

EE23BTECH11054 - Sai Krishna Shanigarapu*

EXERCISE 9.2

13 If the sum of n terms of an A.P. is $3n^2 + 5n$ and its m^{th} term is 164, find the value of m .

Solution: :

$$Y(z) = \frac{2(4 - z^{-1})}{(1 - z^{-1})^3} \quad \{z \in \mathbb{C} : |z| > 1\} \quad (1)$$

$$U(z) = \frac{1}{1 - z^{-1}} \quad \{z \in \mathbb{C} : |z| > 1\} \quad (2)$$

$$X(z) = \frac{Y(z)}{U(z)} \quad (3)$$

$$x(n) = Z_z^{-1} \left[2 \left(\frac{1}{1 - z^{-1}} \right) + 6 \left(\frac{1}{1 - z^{-1}} \right)^2 \right] \quad (4)$$

$$= (6n + 8)(u(n)) \quad (5)$$

Symbol	Remarks
$y(n) = (3n^2 + 11n + 8)(u(n))$	Sum of n terms
$x(m - 1)$	164
$y(n)$	$x(n) * u(n)$
$Z_z^{-1} \left(\frac{1}{1 - z^{-1}} \right)$	$u(n)$
$Z_z^{-1} \left(\frac{1}{1 - z^{-1}} \right)^2$	$(n + 1)(u(n))$

TABLE I
PARAMETERS

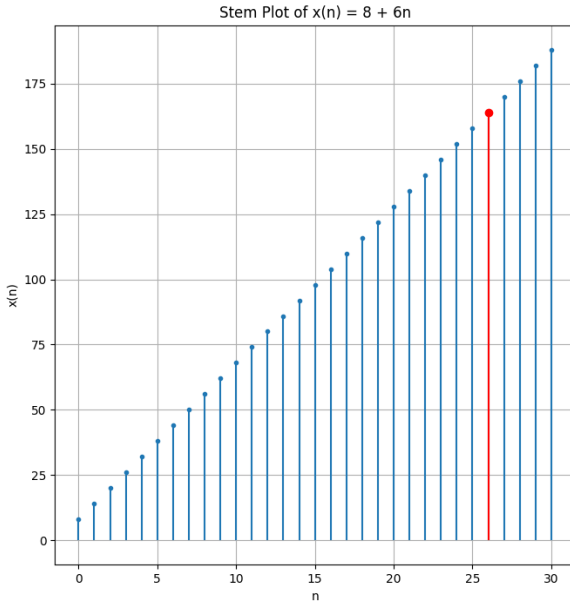


Fig. 1. Plot of $x(n)$ vs n

$$\therefore m = 26$$