

**ARITHMETIC PROGRESSIONS****EASY SCORING IMPORTANT QUESTIONS****LEVEL- 1 (1 Marks)**

Q1) For the A.P 3,1,-1,-3...., Write the first term and common difference?

Sol. Here, first term 'a'=3 & common difference 'd'=1-3 =-2

Q2) Find the 10th Term of the A.P, whose first term is 2 and common difference is 5

Sol Here, first term 'a'=2 & common difference 'd'=5.

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

$$\text{Or, } a_{10} = 2 + (10-1) \times 5$$

$$= 2 + 45$$

$$= 47$$

Q3. Write the formula to find the sum of first n terms of an AP whose first term is a and common difference is d

$$\text{Sol. } S_n = \frac{n}{2} \{2a + (n-1)d\}$$

Q4. Write the sum of first n terms of an AP whose first term is a and last term is l

$$\text{Sol. } S_n = \frac{n}{2} \{a + l\}$$

**LEVEL- 2 (2 Marks)**

Q1. Find the 8<sup>th</sup> term of an A.P. 7,10,13,.....?

Sol. Here a = 7 ,d = 10 – 7 =3

$$\text{Therefore } a_8 = a + 7d$$

$$= 7 + 7 \times 3$$

$$= 7 + 21$$

$$= 28$$

Q2. Find the sum of first 10 terms of the A.P 2,5,8,11.....?

Sol)  $a = 2$  ;  $d = 5 - 2 = 3$  &  $n = 10$

$$S_{10} = ?$$

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

$$\text{or, } S_{10} = \frac{10}{2} [ 2 \times 2 + (10-1) \times 3 ]$$

$$\text{or, } S_{10} = 5 [ 4 + 9 \times 3 ]$$

$$\text{Or, } S_{10} = 5 [ 4 + 27 ]$$

$$\text{Or, } S_{10} = 5 \times 31$$

$$\text{or, } S_{10} = 155$$

Q3. For what values of  $n$  the  $n$ th term of AP is 63, 65, 67, ..... and 3, 10, 17, ..... are equal

Sol. For AP 1 : 63, 65, 67, .....  $a = 63$  ,  $d = 65 - 63 = 2$

For A P 2 : 3, 10, 17, .....  $A = 3$  ,  $D = 10 - 3 = 7$

Let  $n$ th term is equal  $\Rightarrow a_n = A_n$

$$a + (n-1)d = A + (n-1)D$$

$$63 + (n-1)2 = 3 + (n-1)7 \quad \Rightarrow 63 - 3 = (n-1)7 - (n-1)2$$

$$60 = (n-1)5 \quad \Rightarrow 60/5 = n-1 \Rightarrow 12+1 = n$$

$$n = 13$$

Q 4 Find the 20<sup>th</sup> term from the last term of an AP 3, 8, 13, ..... 253 .

Sol : For AP :  $a = 3$  ,  $d = 8 - 3 = 5$  ,  $a_n = 253$

For reverse AP :  $A = 253$   $D = -5$

$$A_{20} = A + (20-1)D$$

$$A_{20} = 253 + 19 \times (-5)$$

$$A_{20} = 253 - 95 = 158$$

### **LEVEL- 3 (3 Marks)**

Q1) Which term of the A.P : 21, 18, 15, ..... is -81?

Sol) Here  $a = 21$ ,  $d = 18 - 21 = -3$

Let  $n^{th}$  term = -81

$$a_n = -81$$

$$a + (n-1)d = -81$$

$$\text{or, } 21 + (n-1)(-3) = -81$$

$$\text{or, } (n-1)(-3) = -81 - 21$$

$$\text{or, } (n-1) = -102 / -3$$

$$\text{or, } (n-1) = 34$$

$$\text{Or, } n = 35$$

Hence  $35^{th}$  term is -81.

Q 2 Determine the A.P whose  $3^{rd}$  term is 5 and  $7^{th}$  term is 9?

Sol) Let first term of A.P =  $a$  & common difference =  $d$

$$\text{since, } a_3 = 5$$

$$\text{or, } a + (3-1)d = 5$$

$$\text{or, } a + 2d = 5 \dots\dots\dots(1)$$

$$\&a_7 = 9$$

$$\text{Or, } a + (7-1)d = 9$$

$$\text{Or, } a + 6d = 9 \dots\dots\dots(2)$$

Subtracting (1) & (2), we get

$$a + 6d - a - 2d = 9 - 5$$

$$\text{or, } 4d = 4$$

$$\text{Or, } d = 1$$

Putting  $d = 1$  in eq. (1), we get

$$a + 2 \times 1 = 5$$

$$a+2=5$$

$$a=5-2$$

$$\text{or, } a=3$$

Required A.P is  $a, a+d, a+2d, a+3d$

$$\text{i.e. } 3, (3+1), 3+2 \times 1, 3+3 \times 1$$

$$\text{i.e. } 3, 4, 5, 6, \dots$$

**Q 3 Find the common difference of an A.P. whose first term is  $\frac{1}{2}$  and the 8<sup>th</sup> term is 17 . Also write its 4<sup>th</sup> term.**

**Sol.3** Here, first term (a) =  $\frac{1}{2}$

and eighth term  $a_8 = \frac{17}{6}$

$$\Rightarrow a + 7d = \frac{17}{6} \Rightarrow \frac{1}{2} + 7d = \frac{17}{6}$$

$$\Rightarrow 7d = \frac{17}{6} - \frac{1}{2} = \frac{14}{6} \Rightarrow d = \frac{1}{3}$$

Now,  $a_4 = a + 3d = \frac{1}{2} + 3 \times \frac{1}{3} = \frac{1}{2} + 1 = \frac{3}{2}$

**Q4. Find the sum of integers between 100 and 200 that are divisible by 9.**

Integers divisible by 9 between 100 and 200 are 108, 117, 126, 135, .....198

$$a_n = 198$$

$$a + (n-1)d = 198$$

$$108 + (n-1)9 = 198$$

$$(n-1)9 = 90/9$$

$$(n-1) = 10$$

$$n = 11$$

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

$$S_{11} = \frac{11}{2} (108 + 198) = \frac{11 \times 306}{2} = 1683$$

**LEVEL- 4 (4 Marks)**

**Q1 If the numbers  $x-2, 4x-1$  and  $5x+2$  are in A.P. Find the value of  $x$ .**

**Ans.12**

**Sol.**  $x-2$ ,  $4x-1$  and  $5x+2$  are in A.P.

$$\Rightarrow (4x-1) - (x-2) = (5x+2) - (4x-1)$$

$$\Rightarrow 4x-1-x+2 = 5x+2-4x+1$$

$$\Rightarrow 2x=2$$

$$\Rightarrow x=1$$

Q2. Determine the AP whose 3<sup>rd</sup> term is 16 and when fifth term is subtracted from 7<sup>th</sup> term, we get 12.

1) Given  $a_3 = 16$  i.e  $a + 2d = 16$ ------(1)

Also  $a_7 - a_5 = 12$

$$a + 6d - (a + 4d) = 12$$

$$a + 6d - a - 4d = 12$$

$$2d = 12$$

$$d = 6$$

Put  $d = 6$  in (1)

$$a + 2 \times 6 = 16$$

$$a + 12 = 16$$

$$a = 4$$

therefore required AP : 4 , 10 , 16 , 22 .....

Q3. Find the sum of the first 31 terms of an AP. Whose  $n^{\text{th}}$  term is given by  $3 + 2n/3$ .

1) Given  $a_n = 3 + 2n/3$

Put  $n = 1, 2, 3, \dots$

$$a = 11/3, a_2 = 13/3, a_3 = 15/3 \text{ and so on}$$

therefore  $a = 11/3$  and  $d = 13/3 - 11/3 = 2/3$

$$S_n = n/2 [ 2a + (n-1)d ]$$

$$= 31/2 [ 2 \times 11/3 + 30 \times 2/3 ]$$

$$= 31/2 [ 22/3 + 60/3 ]$$

$$= 31/2 \times 82/3$$

$$= 1271/3 \text{ (Ans)}$$

Q4. If the 8<sup>th</sup> term of an A.P is 31 and 15<sup>th</sup> term is 16 more than the 11<sup>th</sup> term, find the A.P.

1. Let  $a$  be the first term and  $d$  be the common difference of the A.P

$$a_8 = 31 \text{ and}$$

$$a_{15} = 16 + a_{11}$$

$$\Rightarrow a + 7d = 31 \qquad a + 14d = 16 + a + 10d$$

$$\text{-----}(1) \qquad 14d - 10d = 16$$

$$\Rightarrow 4d = 16$$

$$\Rightarrow d = 4$$

Putting the value d in eq. (1)

$$a + 7 \times 4 = 31$$

$$\Rightarrow a = 31 - 28 = 3$$

$\therefore$  the A.P is 3, 3+d, 3+2d, 3+3d,.....

$$= 3, 3+4, 3+2 \times 4, 3+3 \times 4, \dots$$

$$= 3, 7, 11, 15, \dots$$