



### The Pinocchio Paradox

Some of you may have noticed the mistake in the last newsletter. The pattern of numbers should have looked like this:

- $1 \times 8 + 1 = 9$
- $12 \times 8 + 2 = 98$
- $123 \times 8 + 3 = 987$
- $1234 \times 8 + 4 = 9876$
- $12345 \times 8 + 5 = 98765$
- $123456 \times 8 + 6 = 987654$
- $1234567 \times 8 + 7 = 9876543$
- $12345678 \times 8 + 8 = 98765432$
- $123456789 \times 8 + 9 = 987654321$

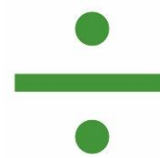


I could say that this was a deliberate mistake, designed to see how many of you read the newsletter carefully, or I could say that I was careless and just didn't bother to check what I'd written<sup>1</sup>, or I could say that I just pretended to not check what I'd written so you could all learn a valuable lesson about how important it is to check your work before you hand it in. Only one of these would be the truth. I'll let you decide which. Obviously, if I was Pinocchio, you could tell if I was lying because my nose would grow, which reminds me of a famous mathematical paradox. What would happen to Pinocchio's nose if he said, "I am now telling a lie." Would his nose grow or would it not? Can you work it out?

1. Like that.

### Maths Words

A 'quotient' is the name given to the result of a division. It is equivalent to the word 'difference' for subtraction, 'product' for multiplication, and 'sum' for addition. The division sign is actually called an 'obelus' and was first used as a symbol for division in 1659 in the algebra book *Teutsche Algebra* by Johann Rahn. Before that, it had been used to represent subtraction and in some parts of Europe it still is today. You can type one in Microsoft Word by holding down 'Alt' and typing 0247 on the number keypad (with Num Lock on).



### Maths Quote

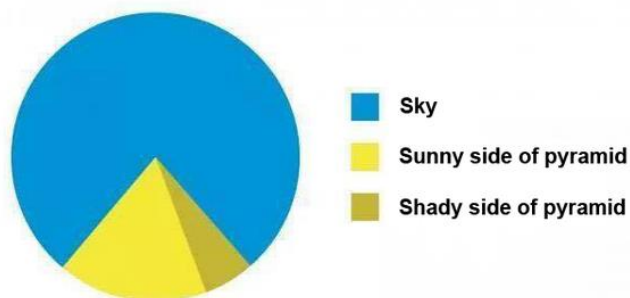
"Mathematics has beauty and romance. It's not a boring place to be, the mathematical world. It's an extraordinary place; it's worth spending time there."

Marcus du Sautoy

If you think that you would like to spend more time there, why not come to Maths Workshop? (every Friday lunchtime in room 13)

### Joke

Here is a pie chart from Egypt...

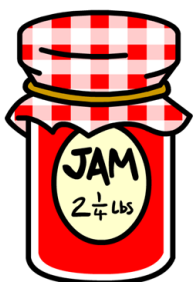


## Did you know?

You can use the following short poems to help you remember two useful metric to imperial conversions.

“A litre of water’s  
a pint and three quarters.”

“Two and a quarter  
pounds of jam,  
weighs about a kilogram.”



Obviously, there is nothing special about jam or water here<sup>2</sup>, other than that they rhyme with kilogram and quarter.



The conversions are only rough, but they are good enough for most real world situations.

## News

There is no news this week from the maths department. Lessons are taking place, mock exams are happening, students have been coming to the maths office, usually either to ask to borrow a calculator, or to tell us that there is a mistake in the last newsletter. Christmas already seems like a long time ago.

## Puzzle

**If you divide the three numbers 618695, 877510 and 1126532 by a certain integer (greater than 1) you get the same remainder. What is the integer and what is the remainder?**

Thanks to Chris Smith for this puzzle ☺

## Famous Mathematician

Leonardo da Vinci was born in 1452 and, until Leonardo DiCaprio became famous, was probably the most famous Leonardo in the world.<sup>3</sup> As well as being a mathematician, he was also an inventor and an artist, best known for his famous painting, the Mona Lisa, which currently hangs in



the Louvre gallery in Paris. He is often referred to as a ‘Renaissance Man’, which means a person who is an expert in a significant number of different subject areas. This used to be a lot easier to achieve than it is today because back in the 15<sup>th</sup> century, when Leonardo was alive, there wasn’t as much to learn.



When writing, he would use ‘mirror writing’, unless he intended people to read what he had written, so as a permanent tribute to Leonardo we will, from now on, put the solutions to the puzzles from

the previous newsletter at the end of the current one, and we will write them using upside down mirror writing.<sup>4</sup>

## Leonardo’s Solutions

picture (we think):  
there are 80 rectangles in the Mondrian integers that multiply to make 5040, and ‘alongside’. There are 18 pairs of positive The answer to the crossword clue was

2. In general, there are lots of special things about water. Ask your science teacher. I’m not so sure about jam...

3. Apart from maybe the Teenage Mutant Ninja Turtle, but he’s not real.

4. Although, unlike Leonardo, we hope that other people will read what we have written.