CLASS XI – MATHEMATICS – CHAPTER 09

SEQUENCES AND SERIES

Name: Date:

Q01. The sum of n terms of two A.P. are in the ratio (3n + 8) : (7n + 15). Find the ratio of their 12^{th} terms.

Q02. Find the sum of first n terms and the sum of first 5 terms of the geometric series $1 + \frac{2}{3} + \frac{4}{9} + \ldots$

Q03. Find the sum to n terms of the series $(1^2) + (1^2 + 2^2) + (1^2 + 2^2 + 3^2)$ .....

Q04. Show that the sum of $(m + n)^{th}$ and $(m – n)^{th}$ terms of an A. P. is equal to twice the m^{th} term.

Q05. Find all two digit no. which when divided by 4 yields 1 as remainder

Q06. If a[(1/b) + (1/c)], b [(1/c) + (1/a)], c[(1/a) + (1/b)] are in A. P. prove that a, b, c are in A. P.

Q07. Find the sum of the products of the corresponding terms of the sequence 2, 4, 8,16, 32 and 128, 32, 8, 2, 1/2

Q08. 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 $(2n)^{th}$ term is $1/r^n$.

Q09. If S1, S2, S3 are the sum of first n natural no. their squares and their cubes respectively, show that $9S_2^2 = S_3(1 + 8S_1)$

Q10. 150 workers were engaged to finish a job in a certain number of days 4 workers dropped out on the second day, 4 more workers dropped out on the third day and so on. It took 8 more days to finish the work find the number of days in which the work was completed.

Q11. Insert 6 numbers between 3 and 24 such that the resulting sequence is an A.P.

Q12. The sum of first three terms of a G. P is 13/12 and their product is –1. Find the common ratio and the terms.

Q13. Find the Sum to n terms of $n^2 + 2^n$

Q14. The Sum of three no. in G.P is 56. If we subtract 1,7,21 from these no. in that order we obtain an A. P. find the number.

Q15. If $\frac{a + bx}{a - bx} = \frac{b + cx}{b - cx} = \frac{c + dx}{c - dx}$. Then show that a, b, c, and d are in G. P.

Q16. In an A. P. is m^{th} term is n and n^{th} term is m, find the p^{th} term.

Q17. If a, b, c are in G. P and $a^{1/x} = b^{1/y} = c^{1/z}$ prove that x, y, z are in A. P.

Q18. If p, q, r are in G. P and the equation $px^2 + 2qx + r = 0$ and $dx^2 + 2ex + f = 0$ have a common root, show that ,d/p, e/q, f/r are in A.P.

Q19. Prove that the sum to n terms of the series 11 + 103 + 1005 + ... is $(10/9)(10^n – 1) + n^2$.

Q20. In an A. P. the first term is 2 and the sum of the first five terms is one fourth of next five terms. Show that 20^{th} term is –112.

Q21. Find the sum of the sequence 7, 77, 777, ... to n terms.

Q22. Find the sum to n terms of the series (3 × 8) + (6 × 11) + (9 × 14) + ...

Q23. Let the sum of n, 2n, 3n terms of an A. P. be S_1, S_2 and S_3 respectively show that $S_3 = 3(S_2 – S_1)$

Q24. Find the sum 0.6 + 0.66 + 0.666 + ...

Q25. If a, b, c are in A.P, b, c, d are in G. P and 1/c,1/d,1/e are in A. P prove that a, c, e are in G. P.

Q26. If a, b, c and d are in G.P show that $(a^2 + b^2 + c^2)(b^2 + c + d^2) = (ab + bc + cd)^2$

Q27. The number of bacteria in a certain culture double every hour. If there were 30 bacteria in the culture originally, how many bacteria will be present at the end of 2^{nd} hour, 4^{th} hour and n^{th} hour.

Q28. If a and b are the roots of $x^2 – 3x + p = 0$ and c, d are roots of $x^2 – 12x + 9 = 0$ where a, b, c, d from G.P, prove that (q + p): (q – p) = 17: 15

Q29. The ratio of A.M and G.M of two positive number a and b is m : n
Show that $a : b = (m + \sqrt{(m^2 – n^2)}) : (m – \sqrt{(m^2 – n^2)})$

Q30. If the Sum of n terms of an A.P is $(pn + qn^2)$, where p and q are constants find the common difference.

Q31. Insert three no. between 1 and 256 so that the resulting sequence is a G.P.

Q32. Find the sum to n terms of $(3 \times 1^2) + (5 \times 2^2) + (7 \times 3^2) +$ .....

Q33. Evaluate $\sum_{k=1}^{11}.(2 + 3^k)$.

Q34. The Sum of first three terms of a G.P. is 16 and the Sum of the next three term is 128. Determine the first term, the common ratio and the Sum to n terms of the G.P.

Q35. If the first and the nth terms of a G.P. are a & b respectively and P is the product of n terms prove that $P^2 = (ab)^n$.

Q36. The ratio of the sums of m and n terms of an AP is $m^2 : n^2$. Show that the rates of m^{th} and n^{th} term is (2m – 1) : (2n – 1).

Q37. If the Sum of n terms of an A.P. is $3n^2 + n$ and its m^{th} term is 164, finds the value of m.

Q38. The difference between any two consecutive interior angles of a polygon is 5^o.If the smallest angle is 120^o, find the number of the sides of the polygon.

Q39. Between 1 and 31, m number have been inserted in such a way that the resulting sequence is an A.P. and the ratio of 7^{th} and $(m –1)^{th}$ no. is 5 : 9 find the value of m.

Q40. If $(a^n + b^n) /(a^{n–1} + b^{n–1})$ is the A. M. between a and b. Then find the value of n.

Q41. If A. M. and G. M of two positive no. a and b are 10 and 8 respectively find the no.

Q42. Find the sum to n terms of the series 5 + 11 + 19 + 29 + 41 + ...

Q43. Find the sum of integers from 1 to 100 that are divisible by 2 or 5

Q44. The Sum of the first four terms of an A.P. is 56. The Sum of the last four terms is 112. If its first term is 11, then find the number of terms.

Q45. Let S be the Sum, P the product and R the sum of reciprocals of n terms in a G.P Prove that $P^2R^n = S^n$

Q46. Find a G.P. for which sum of the first two term is -4 and the fifth term is 4 times the third term.

Q47. If the p^{th}, q^{th} and r^{th} term of a G.P are a, b, c respectively prove that $a^{q-r}b^{r-p}c^{p-q} = 1$

Q48. Find the value of n so that $(a^{n+1} + b^{n+1}) /(a^n + b^n)$ may be the geometric mean between a and b.

Q49. The Sum of two number is 6 times their geometric mean, show that number are in the ratio $(3 + 3\sqrt{2}) : (3 – 2\sqrt{2})$.