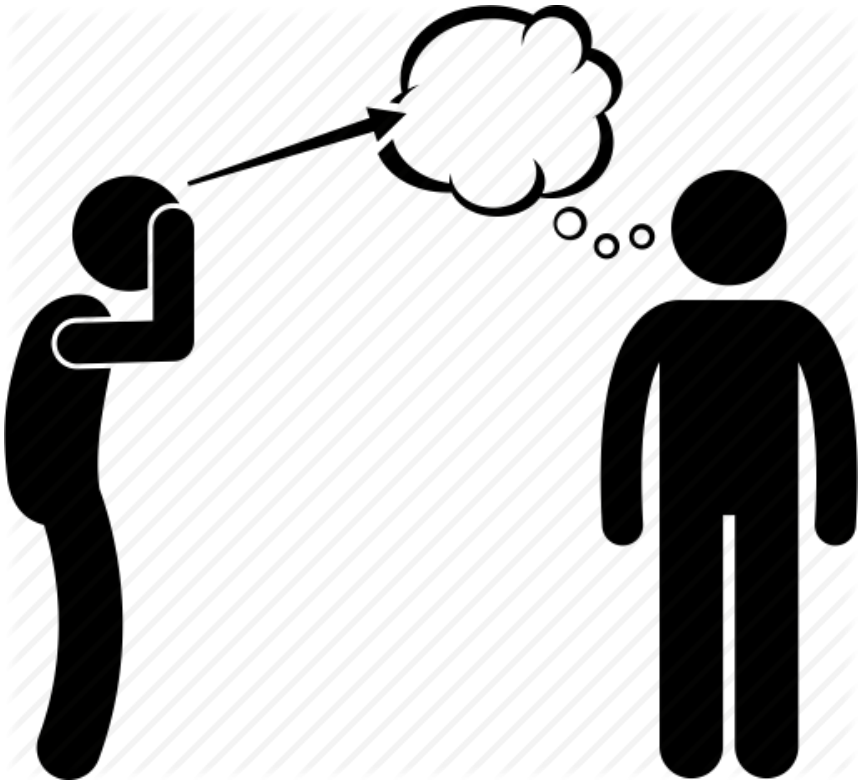
Advanced Mathematics Support Programme®

Amazing Mind Reading Trick

Your teacher is going to amaze you with their mind reading skills……



Write down a 5 digit number with no repeated digits – do not let anyone see your number!

Now rearrange your number to make another 5 digit number (if you have a 0 in your number it can’t be the first digit of your new number)

Subtract the smaller number from the larger number to make a new number

Choose a digit from your new number but don’t tell anyone!... One exception – you can’t choose zero

As I am going to tell you what digit you’ve chosen from your number

Prepare to be amazed!

Why does the trick work?

1) Does it work with numbers with fewer than 5 digits?
2) Does it work with repeated digits?

Why does the trick work?

Digital Roots

To find the digital root of a number - add all of the digits in the number to get a single digit

Example: Find the digital root of 87

1)8 + 7 = 15 – not a single number so continue

2) 1+ 5 = 6 so the digital root of 87 = 6

Why does the trick work?

Subtract the digital root from the original number.

For example:

The digital root of 123 = 6

123 – 6 = 117

Try this with a variety of numbers (of any length)

Do you notice anything about the results?

Why does the trick work?

Any number can be written as a multiple of 9 + its digital root

Can you write this algebraically? Think about the *place value* of the digits.

Why does the trick work?

Let abc be our 3 digit number

In base 10 this can be written as

$$a \times 10^2 + b \times 10 + c$$

$$a(99 + 1) + b(9 + 1) + c$$

$$99a + a + 9b + b + c$$

$$9(11a + b) + a + b + c$$

Digital root

If we rearrange our 3 digit number to cab what happens?

Contact the AMSP

01225 716 492

admin@amsp.org.uk

amsp.org.uk

Advanced_Maths