SWOT INSTITUTE
SEQUENCE AND SERIES

1. In an A.P., the first term is 2 and the sum of the first five terms is one-fourth of the next five terms. Show that 20th term is -112.

2. If $\dfrac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the A.M. between a and b, then find the value of n.

3. If the sum of n terms of an A.P. is $3n^2 + 5n$ and its mth term is 164, find the value of m.

4. The sums of n terms of two arithmetic progressions are in the ratio $5n + 4 : 9n + 6$. Find the ratio of their 18th terms.

5. The difference between any two consecutive interior angles of a polygon is $5°$. If the smallest angle is $120°$, find the number of the sides of the polygon.

6. Find the sum of the sequence 7, 77, 777, 7777, …. to n terms.

7. If the first and the nth terms of a G.P. are a and b, respectively, and if P is the product of n terms, prove that $P^2 = (ab)^n$.

8. If A and G be A.M. and G.M. , respectively between two positive numbers, prove that the numbers are $A \pm \sqrt{(A+G)(A-G)}$.

9. Find the value of n so that $\dfrac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be the geometric mean between a and b.

10. The sum of two numbers is 6 times their geometric means, show that numbers are in the ratio $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$

11. Show that the ratio of the sum of first n terms of a G.P. to the sum of terms from $(n + 1)^{th}$ to $(2n)^{m}$ term is $\dfrac{1}{r^n}$.

12. Find the sum to n terms of the series : $5 + 11 + 19 + 29 + 41 \ldots$

13. Find the sum of n terms : $5^2 + 6^2 + 7^2 + \ldots + 20$.

14. Find the sum of n terms : $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \ldots.$

15. The ratio of the A.M. and G.M. of two positive numbers a and b, is m : n. Show that $a : b = \left(m + \sqrt{m^2 - n^2} \right) : \left((m - \sqrt{m^2 - n^2} \right).$