NCERT Question 11.9.3.15

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Question 11.9.3.15 : Given a GP with x_0 = 729 and 7^{th} term 64, determine s(6)

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 first $(k+1)$ terms	

TABLE 0
PARAMETER TABLE

$$s(k) = x(0)\frac{r^k - 1}{r - 1} \tag{1}$$

from Table 0 :

$$x(6) = x(0)\,r^6 \tag{2}$$

$$\implies 64 = 729r^6 \tag{3}$$

$$\therefore r = \frac{2}{3} \tag{4}$$

using equation (1) and equation (4)

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

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

$$\implies s(6) = 2059 \tag{7}$$

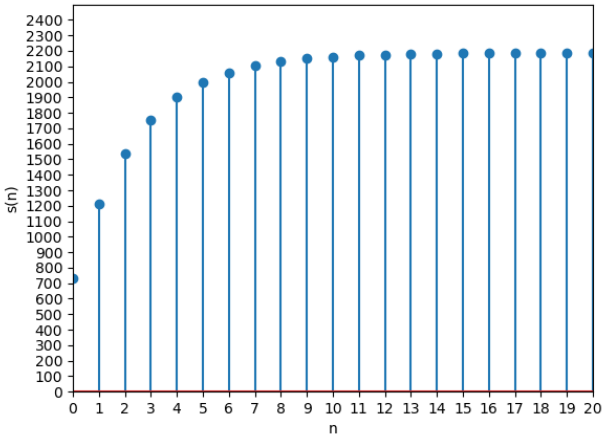

Fig. 0. Plot of $s(n)$