Example (2):

$$5 + 9 + 13 + \cdots\cdots = n(2n+3)$$

n^{th} term $= a + (n-1)d$

$= 5 + (n-1)(4)$

$= 5 + 4n - 4$

$= 4n + 1$

Given series is

$$5 + 9 + 13 + \cdots\cdots + (4n+1) = n(2n+3)$$

(1) $P(1)$

LHS $= 5$

RHS $1(2(1)+3)$ $= 5$

LHS = RHS

$\therefore P(1)$ is True

(2) assume that $P(k)$ is True

$$5 + 9 + 13 + \cdots\cdots (4k+1) = k(2k+3)$$

(3) Prove that $P(k+1)$ is True

LHS

$$5 + 9 + 13 + \cdots\cdots + (4k+1) + \{4(k+1)+1\}$$

$= k(2k+3) + 4k + 4 + 1$

$= 2k^2 + 3k + 4k + 5$

$= 2k^2 + 7k + 5$

$= 2k^2 + 2k + 5k + 5$

$= 2k(k+1) + 5(k+1)$

$= (k+1)(2k+5)$

$= (k+1)\{2(k+1)+3\}$