

DETERMINING SUMS OF
 SESSION TWO

Ex 14:

Find sum of
 (i) first 1000 positive integers
 (ii) first n positive integers.

Soln:

$$(i) S = 1 + 2 + 3 + \dots + 1000$$

$$S_n = \frac{n}{2} (a+l)$$

$$S_{1000} = \frac{1000}{2} (1+1000) = 500 \times 1001$$

$$\Rightarrow 500500$$

$$(ii) S_n = 1 + 2 + 3 + \dots + n$$

$$a = 1$$

$$l = n$$

$$S_n = \frac{n(l+n)}{2}$$

or

$$S_n = \frac{n(n+1)}{2}$$

Sum of positive integers is given by

$$S_n = \frac{n(n+1)}{2}$$

Ex 15:

Sum of first 24 terms.

$$a_n = 3 + 2n$$

Soln:

$$a_1 = 3 + 2 \cdot 1$$

$$a_2 = 3 + 2 \cdot 2 \Rightarrow 5$$

$$a_3 = 3 + 2 \cdot 3 \Rightarrow 7$$

$$a_4 = 3 + 2 \cdot 4 \Rightarrow 9$$

$$\therefore 3, 5, 7, 9, 11, \dots, (1 - 1) + 2n = 2n + 2$$

$$\text{Here, } T - S = 9 - 5 = 11 - 9 = \frac{(s - 1)d}{2} \text{ and for } a_n$$

$$\therefore d = 2$$

$$\therefore 3, 5, 7, 9, \dots, 24, d = 2$$

$$\begin{aligned} S_{24} &= \frac{24}{2} [2 \times 3 + (24 - 1) \times 2] \\ &= 12(10 + 46) = 672 \end{aligned}$$

Ex 16:

Soln:

$$(i) a_3 = 600 \text{ & } a_7 = 700$$

$$a + 2d = 600$$

$$a + 6d = 700$$

$$\therefore d = 25 \text{ and } \boxed{a = 550}$$

$$(ii) a_{10} = a + 9d = 550 + 9 \times 25 \\ = 775$$

$$\begin{aligned} (iii) S_7 &= \frac{7}{2} [2 \times 550 + (7 - 1) \times 25] \\ &= \frac{7}{2} [1100 + 150] \\ &= 4375. \end{aligned}$$

Ex 8:

Soln :

$$AP \sim 10, 7, 4 \dots, -62.$$

$$\therefore a = 10$$

$$d = 7 - 10$$

$$= -3$$

$$l = -62$$

$$l = a + (n-1)d$$

$$-62 = 10 + (n-1)(-3)$$

$$-72 = (n-1)(-3)$$

$$n-1 = 24$$

$$n = 25$$

$$a_{18} = 10 + (18-1)(-3) = 10 - 45$$

$$= -32$$

Ex 9:

Soln: $S.I = \frac{PRT}{100}$

$$1^{\text{st}} \text{ year} = \frac{1000 \times 2 \times 1}{100} \Rightarrow 20 \text{ Rs}$$

$$2^{\text{nd}} \text{ year} = \frac{1000 \times 2 \times 2}{100} \Rightarrow 40 \text{ Rs}$$

$$3^{\text{rd}} \text{ year} = \frac{1000 \times 2 \times 3}{100} \Rightarrow 60 \text{ Rs}$$

and so on.

$$\therefore AP = 20, 40, 60 \dots$$

$$a_{30} = a + (30-1)d \Rightarrow 20 + 29 \times 20$$

$$\Rightarrow 2400 \text{ Rs.}$$

Ex 10:

Sln: AP = 23, 21, 19, ..., s

$$a = 23, d = 21 - 23 \Rightarrow -2, a_n = s$$

$$a_n = a + (n-1)d$$

$$s = 23 + (n-1)(-2)$$

$$-18 = (n-1)(-2)$$

$$n = 10.$$
