

### Answer on Question #48853 – Math – Algebra

If  $S_n$  denotes the sum of  $n$  terms of a G.P. whose first term is  $a$  and common ratio is  $r$  find  $S_1 + S_2 + S_3 + \dots + S_{2n-1} = ?$

**Solution.**

$$S_n = a \frac{1 - r^n}{1 - r}$$

$$\begin{aligned} \sum_{i=1}^{2n-1} a \frac{1 - r^i}{1 - r} &= \frac{a}{1 - r} \left[ \sum_{i=1}^{2n-1} 1 - \sum_{i=1}^{2n-1} r^i \right] = \frac{a}{1 - r} \left[ 2n - 1 - \frac{1 - r^{2n-1}}{1 - r} \right] = \\ &= a \frac{2n - 2 - (2n - 1)r + r^{2n-1}}{(1 - r)^2} \end{aligned}$$