MATHS

BOOKS - KUMAR PRAKASHAN KENDRA MATHS (GUJRATI ENGLISH)

SEQUENCE AND SERIES

Practice Work

1. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = \frac{n^3 + 1}{2}$

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2. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = 2n^2 - n + 1$

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3. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = \frac{n}{n^2 + 1}$

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4. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = n^{th}$ prime number

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5. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = 3n + 1$

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6. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = \frac{3 - n}{2}$

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7. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = \cos\left(\frac{n\pi}{2}\right)$

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8. Write the first five terms of each of the sequences whose n^{th} terms are as following

$a_n = 8 - n^3$

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9. Find the indicated terms in each of the sequences whose n^{th} term is given:

$a_n = (n-1)(n+2)(n-3), a_{10}$

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10. Find the indicated terms in each of the sequences whose n^{th} term is given:

$a_n = n^3 - 2n, a_8$

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11. Find the indicated terms in each of the sequences whose n^{th} term is given:

$a_n = 2n^2 - 1, a_7$

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12. Find the indicated terms in each of the sequences whose n^{th} term is given:

$a_n = (-1)^n(n^2 - 1), a_{13}$

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13. Find the indicated terms in each of the sequences whose n^{th} term is given:

$a_n = n^2 - n + 1, a_5$

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14. Write the first five terms of each of the sequences and obtain the corresponding series:

$a_1 = 3, a_n = 3a_{n-1} + 2$ for all $n > 1$

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15. Write the first five terms of the sequences in obtain the corresponding series:

$a_1 = 2, a_n = a_{n-1} + 3, \forall n \geq 2$

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16. Write the first five terms of the sequences in obtain the corresponding series:

$a_1 = a_2 = 1, a_n = a_{n-1} + a_{n-2}, n > 2$

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17. Find the sum: $5 + 13 + 21 + \ldots . + 181$

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18. Find the sum of all three digit natural numbers divisible by 7

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19. Find the sum of all numbers between 250 and 1000. Which are divisible by 3

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20. Solve: (Find x) $1 + 6 + 11 + 16 + \ldots . + x = 148$

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21. Show that the sum of an AP whose first term is a, the second term is b and the last term is c is equal to $\frac{(a+c)(b+c-2a)}{2(b-a)}$.

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22. S_n is the sum of n terms of an A.P. If $S_{2n} = 3S_n$ then prove that $\frac{S_{3n}}{S_n} = 6$

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23. How many terms of the A.P. 54, 51, 48,.....are needed to give the sum 513?

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24. How many terms of the A.P. 18, 16, 14, 12,.... are needed to give the sum 78?

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25. If the sum of first p terms of an A.P. is equal to the sum of the first q terms, then find the sum of the first (p + q) terms.

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26. If the sum of n terms of an A.P. is $3n + 2n^2$, find the common difference

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27. The sum of n terms of two A.P are in the ratio $(7n - 5) : (5n + 17)$. Show that their 6^{th} term are equal

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

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29. The sum of n terms of two A.P are in the ratio $(3n + 6) : (5n - 13)$. Find the ratio of their 11^{th} terms

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30. If the n^{th} terms of an A.P. 9, 7, 5,..... is equal to the n^{th} term of an A.P. 15, 12, 9.....then find n

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31. In an A.P. the 24^{th} term is twice of its 10^{th} term. Prove that its 72^{th} term is twice of its 34^{th} term

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32. For an A.P., $S_1 = 6$ and $S_7 = 105$. Prove that $S_n : S_{n-3} = (n+3) : (n-3)$

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33. The sum of the n terms of two A.P. are in the ratio $(2n-1) : (4n+3)$. Find the ratio of their 25^{th} terms.

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34. For arithmetic sequence a_1, a_2, a_3 ..... If $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$ then $s_{24} =$ .....

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35. If the 12th term of an AP is -13 and the sum of its first four terms is 24, what is the sum of its first 10 terms ?

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36. Find an A.P whose sum of n terms is equal to three times the square of n.

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37. Insert 6 arithmatic mean between 3 and 24.

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38. Suppose x and y are two real numbers such that the r^{th} mean between x and 2y is equal to the r^{th} mean between 2x and y. When n

arithmatic means are inserted between them in both the cases. Show that $\frac{n+1}{r} - \frac{y}{x} = 1$

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39. Insert for A.M's between $\frac{1}{2}$ and 3 and prove that $A_1 + A_2 + A_3 + A_4 = 7$

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40. If n arithmetic means are inserted between 20 and 80. Such that the ratio of first mean to the last mean is $1:3$, then find the value of n.

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41. The income of a person is Rs 3,50,000 in the first year. He gets Rs 15,000 as incriment each year. How much his income is in 15^{th} year? Find the total amount he received in 15 years.

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42. Bhargav saves Rs 50 in first week. In each week after the first, he saved Rs 17.50 more than he did in the preceeding week. His savings at n^{th} week is Rs 207.50. Find n and also find his total savings.

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43. The sum of four consecutive terms of an A.P is 32. The product of the second and the third term is 60. Find these terms.

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44. x,y and z are in A.P. A_1 is the A.M. of x and y. A_2 is the A.M of y and z. Prove that the A.M. of A_1 and A_2 is y.

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45. Insert the n A.M's between 7 and 71 in such a way that the 5^{th} A.M. is 27. Find the numbers of A.M's.

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46. The sum and product of three consecutive terms of an A.P. are 24 and 312 respectively. Find these terms.

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47. Find the n^{th} term and 12^{th} term of the sequence $6, 18, 54$ .....

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48. Find 6^{th} term of a G.P. $\sqrt{3}, \frac{1}{\sqrt{3}}, \frac{1}{3\sqrt{3}}$.....

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49. If the 4^{th} and 7^{th} term of a G.P. are 27 and 729 respectively, then find the G.P.

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50. The 4^{th} term of a G.P is 4. Find the product of its first five terms.

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51. For G.P. 5, 10, 20,.....and 1280, 640, 320....., their n^{th} terms are equal then find n.

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52. Which term of the sequence $\sqrt{2}, \frac{1}{\sqrt{2}}, \frac{1}{2\sqrt{2}}$ .....is $\frac{1}{512\sqrt{2}}$?

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53. Which term of the sequence $18, \ -12, 8$,....is $\frac{512}{729}$?

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54. For what values of x, the number $(x+9), (x-6)$ and 4 are in G.P.?

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55. a,b,c,d are in G.P. Prove that $a^2-b^2, b^2-c^2, c^2-d^2$ are also in G.P.

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56. Find the 9^{th} term of the G.P. whose 3^{rd} term is 18 and 6^{th} term is 486.

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57. Find the sum of 7 terms of the sequence 2, 6, 18,.....

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58. Find the sum of the sequence $\frac{2}{9}, -\frac{1}{3}, +\frac{1}{2}, -\frac{3}{4}$.....5 - terms.

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59. Evaluate $\sum_{n=2}^{10} 4^n$

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60. How many terms of the G.P.3, $\frac{3}{2}, \frac{3}{4}$ .....are needed to give the sum $\frac{3069}{512}$?

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61. If the sum of n terms of G.P. 3, 6, 12,.....is 381 then find n

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62. How many terms of the sequence $\sqrt{3}, 3, 3\sqrt{3}$..... must be taken to make the sum $39 + 13\sqrt{3}$?

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

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64. The sum of the first three terms of a G.P. is 21 and the sum of the next three terms is 168. Find the sum of first five terms.

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65. The sum of first two terms of a G.P. is $\frac{9}{2}$. Its 6^{th} term is 8 times its 3^{rd} term. Find the sequences.

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66. The first term of a G.P. is 27 and its eight term is $\frac{1}{81}$. Find the sum of its first 10 terms.

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67. Find the sum of the series $0.3 + 0.33 + 0.333 +$ .....to n terms

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

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69. Find the sum of $x(x+y)+x^2\left(x^2+y^2\right)+x^3\left(x^3+y^3\right)+$ .....to n terms

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70. Find the sum of $\left(x+\frac{1}{x}\right)^2, \left(x^2+\frac{1}{x^2}\right)^2, \left(x^3+\frac{1}{x^3}\right)^2,$ .....to n terms

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71. If p^{th}, q^{th}, r^{th} and s^{th} terms of an A.P. are in G.P, then show that (p – q), (q – r), (r – s) are also in G.P.

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72. If x,y, z are three consecutive terms of a G.P. then prove that $\frac{1}{x+y}+\frac{1}{y+z}=\frac{1}{y}$.

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

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74. Three real numbers a, b, c are inG.P. If $a + b + c = xb$ then prove that $x < -1 \text{ or } x > 3$

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75. A G.P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of terms occupying odd places, then find its common ratio.

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

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77. Find two number whose arithmetic mean is 5 and the geometric mean is 4.

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78. a,b,c are positive numbers. Prove that, $a^2 + b^2 + c^2 > ab + bc + ca$

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79. Insert five number between 576 and 9. So that the resulting sequence is an G.P.

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80. If A is the arithmatic mean and G_1 and G_2 be two geometric means between any two numbers then prove that, $\frac{G_1^2}{G_2} + \frac{G_2^2}{G_1} = 2A$

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81. Find two positive numbers whose difference is 12 and whose A.M. exceeds the G.M. by 2.

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82. The numbers of bacteria increases at the rate of 4% every hour. If there were 40 beacteria present originally, then how many bacteria will be present at the end of 4^{th} hour ? How many bacteria will be there in 4^{th} hour?

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83. A man buys a motorcycle in Rs 60,000. If its price decreases every year 10%, then what will be its price at the end of fourth year?

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84. The side of a given square is 10cm. The mid points of its sides are joined to form a new square. Again the mid poind of the sides of this new square are joined to form another square. This process is continued indefinitely. Find the sum of the area.

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85. After striking a floor a certain ball rebounds $\left(\frac{4}{5}\right)^{th}$ of the height from which it has fallen. Find the total distance that it travels before coming to rest, if it is gently dropped from a height of 120 meters

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86. Find the sum of n terms of each of the following

$1^3 + 4^3 + 7^3 + ...$

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87. Find the sum of n terms of each of the following

$2.1 + 5.3 + 8.5 + ...$

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88. Find the sum of n terms of each of the following

$3^2 + 7^2 + 11^2 + ...$

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89. Find the sum of n terms of each of the following

$(5^4 - 1^4) + (8^4 - 4^4) + (11^4 - 7^4) + ...$

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90. Find the sum of n terms of each of the following

$$1^2 + \left(\frac{1^2 + 2^2}{2}\right) + \left(\frac{1^2 + 2^2 + 3^2}{3}\right) + \ldots\ldots$$

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91. Find the sum of n terms of each of the following

$$1 + 5 + 12 + 22 + 35 + \ldots\ldots$$

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92. Find the sum of the series whose n^{th} term is as following:

$$2n^2 - 3n + 5$$

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93. Find the sum of the series whose n^{th} term is as following:

$n^3 - 3n$

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94. Find the sum to n terms of the series in whose n^{th} terms is given by

$(2n-1)^2$

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95. Find the sum: $1 + \frac{1}{2}(1+2) + \frac{1}{3}(1+2+3) +$ .....up to 16 terms.

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96. Find the $\left(3^3 - 2^3\right) + \left(5^3 - 4^3\right) + \left(7^3 - 6^3\right) +$ .....up to 10 terms

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97. Find the sum: $1^1 - 2^2 + 3^2 - 4^2 + 5^2 - 6^2 +$ .....up to n terms

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98. Find the 20^{th} term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 + ... + n$ terms.

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99. Find sum: $\frac{1}{2} + \frac{1}{3^2} + \frac{1}{2^3} + \frac{1}{3^4} + \frac{1}{2^5} + \frac{1}{3^6} + ... \infty$

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100. If $x = a + \frac{a}{r} + \frac{a}{r^2} + ... \infty, y = b - \frac{b}{r} + \frac{b}{r^2} - ..... \infty$ and $z = c + \frac{c}{r^2} + \frac{c}{r^4} + ... \infty$ then prove that $\frac{xy}{z} = \frac{ab}{c}$

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101. If $x = \sum_{n=0}^{\infty} \cos^{2n}\phi, y = \sum_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\phi . \sin^{2n}\phi$, where $0 < \phi < \frac{\pi}{2}$ then prove that, $xy + z = xyz$.

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102. Prove that $9^{\frac{1}{3}} \times 9^{\frac{1}{9}} \times 9^{\frac{1}{27}} \ldots\ldots\infty = 3$

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103. Find the sum: $\frac{1}{3} + \frac{2}{3^2} + \frac{1}{3^3} + \frac{2}{3^4} + \frac{1}{3^5} + \frac{2}{3^6} + \ldots\ldots\infty$

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104. If $1 + \cos\alpha + \cos^2\alpha + \ldots\ldots\infty = 2 - \sqrt{2}$ then find the value of $\alpha . (0 < \alpha < \pi)$

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105. Prove that:

$$\frac{1}{(1+a)(2+a)}+\frac{1}{(2+a)(3+a)}+\frac{1}{(3+a)(4+a)}+\ldots..\infty=\frac{1}{1+a}$$

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106. First term of an infinite G.P. is x and their sum is 10 then prove that $0<x<10$

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107. If a_1, a_2, a_3,...., a_n are the terms of arithmatic progression then prove that $\frac{1}{a_1a_2}+\frac{1}{a_2a_3}+\frac{1}{a_3a_4}+\ldots.+\frac{1}{a_{n-1}a_n}=\frac{n-1}{a_1a_n}$

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108. Divide 32 into four parts which are in A.P. Such that the product of extremes is to the product of means is $7:15$

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109. The sum of the first 7 terms of an A.P is 10 and that of next 7 terms is 17. Find the progression.

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110. If $a^2+2bc, b^2+2ac, c^2+2ab$ are in A.P then prove that $\frac{1}{b-c}, \frac{1}{c-a}$ and $\frac{1}{a-b}$ are in A.P.

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111. The digits of a positive integer, having three digit number are in A.P. and their sum is 15. The number obitained by reversing the digits is 594 less than the original number. Find the number.

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112. Prove that the sum of n arithmatic means between two numbers is n times the single A.M. between them.

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113. The $(m+n)^{th}$ and $(m-n)^{th}$ terms of a G.P. are p and q respectively. Show that the m^{th} and n^{th} terms are $\sqrt{p}q$ and $p\left(\frac{q}{p}\right)^{\frac{m}{2n}}$ respectively.

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114. If S_1, S_2 and S_3 be respectively the sum of n, 2n and 3n terms of a G.P. Prove that $S_1(S_3 - S_2) = (S_2 - S_1)^2$.

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115. If p,q,r are in G.P. and the equations, $px^2 + 2qx + r = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then show that $\frac{d}{p}, \frac{e}{q}, \frac{f}{r}$ are in A.P.

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116. The sum of five consecutive terms of G.P is 243. The sum of second and fourth is 10. Find these numbers.

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117. Find the sum $1 + \frac{1^3 + 2^3}{2} + \frac{1^3 + 2^3 + 3^3}{3} + \ldots\ldots \frac{1^3 + 2^3 + 3^3 + \ldots. + 20^3}{20}$

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118. Ramesh travells at the speed of 40km/hr. If he decreases his speed 4km each hour, then how much time he will taken to cover 216km?

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119. 200 cuboidal logs of woods are arranged in such a way that there is 20 logs in the lower row, then 19 logs in the second row. There are 18 logs in the third row and so on. How many logs are there in the upper most row?

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120. If a,b,c are three terms in A.P and a^2, b^2, c^2 are in G.P. and $a+b+c=\frac{3}{2}$ then find a. (where $a<b<c$)

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121. For an A.P. If $S_{30} = 1635$ and $a_{30} = 98$ then find A.P.

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122. If a,b,c,d are four different positive numbers which are in A.P then prove that $bc > ad$

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123. For the series, $2 + 3 + 6 + 11 + 18 +$ .....find its 50^{th} term (a_{50})

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124. Prove that $2^{\frac{1}{2}}.4^{\frac{1}{8}}.8^{\frac{1}{24}}.16^{\frac{1}{64}}, \ldots\ldots \propto = 2.$

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125. For two A.P.: 2, 5, 8,.....up to 50 terms and 3, 5, 7, 9,....., up to 60 terms.

How many terms are same?

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126. Which term is negative for a sequence 19, $18\frac{1}{5}$, $17\frac{2}{5}$,.....?

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Exercise 9 1

1. Write the first five terms of each of the sequences whose n^{th} terms are:

$a_n = n(n+2)$

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2. Write the first five terms of each of the sequences whose n^{th} terms are:

$a_n = \frac{n}{n+1}$

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3. Write the first five terms of each of the sequences whose n^{th} terms are:

$a_n = 2^n$

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4. Write the first five terms of each of the sequences whose n^{th} terms are:

$a_n = \frac{2n-3}{6}$

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5. Write the first five terms of each of the sequences whose n^{th} terms are:

$a_n = (-1)^{n-1} 5^{n+1}$

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6. Write the first five terms of each of the sequences whose n^{th} terms are:

$$a_n = \frac{n(n^2+5)}{4}$$

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7. Find the indicated terms in each of the sequences whose n^{th} terms are:

$a_n = 4n - 3, a_{17}, a_{24}$

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8. Find the indicated terms in each of the sequences whose n^{th} terms are:

$a_n = \frac{n^2}{2^n}, a_7$

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9. Find the indicated terms in each of the sequences whose n^{th} terms are:

$a_n = (-1)^{n-1} n^3, a_9$

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10. Find the indicated terms in each of the sequences whose n^{th} terms are:

$a_n = \frac{n(n-2)}{n+3}, a_{20}$

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11. Write the first five terms of each of the sequences and obtain the corresponding series:

$a_1 = 3, a_n = 3a_{n-1} + 2$ for all $n > 1$

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12. Write the first five terms of each of the sequences and obtain the corresponding series:

$a_1 = -1, a_n = \frac{a_{n-1}}{n}, n \geq 2$

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13. Write the first five terms of each of the sequences and obtain the corresponding series:

$a_1 = a_2 = 2, a_n = a_{n-1} - 1, n > 2$

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14. The Fibonacci sequence is defined by $1 = a_1 = a_2$ and $a_n = a_{n-1} + a_{n-2}, n > 2$ Find $\frac{a_{n+1}}{a_n}$ for n = 1, 2, 3, 4, 5

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Exercise 9 2

1. Find the sum of odd integers from 1 to 2001.

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2. Find the sum of all natural numbers lying between 100 and 1000, which are multiples of 5.

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3. 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 20^{th} term is –112.

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4. How many terms of the A.P. – 6, , $-\frac{11}{2}$, -5 ..... are needed to give the sum –25?

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5. If the pth term of an AP is $\frac{1}{q}$ and the qth term is $\frac{1}{p}$, show that the sum of pq terms is $\frac{(pq+1)}{2}$.

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6. If the sum of a certain number of terms of the A.P. 25, 22, 19, ... is 116. Find the last term.

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7. Find the sum to n terms of the A.P., whose k^{th} term is 5k + 1.

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

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9. The sum of n terms of two arithmetic progressions are in the ratio $(5n + 4) : (9n + 6)$. Find the ratio of their 18^{th} terms

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10. If the sum of first p terms of an A.P. is equal to the sum of the first q terms, then find the sum of the first (p + q) terms.

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11. Sum of the first p,q and r terms of an A.P. are a, b and c, respectively. Prove that, $\frac{a}{p}(q - r) + \frac{b}{q}(r - p) + \frac{c}{r}(p - q) = 0$

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12. The ratio of the sums of m and n terms of an A.P. is $m^2 : n^2$. Show that the ratio of m^{th} and n^{th} term is (2m-1) : (2n -1) .

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

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14. Insert five numbers between 8 and 26 such that the resulting sequence is an A.P.

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

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16. Between 1 and 31, m numbers have been inserted in such a way that the resulting sequence is an A. P. and the ratio of 7^{th} and $(m-1)^{th}$ numbers is 5 : 9. Find the value of m.

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17. A man starts repaying a loan as first instalment of Rs 100. If he increases the instalment by Rs 5 every month, what amount he will pay in the 30^{th} instalment?

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18. 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.

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Exercise 9 3

1. Find the 20th and nth term of the GP.

$\frac{5}{2}, \frac{5}{4}, \frac{5}{8}$.....

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2. Find the 12th term of a G.P. whose 8th term is 192, and the common ratio is 2.

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3. The $5^{th}, 8^{th}$ and 11^{th} terms of a G.P are p,q and s , respectively . Show that $q^2 = ps$.

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4. The 4^{th} term of a G.P. is square of its second term, and the first term is – 3.Determine its 7^{th} term.

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5. Which term of the following sequences:

$2, 2\sqrt{2}, 4$.....is 128?

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6. Which term of the following sequences:

$\sqrt{3}, 3, 3\sqrt{3}$,.... Is 729?

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7. Which term of the following sequences:

$\frac{1}{3}, \frac{1}{9}, \frac{1}{27}$,....is $\frac{1}{19683}$?

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8. For what values of x, the numbers $-\frac{2}{7}, x, -\frac{7}{2}$ are in G.P ?

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9. Find the sum to indicated number of terms in each of the geometric progressions in

0.15, 0.015, 0.0015 ,.....20 terms .

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10. Find the sum to indicated number of terms in each of the geometric progressions in

$\sqrt{7}, \sqrt{21}3\sqrt{7}$, ...n terms

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11. Find the sum to indicated number of terms in each of the geometric progressions in Exercises

$1, -a, a^2, -a^3,$ ..... n terms (if $a \neq -1$)

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12. Find the sum to indicated number of terms in each of the geometric progressions in

$x^3, x^5, x^7,$ .....n terms (if $x \neq \pm 1$)

Watch Video Solution

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

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14. 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.

Watch Video Solution

15. How many terms of G.P. $3, 3^2, 3^3,$ ... are needed to give the sum 120?

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

Watch Video Solution

17. Given a G.P. with a = 729 and 7^{th} term 64, determine S_7 .

Watch Video Solution

18. Find a G.P. for which sum of the first two terms is – 4 and the fifth term is 4 times the third term.

Watch Video Solution

19. If the 4th, 10th and 16th terms of a G.P. are x, y and z, respectively. Prove that x, y, z are in GP.

Watch Video Solution

20. Find the sum to n terms of the sequence, 8, 88, 888, 8888... .

Watch Video Solution

21. Find the sum of the products of the corresponding terms of the sequences 2, 4, 8, 16, 32 and 128 , 32 , 8 , 2 $\frac{1}{2}$

Watch Video Solution

22. Show that the products of the corresponding terms of the sequences a, ar, $ar^2, \ldots ar^{n-1}$ and A, AR, $\mathrm{AR}^{22}, \ldots \mathrm{AR}^{n-1}$ form a G.P, and find the common ratio.

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23. Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is greater than the 4^{th} by 18.

Watch Video Solution

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

Watch Video Solution

25. If the first and the n^{th} term of a G.P. are a and b, respectively, and if P is the product of n terms, prove that $P^2 = (ab)^n$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

28. Insert two numbers between 3 and 81 so that the resulting sequence is G.P.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

33. What will Rs 500 amounts to in 10 years after its deposit in a bank which pays annual interest rate of 10% compounded annually?

Watch Video Solution

34. If A.M. and G.M. of roots of a quadratic equation are 8 and 5, respectively, then obtain the quadratic equation.

Watch Video Solution

Exercise 9 4

1. Find the sum to n terms of each of the series in

$1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \ldots$

Watch Video Solution

2. Find the sum to n terms of each of the series in

$1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \ldots$

Watch Video Solution

3. Find the sum to n terms of each of the series in

$3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + ...$

Watch Video Solution

4. Find the sum to n terms of each of the series in

$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + ...$

Watch Video Solution

5. Find the sum to n terms of each of the series in

$5^2 + 6^2 + 7^2 + ... + 20^2$

Watch Video Solution

6. Find the sum to n terms of each of the series in

$3 \times 8 + 6 \times 11 + 9 \times 14 + ...$

Watch Video Solution

7. Find the sum to n terms of each of the series in

$1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \ldots$

Watch Video Solution

8. Find the sum to n terms of the series in whose n^{th} terms is given by

$n(n+1)(n+4)$

Watch Video Solution

9. Find the sum to n terms of the series in whose n^{th} terms is given by

$n^2 + 2^n$

Watch Video Solution

10. Find the sum to n terms of the series in whose n^{th} terms is given by

$(2n-1)^2$

Watch Video Solution

Exercise 9 5

1. Find the sum to infinity in each of the following G.P

$1, \frac{1}{3}, \frac{1}{9}, \ldots\ldots$

Watch Video Solution

2. Find the sum to infinity in each of the following G.P

6, 1.2, 0.24.....

Watch Video Solution

3. Find the sum to infinity in each of the following G.P

$5, \frac{20}{7}, \frac{80}{49}, \ldots\ldots$

Watch Video Solution

4. Find the sum to infinity in each of the following G.P

$\frac{-3}{4}, \frac{3}{16}, \frac{-3}{64} \ldots\ldots\ldots$

Watch Video Solution

5. Prove that $3^{\frac{1}{2}} \times 3^{\frac{1}{4}} \times 3^{\frac{1}{8}} \ldots\ldots = 3$

Watch Video Solution

6. $|a| < 1$ and $|b| < 1, x = 1 + a + a^2 + \ldots\ldots$ and $y = 1 + b + b^2 +$ $\ldots\ldots$,Prove that, $1 + ab + a^2b^2 + \ldots. = \frac{xy}{x + y - 1}$

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Miscellaneous Exercise

1. 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.

Watch Video Solution

2. If the sum of three numbers in A.P., is 24 and their product is 440, find the numbers.

Watch Video Solution

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

Watch Video Solution

4. Find the sum of all numbers between 200 and 400 which are divisible by 7.

Watch Video Solution

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

Watch Video Solution

6. Find the sum of all two digit numbers which when divided by 4, yields 1 as remainder.

Watch Video Solution

7. If f is a function satisfying f (x +y) = f(x) f(y) for all $x, y \in N$ such that $f(1) = 3$ and $\sum_{x=1}^{n} f(x) = 120$, find the value of n.

Watch Video Solution

8. The sum of some terms of G.P. is 315 whose first term and the common ratio are 5 and 2, respectively. Find the last term and the number of terms.

Watch Video Solution

9. The first term of a G.P. is 1. The sum of the third term and fifth term is 90. Find the common ratio of G.P.

Watch Video Solution

10. The sum of three numbers in G.P. is 56. If we subtract 1, 7, 21 from these numbers in that order, we obtain an arithmetic progression. Find the numbers.

Watch Video Solution

11. A G.P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of terms occupying odd places, then find its common ratio.

Watch Video Solution

12. 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.

Watch Video Solution

13. If $\frac{a+bx}{a-bx}=\frac{b-cx}{b-cx}=\frac{c+dx}{c-dx}(x\neq 0)$ then show that a, b, c and d are in G.P.

Watch Video Solution

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

Watch Video Solution

15. Thep^{th}, q^{th} and r^{th} terms of an A.P. are a, b, c, respectively. Show that $(q-r)a + (r-p)b + (p-q)c = 0$

Watch Video Solution

16. If $a\left(\frac{1}{b}+\frac{1}{c}\right), b\left(\frac{1}{c}+\frac{1}{a}\right), c\left(\frac{1}{a}+\frac{1}{b}\right)$ are in A.P., prove that a,b,c are in A.P.

Watch Video Solution

17. If a, b, c, d are in G.P, prove that $(a^n + b^n), (b^n + c^n), (c^n + d^n)$ are in G.P.

Watch Video Solution

18. If a and b are the roots of $x^2-3x+p=0$ and c, d are roots of $x^2-12x+q=0$, where a,b,c,d form a G.P Prove that (q+q):(q-p) = 17 : 15

Watch Video Solution

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

Watch Video Solution

20. If a, b, c are in A.P., b, c, d are in G.P. and $\frac{1}{c},\frac{1}{d},\frac{1}{e}$ are in A.P. prove that a,c,e are in GP.

Watch Video Solution

21. Find the sum of the following series up to n terms:

(i) $5 + 55 + 555 + \ldots\ldots$ (ii) $.6 + .66. + .666 + \ldots\ldots\ldots\ldots$

Watch Video Solution

22. Find the sum of the following series up to n terms:

(i) $5 + 55 + 555 + \ldots\ldots$ (ii) $.6 + .66. + .666 + \ldots\ldots\ldots\ldots$

Watch Video Solution

23. Find the 20^{th} term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 + \ldots + n$ terms.

Watch Video Solution

24. Find the sum of the first n terms of the series: 3+ 7 +13 +21 +31 +.....

Watch Video Solution

25. If S_1, S_2, S_3 are the sum of first n natural numbers, their squares and their cubes, respectively , show that $9S_2^2 = S_3(1 + 8S_1)$

Watch Video Solution

26. Find the sum of the following series up to n terms:

$$\frac{1^3}{1} + \frac{1^3 + 2^3}{1 + 3} + \frac{1^3 + 2^3 + 3^3}{1 + 3 + 5} + \ldots\ldots$$

Watch Video Solution

27. Show that, $\frac{1 \times 2^2 + 2 \times 3^2 + \ldots. + n \times (n + 1)^2}{1^2 \times 2 + 2^2 \times 3 + \ldots. + n^2 \times (n + 1)} = \frac{3n + 5}{3n + 1}$

Watch Video Solution

28. A farmer buys a used tractor for Rs 12000. He pays Rs 6000 cash and agrees to pay the balance in annual instalments of Rs 500 plus 12%

interest on the unpaid amount. How much will the tractor cost him?

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29. Shamshad Ali buys a scooter for Rs 22000. He pays Rs 4000 cash and agrees to pay the balance in annual instalment of Rs 1000 plus 10% interest on the unpaid amount. How much will the scooter cost him?

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30. A person writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with instruction that they move the chain similarly. Assuming that the chain is not broken and that it costs 50 paise to mail one letter. Find the amount spent on the postage when 8th set of letter is mailed.

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31. A man deposited Rs 10000 in a bank at the rate of 5% simple interest annually. Find the amount in 15^{th} year since he deposited the amount and also calculate the total amount after 20 years.

Watch Video Solution

32. A manufacturer reckons that the value of a machine, which costs him Rs. 15625,will depreciate each year by 20%. Find the estimated value at the end of 5 years.

Watch Video Solution

33. 150 workers were engaged to finish a job in a certain number of days. 4 workers dropped out on second day, 4 more workers dropped out on third day and so on.

Watch Video Solution

Textbook Based Mcqs

1. If 3^{rd} and 10^{th} terms of an A.P. be 9 and 21 respectively. Then the sum of its first 12 terms is.....

A. 180

B. 360

C. 150

D. 210

Answer: A

Watch Video Solution

2. The A.M. of two positive number is 2. If 1 is added in large number then their G.M. will become 2. The numbers are.....

A. 1,3

B. $\frac{1}{2}, \frac{7}{2}$

C. $\frac{2}{3}, \frac{10}{3}$

D. 0.7, 3.3

Answer: A

Watch Video Solution

3. $\frac{1}{2 \times 5} + \frac{1}{5 \times 8} + \frac{1}{8 \times 11}$ + ...100 terms= .....

A. $\frac{25}{100}$

B. $\frac{1}{6}$

C. $\frac{25}{151}$

D. $\frac{25}{152}$

Answer: C

Watch Video Solution

4. If a,b,c are in HP, then prove that $\frac{a+b}{2a-b}+\frac{c+b}{2c-b}>4.$

A. $\frac{2}{bc}-\frac{1}{b^2}$

B. $\frac{1}{4}\left(\frac{3}{c^2}+\frac{2}{ca}-\frac{1}{a^2}\right)$

C. $\frac{3}{b^2}-\frac{2}{ab}$

D. None of these

Answer: D

Watch Video Solution

5. Fill in the blanks so as to make each of the following statements true :

If the sum of first n terms of an AP is $2n^2+5n,$ then its nth term is .....

A. $4n-3$

B. $3n-4$

C. $4n+3$

D. $3n+4$

Answer: C

Watch Video Solution

6. If first term, second term and last term of an A.P are a,b and 2a respectively then there sum is.....

A. $\frac{ab}{2(b-a)}$

B. $\frac{ab}{b-a}$

C. $\frac{3ab}{2(b-a)}$

D. None of these

Answer: C

Watch Video Solution

7. If $a_1, a_2, a_3. , , , , , , , , a_n$ are in A.P and their common difference is d. The value of the series

$\sin d_1[\sec a_1 . \sec a_2 + \sec a_2 . \sec a_3 + \ldots + \sec a_{n-1} . \sec a_n]$ is.....

A. $\sec a_1 . \sec a_n$

B. $\cos eca_1 - \cos eca_n$

C. $\cot a_1 - \cot a_n$

D. $\tan a_n - \tan a_1$

Answer: D

Watch Video Solution

8. The sum of first n even natural numbers is k times the sum of first n odd natural numbers then k= .....

A. $\frac{1}{n}$

B. $\frac{n-1}{n}$

C. $\frac{n+1}{2n}$

D. $\frac{n+1}{n}$

Answer: D

Watch Video Solution

9. The sum of .....terms of on A.P. 3, 7, 11, 15,..... Will becomes 406

A. 5

B. 10

C. 14

D. 20

Answer: D

Watch Video Solution

10. S_n denots the sum of first n terms of an A.P. Its first term is a and common difference is d. If $d = S_n - kS_{n-1} + S_{n-2}$ then k= .....

A. 1

B. 2

C. 3

D. None of these

Answer: B

Watch Video Solution

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

A. A.P

B. G.P

C. H.P

D. None of these

Answer: A

Watch Video Solution

12. The p^{th}, q^{th} and r^{th} terms of an A.P. are in geometric progression then common ratio for G.P is.....

A. $\frac{p-q}{q-r}$

B. $\frac{q-r}{p-q}$

C. pqr

D. None of these

Answer: B

Watch Video Solution

13. If a,b,c are in G.P and A.M of a and b is x and A.M. of b and c is y then.....

A. $\frac{1}{x}+\frac{1}{y}=2$

B. $\frac{1}{x}+\frac{1}{y}=\frac{1}{2}$

C. $\frac{1}{x}+\frac{1}{y}=\frac{2}{a}$

D. $\frac{1}{x}+\frac{1}{y}=\frac{2}{b}$

Answer: D

Watch Video Solution

14. If 10^{th} and 4^{th} terms of a G.P are 9 and 4 respectively, then its 7^{th} term is.....

A. 6

B. 36

C. $\frac{4}{9}$

D. $\frac{9}{4}$

Answer: A

Watch Video Solution

15. If A be one A.M and p, q be two G.M.'s between two numbers then 2A is equal to.....

A. $\frac{p^3+q^3}{pq}$

B. $\frac{p^3-q^3}{pq}$

C. $\frac{p^2+q^2}{2}$

D. $\frac{pq}{2}$

Answer: A

Watch Video Solution

16. If m^{th}, n^{th} and p^{th} terms of an A.P and G.P be equal and be respectively x,y, z then..... a) $x^y.y^z.z^x = x^z.Y^x.z^y$ b) $(x-y)^x.(y-z)^y = (z-x)^z$ c) $(x-y)^z(y-z)^x = (z-x)^y$ d) None of these

A. $x^y.y^z.z^x = x^z.Y^x.z^y$

B. $(x-y)^x.(y-z)^y=(z-x)^z$

C. $(x-y)^z(y-z)^x=(z-x)^y$

D. None of these

Answer: A

Watch Video Solution

17. The A.M of two positive number is x and two G.M.'s between them are y and z. Then $\frac{y^3+z^3}{xyz}$= .....

A. 1

B. 2

C. $\frac{1}{2}$

D. None of these

Answer: B

Watch Video Solution

18. Series $\frac{1}{\log_2^2} + \frac{1}{\log_4^4} + \frac{1}{\log_8^4} + \ldots\ldots + \frac{1}{\log_{2^n} 4}$=.....

A. $\frac{n(n+1)}{2}$

B. $\frac{n(n+1)(2n+1)}{12}$

C. $\frac{n(n+1)}{4}$

D. None of these

Answer: C

Watch Video Solution

19. If $\Sigma n = 210 \quad \text{then} \quad \Sigma n^2$=.....

A. 2870

B. 2160

C. 2970

D. None of these

Answer: A

Watch Video Solution

20. $\sqrt{2}+\sqrt{8}+\sqrt{18}+\sqrt{32}+$ .....up to n terms is.....

A. $\frac{n(n+1)}{2}$

B. $2n(n+1)$

C. $\frac{n(n+1)}{\sqrt{2}}$

D. 1

Answer: C

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21. $1^2+3^2+5^2+$ .....up to n terms is.....

A. $\frac{n(n+1)(2n+1)}{2}$

B. $\frac{n(2n-1)(2n+1)}{3}$

C. $\frac{(n-1)^2(2n+1)}{6}$

D. $\frac{(2n+1)^3}{3}$

Answer: B

Watch Video Solution

22. If $S_n = 1 + \frac{1}{2} + \frac{1}{2} + \ldots\ldots + \frac{1}{2^{n-1}}, (n \in N)$ then .....

A. $S_{100} < 100$

B. $S_{100} > 100$

C. $S_{200} = 100$

D. $S_{200} > 200$

Answer: A

Watch Video Solution

23. $0 < \theta < \frac{\pi}{2}$ then the minimum value of $\sin^3\theta + \cos ec^3\theta$ is.....

A. 2

B. 1

C. 0

D. Not possible

Answer: A

Watch Video Solution

24. If a,b,c,d,e,f are in A.P. then $d - b =$ .....

A. $2(c - a)$

B. $2(f - c)$

C. $2(d - c)$

D. $2(f-b)$

Answer: C

Watch Video Solution

25. $\sum_{r=1}^{n}\left(\sum_{m=1}^{r} m\right) =$ .....

A. $\frac{n(n+1)(2n+1)}{6}$

B. $\frac{n(n+1)(n+2)}{6}$

C. $\frac{n^2(n+1)^2}{4}$

D. $\frac{n(n+1)(2n+1)}{12}$

Answer: B

Watch Video Solution

26. If 25, x - 6 and x - 12 are in G.P then x = ... or ..... .

A. 8

B. 12

C. 16

D. 20

Answer: C

Watch Video Solution

27. If 2,b,c, 23 are in G.P then $(b-c)^2+(c-2)^2+(23-b)^2$= .....

A. 625

B. 525

C. 441

D. 442

Answer: C

Watch Video Solution

28. If $a+b+c=5$ then the maximum value of ab^3c is.....

A. 3

B. 9

C. 27

D. 81

Answer: C

Watch Video Solution

29. Three numbers a,b, c are between 2 and 18 such that $a+b+c=25$.

If 2,a,b are in A.P and b,c 18 are in G.P then these numbers are.....

A. 5,8,12

B. 4,8,13

C. 3,9,13

D. 5,9,11

Answer: A

Watch Video Solution

30. A G.P has 2n terms. Its first term is a and last term is l then the product of all terms is.....

A. $(al)^{\frac{n}{2}}$

B. $(al)^{n+1}$

C. $(al)^{n}$

D. $(al)^{2n}$

Answer: C

Watch Video Solution

31. The measures of the sides of a right angle triangle are in A.P. The sum of sin e of two acute angles is.....

A. $\frac{7}{5}$

B. $\frac{8}{5}$

C. $\frac{1}{5}$

D. $\frac{6}{5}$

Answer: A

Watch Video Solution

32. $11 + 103 + 1005 +$ .....up to n terms is.....

A. $\frac{1}{9}(10^n - 1) + n^2$

B. $\frac{10}{9}(10^n - 1) + n^2$

C. $\frac{10}{9}(10^n - 1) + 2n$

D. None of these

Answer: B

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Textbook Based Mcqs Latest Exam Mcqs

1. Suppose $a_1, a_2, a_3, \ldots, a_{49}$ are in A.P and $\sum_{k=0}^{12} a_{4k+1} = 416$ and $a_9 + a_{43} = 66$. If $a_1^2 + a_2^2 + \ldots + a_{17}^2 = 140m$ then m= .....

A. 66

B. 68

C. 34

D. 33

Answer: C

Watch Video Solution

2. Series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 +$ .....are given. The sum of its first 20 terms is A and that of first 40 terms is B. If $B - 2A = 100\lambda, \quad \text{then} \lambda =$ .....

A. 232

B. 248

C. 464

D. 496

Answer: B

Watch Video Solution

3. Let $f(x) = x^2 + \frac{1}{x^2}$ and $g(x) = x - \frac{1}{x}, x \in R - \{-1, 0, 1\}$. If $h(x) = \frac{f(x)}{g(x)}$ then the minimum local value of h(x) is.....

A. 3

B. -3

C. $-2\sqrt{2}$

D. $2\sqrt{2}$

Answer: D

Watch Video Solution

Testbook Illustrations For Practice Work

1. Write the first three terms in each of the following sequences defined by the following

$a_n = 2n + 5$

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2. Write the first three terms in each of the following sequences defined by the following

$a_n = \frac{n-3}{4}$

Watch Video Solution

3. What is the 20^{th} term of the sequence defined by $a_n = (n-1)(2-n)(3+n)$?

Watch Video Solution

4. Let the sequence a_n be defined as follows: $a_1 = 1, a_n = a_{n-1} + 2$ for $n \geq 2$. Find first five terms and write corresponding series.

Watch Video Solution

5. In an A.P. if m^{th} term is n and the n^{th} term is m, where $m \neq n$, find the pth term .

Watch Video Solution

6. If the sum of n terms of an A.P. is $nP + \frac{1}{2}n(n-1)Q$, where P and Q are constants, find the common difference.

Watch Video Solution

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

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8. The income of a person is Rs 3,00,000 in the first year and he receives an increase of Rs 10,000 to his income per year for the next 19 years. Find the total amount, he received in 20 years.

Watch Video Solution

9. Example 8 Insert 6 numbers between 3 and 24 such that the resulting sequence is an A.P.

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10. Find the 10^{th} and n^{th} terms of the G.P . 5, 25,125 .....

Watch Video Solution

11. Which term of the G.P., 2,8,32, ... up to n terms is 131072 ?

Watch Video Solution

12. In a GP the 3rd term is 24 and 6th term is 192. Find the 10th term.

Watch Video Solution

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

Watch Video Solution

14. How many terms of the G.P.$3, \frac{3}{2}, \frac{3}{4}$ .....are needed to give the sum $\frac{3069}{512}$?

Watch Video Solution

15. The sum of first three terms of a G.P. is $\frac{13}{12}$ and their product is – 1. Find the common ratio and the terms.

Watch Video Solution

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

Watch Video Solution

17. A person has 2 parents, 4 grandparents, 8 great grandparents, and so on.Find the number of his ancestors during the ten generations

preceding his own.

Watch Video Solution

18. Insert three numbers between 1 and 256 so that the resulting sequence is a G.P.

Watch Video Solution

19. If A.M. and G.M. of two positive numbers a and b are 10 and 8, respectively, find the numbers.

Watch Video Solution

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

Watch Video Solution

21. Find the sum to n terms of the series whose n^{th} term is n (n+3).

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22. If p^{th}, q^{th}, r^{th} and s^{th} terms of an A.P. are in G.P, then show that (p – q), (q – r), (r – s) are also in G.P.

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

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24. If a, b, c, d and p are different real numbers such that $\left(a^2+b^2+c^2\right)p^2-2(ab+bc+cd)p+\left(b^2+c^2+d^2\right) \leq 0$, then show that a, b, c and d are in GP.

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25. If p,q,r are in G.P. and the equations, $px^2 + 2qx + r = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then show that $\frac{d}{p}, \frac{e}{q}, \frac{f}{r}$ are in A.P.

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Solutions Of Ncert Exemplar Problems

1. The first term of an AP is a and the sum of the first p terms is zero, show that the sum of its next q terms is $\frac{-a(p+q).q}{p-1}$

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2. A man saved Rs 66,000 in 20yr. In each succeeding year after the first year, he saved Rs 200 more than what he saved in the previous year. How much did he save in the first year?

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3. A man accepts a position with an initial salary of Rs 5200 per month. It is understood that he will receive an automatic increase of Rs 320 in the very next month and each month thereafter.

Find his salary for the tenth month

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4. A man accepts a position with an initial salary of Rs 5200 per month. It is understood that he will receive an automatic increase of Rs 320 in the very next month and each month thereafter.

What is his total earning during the first year?

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5. If the p th and qth terms of a GP are q and p respectively, then show that its $(p+q)$ th term is $\left(\frac{q^p}{p^q}\right)^{\frac{1}{p-q}}$

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6. A carpenter was hired to build 192 window frames. The first day he made five frames and each day, thereafter he made two more frames than he made the day before. How many days did it take him to finish the job?

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7. The sum of interior angles of a triangle is 180°. Show that the sum of the interior angles of polygons with 3,4,5,6.....sides form an arithmetic progression. Find the sum of the interior angles for a 21 sided polygon.

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8. A side of an equillateral triangle is 20cm long. A second equilateral triangle is inscribed in it by joining the mid-points of the sides of the first triangle. The progress is continued as shown in the accompanying diagram. Find the perimeter of the sixth inscribed equilateral triangle.

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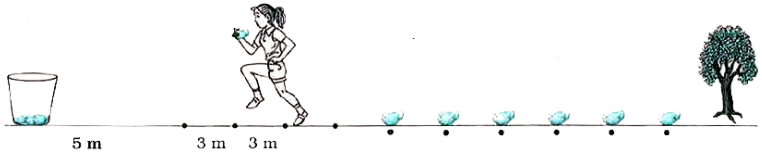
9. In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato , and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line (see the given figure).



A competitor starts from the bucker, picks up the nearest potato, runs back with it , drops it in the bucket, runs back to pick up the next potato , runs to the bucket to drop it in. and she continues in the same way until all the potatoes are in the bucket . What is the total distance the competitor has to run?

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10. In a cricket tournament 16 school teams participated. A sum of Rs 8000 is to be awarded among themselves as prize money. If the last

placed team is awarded Rs 275 in prize money and the award increases by the same amount for successive finishing places, how much amount will the first place team receive?

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11. If $a_1, a_2, a_3, \ldots\ldots, a_n$ are in AP, where $a_i > 0$ for all i, show that

$$\frac{1}{\sqrt{a_1}+\sqrt{a_2}}+\frac{1}{\sqrt{a_2}+\sqrt{a_3}}+\ldots\ldots+\frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}=\frac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$$

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12. Find the $\left(3^3-2^3\right)+\left(5^3-4^3\right)+\left(7^3-6^3\right)+$ .....up to 10 terms

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13. Find the rth term of an AP sum of whose first n terms is $2n+3n^2$

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Solutions Of Ncert Exemplar Problems Long Answer Type Question

1. If A is the arithmetic mean and G_1, G_2 be two geometric mean between any two numbers, then prove that $2A = \frac{G_1^2}{G_2} + \frac{G_2^2}{G_1}$

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2. If $\theta_1, \theta_2, \theta_3, \theta_4, \ldots\ldots, \theta_n$ are in AP whose common difference is d, show that

$$\sec\theta_1 \sec\theta_2 + \sec\theta_2 \sec\theta_3 + \ldots\ldots\ldots + \sec\theta_{(n-1)} \sec\theta_n = \frac{\tan\theta_n - \tan\theta_1}{\sin d}$$

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3. If the sum of p terms of an AP is q and the sum of q terms is p, then show that the sum of $p + q$ terms is $-(p + q)$. Alos, find the sum of first $p - q$ terms (where, $p > q$)

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

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Solutions Of Ncert Exemplar Problems Objective Type Questions

1. If the sum of n terms of an AP is given by $S_n = 3n + 2n^2$, then the common difference of the AP is

A. 3

B. 2

C. 6

D. 4

Answer: D

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2. The 4^{th} term of a G.P is 4. Find the product of its first five terms.

A. 4^3

B. 4^4

C. 4^5

D. None of these

Answer: C

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3. The 9th term of an AP is equal to 6 times the second term. If its 5th term is 22 find the AP.

A. 0

B. 22

C. 198

D. 220

Answer: A

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4. If x, 2y and 3z are in AP where the distinct numbers x,y and z are in GP, then the common ratio of the GP is

A. 3

B. $\frac{1}{3}$

C. 2

D. $\frac{1}{2}$

Answer: B

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5. If in an AP, $S_n = qn^2$ and $S_m = qm^2$, where S_r denotes the sum of r terms of the AP, then S_q equals to,

A. $\frac{q^3}{2}$

B. mnq

C. q^3

D. $(m+n)q^2$

Answer: C

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6. S_n is the sum of n terms of an A.P. If $S_{2n} = 3S_n$ then prove that $\frac{S_{3n}}{S_n} = 6$

A. 4

B. 6

C. 8

D. 10

Answer: B

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7. The minimum value $4^x + 4^{1-x}$, $x \in R$ is

A. 2

B. 4

C. 1

D. 0

Answer: B

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8. Let S_n denote the sum of the cubes of the first n natural numbers and S'_n denote the sum of the first n natural numbers, then $\sum_{r=1}^{n} \left(\frac{S_r}{S'_r} \right)$ equals to

A. $\frac{n(n+1)(n+2)}{6}$

B. $\frac{n(n+1)}{2}$

C. $\frac{n^2+3n+2}{2}$

D. None of these

Answer: A

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9. If t_n denotes the nth term of the series $2+3+6+11$,.....then t_{50} is

A. $(49)^2+2$

B. $(49)^2$

C. $(50)^2+1$

D. $(40)^2+2$

Answer: D

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10. The lengths of three unequal edges of a rectangular solid block are in G.P. If the Volume of the block is $216cm^3$ and the total surface area is $252cm^2$, then the length of the longest edge is,

A. 12

B. 6

C. 18

D. 3

Answer: A

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Solutions Of Ncert Exemplar Problems Fillers

1. If a, b and c are in GP, then the value of $\frac{a-b}{b-c}$ is equal to.....

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2. The sum of terms equidistant from the beginning and end in an AP is equal to.....

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3. The 4^{th} term of a G.P is 4. Find the product of its first five terms.

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Solutions Of Ncert Exemplar Problems True False

1. Two sequences cannot be in both AP and GP together.

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2. Every progression is a sequence but the converse, i.e., every sequences is also a progression need not necessarily be true

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3. Any term of an AP (except first) is equal to half the sum of terms which are equidistant from it.

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4. The sum or difference of two GP is again a G.P.

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5. If the sum of n terms of a sequence is quadratic expression, then it always represents an AP.

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Solutions Of Ncert Exemplar Problems Matching The Columns

1. Match the following

Column - I	Column - II
(i) $4, 1, \frac{1}{4}, \frac{1}{16}, \ldots\ldots$	(a) AP
(ii) $2, 3, 5, 7, \ldots\ldots$	(b) Sequence
(iii) $13, 8, 3, -2, -7, \ldots$	(c) GP

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2. Match the following

Column - I	Column - II
(i) $1^2 + 2^2 + 3^2 + \ldots\ldots + n^2$	(a) $\left[\frac{n(n+1)}{2}\right]^2$
(ii) $1^3 + 2^3 + 3^3 + \ldots\ldots + n^3$	(b) $n(n+1)$
(iii) $2 + 4 + 6 + \ldots\ldots + 2n$	(c) $\frac{n(n+1)(2n+1)}{6}$
(iv) $1 + 2 + 3 + 4 + \ldots\ldots + n$	(c) $\frac{n(n+1)}{2}$

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Solutions Of Ncert Exemplar Problems Question Of Module

1. The terms 1,1,2,3,5,8,13,.....respresents which sequence?

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2. Which is the sequence whose terms are not finite?

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3. What does $a_1 + a_2 + a_3 + \ldots . + a_n$ represent

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4. Give new series by adding 2 in each term of arithmetic sequence 2,4,6,8,..... Give its 10^{th} term

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5. Find twelveth term of A.P. 4, 8, 12.....

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6. $3 + 6 + 9 +$ .....Find sum of n terms.

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7. $4 + 8 + 12 +$ .....Find sum of first 15 terms.

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8. Obtain arithmetic mean of 2 and 128

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9. Insert 5 arithmetic mean between 3 and 4.

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10. Find 8^{th} term of geometric sequence 3, 6,12,....

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11. Find n^{th} term of Geometric sequence 1,3,9,27,.....

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12. Find S_n for geometric sequence 4, 8, 15, 32,.....

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13. Find sum of first 10 terms of geometric series 3,9, 27,.....

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14. Find geometric mean of numbers 5 and 125.

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15. Insert 3 geometric mean between 4 and 64.

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16. The arithmetic and geometric mean of two positive numbers are 8 and $4\sqrt{3}$ respectively. Find these numbers.

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

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18. Find value : $5^2 + 6^2 + 7^2 + \ldots\ldots + 25^2$

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19. Prove the following by using the principle of mathematical induction for all $n \in N$

$$1.2.3. + 2.3.4 + \ldots. + n(n+1)(n+2) = \frac{n(n+1)(n+2)(n+3)}{4}$$

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