

# NCERT Discrete - 10.5.3.20

EE23BTECH1205 - Avani Chouhan\*

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

TABLE 0  
INPUT PARAMETERS

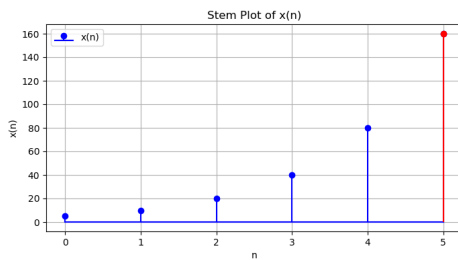


Fig. 0. Stem plot of x(n)

**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:**

Given:

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

$$X(z) = \frac{x(0)}{1 - rz^{-1}} \quad (2)$$

$$= \frac{5}{1 - 2z^{-1}} \quad (3)$$

By contour integration:

$$y(n) = x(0) \left( \frac{r^{n+1} - 1}{r - 1} \right) u(n) \quad (4)$$

$$\Rightarrow 315 = 5(2^{n+1} - 1) \quad (5)$$

$$\Rightarrow n = 5 \quad (6)$$

From (1):

$$x(5) = 5(2^5) \quad (7)$$

$$= 160 \quad (8)$$

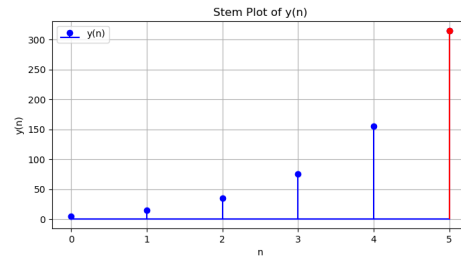


Fig. 0. Stem plot of y(n)