

DISCRETE

EE23BTECH11006 - Ameen Aazam*

Question : Find the sum of the following APs:

- (a) 2, 7, 12, ... to 10 terms.
- (b) -37, -33, -29, ... to 12 terms.
- (c) 0.6, 1.7, 2.8, ... to 100 terms.
- (d) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}, \dots$ to 11 terms.

Solution: From (??), we get the sum to n terms,

Input Parameters	Values	Description
$x(0)$	2, -37, 0.6, $\frac{1}{15}$	First term of AP
d	$x(1) - x(0)$	Common difference of AP
$x(n)$	$[x(0) + nd]u(n)$	General term of AP
$y(n-1)$		Sum to n terms of AP

TABLE 4
PARAMETERS

$$y(n) = \frac{(n+1)}{2} \{2x(0) + nd\} u(n) \quad (1)$$

Now taking the Z-transform we have,

$$Y(z) = \frac{x(0)}{(1-z^{-1})^2} + \frac{dz^{-1}}{(1-z^{-1})^3} \quad (2)$$

(a)

$$x(0) = 2 \quad (3)$$

$$d = 5 \quad (4)$$

$$\Rightarrow y(9) = 245 \quad (5)$$

(b)

$$x(0) = -37 \quad (6)$$

$$d = 4 \quad (7)$$

$$\Rightarrow y(11) = -180 \quad (8)$$

(c)

$$x(0) = 0.6 \quad (9)$$

$$d = 1.1 \quad (10)$$

$$\Rightarrow y(99) = 5505 \quad (11)$$

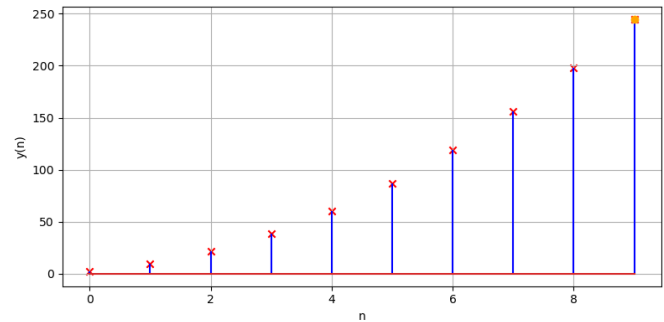
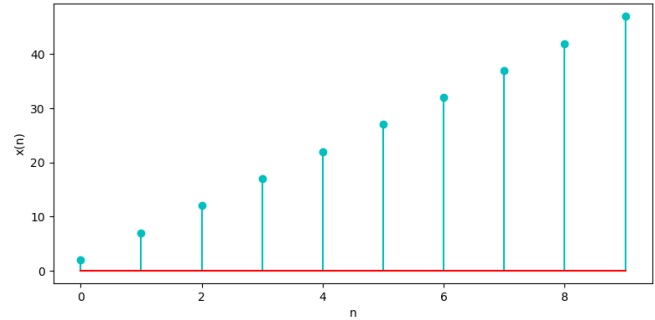


Fig. (a). 1st AP

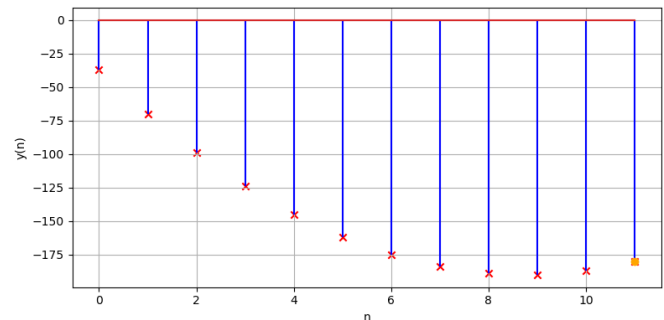
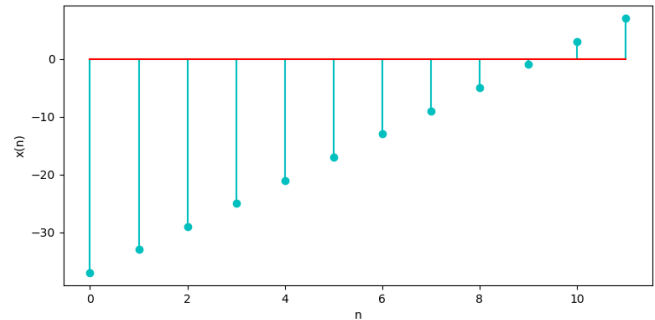


Fig. (b). 2nd AP

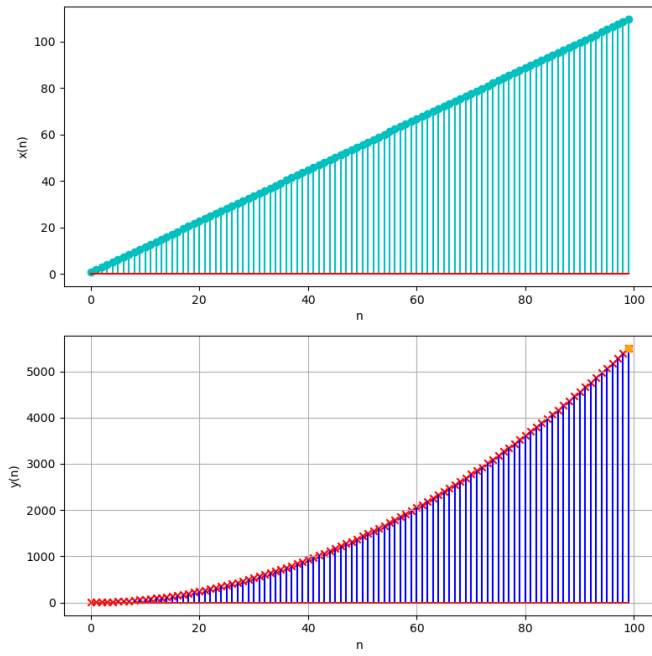


Fig. (c). 3rd AP

(d)

$$x(0) = \frac{1}{15} \quad (12)$$

$$d = \frac{1}{60} \quad (13)$$

$$\Rightarrow y(10) = 1.65 \quad (14)$$

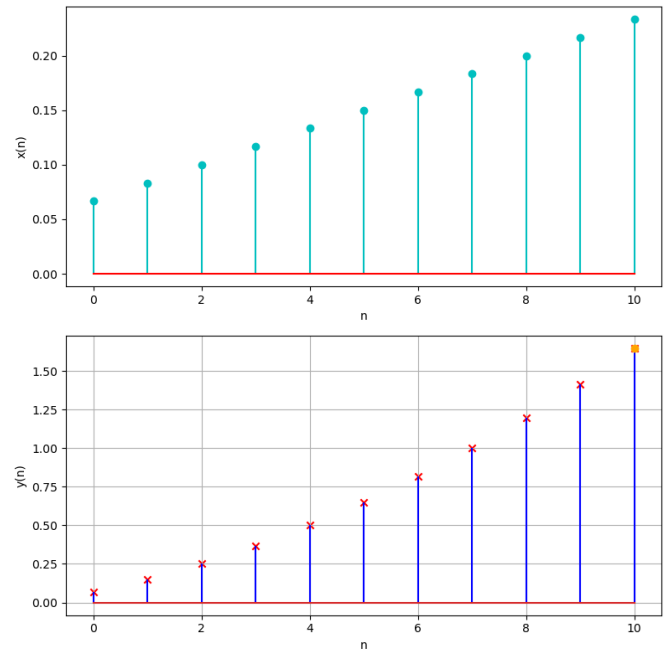


Fig. (d). 4th AP