

**SELAQUI INTERNATIONAL SCHOOL**  
**WINTER VACATION ASSIGNMENT 2016-17**  
**(CLASS X-MATHEMATICS)**  
**WORKSHEET NO. 3**  
**ARITHMETIC PROGRESSION**

**KEY-POINTS**

- Arithmetic progression (A.P.) :- An A.P. is a list of numbers in which each term is obtained by adding a fixed number to the preceding term except the first term.
- This fixed number is called the common difference of the A.P.
- If a is first term and d is common difference of an A.P. , then the A.P is a , a+d , a+2d , 2+3d .....
- The  $n^{th}$  term of an a.p is denoted by  $a_n$  and  $a_n = a+(n-1) d$  , where a = first term and d = common difference.
- $n^{th}$  term from the end =  $l - (n-1) d$  , where l = last term.
- Three terms a-d , a , a+d are in A.P with common difference d.
- Four terms a-3d , a-d , a+d , a+3d are in A.P with common diff. 2d .
- The sum of first n natural number is  $\frac{n(n+1)}{2}$
- The sum of n terms of an A.P with first term a and common difference d is denoted by  $s_n = \frac{n}{2} \{ 2a+(n-1) d \}$  also ,  $s_n = \frac{n}{2}(a+l)$  where , l = last term.
- $a_n = s_n - s_{n-1}$ . Where  $a_n = n^{th}$  term of an A.P
- $D = a_n - a_{n-1}$ . Where d = common difference of an A.P.

**[LEVEL -1 ]**

1. Find  $n^{th}$  term of – 15 , -18 , -21 , .....

Ans .-3 (n+4)

2. Find the common diff. of A.P 1 , -2 ,-5 ,-8 ,.....

Ans . -3

3. Find the A.P whose first term is 4 and common difference is – 3

Ans . a.p = 4 , 1 -2, -5, -8.....

4. Find  $5^{th}$  term from end of the AP : 17 , 14 ,11.....-40.

Ans . -28

5. If 2p, p+10 , 3p+2 are in AP then find p.

Ans . p= 6

6. If arithmetic mean between 3a and 2a-7 is a+4 , then find a.

Ans . a= 5

7. Find sum of all odd numbers between 0 & 50.

Ans . 625

8. If a = 5 , d = 3 and  $a_n = 50$  , then find n.

Ans .n =16

9. For what value of  $n$  are the  $n^{\text{th}}$  term of two AP,  $63, 65, 67, \dots$  and  $3, 10, 17, \dots$  equal?

Ans.  $n = 13$ .

10. If sum of  $n$  terms of an AP is  $2n^2 + 5n$ , then find its  $n^{\text{th}}$  term.

Ans.  $4n + 3$ .

**[ LEVEL - 2 ]**

1. Find  $n^{\text{th}}$  term of an AP is  $7 - 4n$ . find its common difference.

Ans.  $-4$ .

2. Which term of an AP  $5, 2, -1, \dots$  will be  $-22$  ?

Ans.  $10^{\text{th}}$  term .

3. Write the next term of an AP  $\sqrt{8}, \sqrt{18}, \sqrt{32}, \dots$

Ans.  $5\sqrt{2}$ .

4. Determine  $27^{\text{th}}$  term of an AP whose  $9^{\text{th}}$  term is  $-10$  and common difference is  $1\frac{1}{4}$

Ans.  $927 = \frac{25}{2}$ .

5. Find the sum of series  $103 + 101 + 99 + \dots + 49$ .

Ans.  $2128$ .

6. Which term of the AP  $3, 15, 27, 39, \dots$  will be  $132$  more than its  $54^{\text{th}}$  term ?

Ans.  $65^{\text{th}}$  term .

7. How many three digit numbers are divisible by  $7$  ?

Ans.  $128$ .

8. Given  $a = 2$ ,  $d = 8$ ,  $s_n = 90$ , find  $n$  and  $a_n$ .

Ans.  $N = 5$  &  $a_n = 34$

**[ LEVEL - 3 ]**

1. Which term of the sequence  $-1, 3, 7, 11, \dots$  is  $95$ ?

Ans.  $25^{\text{th}}$  term

2. How many terms are there in the sequence  $3, 6, 9, 12, \dots, 111$ ?

Ans.  $37$  terms

3. The first term of an AP is  $-7$  and the common difference  $5$ , find its  $18^{\text{th}}$  term and the general term.

Ans.  $a_{18} = 78n$  &  $a_n = 5n - 12$

4. How many numbers of two digits are divisible by  $3$ ?

Ans.  $30$

5. If the  $n^{\text{th}}$  term of an AP is  $(2n+1)$ , find the sum of first  $n$  terms of the AP

Ans.  $S_n = n(n+2)$

6. Find the sum of all natural numbers between  $250$  and  $1000$  which are exactly divisible by  $3$ .

Ans.  $156375$ .

**Problems for self evaluation.**

1. Show that the sequence defined by  $t_n = 4n + 7$  is an AP.
  2. Find the number of terms for given AP : 7, 13, 19, 25, ....., 205.
  3. The 7<sup>th</sup> term of an AP is 32 and its 13<sup>th</sup> term is 62. Find AP.
  4. Find the sum of all two digit odd positive nos.
  5. Find the value of 'x' for AP.  $1 + 6 + 11 + 16 + \dots + X = 148$ .
  6. Find the 10<sup>th</sup> term from the end of the AP 8, 10, 12, ... 126.
  7. The sum of three numbers of AP is 3 and their product is -35. Find the numbers.
  8. A man repays a loan of Rs 3250 by paying Rs 20 in the first month and then increases the payment by Rs 15 every month. How long will it take him to clear the loan?
  9. The ratio of the sums of m and n terms of an AP is  $m^2 : n^2$ . Show that the ratio of the m<sup>th</sup> and n<sup>th</sup> terms is  $(2m-1) : (2n-1)$ .
  10. In an AP, the sum of first n terms is  $\frac{3n^2}{2} + \frac{5n}{2}$ , Find its 25<sup>th</sup> term.
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