NCERT Discrete

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Question 10.5.2.8:
An AP consists of 50 terms of which 3^{rd} term is 12 and the last term is 106. Find the 29^{th} term.
Solution :

x_3	x_{50}	x_n
12	106	$a_0 + nd$

TABLE I
GIVEN INPUTS

For an AP

$$x_n - x_{n-1} = d \tag{1}$$

Given

$$x_0 + 3d = 12 \tag{2}$$

Given

$$x_0 + 50d = 106 \tag{3}$$

$(2) - (1)$

$$x_0 + 50d - (x_0 + 3d) = 106 - 12 \tag{4}$$
$$47d = 94 \tag{5}$$
$$d = 2 \tag{6}$$

Substituting d in (1)

$$x_0 + 3(2) = 12 \tag{7}$$
$$x_0 = 6 \tag{8}$$

We know that

$$x_{29} = x_0 + 29d \tag{9}$$

By (8) and (6) in (9)

$$x_{29} = 6 + 29(2) \tag{10}$$
$$x_{29} = 6 + 58 \tag{11}$$
$$x_{29} = 64 \tag{12}$$