MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

GEOMETRICAL PROGRESSION

Example

1. Show that the progression 6, 18, 54, 162, ... is a GP. Write down its first term and the common ratio.

Watch Video Solution

2. Show that the progression -16, 4, -1, $\frac{1}{4}$, ... is a GP. Write down its first term and the common ratio.

Watch Video Solution

3. Show that the progression $\frac{1}{2}, \frac{-1}{3}, \frac{2}{9}, \frac{-4}{27}, \ldots$ is a GP. Write down its first term and find the common ratio.

Watch Video Solution

4. Show that the sequence given by $T_n = (2 \times 3^n)$ for all $n \in N$ is a GP. Find its first term and the common ratio.

Watch Video Solution

5. Find the 10th term and the general term of the progression $\frac{1}{4}, \frac{-1}{2}, 1, -2, 4, \ldots$

Watch Video Solution

6. Find the 5^{th} term of the progression $1, \frac{\left(\sqrt{2}-1\right)}{2\sqrt{3}}, \left(\frac{3-2\sqrt{2}}{12}\right), \left(\frac{5\sqrt{2}-7}{24\sqrt{3}}\right), ..$

Watch Video Solution

7. If the nth term of a GP $2, 8, 32, \ldots$ is $131072,$ then the value of n is

Watch Video Solution

8. Which term of the $GP\sqrt{3}, \frac{1}{\sqrt{3}}, \frac{1}{3\sqrt{3}}, \frac{1}{9\sqrt{3}}, \ldots$ Is $\frac{1}{729\sqrt{3}}$?

Watch Video Solution

9. If the 4th and 9th terms of a GP are 54 and 13122 respectively, find the GP. Also, find its general term.

Watch Video Solution

10. The first term of a GP is 1 and the sum of its 3rd and 5th terms is 90.

Find the common ratio of the GP.

Watch Video Solution

11. The 4th, 7th and 10 th terms of a GP are a, b, c, respectively. Prove that

$b^2 = ac.$

Watch Video Solution

12. If a, b, c are in A.P. and x, y, z are in G.P., then prove that :

$x^{b-c}.\ y^{c-a}.\ z^{a-b} = 1$

Watch Video Solution

13. 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

14. If a, b, c, d are in GP, prove that

$(b-c)^2+(c-a)^2+(d-b)^2=(a-d)^2$.

Watch Video Solution

15. If the pth, qth and rth terms of a G.P. are a, b, c respectively, prove that: $a^{q-r}.\ b^{r-p}.\ c^{p-q}=1$.

Watch Video Solution

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

Watch Video Solution

17. 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 $\sqrt{pq}$ and $p\left(\frac{q}{p}\right)^{m/2n}$ respectively.

Watch Video Solution

18. If the $pth,\ qth\ and\ rth$ terms of a G.P. are $a,\ b,\ c$ respectively, prove that: $a^{(q-r)} \dot{\frown} (\ )b^{(r-p)}\dot{c}^{(p-q)} = 1.$

Watch Video Solution

19. if x , 2y and 3z are in AP where the distinct numbers x, yand z are in gp. Then the common ratio of the GP is

Watch Video Solution

20. In a G.P. of positive terms, for a fixed n, the n^{th} term is equal to sum of the next two terms. Then the common ratio of the G.P. is

Watch Video Solution

21. If p, q, r are in AP then prove that p^{th}, q^{th} and r^{th} terms of any GP are in GP.

Watch Video Solution

22. 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

23. If a, b, c are in AP or GP or HP, then $\frac{a-b}{b-c}$ is equal to

Watch Video Solution

24. Which of the foliowing statement(s) is/are true? (A) If $a^x = b^y = c^z$ and a, b, c are in GP, then x, y, z are in HP (B) If $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ and a, b, c are in GP, then x, y, z are in AP

Watch Video Solution

25. 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 G.P.?

Watch Video Solution

26. 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.

Watch Video Solution

27. Find all sequences which are simultaneously A.P. and G.P.

Watch Video Solution

28. If p_{th}, q_{th}, r_{th} and s_{th} terms of an AP are in GP then show that (p-q), (q-r), (r-s) are also in GP

Watch Video Solution

29. Find the 8th term from the end of the GP 1, 6, 12, 24, ..., 12288.

Watch Video Solution

30. 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

31. Find three numbers in G.P. whose sum is 13 and the sum of whose squares is 91.

A. 1,3,6

B. 1,3,9

C. 1,6,36

D. None of these

Answer: B

Watch Video Solution

32. Find three numbers in G.P. whose sum is 52 and the sum of whose products i pairs is 624.

Watch Video Solution

33. If the continued product of three numbers in G.P. is 216 and the sum of their products in pairs is 156, find the numbers.

Watch Video Solution

34. 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

35. The sum of three numbers m GP 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

36. Find the sum of 8 terms of the GP 3, 6, 12, 24, ...

Watch Video Solution

37. Find the sum of the grometric series $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots$ to 12 terms.

Watch Video Solution

38. How many terms of the geometric series $1+4+16+64+$ will make the sum 5461 ?

Watch Video Solution

39. Find the sum of the series $2+6+18+\ldots..+4374$

Watch Video Solution

40. In a GP $a_1 = 3$, $a_n = 96$ and $S_n = 189$ .Find the number of terms

Watch Video Solution

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

(i) $5 + 55 + \ldots\ldots$

(ii) $6 + 66 + 666 + \ldots\ldots$

Watch Video Solution

42. Sum the series $.4 + .44 + .444 + \ldots$ to n terms.

Watch Video Solution

43. 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.

A. Given GP contains 6 terms and its last term is 150

B. Given GP contains 6 terms and its last term is 149

C. Given GP contains 6 terms and its last term is 160

D. Given GP contains 5 terms and its last term is 160

Answer: C

Watch Video Solution

44. 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 GP.

Watch Video Solution

45. In a GP, the sum of first two terms is -4 and the 5th term is 4 times the 3rd term. Find the GP.

Watch Video Solution

46. In a n increasing G.P. , the sum of the first and the last term is 66, the product of the second and the last but one is 128 and the sum of the terms is 126. How many terms are there in the progression?

Watch Video Solution

47. Find the sum of the products of the corresponding terms of finite geometrical progressions

2, 4, 8, 16, 32 and 128, 32, 8, 2, $\frac{1}{2}$.

Watch Video Solution

48. Find the sum of n terms of the sequence given by $a_n = (3^n + 5n), n \in N.$

Watch Video Solution

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

Watch Video Solution

50. If S be the sum, P the product and R the sum of the reciprocals of n terms of a G.P. prove that $\left(\frac{S}{R}\right)^n = P^2$.

Watch Video Solution

51. 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

52. A man 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 the instruction that they move the chain similarly. Assuming that the chain is not broken and it costs Rs. 4 to mail one letter, find the amount spent on postange when 6th set of letters is mailed.

Watch Video Solution

53. What will Rs. 10000 amount to in 4 years to in 4 years after its deposit in a bank which pays annual interest at the rate of 10% per annum compounded annually ?

Watch Video Solution

54. 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

Watch Video Solution

55. 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 2nd hour, 4th hour and nth hour?

Watch Video Solution

56. The inventor of the chess board suggested a reward of one grain of when for the first square, 2 grains for the second, 4 grains for the third and so on, doubling the number of the grains for subsequent squares. How many grains would have to be given to inventory? (There are 64 square sin the chess board).

Watch Video Solution

57. the lengths of three unequal egdes of a rectangular solids block are in GP .if the volume of the block is 26 cm^3 and the total surface area is

$252cm^2$ then the length of the longest edge is

Watch Video Solution

58. If $a,\ b,\ c$ are in G.P. prove that $\log a,\ \log b,\ \log c$ are in A.P.

Watch Video Solution

59. If a, b, c, d are in G.P., prove that $a + b + , b + c, c + d$ are also in G.P.

Watch Video Solution

60. If a, b, c 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

61. If $\left(a^2+b^2\right),(ab+bc),\left(b^2+c^2\right)$ are in GP then prove that a, b, c are also in GP.

Watch Video Solution

62. If mth, nth and pth terms of a G.P. form three consecutive terms of a G.P. Prove that $m, n, andp$ form three consecutive terms of an arithmetic system.

Watch Video Solution

63. If the 4th, 10th and 16th terms of a GP are x, y, z respectively, prove that x, y, z are in GP.

Watch Video Solution

64. Three numbers are in A.P. and their sum is 15. If 1,3,9 be added to them respectively they form a G.P. Find the numbers.

Watch Video Solution

65. Find the geometric mean between

(i) 6 and 24 (ii) -9 and -25 (iii) -6 and 9

Watch Video Solution

66. Find two positive numbers a and b whose AM and GM are 34 and 16 respectively.

Watch Video Solution

67. 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

A. $n = \frac{1}{3}$

B. $n = -\frac{1}{2}$

C. $n = -\frac{1}{3}$

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

Answer: B

Watch Video Solution

68. If A and G are respectively arithmetic and geometric mean between positive no. a and b ; $A > G$

Watch Video Solution

69. If A and G are respectively arithmetic and geometric mean between positive no. a and b ; then the quadratic equation having a;b as its roots is $x^2 - 2Ax + G^2 = 0$

Watch Video Solution

70. If A and G be the AM and GM between two positive no.'s ; then the numbers are $A \pm \sqrt{A^2 - G^2}$

Watch Video Solution

71. If x, y, z are distinct positive numbers, then prove that $(x+y)(y+z)(z+x) > 8xyz$.

Watch Video Solution

72. If a, b, c, d are four distinct positive numbers in G.P. then show that $a + d > b +$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

75. 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

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

Watch Video Solution

77. If $x \in R$, find the minimum value of the expression $3^x + 3^{1-x}$.

Watch Video Solution

78. Insert n geometric means between a and b.

Watch Video Solution

79. Insert two number between 3 and 81 so that the resulting sequence is G.P.

Watch Video Solution

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

Watch Video Solution

Watch Video Solution

81. If one geometric mean G and two arithmetic means $A_1 and A_2$ be inserted between two given quantities, prove that $G^2 = (2A_1 - A_2)(2A_2 - A_1)$.

Watch Video Solution

82. If G_1 and G_2 are two geometric means and A is the arithmetic mean inserted two numbers, then the value of $\frac{G_1^2}{G_2} + \frac{G_2^2}{G_1}$ is:

Watch Video Solution

83. Find the sum of the infinite geometric series $\left(1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \ldots\infty\right)$.

Watch Video Solution

84. Find the sum of the infinite geometric series $\left(1-\frac{1}{3}+\frac{1}{3^2}-\frac{1}{3^3}+\ldots\infty\right)$.

A. $\frac{3}{4}$

B. $\frac{3}{2}$

C. $\frac{1}{4}$

D. 3

Answer: A

Watch Video Solution

85. Find the sum of the infinite geomwtric series $\left(\frac{-5}{4}+\frac{5}{16}-\frac{5}{64}+\ldots\infty\right)$.

Watch Video Solution

86. Find the sum of the following series: $\left(\sqrt{2}-1\right)+1+\left(\sqrt{2}-1\right)+\infty$

Watch Video Solution

87. Find the sum of the following series:

$$\frac{1}{2}+\frac{1}{3^2}+\frac{1}{2^3}+\frac{1}{3^4}+\frac{1}{2^5}+\frac{1}{3^6}+\infty$$

Watch Video Solution

88. Prove that $6^{1/2}\times 6^{1/4}\times 6^{1/8}\infty=6.$

Watch Video Solution

89. If

$$x=a+\frac{a}{r}+\frac{a}{r^2}+\infty, y=b-\frac{b}{r}+\frac{b}{r^2}+\infty, andz=c+\frac{c}{r^2}+\frac{c}{r^4}+\infty$$

prove that $\frac{xy}{z}=\frac{ab}{.}$

Watch Video Solution

90. If $y = x + x^2 + x^3 + \ldots\ldots\ldots\ldots\infty$, prove that $x = \dfrac{y}{1+y}$

Watch Video Solution

91. If

$x = 2 + a + a^2 + \infty, where |a| < 1 and y = 1 + b + b^2 + \infty, where |b| < 1$

prove that: $1 + ab + a^2b^2 + \infty = \dfrac{xy}{x + y - 1}$

Watch Video Solution

92. If $A = 1 + r^a + r^{2a} +$ to $\infty and B = 1 + r^b + r^{2b} + \infty$, prove that

$r = \left(\dfrac{A-1}{A}\right)^{1/a} = \left(\dfrac{B-1}{B}\right)^{1/a}$

Watch Video Solution

93. Use geometric series to express $0.555\ldots = 0.\bar{5}$ as a rational number.

Watch Video Solution

94. Find the rational number whose decimal form is $0.\overline{142}$.

Watch Video Solution

95. Find the rational number whose decimal form is $1.\overline{345}$.

Watch Video Solution

96. The sum of an infinite GP is $\frac{80}{9}$ and its common ratio is $\frac{-4}{5}$. Find its first term.

Watch Video Solution

97. The sum of first two terms of an infinite geometric series is 15 and each term is equal to the sum of all the terms following it, find the series.

Watch Video Solution

98. The sum of an infinite geometric series is 6. If its first terms is 2, find its common ratio.

Watch Video Solution

99. The sum of an infinite geometric series is 15 and the sum of the squares of these terms is 45. Find the series.

Watch Video Solution

100. If $S_1, S_2, S_3, \ldots, S_n$ are the sums of infinite geometric series, whose first terms are 1, 2, 3,.., n and whose common rations are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots, \frac{1}{n+1}$ respectively, then find the values of $S_1^2 + S_2^2 + S_3^2 + \ldots + S_{2n-1}^2$.

Watch Video Solution

101. The side of a given square is 10 cm. The midpoints of its sides are joined to form a new square. Again, the midpoints of the sides of this new aquare are joined to form another square. The process is continued indefinitely. Find (i) the sum of the areas and (ii) the sum of the perimeters of the squares.

Watch Video Solution

102. One side of an equilateral triangle is 18 cm. The mid-point of its sides are joined to form another triangle whose mid-points, in turn, are joined to form still another triangle. The process is continued indefinitely. Find the sum of the (i) perimeters of all the triangles. (ii) areas of all triangles.

Watch Video Solution

103. 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 $120 metres$.

Watch Video Solution

104. If $x = \Sigma_{n=0}^{\infty} \cos^{2n}\theta$, $y = \Sigma_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \Sigma_{n=0}^{\infty} \cos^{2n}\theta \sin^{2n}\phi$, where $0 < \theta < \phi < \frac{\pi}{2}$ then prove that $xz + yz - z = xy$.

Watch Video Solution

Exercise 12 A

1. Find the 6th and nth terms of the GP 2, 6, 18, 54, ...

Watch Video Solution

2. Find the $17th$ term and nth term of GP $2, 2\sqrt{2}, 4, 8\sqrt{2}, \ldots$

Watch Video Solution

3. Find the 7th and nth terms of the GP $0.4, 0.8, 1.6, \ldots$.

Watch Video Solution

4. Find the 10th and nth terms of the $GP \frac{-3}{4}, \frac{1}{2}, \frac{-1}{3}, \frac{2}{9}, \ldots$

Watch Video Solution

5. Which term of the GP 3, 6, 12, 24, ... is 3072 ?

Watch Video Solution

6. Which term of the G.P $\frac{1}{4}, -\frac{1}{2}, 1, \ldots$ is -128

Watch Video Solution

7. Which term of the G.P.: $\sqrt{3}, 3, 3, \sqrt{3}, is\ 729?$

Watch Video Solution

8. Find the geometric series whose 5th and 8th terms are 80 and 640 respectively.

Watch Video Solution

9. Find teh GP whose 4th and 7th terms are $\frac{1}{18}$ and $-\frac{1}{486}$ respectively

Watch Video Solution

10. The 5th, 8th and 11th terms of a GP are a, b, c respectively. Show that $b^2 = ac$.

Watch Video Solution

11. The first term of a GP is -3 and the square of the second term is equal to its 4th term. Find its 7th term.

Watch Video Solution

12. The $6th$ term from the end of the $G.\ P.\ 8, 4, 2, 1, \ldots \frac{1}{1024}$ (A) $\frac{1}{64}$ (B) 32 (C) $\frac{1}{32}$ (D)none of these

Watch Video Solution

13. Find the 4th term from the end of the G.P. $\frac{2}{27}, \frac{2}{9}, \frac{2}{3}, , 162.$

Watch Video Solution

14. (iii) If a, bc are respectively the pth, qth and rth terms of the given $G.\ P.$ then show that $(q-r)\log a + (r-p)\log b + (p-q)\log c = 0$, where $a, b, c > 0$.

Watch Video Solution

15. (ii)If the third term of G.P.is 4, then find the product of first five terms

Watch Video Solution

16. In a finite G.P. the product of the terms equidistant from the beginning and the end is always same and equal to the product of first and last term.

Watch Video Solution

17. 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

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

Watch Video Solution

Exercise 12 B

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

Watch Video Solution

2. For what values of x are the numbers $(x + 9), (x - 6)\ \text{and}\ 4$ in GP ?

Watch Video Solution

3. The sum of three numbers in GP is $\frac{39}{10}$ and their product is 1. Find the numbers

Watch Video Solution

4. The sum of first three terms of a G.P. is 13/12 and their product is -1. Find the G.P.

Watch Video Solution

5. If the sum of three numbers in G.P. is 38 and their product is 1728, find them.

Watch Video Solution

6. Find three numbers in G.P. whose sum is 65 and whose product is 3375.

Watch Video Solution

7. The sum of three numbers in G.P. is 21 and the sum of their squares is 189. Find the numbers.

Watch Video Solution

8. The product of three numbers in G.P. is 216. If 2, 8, 6, be added to them, the results are in A.P. find the numbers.

Watch Video Solution

9. The product of three numbers in GP is 1000. If 6 is added to the second number and 7 is added to the third number, we get an AP. Find the numbers.

Watch Video Solution

Exercise 12 C

1. Find the sum of the GP:

(i) $1 + 3 + 9 + 27 + \ldots$ to 7 terms

(ii) $1 + \sqrt{3} + 3 + 3\sqrt{3} + \ldots$ to 10 terms

(iii) $0.15 + 0.015 + 0.0015 + \ldots$ to 6 terms

(iv) $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \ldots$ to 9 terms

(v) $\sqrt{2} + \frac{1}{\sqrt{2}} + \frac{1}{2\sqrt{2}} + \ldots$ to 8 terms

(vi) $\frac{2}{9} - \frac{1}{3} + \frac{1}{2} - \frac{3}{4} + \ldots$ to 6 terms

Watch Video Solution

2. Find the sum of the GP :

(i) $\sqrt{7} + \sqrt{21} + 3\sqrt{7} + \ldots$ to n terms

(ii) $1 - \frac{1}{3} + \frac{1}{3^2} - \frac{1}{3^3} + \ldots$ to n terms

(iii) $1 - a + a^2 - a^3 + \ldots$ to n terms $(a \neq 1)$

(iv) $x^3 + x^5 + x^7 + \ldots$ to terms

(v) $x(x + y) + x^2(x^2 + y^2) + x^3(x^3 + y^3) + \ldots$ to n terms

Watch Video Solution

3. Find the sum to n terms of the sequence : (i) $\left(x+\frac{1}{x}\right)^2+\left(x^2+\frac{1}{x^2}\right)^2+\left(x^3+\frac{1}{x^3}\right)^2$ ... to n terms (ii) $(x+y)+\left(x^2+xy+y^2\right)+\left(x^3+x^2y+xy^2+y^3\right)$, ... to n terms

Watch Video Solution

4. $\frac{3}{5}+\frac{4}{5^2}+\frac{3}{5^3}+\frac{4}{5^4}+\ldots$ to 2n terms;

Watch Video Solution

5. Evaluate :

(i) $\sum_{n=1}^{10}\left(2+3^n\right)$ (ii) $\sum_{k=1}^{n}\left[2^k+3^{(k-1)}\right]$ (iii) $\sum_{n=1}^{8}5^n$

Watch Video Solution

6. Find the sum of the series :

(i) $8+88+888+$ ... to n terms

(ii) $3 + 33 + 333 +$ ... to n terms

(iii) $0.7 + 0.77 + 0.777 +$ ... to n terms

Watch Video Solution

7. The sum of n terms of a progression is $(2^n - 1)$. Show that it is a GP and find its common ratio.

Watch Video Solution

8. The ratio of the sum of first three terms is to that of first 6 terms of a G.P. is 1:12. Find the common ratio.

Watch Video Solution

9. Find the sum of the geometric series $3 + 6 + 12 + \ldots + 1536$.

Watch Video Solution

10. How many terms of the series $2 + 6 + 18 +$ ... Must be taken to make the sum equal to 728 ?

Watch Video Solution

11. .Find the G.P., if the common ratio of G.P. is 3, nth term is 486 and sum of first n terms is 728.

Watch Video Solution

12. The first term of a GP is 27 and its 8th terms is $\frac{1}{81}$. Find the sum of its first 10 terms.

Watch Video Solution

13. The 2nd and 5th terms of a GP are $\frac{-1}{2}$ and $\frac{1}{16}$ respectively. Find the sum of the GP up to 8 terms.

Watch Video Solution

14. The 4th and 7th terms of a G.P. are $\frac{1}{27} and \frac{1}{729}$ respectively. Find the sum of n terms of the G.P.

Watch Video Solution

15. A. G.P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of the terms occupying he odd places. Find the common ratio of the G.P.

Watch Video Solution

16. 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 $\frac{1}{r^n}$. 9873740001

Watch Video Solution

Exercise 12 D

1. What will Rs. 15625 amount to in 3 years after its deposit in a bank which pays annual interest at the rate of 8% per annum, compounded annually ?

Watch Video Solution

2. The value of a machine costing Rs 80000 depreciates at the rate of 15% per annume. What will be the worth of this machine after 3 years ?

Watch Video Solution

3. Three years before the population of a village was 10000. If at the end of each year, 20% of the prople migrated to a neaby town, what is its present population ?

Watch Video Solution

4. What will Rs. 5000 amount to in 10 years, compounded annually at 10 % per annume ? $\left[\text{Given } \ (1.1)^{10} = 2.594\right]$

Watch Video Solution

5. A manufacture reckons that the value of a machine which costs him Rs. 156250, will depreciate each year by 20%. Find the estimated value at the end of 5 years.

Watch Video Solution

6. The number of bacteria in a certain culture doubles every hour. If there were 50 bacteria present in the culture originally, how many bacteria would be present at the end of (i) 2nd hour, (ii) 5th hour and (iii) nth hour ?

Watch Video Solution

Exercise 12 E

1. If p, q, r are in AP then prove that pth, qth and rth terms of any GP are in GP.

Watch Video Solution

2. If a, b, c are in G.P., then prove that $\log a^n, \log b^n, \log c^n$ are in A.P.

Watch Video Solution

3. If a, b, c are in G.P. then $\log_a 10, \log_b 10, \log_c 10$ are in

Watch Video Solution

4. Find the values of k for which $k + 12, k - 6$ and 3 are in GP.

Watch Video Solution

5. Three numbers whose sum is 15 are in A.P. If they are added by 1,4 and 19 respectively, they are in GP. Thenumbers are

Watch Video Solution

6. The three numbers are in A.P and their sum is 21. If the first and second are decrease by 1 each and third is increased by 7, they form a G.P Find the numbers of A.P.

Watch Video Solution

7. The sum of three numbers in GP. 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

8. If a, b, c are in G.P. then prove that $\frac{a^2+ab+b^2}{bc+ca+ab} = \frac{b+a}{c+b}$

Watch Video Solution

9. If $(a-b), (b-c), (c-a)$ are in G.P. then prove that $(a+b+c)^2 = 3(ab+bc+ca)$

Watch Video Solution

10. If a, b, c are in G.P., prove that: $a(b^2+c^2) = c(a^2+b^2)$

$A^2b^2c^2\left(\frac{1}{a^3}+\frac{1}{b^3}+\frac{1}{c^3}\right) = a^3+b^3+c^3$ $\frac{(a+b+c)^2}{a^2+b^2+c^2} = \frac{a+b+c}{a-b+c}$

$\frac{1}{a^2-b^2}+\frac{1}{b^2} = \frac{1}{b^2-c^2}$ (a+2b=2c)(a-2b+2c) $= a^2+4c^2$.

Watch Video Solution

11. If a, b, c, d are in GP, prove that

(i) $(b+c)(b+d) = (c+a)(c+d)$

(ii) $\frac{ab-cd}{b^2-c^2}=\frac{a+c}{b}$

(iii) $(a+b+c+d)^2=(a+b)^2+2(b+c)^2+(c+d)^2$.

Watch Video Solution

12. If a, b, c are in GP, prove that $\frac{1}{(a+b)}, \frac{1}{2b}, \frac{1}{b+c}$ are in AP.

Watch Video Solution

13. If a, b, c are in GP, prove that a^2, b^2, c^2 are in GP.

Watch Video Solution

14. If a, b, c are in GP, prove that a^3, b^3, c^3 are in GP.

Watch Video Solution

15. If a, b, c are in GP, prove that $\left(a^2+b^2\right), (ab+bc), \left(b^2+c^2\right)$ are in GP.

Watch Video Solution

16. If a, b, c, d are in GP, prove that $(a^2 - b^2), (b^2 - c^2), (c^2 - d^2)$ are in GP.

Watch Video Solution

17. 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.

Watch Video Solution

18. If $(p^2 + q^2), (pq + qr), (q^2 + r^2)$ are in GP then prove that p, q, r are in GP.

Watch Video Solution

19. If a, b, c are in AP and a, b, d are in GP, show that $a, (a-b)$ and $(d-c)$ are in GP.

Watch Video Solution

20. If a, b, c are in AP, and a, x, b and b, y, c are in GP then show that x^2, b^2, y^2 are in AP.

Watch Video Solution

Exercise 12 F

1. Find two positive numbers a and b, whose

(i) AM = 25 and GM = 20 (ii) AM = 10 and GM = 8.

Watch Video Solution

2. Find the GM between the numbers

(i) 5 and 125 (ii) 1 and $\frac{9}{16}$ (iii) 0.15 and 0.0015

(iv) -8 and -2 (v) -6.3 and -2.8 (v) a^3b and ab^3

Watch Video Solution

3. Insert two geometric means between 9 and 243.

Watch Video Solution

4. Insert three geometric means between $\frac{1}{3}$ and 432.

Watch Video Solution

5. Insert four geometric means between 6 and 192.

Watch Video Solution

6. If the A.M. of two positive numbers $aandb(a > b)$ is twice their geometric mean. Prove that : $a : b = (2 + \sqrt{3}) : (2 - \sqrt{3})$.

Watch Video Solution

7. If a, b, c are in AP, x is the GM between a and b, y is the GM between b and c, then show that b^2 is the AM between x^2 and y^2.

Watch Video Solution

8. 9. Show that the product of n geometric means between a and b is equal to the nth power of the single GM between a and b.

Watch Video Solution

9. If Am and GM of the roots of a quadratic equation are 10 and 8 respectively then obtain the quadratic equation.

Watch Video Solution

Exercise 12 G

1. Find the sum of each of the following infinite series :

$$\sqrt{2} - \frac{1}{\sqrt{2}} + \frac{1}{2\sqrt{2}} - \frac{1}{4\sqrt{2}} + \ldots\infty$$

Watch Video Solution

2. Find the sum of each of the following infinite series :

$$6 + 1.2 + 0.24 + \infty$$

Watch Video Solution

3. Find the sum of each of the following infinite series :

$$\sqrt{2} - \frac{1}{\sqrt{2}} + \frac{1}{2\sqrt{2}} - \frac{1}{4\sqrt{2}} + \ldots\infty$$

Watch Video Solution

4. Find the sum of the following series to infinity:

$10 - 9 + 8.1 - 7.29 + \infty$

Watch Video Solution

5. Find the sum of each of the following infinite series :

$\frac{2}{5} + \frac{3}{5^2} + \frac{2}{5^3} + \frac{3}{5^4} + \ldots\infty$

Watch Video Solution

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

Watch Video Solution

7. Find the rational number whose decimal expansion is given below :

(i) $0.\bar{3}$ (ii) $0.\overline{231}$ (iii) $3.\overline{52}$

Watch Video Solution

8. Express the recurring decimal $0.125125125... = 0.\overline{125}$ as a reatonal number.

Watch Video Solution

9. Write the value of $0.\overline{423}$ in the form of a simple fraction.

Watch Video Solution

10. Write the value of $2.1\overline{34}$ in the form of a simple fraction.

Watch Video Solution

11. The sum of an infinite geometric series is 6. If its first terms is 2, find its common ratio.

Watch Video Solution

12. The sum of an infinite geomwtric series is 20 and the sum of the squares of these terms is 100. Find the series.

Watch Video Solution

13. The sum of an infinite GP is 57 and the sum of their cubes is 9747. Find the GP.

Watch Video Solution

Exercise 12 H Very Short Answer Type Questions

1. If the 5th term of a GP is 2, find the product of its first nine terms.

Watch Video Solution

2. If $(p+q)^{th} and\ (p-q)^{th}$ terms of a G.P. re $m\ and\ n$ respectively, then write it pth term.

Watch Video Solution

3. If 2nd, 3rd and 6th terms of an AP are the three consecutive terms of a GP then find the common ratio of the GP.

Watch Video Solution

4. Write the quadratic equation, the arithmetic and geometric means of whose roots are A and G respectively.

Watch Video Solution

5. Which of the foliowing statement(s) is/are true? (A) If $a^x = b^y = c^z$ and a, b, c are in GP, then x, y, z are in HP (B) If

$a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ and a, b, c are in GP, then x, y, z are in AP

Watch Video Solution

6. If a, b, c are in A.P. and x, y, z are in G.P., then prove that :

$x^{b-c}. y^{c-a}. z^{a-b} = 1$

Watch Video Solution

7. Prove that $\left(1 - \frac{1}{3} + \frac{1}{3^2} - \frac{1}{3^3} + \frac{1}{3^4} - \ldots\infty\right) = \frac{3}{4}$

Watch Video Solution

8. Express $0.\overline{123}$ as a rational number.

Watch Video Solution

9. Express $0.\bar{6}$ as a rational number.

Watch Video Solution

10. Express $0.\overline{68}$ as a rational number.

Watch Video Solution

11. The second term of a GP is 24 and its fifth term is 81. Find the sum of its first five terms.

Watch Video Solution

12. The ratio of the sum of first three terms is to that of first 6 terms of a G.P. is 1:12. Find the common ratio.

Watch Video Solution

13. 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