

Discrete 10.5.3 Q-3

EE23BTECH11207 -KAILASH.C*

QUESTION:

In an AP:

- 1) given $a = 5$, $d = 3$, $a_n = 5$, find n and S_n .
- 2) given $a = 7$, $a_{13} = 35$, find d and S_{13} .
- 3) given $a_{12} = 37$, $d = 3$, find a and S_{12} .
- 4) given $a_3 = 15$, $S_{10} = 125$, find d and a_{10} .
- 5) given $d = 5$, $S_9 = 75$, find a and a_9 .
- 6) given $a = 2$, $d = 8$, $S_n = 90$, find n and a_n .
- 7) given $a = 8$, $a_n = 62$, $S_n = 210$, find n and d .
- 8) given $a_n = 4$, $d = 2$, $S_n = -14$, find n and a .
- 9) given $a = 3$, $n = 8$, $S_n = 192$, find d .
- 10) given $l = 28$, $S = 144$, and there are total 9 terms. Find a .

Solution: In the 9th subpart: By using sum of n

Symbols	Definition
a	First term
d	Difference
$x(n)$	General term
$S(n)$	Sum of terms till n_{th} term
$X(z)$	Z-Transformation Of $x(n)$

TABLE 10
DEFINITION TABLE

Using These properties in $x(n)$, we get:

$$X(z) = \frac{6z^{-1}}{(1 - z^{-1})^2} + \frac{3}{(1 - z^{-1})} \quad (10)$$

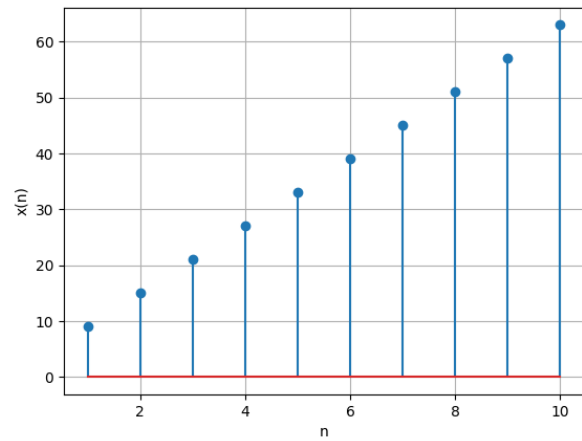


Fig. 10. Graph of $x(n)$ vs n

terms of A.P:

$$S_n = \frac{(n+1)}{2} (2a + nd) \quad (1)$$

$$192 = \frac{8}{2} (2(3) + 7d) \quad (2)$$

$$48 = 6 + 7d \quad (3)$$

$$d = \frac{42}{7} \quad (4)$$

$$d = 6 \quad (5)$$

We have:

$$x(n) = (a + nd) u(n) \quad (6)$$

$$= (3 + 6n) u(n) \quad (7)$$

By Z-Transformation properties:

$$u(n) \xleftrightarrow{Z} \frac{1}{(1 - z^{-1})} \quad (8)$$

$$nu(n) \xleftrightarrow{Z} \frac{z^{-1}}{(1 - z^{-1})^2} \quad (9)$$