Geometric Sequences and Series

Vocabulary of Sequences (Universal)

$a_1 \rightarrow$ First term

$a_n \rightarrow$ nth term

$n \rightarrow$ number of terms

$S_n \rightarrow$ sum of n terms

$r \rightarrow$ common ratio

nth term of geometric sequence $\rightarrow a_n = a_1 r^{n-1}$

sum of n terms of geometric sequence $\rightarrow \dfrac{a_1(1-r^n)}{1-r}$

Find S_7 of $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots$

$a_1 \rightarrow$ First term 1/2

$a_n \rightarrow$ nth term NA

$n \rightarrow$ number of terms 7

$S_n \rightarrow$ sum of n terms x

$r \rightarrow$ common ratio $r = \frac{\frac{1}{4}}{\frac{1}{2}} = \frac{\frac{1}{8}}{\frac{1}{4}} = \frac{1}{2}$

$$S_n = \frac{\left[a_1\left(r^n - 1\right)\right]}{r-1}$$

$$x = \frac{\left[\frac{1}{2}\left(\left(\frac{1}{2}\right)^7 - 1\right)\right]}{\frac{1}{2}-1} = \frac{\left[\frac{1}{2}\left(\left(\frac{1}{2}\right)^7 - 1\right)\right]}{-\frac{1}{2}}$$

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