10.05.2

EE23BTECH11053-R.Rahul*

QUESTION:

1. In the following APs, find the missing terms in the boxes:

(i) $2, \square, 26$

(ii) $\square, 13, \square, 3$

(iii) $5, \square, \square, 9\frac{1}{2}$

(iv) $-4, \square, \square, \square, \square, 6$

(v) $\square, 38, \square, \square, \square, '-22'$

Solution:

Parameter	Description
n	No. of terms in the A.P
$x(0)$	first term in the A.P
d	common difference in the A.P
$x(n) = x(0) + nd$	$(n+1)^{th}$ term in A.P

TABLE I
VARIABLES

1) $x(0)=2$,$x(2)=26$

$$26 = 2 + 2d \tag{1}$$
$$24 = 2d \tag{2}$$
$$\therefore d = 12 \tag{3}$$
$$x(1) = 14 \tag{4}$$

2) $x(1) = 13, x(3) = 3$

$$3 - 13 = 2d \tag{5}$$
$$-10 = 2d \tag{6}$$
$$\therefore d = -5 \tag{7}$$
$$x(1) = 18 \tag{8}$$
$$x(2) = 8 \tag{9}$$

3) $x(0)=5$, $x(3)=9\frac{1}{2}$

$$9\ \frac{1}{2} = 5 + 3d \tag{10}$$
$$3d = \frac{9}{2} \tag{11}$$
$$\therefore d = \frac{3}{2} \tag{12}$$
$$x(1) = 6\ \frac{1}{2} \tag{13}$$
$$x(2) = 8 \tag{14}$$

4) $x(0)$=-4 , $x(5)$=6

$$6 = -4 + 5d \tag{15}$$
$$10 = 5d \tag{16}$$
$$\therefore d = 2 \tag{17}$$
$$x(1) = -2 \tag{18}$$
$$x(2) = 0 \tag{19}$$
$$x(3) = 2 \tag{20}$$
$$x(4) = 4 \tag{21}$$

5) $x(1)$=38 $x(5)$=-22

$$-22 - 38 = 4d \tag{22}$$
$$-60 = 4d \tag{23}$$
$$\therefore d = -15 \tag{24}$$
$$x(0) = 53 \tag{25}$$
$$x(2) = 23 \tag{26}$$
$$x(3) = 8 \tag{27}$$
$$x(4) = -7 \tag{28}$$
$$\tag{29}$$

1) The Z-transform of $x(n) = 2 + 12n$ is given by:

$$X(z) = \frac{2 + 10z^{-1}}{(1 - z^{-1})^2} \qquad |z| > 1 \qquad (30)$$

$$(31)$$

2) The Z-transform of $x(n) = 18 - 5n$ is given by:

$$X(z) = \frac{18 - 23z^{-1}}{(1 - z^{-1})^2} \qquad |z| > 1 \qquad (32)$$

$$(33)$$

3) Z-transform of $x(n) = 5 + \frac{3}{2}n$ is given by:

$$X(z) = \frac{5 - \frac{7}{2}z^{-1}}{(1 - z^{-1})^2} \qquad |z| > 1 \qquad (34)$$

$$(35)$$

4) Z-transform of $x(n) = -4 + 2n$ is given by:

$$X(z) = \frac{-4 + 6z^{-1}}{(1 - z^{-1})^2} \qquad |z| > 1 \qquad (36)$$

$$(37)$$

5) Z-transform of $x(n) = 53 - 15n$ is given by:

$$X(z) = \frac{53 - 68z^{-1}}{(1 - z^{-1})^2} \qquad |z| > 1 \qquad (38)$$

$$(39)$$

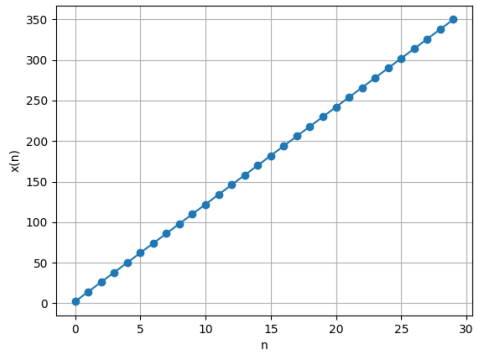

Fig. 1.

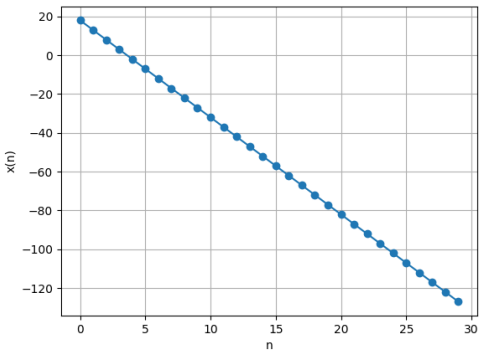

Fig. 2.

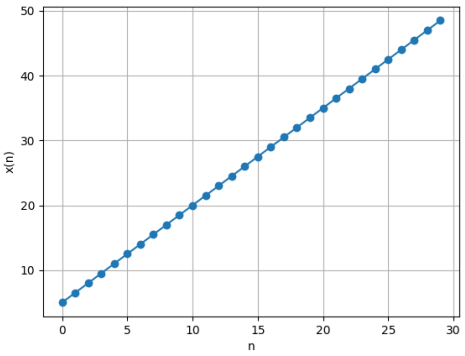

Fig. 3.

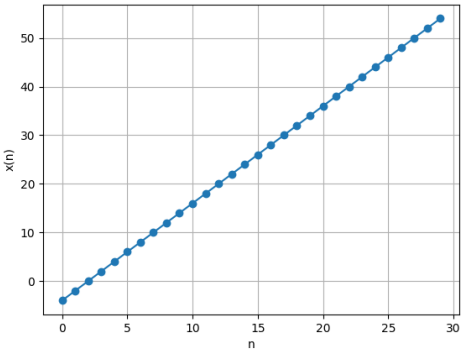

Fig. 4.

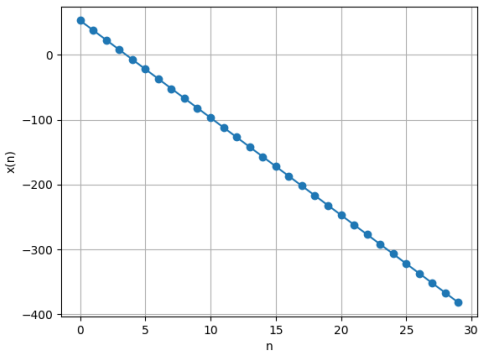

Fig. 5.