

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: :

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

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

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

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

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

Symbol	Formulae
$y(n)$	$x(n) * u(n)$
$Z_z^{-1} \left(\frac{z}{z-1} \right)$	$u(n)$
$Z_z^{-1} \left(\frac{z}{z-1} \right)^2$	$(n+1)(u(n))$

TABLE I
FORMULAE

Symbol	Parameters
$y(n) = (3(n+1)^2 + 5(n+1))(u(n))$	Sum of n terms
$x(n)$	general term
$u(n)$	unit step function
$Y(z)$	Z-transform of $y(n)$
$X(z)$	Z-transform of $x(n)$
$U(z)$	Z-transform of $u(n)$

TABLE II
PARAMETERS

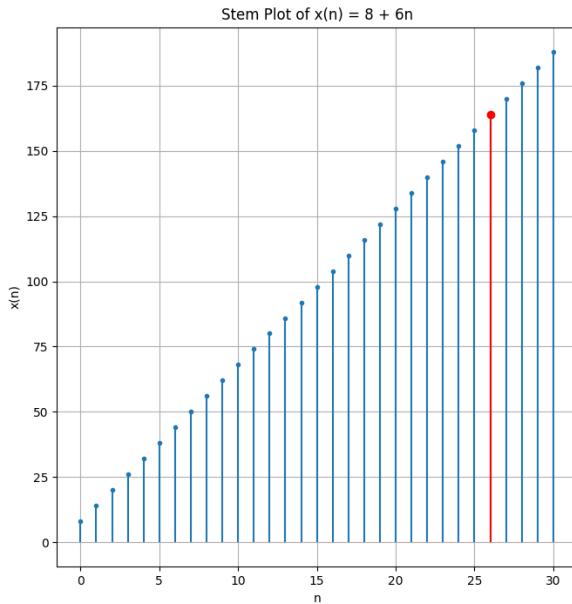


Fig. 1. Plot of $x(n)$ vs n

$$\therefore m = 26$$