Problem 4 Solution

proof:

We know that every odd natural number(P say) is of the form $2q+1$ $q \in \mathbb{Z}$

Case I:- q is even

$\implies q = 2n$ $n \in \mathbb{Z}$

$\implies P = 2(2n) + 1$

$\implies P = 4n + 1$

Case II:- q is odd

$\implies q = 2n + 1$ $n \in \mathbb{Z}$

$\implies P = 2(2n + 1) + 1$

$\implies P = 4n + 2 + 1$

$\implies P = 4n + 3$

Hence any odd natural number is of one of the form 4n+1 or 4n+3 $n \in \mathbb{Z}$