NCERT-discrete : 11.9.3 - 21

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I. QUESTION

Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is greater than the 4^{th} by 18.

Solution:

Symbols	Description	Values
r	Common ratio of the GP	-2
$x(n)$	$(n+1)^{th}$ term of the Sequence	$x(0)r^n u(n)$
$x(0)$	First term of the GP	3

Table 1 : Parameters , Descriptions And Values

Solving for $x(0)$,r :

$$x(0)\,r^2 - 9 = x(0) \tag{1}$$

$$x(0)\,r + 18 = x(0)\,r^3 \tag{2}$$

Solving (1) , (2)

$$x(0) = 3 \tag{3}$$

$$r = -2 \tag{4}$$

Z-Transform for x(n) Using (**??**) :

$$X(z) = \sum_{n=-\infty}^{\infty} \left(3\,(-2)^n\,u(n)\right) z^{-n} \tag{5}$$

$$= \frac{z}{2+z}, \quad |z| > |2| \tag{6}$$

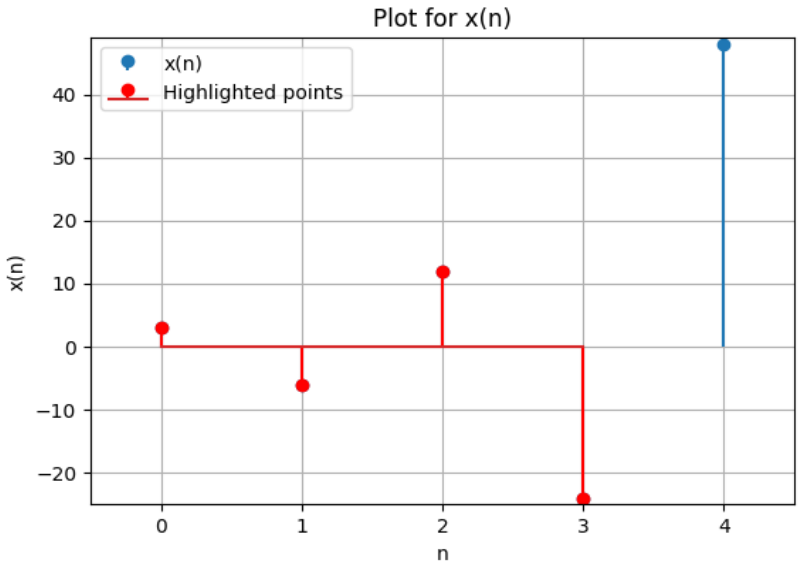

Fig. 0. $x(n)$ vs n