Let $P(n) = \sum_{k=1}^{n} 2k - 1$. Prove the $P(n) = n^2$

Proof: we procede by induction

For n = 1, $P(1) = 1^2$

Let $P(n) = n^2$, we demonstrate that $P(n+1) = (n+1)^2$

$P(n+1) = P(n) + 2(n+1) - 1$

$\Rightarrow P(n+1) = n^2 + 2n + 1$

$\Rightarrow P(n+1) = (n+1)^2$

Then : $\forall n > 0, P(n) = n^2$