

# Problem 2

Say whether the following is true or false and support your answer by a proof:  
The sum of any five consecutive integers is divisible by 5 (without remainder).

**ANSWER** The statement is true.

**PROOF** I am going to proof that the statement is true by generalizing it. Let's see the result of the sum of the first five natural numbers:

$$1 + 2 + 3 + 4 + 5 = 15$$

The statement holds for the equation above. Now, let's express the statement in a different way, let  $n \in \mathbb{Z}$ :

$$n + (n + 1) + (n + 2) + (n + 3) + (n + 4) = 5n + 10$$

Since 5 and 10 are multiples of 5, for any integer  $n$ , the result will be a multiple of 5, and this proves that the sum of any five consecutive integers is divisible by 5 (without remainder).