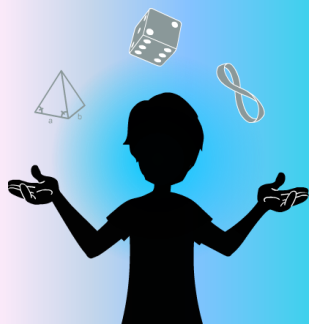


MATHEMAGIC

-10 MAKE THE SUM-



AMAZINGMATHS

Materials:

- Sheet of paper
- Pencils
- Calculator

How to do the Magic Trick

Goal:

Quickly determine the sum of the 10 numbers written down by the spectator.

Trick:

1. While the magician is turned around, the spectator writes a first number of 2 digits on the sheet.
2. The magician tells the spectator that he will have to write down a series of 10 numbers on the sheet. To create this series, the spectator chooses a digit between 1 and 9 and the value of this digit represents the leaps to make between each number. The first number of the series is the number written in step 1. The spectator writes the 9 other numbers on the sheet.
3. The spectator must calculate the sum of these 10 numbers (it is better to have him use a calculator, because the calculation is long).
4. The magician asks the spectator to tell him the first and the last number he wrote down.
5. The magician turns around and quickly announces the sum that he finds by looking at the written numbers. (To do so, he adds the first number to the last number and multiplies the result by 5.)



MATHEMATICAL EXPLANATION

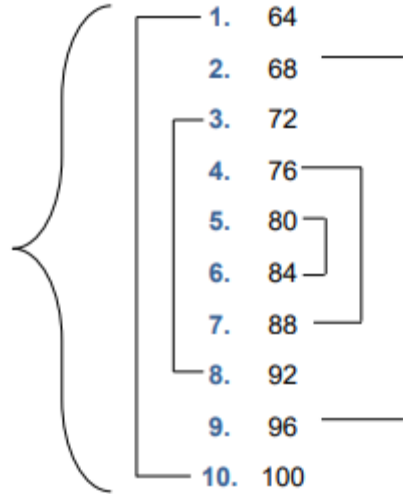


Why this trick works.

It is important to observe what links together the numbers written on the sheet.

Here is an example of a series of numbers given by the spectator, with leaps of 4:

The sum of all the pairs is the same: 164.



As represented on the diagram, 5 pairs are created. The particularity of these pairs is that the addition of their numbers always gives the same result. So, the total sum of these numbers represents 5 times the sum of a pair. In the example above, we added the first number and the last number together, which gave us the sum common to each pair. It could be another pair, since they all have the same sum. But it is easier to quickly find that pair. Next, the only thing left to do is to multiply the sum by the number of pairs, which is 5.

Calculation 1

First number	+	Last number	=	Sum common to all the pairs
64	+	100	=	164

Calculation 2

Sum common to all the pairs	x	Number of pairs	=	Sum of all the numbers
164	x	5	=	820

Note: We notice that we can, to quickly calculate the product of the sum by 5, divide the sum by two and multiply the result by 10. It would also be possible to use other ways to quickly multiply a number by 5.