Sujet n°24

Please do not write on this document, and do not forget to hand it back to the jury at the end of the test.

ARITHMETICS : Lightning addition

Anyone can be a lightning-fast calculator if he or she knows the secret of this addition trick:

Ask someone to write any five-figure number on the blackboard. You then write a five-figure number beneath it, apparently at random. Actually you choose your digits so that each one, added to the digit above it, will add up to nine. For example:

- His/Her number: 45623
- Your number: 54376

Tell the person to put a third five-figure number beneath your number. You then write a fourth number, using the same nine-principle. After he or she has written a fifth number, you draw a line under it and without a moment's hesitation write the correct total. More startling still, you write it from left to right!

How do you do it? Just subtract 2 from the fifth number and put 2 in front of what is left. For example if the fifth number is 48765, the total will be 248763.

1. Perform this lightning addition trick for the jury, asking them for numbers.
2. Explain to the jury why this trick works.
3. Explain if this lightning addition still works for a six-figure number.
4. Modify this trick to impress the listener with a lightning addition of seven numbers instead of five.