

Prove that every odd natural number is of one of the following forms

$4n + 1$  or  $4n + 3$  for  $n \in \mathbb{N}$

We will prove this statement by a direct proof.

**Direct Proof:** First it is clear that every natural number that is not divisible by 4 is either one of the following forms;  $4n + 1$  or  $4n + 2$  or  $4n + 3$  where  $n \in \mathbb{Z}$ . But also it is clear that  $4n + 2$  is even. So an odd natural number should be either  $4n + 1$  or  $4n + 3$ .

So this statement is true and this concludes the proof.