NCERT Discrete 11.9.3 -26

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Question: Insert two numbers between 3 and 81 so that the resulting sequence is G.P.

Solution:

n^{th} term of a GP is $ar^n u(n)$.

Parameter	Sub-question	Description	Value
$x_i(0)$	$x_1(0)$	1^{st} term of 1^{st} A.P.	63
	$x_2(0)$	1^{st} term of 2^{nd} A.P.	3
d_i	d_1	Common difference of 1^{st} A.P.	2
	d_2	Common difference of 2^{nd} A.P.	7

TABLE I
INPUT VALUES

1)

$$x(n) = ar^n u(n) \tag{1}$$

$$X(z) = \frac{a}{1 - rz^{-1}} \quad |z| > |r| \tag{2}$$

Z-transform of first term, i.e. 3u(n) is:

$$X_3(z) = \frac{3}{1 - z^{-1}} \quad |z| > 1 \tag{3}$$

Z-transform of fourth term, i.e. 81u(n) is:

$$X_{81}(z) = \frac{81}{1 - z^{-1}} \quad |z| > 1 \tag{4}$$

2) given,

$$a = 3 \tag{5}$$

$$ar^3 = 81 \tag{6}$$

$$\implies r = 3 \tag{7}$$

$\therefore$ Required numbers are 9 and 27.

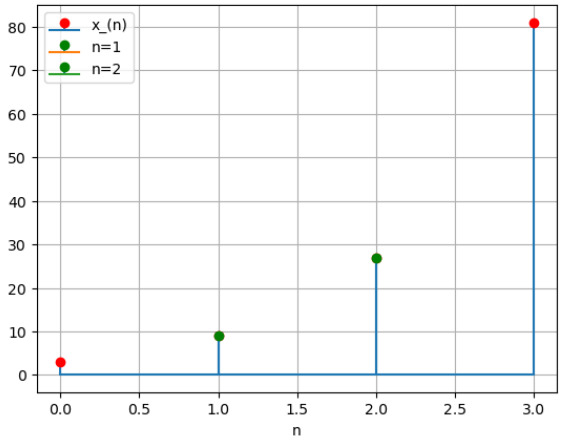

Fig. 1. Graph of $x(n)$