number that existed in Ancient Greek mathematics, until Archimedes (who, as you know, was very clever) introduced a new number that meant one hundred million. He called this number 'a myriad myriad'.⁸

4. He does look very angry. Is it definitely a male robin? How can you tell?

5. Why not try this. If you make a good one, send it to us.

6. Nobody really seems to know whether 'myriad' is a noun or an adjective, and I'm too busy to google it.

7. There are literally myriad reasons for using it... or is that a myriad of reasons?

8. I bet all the other Greek mathematicians were kicking themselves for not thinking of this!

Chris's Puzzles

Here are a few puzzles I got from Chris @aap03102 Smith's newsletter.

1. Can you think of a number that, when you write it out in words, contains all 5 vowels, and no repeated letters?
2. If you wrote the number $1^1 \times 2^2 \times 3^3 \times 4^4 \times 5^5 \times 6^6 \times 7^7 \times 8^8 \times 9^9$ out in full, how many zeros would it have on the end?
3. There is a number that is 5 times the sum of its digits. What is this number?
4. Each child in a family has at least 3 brothers and 2 sisters. What is the smallest number of children the family could have?
5. If the final score in a hockey match is 7-4, how many possible half-time scores are there? How many would there be if the final score is $n - m$?

The Maths Newsletter

Thanks to everybody who replied to my offer of 3 house points for being a maths newsletter reader. I'll make sure those get passed on to your heads of year.

Also, you may like to know that all of the newsletters since the start of lockdown (I'll get all the others on soon) are now on the school website, at <http://kechg.org.uk/departments/mathematics/> Thanks to Mrs Hayes for sorting that out for me!