

Carl Fredrich Gauss

Carl Fredrich Gauss, often referred to as the ‘Prince of Mathematics’, was born in New Brunswick of Germany in 1777. At the young age of 7, his mathematical abilities were already apparent to his teachers.

The famous story goes that, one day, in order to quieten the class, one of Gauss’ teachers asked his students to work on a challenging Maths problem, thinking that they would require so much time that he could move on with other things.

Gauss surprised the teacher by putting up his hand in less than a minute. “Sir, I have the answer!” He exclaimed.



How did Gauss do it?

The original problem was as follows:

$$1 + 2 + 3 \dots + 98 + 99 + 100$$

Instead of trudging through the tedious addition using pencil and paper, Gauss imagined 50 pairs of 101, since

$$(1 + 100) = (2 + 99) = (3 + 98) = \dots = 101.$$

Now, you might have learned somewhere before that the product of 101 and any 2-digit number is a 4-digit number with the two digits repeated.

For example, $101 \times 12 = 1212$, $101 \times 35 = 3535$, etc.

Since there were 50 pairs of 101, Gauss quickly figured out the answer to be 5050!

Few of us will be as mathematically precocious as Carl Fredrich Gauss, but we certainly can ask ourselves these questions to improve our problem solving skills:

- ⬡ Have we solved a similar problem before?
- ⬡ Is there a quicker way of solving the problem?
- ⬡ Is there a pattern in the question that will help us to devise the solution?
- ⬡ Can we simplify the problem?

Another ingenious insight to this problem is that instead of adding the numbers in sequence, we can write the sequence forward and then backwards as follows:

$$\text{Forward} \quad 1 + 2 + 3 + \dots + 98 + 99 + 100$$

$$\text{Backwards} \quad 100 + 99 + 98 + \dots + 3 + 2 + 1$$

Now, if we add the pairs of numbers in the columns together, we get

$$101 + 101 + 101 + \dots + 101 + 101 + 101.$$

This is just 101×100 , an easy sum with the answer of 10100. The original sum is half of this, which is 5050. Problem solved!