

NCERT Discrete - 10.5.3.20

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Parameter	Value	Description
$x(0)$	5	First term
r	2	Common ratio
$y(l)$	315	Sum of $l + 1$ terms
$x(l)$?	Last term

TABLE 0
INPUT PARAMETERS

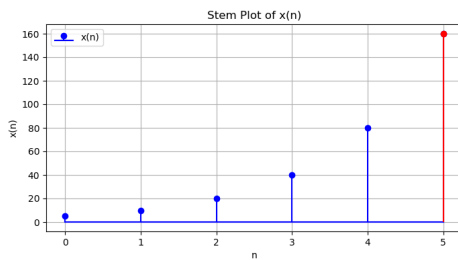


Fig. 0. Stem plot of $x(n)$

Question : 10.5.3.20 The sum of some terms of G.P. is 315 whose first term and the common ratio are 5 and 2, respectively. Find the last term and the number of terms.

Solution:

$$x(n) = x(0)r^n u(n) \quad (1)$$

From (??)

$$X(z) = \frac{5}{1 - 2z^{-1}} \quad (2)$$

By contour integration:

$$y(n) = x(0) \left(\frac{r^{n+1} - 1}{r - 1} \right) u(n) \quad (3)$$

$$315 = 5(2^{l+1} - 1) \quad (4)$$

$$\Rightarrow l = 5 \quad (5)$$

The number of terms is $l + 1 = 6$

From (1):

$$x(5) = 5(2^5) \quad (6)$$

$$= 160 \quad (7)$$

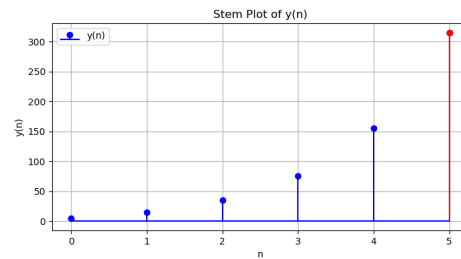


Fig. 0. Stem plot of $y(n)$