

Proof 2

nibir@nibirsan.org

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).

Proof

We want to prove:

$$\begin{aligned}n + (n + 1) + (n + 2) + (n + 3) + (n + 4) &= 5k + 0 \\ &\text{(by the definition of divisibility)}\end{aligned}$$

where $n, k \in \mathbb{Z}$.

Now,

$$\begin{aligned}n + (n + 1) + (n + 2) + (n + 3) + (n + 4) &= 5n + 10 \\ &= 5(n + 2)\end{aligned}$$

where $k = n + 2$.

This proves that the sum of any five consecutive integers is divisible by 5.