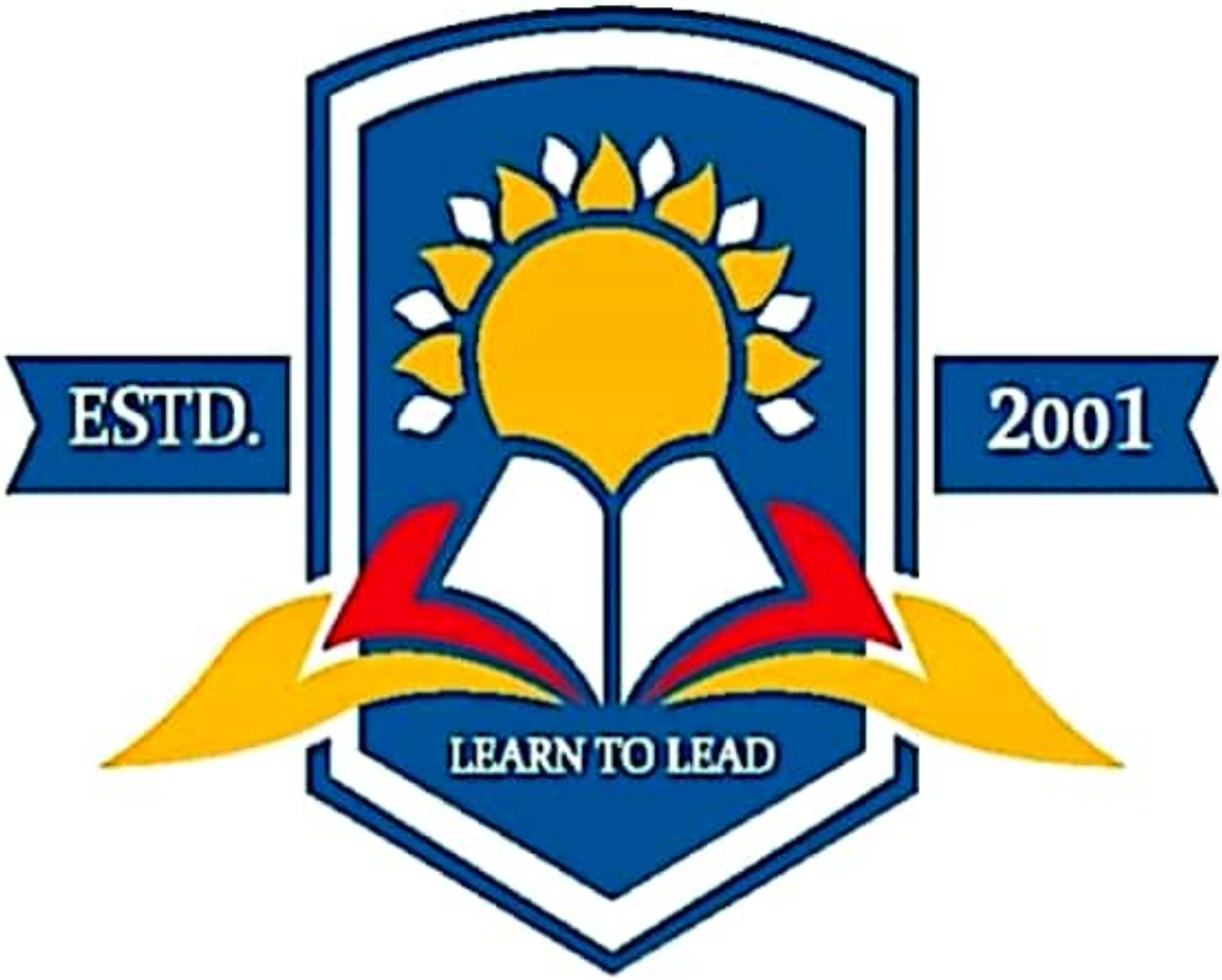

STEPPING STONE SCHOOL (HIGH)

WORKSHEET – 18. Date:- 12.06.20

Sub- MATHEMATICS. CLASS- X

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Topic:- PROBLEMS ON A.P

Example 1. How many whole numbers, each divisible by 7, lie between 200 and 500

Ans → $200 \div 7 = 28\frac{4}{7}$ and $500 \div 7 = 71\frac{3}{7}$

So the numbers between 200 and 500 and divisible by '7' are: $29\times7, 30\times7, 31\times7 \text{ ----- } 71\times7$

$= 203, 210, 217, \text{-------}, 497.$

So first term is 203 and last term $= l = 497$

Obviously common difference $= d = 7$. So

$l = a + (n-1)d \Rightarrow 497 = 203 + (n-1)7$

$\Rightarrow (n-1)7 = 294 \Rightarrow n-1 = \frac{294}{7} = 42$

So $n = 43$.

Example 2: If $n-2, 4n-1,$ and $5n+2$ are in A.P. Find the value of 'n'.

Proof: Let us apply the result, $2b = a+c$ if

a, b, c are in A.P, we get ——

$2(4n-1) = (n-2) + (5n+2) = 6n$

$\Rightarrow 8n - 2 = 6n \Rightarrow 2n = 2 \Rightarrow n = 1$ (Ans)

Example 3.0 In an A.P; $t_m = n$ and $t_n = m$; prove that its $t_r = m+n-r$

Ans → Let us assume that first term is 'a' and common difference 'd'. So $t_m = n \Rightarrow$

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

$a + (n-1)d = m$. Subtracting the above relation we get $(m-n)d = (n-m) \Rightarrow d = -1$ as $m \neq n$

So we put, $d = -1$ in $a + (n-1)d = n$, we get $a - (m-1) = n \Rightarrow a = (m+n-1)$

Now $t_r = a + (r-1)d = (m+n-1) + (r-1)(-1)$

$= (m+n-1) - r + 1 \Rightarrow m+n-r$. (Proved)

Example 4: The angles of a triangle are in A.P. The greatest angle is twice the least. Find all angles of the triangles.

Ans → Let the three angles of the triangle be →

$(a-d)^\circ, a^\circ, (a+d)^\circ$. $\therefore$ $a-d+a+a+d = 180^\circ$

$\therefore$ $3a = 180^\circ \Rightarrow a = 60^\circ$. Also given

$(a+d) = 2(a-d) \Rightarrow a = 3d \Rightarrow d = 20$

So the angles are; $60-20$; 60°, $60+20$

$= 40$; 60 ; 80

EXERCISES 1) If t_n represents the n^{th} term of an A.P ; $t_2 + t_5 - t_3 = 10$ and $t_2 + t_9 = 17$, find its first term and its common difference.

2) An A.P Consist of 60 terms. If the first and the last terms be 7 and 125 respectively. Find the 31st term.

3) If the third term of an A.P is 5 and the seventh terms is 9. Find the 17th term.

4) Determine the value of 'k' for which k^2+4k+8, $2k^2+3k+6$ and $3k^2+4k+4$ are in A.P.

5) How many three-digit numbers are divisible by 87

6) Which term of the A.P: 3, 10, 17 ..... will be 84 more than its 13th term.

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