

Mathematical Induction

Let  $S_n$  be a statement involving the positive integer  $n$ .

If

Generic even number  $2m$  where  $m$

Always simplify

$$2 + 4 + 6 + \dots + 2n = n(n+1)$$

$$1^3 + 2^3 + \dots + n^3 = \frac{n^2(n+1)^2}{4}$$

Ex 2 is a factor of  $n^2 + n$

$s_1$  2 is a factor of  $1^2 + 1$

If 2 is a factor of  $k^2 + k$  then prove 2 is a factor of  $(k+1)^2 + (k+1)$

Use mathematical induction to prove the statement for all positive integers n.

$$4 + 14 + 24 + \dots + (10n - 6) = n(5n - 1)$$