

NCERT Question 11.9.3.15

EE23BTECH11032 - Kaustubh Parag Khachane *

Question 11.9.3.15 : Given a GP with $x_0 = 729$ and 7th term 64, determine S_7

Solution:

Parameter	Description	Value
$x(0)$	First Term	729
r	Common Ratio	
$x(n)$	$(n + 1)^{th}$ Term	$x(0) r^n u(n)$
$x(6)$	7 th Term	64
S_k	Sum of terms till k^{th} Term	

TABLE 0
PARAMETER TABLE

$$S_k = x(0) \frac{r^k - 1}{r - 1} \quad (1)$$

from Table 0 :

$$x(6) = x(0) r^6 \quad (2)$$

$$\implies 64 = 729 r^6 \quad (3)$$

$$\therefore r = \frac{2}{3} \quad (4)$$

using equation (1) and equation (4)

$$S_7 = 729 \frac{\left(\frac{2}{3}\right)^6 - 1}{\frac{2}{3} - 1} \quad (5)$$

$$= \frac{729 \left(\frac{2187-128}{2187}\right)}{\frac{1}{3}} \quad (6)$$

$$= 2059$$