10.05.2.3

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QUESTION:

1. In the following APs, find the missing terms in the boxes:
(i) 2, _, 26
(ii) _, 13, _, 3
(*iii*)5, _, _,$9\frac{1}{2}$
(*iv*)- 4, _, _, _, _, 6
(*v*) _, 38, _, _, _,′ −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)

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

2)

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

3)

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

4)

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

5)

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

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)

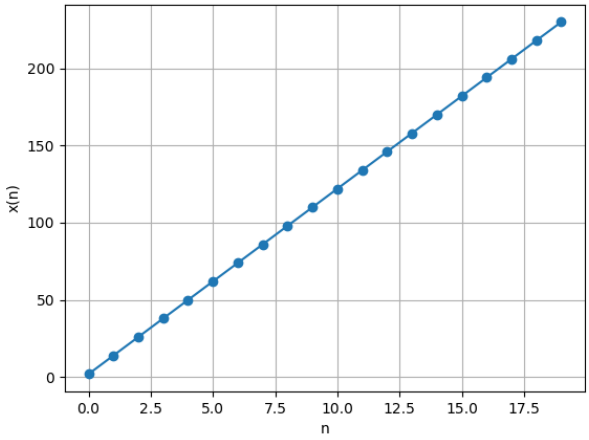

Fig. 1.

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)

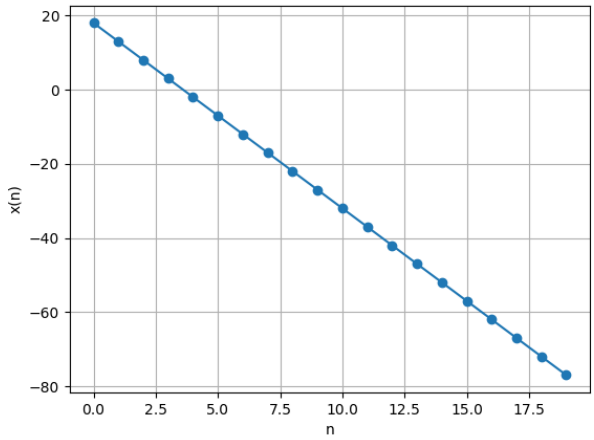

Fig. 2.

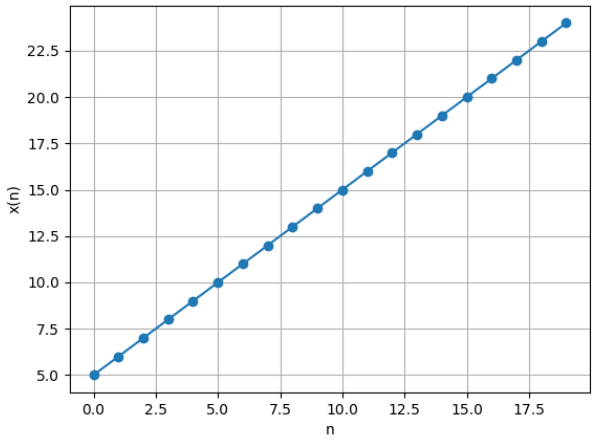

Fig. 3.

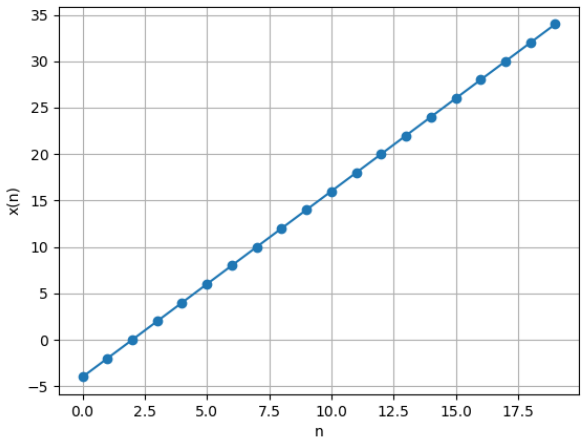
x(n)
n
35
30
25
20
15
10
5
0
−5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5

Fig. 4.

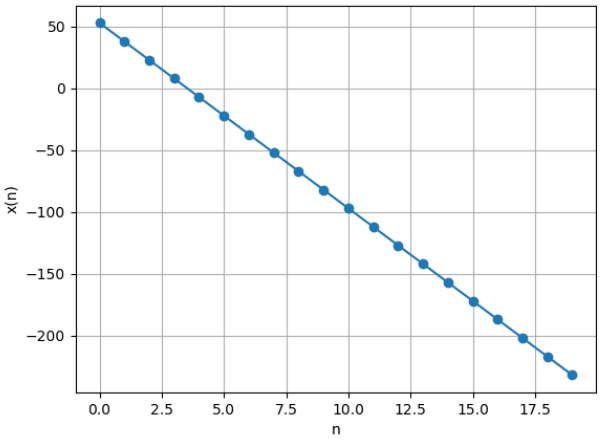
x(n)
n
50
0
−50
−100
−150
−200
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5

Fig. 5.