Saitech Informatics

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SEQUENCE AND SERIES

Class 11 - Mathematics

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 45**

1. Find the rational number whose decimal expansion is $0.4\overline{23}$. **[1]**
2. Find the sum of the GP: 1 + 3 + 9 + 27 +... to 7 terms. **[1]**
3. If $S_1, S_2, ..., S_n$ are the sums of n terms of n G.P.'s whose first term is 1 in each and common ratios are 1, 2, 3, ..., n respectively, then prove that $S_1 + S_2 + 2S_3 + 3S_4 + ... (n - 1) S_n = 1^n + 2^n + 3^n + ... + n^n$. **[1]**
4. Find the GM between the numbers -8 and -2. **[1]**
5. Evaluate: $\sum_{n=2}^{10} 4^n$. **[1]**
6. Find the GM between the numbers 2 and 8. **[1]**
7. Find the sum of the series 2 + 6 + 18 + 54 + ... + 4374. **[1]**
8. The sum of an infinite geometric series is 6. If its first term is 2, find its common ratio. **[1]**
9. What is the 20^{th} term of the sequence defined by $a_n = (n - 1)(2 - n)(3 + n)$? **[1]**
10. Find the ninth term of G.P. 1, 4, 16, 64, ... **[1]**
11. The sum of first three terms of a G.P. is $\frac{39}{10}$ and their product is 1. Find the common ratio and the terms. **[3]**
12. Each side of an equilateral triangle is 18 cm. The midpoints of its sides are joined to form another triangle whose midpoints, in turn, are joined to form still another triangle. The process is continued indefinitely. Find the sum of the areas of all the triangles. **[3]**
13. If a, b, c are in GP then show that $\frac{1}{\log_a m}, \frac{1}{\log_b m}, \frac{1}{\log_c m}$ are in AP. **[3]**
14. If a, b, c, d are in GP then prove that $\frac{1}{(a^2+b^2)}, \frac{1}{(b^2+c^2)}, \frac{1}{(c^2+d^2)}$ are in GP. **[3]**
15. Which term of the sequence 12 + 8i, 11 + 6i, 10 + 4i, ... is (a) purely real (b) purely imaginary ? **[3]**
16. Find the three numbers in GP, whose sum is 52 and sum of whose product in pairs is 624. **[5]**
17. The ratio of A M and G. M of two positive no. a and b is m : n show that $a : b = \left(m + \sqrt{m^2 - n^2}\right) : \left(m - \sqrt{m^2 - n^2}\right)$. **[5]**
18. The Sum of two no. is 6 times their geometric mean, show that no. are in the ratio $(3 + 3\sqrt{2}) : (3 - 2\sqrt{2})$ **[5]**
19. If S be the sum, P be the product and R be the sum of reciprocals of n terms in a G.P, prove that $P^2 = \left(\frac{S}{R}\right)^n$. **[5]**