

# NCERT Discrete

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## Question 10.5.2.8:

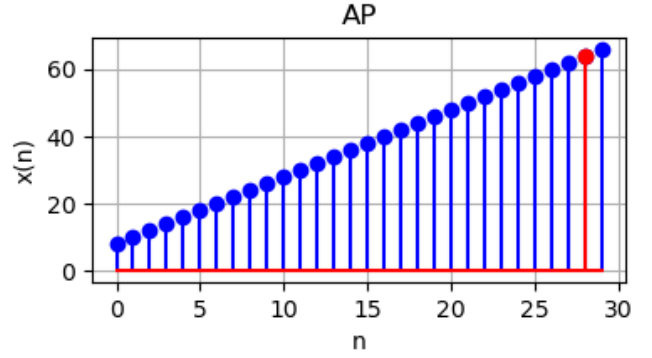
An AP consists of 50 terms of which 3<sup>rd</sup> term is 12 and the last term is 106. Find the 29<sup>th</sup> term.

**Solution:**

Parameter	Value	description
$x(2)$	12	Third term
$x(49)$	106	Last term
$x(0)$		First term
$d$		Common difference
$x(n)$	$(x(0) + nd)u(n)$	general term

TABLE I  
INPUT PARAMETERS

$$\Rightarrow X(z) = \frac{8 - 6z^{-1}}{(1 - z^{-1})^2} \quad |z| > 1 \quad (11)$$



$$\begin{pmatrix} x(2) \\ x(49) \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ 1 & 49 \end{pmatrix} \begin{pmatrix} x(0) \\ d \end{pmatrix} \quad (1)$$

$$\begin{pmatrix} 12 \\ 106 \end{pmatrix} = \begin{pmatrix} x(0) & 2d \\ x(0) & 49d \end{pmatrix} \quad (2)$$

$$R_2 \rightarrow R_2 - R_1 \quad (3)$$

$$\begin{pmatrix} 12 \\ 94 \end{pmatrix} = \begin{pmatrix} x(0) & 2d \\ 0 & 47d \end{pmatrix} \quad (4)$$

1) From column 2 we get

$$\Rightarrow d = 2 \quad (5)$$

2) Substituting (5) in column 1, we get

$$\Rightarrow x(0) = 8 \quad (6)$$

3) From the Table I :

$$x(n) = (x(0) + nd)u(n) \quad (7)$$

$$\Rightarrow x(n) = (8 + 2n)u(n) \quad (8)$$

4) Finding  $x(28)$  :

$$x(28) = x(0) + 28(2) \quad (9)$$

$$\Rightarrow x(28) = 64 \quad (10)$$

5) Z-transform :

Fig. 1. graph of the given AP