NCERT Discrete - 10.5.2.2

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Question 10.5.2.2:

1) 30th term of the AP: 10, 7, 4, ... is
2) 11th term of the AP: $-3, -\frac{1}{2}, 2, \ldots$ is

Solution:

Parameter	value	Description
$x_i(0)$	10	First term
	-3	
d_i	-3	Common difference
	$\frac{5}{2}$	
$x_1(29)$	?	30th term
$x_2(10)$	?	11th term

TABLE 2
INPUT PARAMETERS

The $(n+1)th$ term of the AP is given by:

$$x_i(n) = [x_i(0) + n \times d_i]\, u(n) \tag{1}$$

1) From the equation (1) and the values from the table Table 2 :

$$x_1(n) = [10 + n(-3)]\, u(n) \tag{2}$$
$$x_1(29) = [10 + (29)(-3)]\, (u(n)) \tag{3}$$
$$= [10 + 29(-3)]\, (1) \tag{4}$$
$$= 10 + (-87) \tag{5}$$
$$= -77 \tag{6}$$

$$X_1(z) = \frac{10 - 13z^{-1}}{(1 - z^{-1})^2} ROC : |z| > 1 \tag{7}$$

So, the 30th term of the AP is -77.

2) From the equation (1) and the values from the table Table 2 :

$$x_2(n) = \left[-3 + n\frac{5}{2}\right] u(n) \tag{8}$$
$$x_2(10) = \left[-3 + (10)\left(\frac{5}{2}\right)\right] (u(n)) \tag{9}$$
$$= [-3 + 10(2.5)]\, (1) \tag{10}$$
$$= -3 + 25 \tag{11}$$
$$= 22 \tag{12}$$

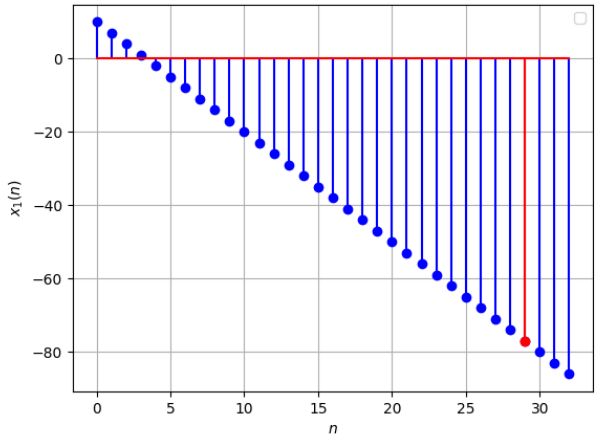

Fig. 1. stem plot of $x_1(n)$

$$X_2(z) = \frac{0.5z^{-1} - 3}{(1 - z^{-1})^2} ROC : |z| > 1 \tag{13}$$

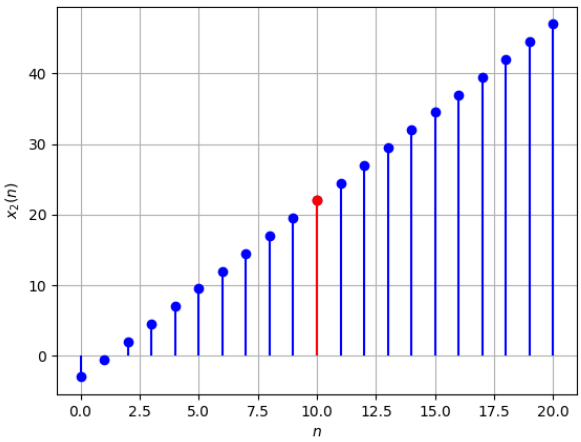

Fig. 2. stem plot of $x_2(n)$

so, the 11th term of the AP is 22.