Name ___Solutions_____ Discrete I, Quiz 8

Show using induction that $1 + 3 + 5 + \cdots + (2n - 1) = n^2$.

BC: $n = 1$

$$1 = 1^2$$

IH: For the case $n = k$, we assume:

$$1 + 3 + \cdots + (2k - 1) = k^2$$

IS: We now show the case $n = k + 1$:

$$1 + 3 + \cdots + (2k - 3) + (2k - 1) + (2k + 1) = k^2 + 2k + 1 = (k + 1)^2$$

Therefore we have shown that for all $n \geq 1$:

$$\sum_{i=1}^{n} 2i - 1 = n^2$$