

Maths Transition Challenge

Numbers and Maths are everywhere in our lives. With us at GTS you are going on a journey from basic number concepts up to algebra, trigonometry and not forgetting geometry and data handling. For us to get a feel for how far along the journey you already are with your Maths, we have come up with the selection of challenges below. All you need to do is pick at least 3 of them and give it your best shot. You can pick as many as you like, or even do them all if that is what you enjoy.

Please email your answers to csargeant@gts.devon.sch.uk

1) What is your favourite number? And why? Do you have a personal reason, like the number of your siblings, your house number, your lucky number, etc...? Or is there a more mathematical reason, like the size of something important to you? Or is it a perfect number? Is it a happy number? A square number? Tell us the story of your favourite number!

2) What is the largest number you can name? A million? A billion? Any higher?

3) This is the rear tyre of my car. Try and estimate how long the circumference is! Can you suggest a way to measure it?



4) Here is our Lowest Positive Whole Number Competition

Name:

Primary School:

Write down the lowest positive whole number that you think no one else will enter!

5) Here is a famous Maths challenge: The “four fours”:

Look at the calculations below. All the operations are missing!
You need to find the correct mathematical operations
in order to make each calculation true.

To remind you:

+ - x ÷ (brackets) powers like: to the power of 2, 3, 4 etc.

$$5^3 = 5 \times 5 \times 5 = 125$$

$\sqrt{\quad}$ the square root, $\sqrt{36} = 6$, because $6 \times 6 = 36$

Four fours (1-20)

$$4 \ 4 \ 4 \ 4 = 1$$

$$4 \ 4 \ 4 \ 4 = 2$$

$$4 \ 4 \ 4 \ 4 = 3$$

$$4 \ 4 \ 4 \ 4 = 4$$

$$4 \ 4 \ 4 \ 4 = 5$$

$$4 \ 4 \ 4 \ 4 = 6$$

$$4 \ 4 \ 4 \ 4 = 7$$

$$4 \ 4 \ 4 \ 4 = 8$$

$$4 \ 4 \ 4 \ 4 = 9$$

$$4 \ 4 \ 4 \ 4 = 10$$

$$4 \ 4 \ 4 \ 4 = 11$$

$$4 \ 4 \ 4 \ 4 = 12$$

$$4 \ 4 \ 4 \ 4 = 13$$

$$4 \ 4 \ 4 \ 4 = 14$$

$$4 \ 4 \ 4 \ 4 = 15$$

$$4 \ 4 \ 4 \ 4 = 16$$

$$4 \ 4 \ 4 \ 4 = 17$$

$$4 \ 4 \ 4 \ 4 = 18$$

$$4 \ 4 \ 4 \ 4 = 19$$

$$4 \ 4 \ 4 \ 4 = 20$$

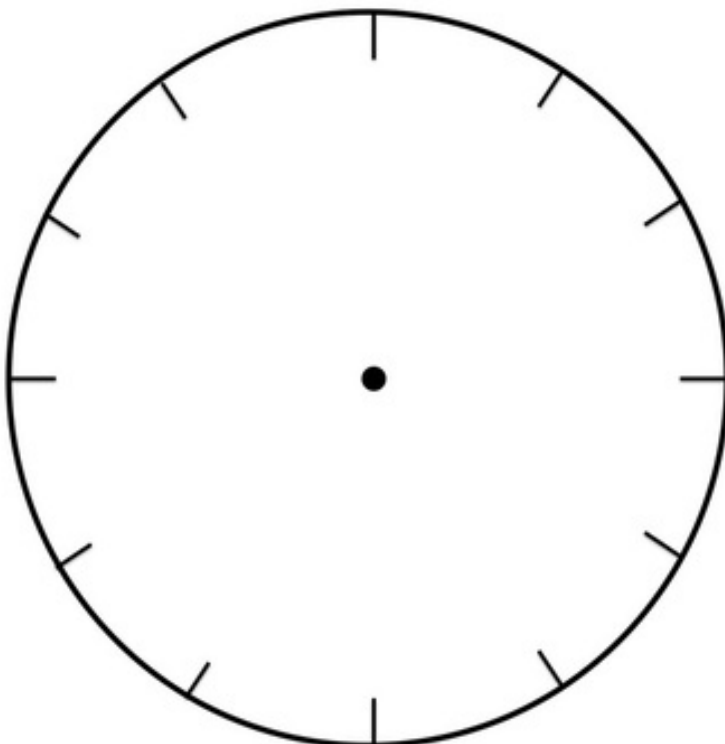
There are many possible answers to this, some are (much) harder than others. Try to find as many as you can!

6) Design a Maths clock:

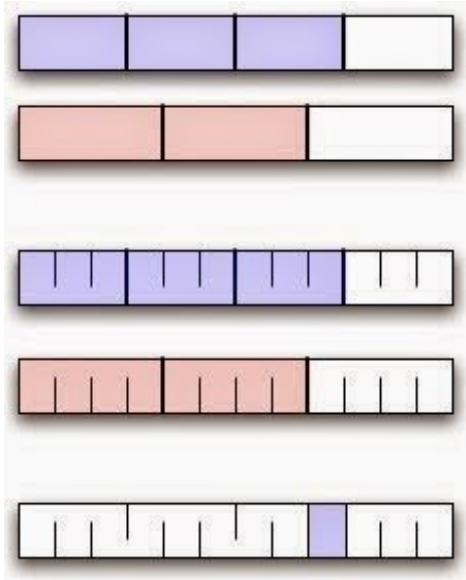
Now, we all know which numbers can be found on a clockface.

How about you made up a calculation with each number on the clockface as the answer. You can make this straightforward, but even better to make it as complex as you can! Make sure though that all your calculations are correct!

Do you want to use Roman Numerals for the answers?



- 7) What is happening here?
 Can you describe what you see?
 Can you write this using mathematical symbols and numbers?
 What is the significance of all these visualisations?
 Can you make some of your own?



- 8) Do a diffy!

Start with any four, smallish, numbers – you can put them in any order

Now calculate the positive difference between an adjacent pair of numbers
 - This means you take the first two numbers, take away the smaller from the bigger, write down your answer.

Now use number 2 and 3 from your first line. Take away the smaller from the bigger and write down your answer again.

Do the same for numbers 3 and 4.

For the last number, you pair it up with the first one and take the smaller from the bigger once more; write down your answer.

You have produced a new set of 4 numbers

Keep on doing this, line by line
 until you have a good reason to stop

| | | | |
|----|----|----|----|
| 6 | 23 | 5 | 19 |
| 17 | 18 | 14 | 13 |
| 1 | 4 | 1 | 4 |

You could consider the following points:

it is quite hard to find a set of numbers that involves more than six steps (iterations)
but it is possible

...

after a while playing around with any four numbers trying to better the "class (world)
record" diffy

What is the highest amount of steps you can achieve until you have reason to stop?

...

start to input four consecutive terms of a sequence and explore what happens

e.g. for a constant difference pattern: 7 10 13 16

...

If you want to make it even more complex, try these:

- consecutive multiples (start with a number keep multiplying by e.g. 2)
- a linear rule: start with a number, multiply by e.g. 3 and e.g. subtract 2 each time
- consecutive fibonacci numbers
- consecutive square numbers
- consecutive triangular numbers
- consecutive cubes
- consecutive terms of a general geometric sequence