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

1) Solving for $x(0)$,$x(1)$,$x(2)$,$x(3)$:

$$x(0)r^2 - 9 = x(0) \tag{1}$$
$$x(0)r + 18 = x(0)r^3 \tag{2}$$

Solving (1) , (2)

$$x(0) = 3 \tag{3}$$
$$r = -2 \tag{4}$$

Therefore

$$x(0) = 3 \tag{5}$$
$$x(1) = -6 \tag{6}$$
$$x(2) = 12 \tag{7}$$
$$x(3) = -24 \tag{8}$$

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

$$X(z) = \sum_{n=-\infty}^{\infty} (3(-2)^n u(n)) z^{-n} \tag{9}$$
$$= z(2+z)^{-1}, \quad |z| > |2| \tag{10}$$

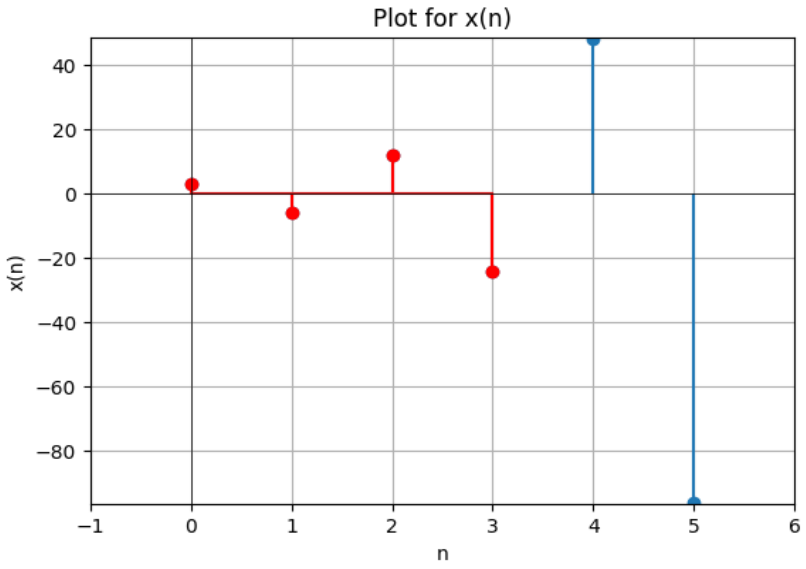

Fig. 2. $x(n)$ vs n