

6/7/2020
MONDAY

MATHEMATICS

STD - 8
class - 08

NOTES

• Sums

1) The expressions for the sum to n terms of some arithmetic sequences are given below. Find the expression for the n th term of each:

i) $n^2 + 2n$ ii) $2n^2 + n$ iii) $n^2 - 2n$ iv) $2n^2 - n$

v) $n^2 - n$

Ans) i) $n^2 + 2n$

Sum of the first one term = first term = $1^2 + 2 \times 1$

$$= 1 + 2$$

$$= \underline{\underline{3}}$$

Sum of the first 2 terms = $2^2 + 2 \times 2$

$$= 4 + 4$$

$$= \underline{\underline{8}}$$

$$x_1 + x_2 = 8$$

$$3 + x_2 = 8,$$

$$\therefore x_2 = 8 - 3 = \underline{\underline{5}}$$

$$x_1 = 3$$

$$d = 2$$

$$\therefore x_n = f + (n-1)d$$

$$= 3 + (n-1)2$$

$$= 3 + 2n - 2$$

$$= \underline{\underline{2n + 1}}$$

$$f = 3$$

$$d = 5 - 3 = 2$$

$$\text{ii) } 2n^2 + n$$

$$\begin{aligned}x_1 &= 2 \times 1^2 + 1 \\ &= 2 \times 1 + 1 \\ &= \underline{\underline{3}}\end{aligned}$$

$$\begin{aligned}S_2 &= 2 \times 2^2 + 2 \\ &= 2 \times 4 + 2 \\ &= 8 + 2 \\ &= \underline{\underline{10}}\end{aligned}$$

$$\begin{aligned}\therefore x_2 &= S_2 - x_1 \\ &= 10 - 3 \\ &= \underline{\underline{7}}\end{aligned}$$

$$\begin{aligned}\therefore d &= x_2 - x_1 \\ &= 7 - 3 \\ &= \underline{\underline{4}}\end{aligned}$$

$$\begin{aligned}\therefore x_n &= 3 + (n-1)4 \\ &= 3 + 4n - 4 \\ &= \underline{\underline{4n - 1}}\end{aligned}$$

$$\text{iii) } n^2 - 2n$$

$$\begin{aligned}x_1 &= 1^2 - 2 \times 1 \\ &= 1 - 2 \\ &= \underline{\underline{-1}}\end{aligned}$$

$$\begin{aligned}S_2 &= 2^2 - 2 \times 2 \\ &= 4 - 4 \\ &= \underline{\underline{0}}\end{aligned}$$

$$\begin{aligned}x_2 &= S_2 - x_1 \\ &= 0 - (-1) \\ &= \underline{\underline{1}}\end{aligned}$$

$$\begin{aligned}\therefore d &= 1 - (-1) \\ &= \underline{\underline{2}}\end{aligned}$$

$$\begin{aligned}\therefore x_n &= f + (n-1)d \\ &= -1 + (n-1)2 \\ &= -1 + 2n - 2 \\ &= \underline{\underline{2n - 3}}\end{aligned}$$

$$\text{iv) } 2n^2 - n$$

$$\begin{aligned}x_1 &= 2 \times 1^2 - 1 \\ &= 2 - 1 \\ &= \underline{\underline{1}}\end{aligned}$$

$$\begin{aligned}S_2 &= 2 \times 2^2 - 2 \\ &= 2 \times 4 - 2 \\ &= 8 - 2 \\ &= \underline{\underline{6}}\end{aligned}$$

$$\begin{aligned}\therefore x_2 &= S_2 - x_1 \\ &= 6 - 1 \\ &= \underline{\underline{5}}\end{aligned} \quad \begin{aligned}\therefore d &= 5 - 1 \\ &= \underline{\underline{4}}\end{aligned}$$

$$\begin{aligned}\therefore x_n &= f + (n-1)d \\ &= 1 + (n-1)4 \\ &= 1 + 4n - 4 \\ &= \underline{\underline{4n - 3}}\end{aligned}$$

$$\text{v) } n^2 - n$$

$$\begin{aligned}x_1 &= 1^2 - 1 \\ &= \underline{\underline{0}}\end{aligned}$$

$$\begin{aligned}S_2 &= 2^2 - 2 \\ &= 4 - 2 \\ &= \underline{\underline{2}}\end{aligned}$$

$$\begin{aligned}\therefore x_2 &= S_2 - x_1 \\ &= 2 - 0 \\ &= \underline{\underline{2}}\end{aligned} \quad \begin{aligned}\therefore d &= 2 - 0 \\ &= \underline{\underline{2}}\end{aligned}$$

$$\begin{aligned}\therefore x_n &= f + (n-1)d \\ &= 0 + (n-1)2 \\ &= \underline{\underline{2n - 2}}\end{aligned}$$