King Edward VI Camp Hill School for Girls
Maths Department Newsletter

41 is the largest of Euler's lucky numbers

News

Year 7 have just started studying units, which reminds me of the story about the French general Napoleon Bonaparte, who people thought was shorter than he really was, due to the fact that he was French. This meant that his height was measured in French inches, which were 2.71 centimetres, as opposed to English inches, which were 2.54 centimetres.[1] This meant that Napoleon was actually around 5'6" in our units, rather than the 5' 2" he was according to the French units.

Pie, Cheese or Cake?

While we're talking about French things, Mrs Price has told us that in France, a pie chart is called a 'camembert', which as you probably know is a type of cheese.

People who did know.

People who didn't know that pie charts are called camembert in France.

Pie Chart (Camembert)   Actual Camembert

In German, the word for a pie chart is Kuchendiagramm, meaning 'cake diagram'.
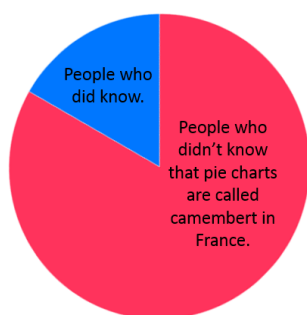
Maths Word

The word '**random**' refers to something that happens by chance, rather than according to a plan, rule or pattern. Originally, though, it came from the old French word *randir*, meaning 'to gallop'. Maybe the idea is that, in full gallop, the rider of the horse

A random horse picture off the internet.

has abandoned control, and potentially anything could happen.

Did you know?

The idea for a **metre** came from France, in the late 18th century. They decided that it should be one ten millionth of the distance from the North Pole to the equator. They thought that if they based the new unit on the whole planet, rather than just on France, then the rest of the world would be more likely to start using it. All they then had to do was measure the distance from the North Pole to the equator and divide that by 10,000,000. As you can imagine, this took them quite a while to do.

Puzzle from #39

In newsletter 39, we asked you what was special about the number 8549176320. The answer is that it is the number made by putting all the digits from 0 to 9 in alphabetical order.[2]

1. And still are.
2. We actually said there were two interesting things about the number, but I've run out of space, so I'll put the other thing here. The other thing is that all the numbers from 0 to 9 are also factors of 8549176320.

Joke

BOX & BEARD PLOT

Since this newsletter has quite a lot of references to France in it, perhaps it's worth mentioning that a box and whisker diagram is called a 'boîte et moustache' in French, which literally means a 'box and moustache'.
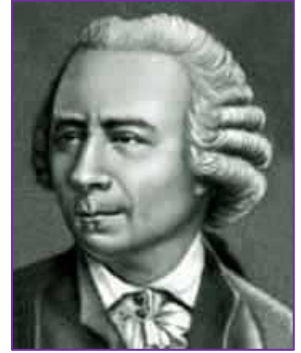
Origami

You may remember, in the last newsletter, that we were wondering why the word 'origami' was 'origami' and not 'orukami', as it comes from the Japanese words 'oru' (meaning 'to fold') and 'kami' (meaning 'paper'). Mr Taylor asked his friend who lives in Japan, and got this interesting reply.

> wow, interesting question. yes, Oru is the plain form of the verb to fold but it changes to the Ori form when added to another kanji character to form a new word. Similarly Kami (paper) changes to Gami when combined, just because it sounds nicer. Think that sort of thing sometimes happens in french too. how are you? I'm in UK on a last-minute business trip this week but stuck down in wiltshire!

Mr Taylor told him that he was OK and that hopefully he would see him at Christmas.

Euler's Lucky Number

Since this is the 41st maths newsletter, we really should talk about the fact that 41 is the largest of Euler's 'lucky numbers'. This is because, if we let k equal any positive whole number from 1 to 40 and substitute it into Euler's polynomial $k^2 - k + 41$, we will always get a prime number. This is a very interesting property of the number 41 because, as you know, there is no general formula for generating prime numbers, and what we have here is a formula for generating 40 prime numbers. As far as we know, there is no reason why this happens; the number 41 is just lucky. Can you see why we will not get a prime number when $k = 41$?

Prime Puzzle

While we're on the topic of prime numbers, can you work out what is special about this prime number?[3]

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Senior Maths Challenge

The Senior Maths Challenge results have arrived and the following girls have qualified for the Senior Kangaroo: Yuning Liu, Amrit Phull, Jagvi Patel, Josie Futterer, Rebecca Xia, Emma Hillier, and Spardha Raut. This will take place on 1st December. Kate Pham has also pre-qualified for the BMO, as a result of her distinction in the Maths Olympiad for Girls. Emma Eaton also achieved a distinction in the MOG. Well done to everybody who took part.

3. Hint: Start from the right, taking the last digit, then the last two digits, then the last three digits etc.