KIRAN TUTORIALS **Seat No.** | | | | | | | |

Std 10 (English) **Mathematics Part - I**

Time 1HRS	**Chapter 3SOLUTION**	**Marks 20**

Q.1 **Multiple Choice Questions** **2**

1 The list of number -10, -6, - 2, 2, ... is

a. an A.P. with d = -16 b. an A.P with d = 4

c. an A.P with d = -4 d. not an A.P

Ans Option b.

2 The 10th term of the A.P 5,8,11,14, ... is

a. 32 b. 35 c. 38 d. 185

Ans Option a.

Hint : Use t_n formula

Q.2 **Attempt the following (Activity)** **2**

1 Complete the following activity to find the sum of natural number from 1 to 140 which are divisible by 4.

The natural nos. between 1 to 140 which are divisible by 4

↓

4, 8, ……., 136

↓

How many numbers? ∴ n = 34

↓

a = 4, d = 4, t_n = 136

↓

$t_n = a + (n - 1)\,d$

↓

136 = ☐ + (n - 1) × ☐

↓

∴ n = 34

↓

$S_n = \frac{n}{2}[2a + (n - 1)\,d]$

↓

$S_{\square} = \frac{\square}{2}[2 \times 4 + (34 - 1)\,4]$

↓

∴ S_{34} = 2380

∴ The sum of all numbers between 1 to 140 which are divisible by 4 = ☐

Ans

Q.3 **Answer the following** **6**

1 Find the sum of all even natural numbers between 1 to 350.

Ans The even natural numbers from 1 to 350 are 2, 4, 6, 8 ..., 348

They form an A.P. where a = 2, d = 4 - 2 = 2 and t_n = 348

Now, $t_n = a + (n - 1)d$

$\therefore$ 348 = 2 + (n - 1)2

$\therefore$ 348 = 2n

$\therefore$ 174 = n

$S_n = \frac{n}{2}\left[2a + \left(n - 1\right)d\right]$

$= \frac{174}{2}\left[2 \times 2 + \left(174 - 1\right) \times 2\right]$

= 87 (4 + 346)

= 87 (350)

= 30,450

2 Which term of an A.P. is 70, if the first term is 120 and the common difference - 5?

Ans Here, a = 120, d = -5

Let t_n = 70

Now, $t_n = a + (n - 1)\ d$ ... (Formula)

$\therefore$ $70 = 120 + (n - 1) \times (- 5)$ ... (Substituting the values)

$\therefore$ $70 - 120 = (n - 1) \times (- 5)$

$\therefore$ $(n - 1) \times (- 5) = - 50$

$\therefore$ $n - 1 = \frac{-50}{-5}$ $\therefore$ n - 1 = 10 $\therefore$ n = 10 + 1 $\therefore$ n = 11.

The **eleventh term** of the A.P. is 70.

3 In the year 2010 in the village there were 4000 people who were literate. Every year the number of literate people increases by 400. How many people will be literate in the year 2020?

Ans

Year	2010	2011	2012	...	2020
Literate People	4000	4400	4800	...	▭

a = 4000, d = 400 n = 11

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

= 4000 + (11 - 1)400

= 4000 + 4000

= 8000

In year 2020, 8000 people will be literate.

Q.4 Solve the following **6**

1 Find out the sum of all natural numbers between 1 and 145 which are divisible by 4.

Ans The numbers divisible by 4 between 1 and 145 are 4, 8, 12, 16, ... 144 ; which is an A. P.

Here, a = 4, d = 4, t_n = 144 we have to find n.

$t_n = a + (n - 1)\ d$

$\therefore$ $t_n = 4 + (n - 1) \times 4$

$\therefore$ 144 = 4n

$\therefore$ n = 36

Now, $s = \frac{n}{2}\left[t_1 + t_n\right]$

$\therefore$ $S_{36} = \frac{36}{2}$ [4 + 144]

$= 18 \times 148 = 2664$

$\therefore$ The sum of numbers between 1 and divisible by 4 is 2664.

2 Find how many three digit natural numbers are divisible by 5.

Ans The three digit natural numbers divisible.

by 5 are 100, 105, 110, ..., 995.

Here $t_1 = 100$, $t_2 = 105$, $t_3 = 110$

$t_2 - t_1 = 105 - 100 = 5$,

$t_3 - t_2 = 100 - 105 = 5$

This shows that the difference between any two consecutive terms is constant.

$\therefore$ The given sequence is an A.P. where a = 100,

d = 5, $t_n = 995$, n = ?

$t_n = a + (n - 1)\, d$

$\therefore$ $995 = 100 + (n - 1)5$

$\therefore$ $895 = 5n - 5$

$\therefore$ $895 + 5 = 5n$

$\therefore$ $5n = 900$

$\therefore$ $n = \frac{900}{5}$

$\therefore$ $n = 180$

Thus there are 180 three digit natural numbers which are divisible by 5.

Q.5 **Answer the following (Non textual)(Any One)** **4**

1 The second and the fourth terms of an A.P. are 12 and 20 respectively. Find the sum of the first 25 terms of that A.P.

Ans Here, $t_2 = 12$; $t_4 = 20$.

$t_n = a + (n - 1)\, d$ ... (Formula)

$\therefore$ $t_2 = a + (2 - 1)\, d$

$\therefore$ $12 = a + d$ ... (Given : $t_2 = 12$) ... (1)

Similarly, $t_4 = a + (4 - 1)\, d$

$\therefore$ $20 = a + 3d$ ... (Given : $t_4 = 20$) ... (2)

Subtracting equation (1) from equation (2),

$$\begin{array}{rl} a + 3d = 20 & \text{... (2)} \\ a + d = 12 & \text{... (1)} \\ - \quad - \quad - & \\ \hline 2d = 8 & \end{array} \quad \therefore d = 4$$

Substituting d = 4 in equation (1).

$12 = a + 4$

$\therefore$ $a = 12 - 4$ $\quad \therefore a = 8$

For the given A.P., a = 8, d = 4 and n = 25.

$S_n = \frac{n}{2}\,[2a + (n - 1)\,]$ ... (Formula)

$\therefore$ $S_{25} = \frac{25}{2}\,[2 \times 8 + (25 - 1) \times 4]$ ... (Substituting the given values)

$= \frac{25}{2}\,[16 + 24 \times 4]$

$= \frac{25}{2}\,(16 + 96) = \frac{25}{2} \times 112$

25×56 $\quad \therefore S_{25} = 1400$.

The sum of the first 25 terms is **1400.**

2 Find three consecutive terms in an A.P. whose sum is - 3 and the product of their cubes is 512.

Ans Let the three consecutive terms in an A.P. be a - d, a and a + d.

From the first condition,

$(a - d) + a + (a + d) = - 3$

$\therefore$ $3a = - 3$ $\quad \therefore a = - 1$.

From the second condition,

$(a - d)^3 \times a^3 \times (a + d)^3 = 512$

$\therefore$ $(-1-d)^3 \times (-1)^3 \times (-1+d)^3 = 512$ ... [Substituting a = - 1]

$\therefore$ $[(-1)(-1-d)]^3 (-1+d)^3 = 512$

$\therefore$ $(1+d)^3 (-1+d)^3 = (8)^3$

$\therefore$ $(1+d)(-a+d) = 8$ ... (Taking cube root of both the sides)

$\therefore$ $d^2 - 1 = 8$ $\therefore d^2 = 9$ $\therefore d = \pm 3$.

Taking a = - 1 and d = 3,

(a - d) = - 1 - 3 = - 4;

(a + d) = - 1 + 3 = 2

$\therefore$ The terms are - 4, - 1 and 2

Taking a = - 1 and d = - 3,

(a - d) = - 1 - (- 3) = - 1 + 3 = 2;

a = - 1

a + d = -1 - 3 = - 4

$\therefore$ the terms are 2, -1, -4.

The three consecutive terms are **- 4, - 1** and **2** OR **2, - 1** and **-4.**

YOUR FLIGHT , OUR WINGS .