Mathematical Induction

Steps to Prove by Mathematical Induction

Step 1: Find a_1 and S_1.

Step 2: Find a_k, S_k, a_{k+1} and S_{k+1}.

Step 3: Show $S_{k+1} = a_{k+1} + S_k$.

$$a_1 + a_2 + a_3 + \cdots + a_n = S_n$$

Directions: Use Mathematical Induction to prove each formula.

1. $1 + 4 + 7 + 10 + \cdots + (3n - 2) = \frac{n}{2}(3n - 1)$

2. $2\left[1+3+3^2+3^3+\cdots+3^{n-1}\right]=3^n-1$

3. $\sum_{i=1}^{n} i(i+1) = \frac{n(n+1)(n+2)}{3}$