Answer on Question #38456 – Math - Other

If S1 be the sum of (2n+1) terms of an AP and S2 be the sum of its odd terms then prove that S1:S2=(2n+1) : (n+1).

Solution:

Let the first term and the common difference the A.P. be a and d respectively:

$$S_1 = \frac{2n+1}{2}[2a + \{(2n+1) - 1\}d] = \frac{2n+1}{2} \times 2[a + nd] = (2n+1)(a+nd)$$

Now,

$$S_2 = a_1 + a_3 + a_5 + \ \dots + a_{2n+1} = (a) + (a+2d) + (a+4d) + \ \dots + (a+2nd)$$

$$= (n+1)a + 2 \cdot \frac{n(n+1)}{2} d = (n+1)a + n(n+1)d$$

$$= (n+1)[a+nd]$$

Hence,

$$\frac{S_1}{S_2} = \frac{(2n+1)(a+nd)}{(n+1)[a+nd]} = \frac{2n+1}{n+1}$$

Answer: $\frac{S_1}{S_2} = \frac{2n+1}{n+1}$.