



MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

SEQUENCE AND SERIES

Solved Example

1. The n th term of a series is $3^n + 2n$; find the sum of first n terms of the series.

 [Watch Video Solution](#)

2. The n th term of a progression is $2n+3$. Show that it is an A.P. Also find its 10th term.

 [Watch Video Solution](#)

3. Show that a sequence is an AP if its n th term is a linear expression in n and in such a case the common difference is equal to the coefficient of n .

 [Watch Video Solution](#)

4. Find: 10th term of the A.P. 1,4,7,10..

 [Watch Video Solution](#)

5. Find the 25th term of the progression 6+10+14+....

 [Watch Video Solution](#)

6. Which term of the A.P. 102+108+...is 210?

 [Watch Video Solution](#)

7. Find the number of terms in the progression $8 + 12 + 16 + \dots + 124$.

A. 25

B. 30

C. 29

D. None of these

Answer: B



[Watch Video Solution](#)

8. Find the 7th term from the end of A.P. $3+5+7+\dots+75$.



[Watch Video Solution](#)

9. Which term of the A.P. $90+87+84+\dots$ is zero ?



[Watch Video Solution](#)

10. The 5th and 13th terms of an A.P. are 5 and -3 respectively. Find the 20th term of the progression.



[Watch Video Solution](#)

11. If the m th term of an A.P. be $1/n$ and n th term be $1/m$ then show that its (mn) term is 1.



[Watch Video Solution](#)

12. The 5th term of an A.P. is three times the first term. Prove that its 7th term will be two times the 3rd term.



[Watch Video Solution](#)

13. Find the 20th term from the last term of the AP : 3, 8, 13, . . . , 253.

 [Watch Video Solution](#)

14. Find the value of x, if $2+4+6+\dots+x=650$.

 [Watch Video Solution](#)

15. How many terms of the A.P. $22+26+30+\dots$ has the sum 400?

A. 9

B. 10

C. 11

D. None of these

Answer: B

 [Watch Video Solution](#)

16. The sum of 'n' terms of a progression is $(n^2 + 5n)$. Prove that it is arithmetic progression. Also find its common difference.

 [Watch Video Solution](#)

17. The sum of m terms and n terms of an A.P. are equal. Prove that the sum of (m+n) terms will be zero. Given that $m \neq n$.

 [Watch Video Solution](#)

18. The first term of an A.P. is 'a' and sum of first p terms is zero. Show that the sum of next q terms will be $\frac{a(p+q)q}{1-p}$.

 [Watch Video Solution](#)

19. Find the sum of 'n' terms of an A.P. whose nth term is $2n+1$.

 [Watch Video Solution](#)

[Watch Video Solution](#)

20. If the ratio of the sum of 'n' terms of two A.P's is $(5n+4) : (9n+6)$, find the ratio of the 18th terms of these A.P.'s.



[Watch Video Solution](#)

21. How many terms of the A.P. $17+15+13+\dots$ has the sum 72? Explain the double answer.



[Watch Video Solution](#)

22. Find the arithmetic mean of 4 and 12.

A. 9

B. 8

C. 16

D. 10

Answer: B

 [Watch Video Solution](#)

23. Find 7 arithmetic means between 6 and 46.

 [Watch Video Solution](#)

24. n arithmetic means are there between 4 and 36. If the ratio of 3rd and $(n-2)$ th mean is 2:3, find the value of n .

 [Watch Video Solution](#)

25. If x, y, z are in arithmetic progression and a is the arithmetic mean of x and y and b is the arithmetic mean of y and z , then prove that y is the arithmetic mean of a and b .

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

27. Find three numbers in A.P. whose sum is 12 and product is 48.

 [Watch Video Solution](#)

28. The angles of a quadrilateral are in arithmetic progression and their common difference is 10° . Find the angles.

 [Watch Video Solution](#)

29. If a, b, c are in A.P., prove that $a^3 + 4b^3 + c^3 = 3b(a^2 + c^2)$.

 [Watch Video Solution](#)

30. If a, b, c are in A.P., prove that $a^2(b+c), b^2(c+a), c^2(a+b)$ are also in A.P.

 [Watch Video Solution](#)

31.

If a^2, b^2, c^2 are in A.P., prove that $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are also in A.P.

 [Watch Video Solution](#)

32. If $(b-c)^2, (c-a)^2, (a-b)^2$ are in A.P., then prove that $\frac{1}{b-c}, \frac{1}{c-a}, \frac{1}{a-b}$ are also in A.P.

 [Watch Video Solution](#)

33. The n th term of a progression is 2^n . Prove that it is G.P. Also find its common ratio.



[Watch Video Solution](#)

 [Watch Video Solution](#)

34. Find the 6th term of the progression 2, 6, 18,....

 [Watch Video Solution](#)

35. Find the number of terms in the progression 4, 2, 1, ..., $\frac{1}{128}$.

 [Watch Video Solution](#)

36. Find the 4th term from the end in the progression 3,6,12,....,1536.

 [Watch Video Solution](#)

37. The 4th and 7th terms of a G.P. are 18 and 486 respectively. Find the G.P.

 [Watch Video Solution](#)

38. Find the sum of 10 terms of the progression : $2+4+8+\dots$



Watch Video Solution

39. How many terms of the G.P. $\frac{2}{9} - \frac{1}{3} + \frac{1}{2} \dots$ give the sum $\frac{55}{72}$?

A. 6

B. 3

C. 4

D. 5

Answer: D



Watch Video Solution

40. Evaluate $\sum_{n=1}^6 (3 + 2^n)$.



Watch Video Solution

41. The n th term of a G.P. is $3 \cdot 2^n$. Find the sum of 8 terms of the G.P.

 [Watch Video Solution](#)

42. Find the sum of n terms of the series $7 + 77 + 777 + \dots$

 [Watch Video Solution](#)

43. 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](#)

44. Find the sum of n terms of the series

$$(x + y) + (x^2 + xy + y^2) + (x^3 + x^2y + xy^2 + y^3) + \dots$$

 [Watch Video Solution](#)

45. Find the sum to infinity of the series $2 + 1 + \frac{1}{2} + \dots\infty$.

A. 1

B. 2

C. 3

D. 4

Answer: D



[Watch Video Solution](#)

46. The first term of a G.P. is 2 and each of its term is equal to sum of the succeeding terms of the G.P. Find the G.P.



[Watch Video Solution](#)

47.

If $y = x + x^2 + x^3 + \dots\infty$ and $|x| < 1$, then prove that $x = \frac{y}{1+y}$.



[Watch Video Solution](#)

48. Convert the recurring decimal $3.5\dot{2}$ into a rational number.



[Watch Video Solution](#)

49. If the sum of n , $2n$ and infinite terms of G.P. are S_1 , S_2 and S respectively, then prove that $S_1(S_1 - S) = S(S_1 - S_2)$.



[Watch Video Solution](#)

50. Find the geometric mean of 12 and 27.



[Watch Video Solution](#)

51. Find 3 geometric means between 10 and 160.

A. 20, 40, 80

B. 20, 60, 100

C. 30, 60, 90

D. None of these

Answer: A

 [Watch Video Solution](#)

52. If A is the arithmetic mean and p and q be two geometric means between two numbers a and b , then prove that :

$$p^3 + q^3 = 2pq A$$

 [Watch Video Solution](#)

53. If a, b, c are in G.P., x and y are the A.M.'s of a, b and b, c respectively, then prove that:

$$(i) \frac{a}{x} + \frac{c}{y} = 2 \qquad (ii) \frac{1}{y} + \frac{1}{y} = \frac{2}{b}$$



Watch Video Solution

54. If the A.M. of two numbers is twice their G.M., then the numbers are in the ratio

A. $(2 + \sqrt{3}) : (2 - \sqrt{3})$.

B. $(2 + \sqrt{5}) : (2 - \sqrt{5})$.

C. $(5 + \sqrt{3}) : (2 - \sqrt{3})$.

D. $(2 - \sqrt{3}) : (2 + \sqrt{3})$.

Answer: A



Watch Video Solution

55. Prove that the A.M. of two positive real numbers is greater than their G.M.



Watch Video Solution

56. The product of three numbers in G.P. is 64 and their sum is 14. Find the numbers.

 [Watch Video Solution](#)

57. The product of three consecutive terms of a G.P. is 64. The sum of product of numbers taken in pair is 56. Find the numbers.

 [Watch Video Solution](#)

58. The sum of 3 numbers in A.P. is 15. If we add 1, 4, 19 respectively, then the new numbers form a G.P. Find the numbers of the A.P.

 [Watch Video Solution](#)

59. If a, b, c are in geometric progression, then prove that :

$$\frac{1}{a^2 - b^2} + \frac{1}{b^2} = \frac{1}{b^2 - c^2}$$



Watch Video Solution

60. If a, b, c, d are in G.P., then prove that:

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



Watch Video Solution

61. If a, b, c are in A.P. and a, b, d are in G.P., prove that $a, a - b, d - c$ are in G.P.



Watch Video Solution

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

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



Watch Video Solution

63. 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](#)

64. Find the sum of n terms of the series when n th terms is :

(i) $n^2 + n$ (ii) $n^2 + 2^n$

 [Watch Video Solution](#)

65. Find the sum of n terms of the series $1^2 + 4^2 + 7^2 + \dots$

 [Watch Video Solution](#)

66. Find the sum of the series:

1. $n + 2. (n - 1) + 3. (n - 2) + \dots + (n - 1). 2 + n. 1.$

 [Watch Video Solution](#)

67. Find the sum of first n terms of the following series:

$$5 + 11 + 19 + 29 + 41 + \dots$$



[Watch Video Solution](#)

68. Sum of n terms of series $12 + 16 + 24 + 40 + \dots$ (A) $2(2^n - 1) + 8n$

(B) $2(2^n - 1) + 6n$ (C) $3(2^n - 1) + 8n$ (D) $4(2^n - 1) + 8n$



[Watch Video Solution](#)

69. Find the sum of n terms of the series $1+4+10+20+35+\dots$



[View Text Solution](#)

1. The n th term of a sequence is defined as follows. Find the first four terms: (i) $T_n = 3n + 1$ (ii) $T_n = n^2 + 5$



[Watch Video Solution](#)

2. The n th term of a sequence is $(3n - 7)$. Find its 20th term.

A. 60

B. 53

C. 50

D. None of these

Answer: B



[Watch Video Solution](#)

3. Find the first four terms of the sequence defined by $a_1 = 3$ and $a_n = 3a_{n-1} + 2$, for all $n \geq 1$.



Watch Video Solution

4. A sequence is defined by $a_n = n^3 - 6n^2 + 11n - 6$. Show that the first three terms of the sequence are zero and all other terms are positive.



Watch Video Solution

Exercise 9 B

1. (a) The n th term of a progression is $(3n + 5)$. Prove that this progression is an arithmetic progression. Also find its 6th term. (b) The n th term of a progression is $(3 - 4n)$. Prove that this progression is an arithmetic progression. Also find its common difference. (c) The n th term of a progression is $(n^2 - n + 1)$. Prove that it is not an A.P.



Watch Video Solution

2. (a) Find the 10th term of the progression $1 + 3 + 5 + 7 + \dots$ (b) Find the 7th term of the progression $80 + 77 + 74 + \dots$ (c) Find the 22nd term of the progression $7\frac{3}{4} + 9\frac{1}{2} + 11\frac{1}{4} + \dots$ (d) Find the n th term of the progression $-5 - 3 - 1 + 1 + \dots$



[Watch Video Solution](#)

3. (a) Which term of the progression $4 + 8 + 12 + \dots$ is 76 ?

(b) Which term of the progression $36 + 33 + 30 + \dots$ is zero ?

(c) Which term of the progression $\frac{3}{4} + 1 + \frac{5}{4} + \dots$ is 12?



[Watch Video Solution](#)

4. (a) Find the 16th term from the end of the progression $3 + 6 + 9 + \dots + 99$.

(b) Find the 10th term from the end of the progression $82 + 79 + 76 + \dots + 4$.

(c) Find the 10th term from the end of the progression $5 + 2 - 1 - 4 - \dots - 34$.



 [Watch Video Solution](#)

5. (a) How many numbers of two digits are divisible by 3 ?

(b) How many numbers of three digits are divisible by 9 ?

 [View Text Solution](#)

6. (a) Find the value of 'x' if $x + 1$, $2x + 1$ and $x + 1$ are in A.P. Also find the 4th term of this progression.

(b) If $k + 3$, $2k + 1$, $k + 7$ are in A.P., then find this progression upto 5 terms.

 [Watch Video Solution](#)

7. (a) The 3rd and 19th terms of an A.P. are 13 and 77 respectively. Find the A.P.

(b) The 5th and 8th terms of an A.P. are 56 and 95 respectively. Find the 25th term of this A.P.

(c) The p th and q th terms of an A.P. are q and p respectively. Prove that its $(p + q)$ th term will be zero.

 [Watch Video Solution](#)

8. If $(p + 1)$ th term of an A.P. is twice the $(q + 1)$ th term, then prove that $(3p + 1)$ th term will be twice the $(p + q + 1)$ th term.

 [Watch Video Solution](#)

9. The 12th term of an A.P. is 14 more than the 5th term. The sum of these terms is 36. Find the A.P.

 [Watch Video Solution](#)

10. (a) Is 303, a term of the progression 5, 10, 15, ... ?

(b) Is 38, a term of the progression -18, -14, -10, ... ?

 [Watch Video Solution](#)

11. In an A.P., prove that : $T_{m+n} + T_{m-n} = 2 \cdot T_m$

 [Watch Video Solution](#)

12. (i) 10 times the 10th term and 15 times the 15th term of an A.P. are equal. Find the 25th term of this A.P .

(ii) 17 times the 17th term of an A.P. is equal to 18 times the 18th term. Find the 35th term of this progression.

 [Watch Video Solution](#)

13. Which term of the A.P. $(16-6i), (15-4i), (14-2i), \dots$ is a :

(a) pure real number ?

(b) pure imaginary number ?

 [Watch Video Solution](#)

14. (a) Which term of the progression $10, 9\frac{1}{3}, 8\frac{2}{3}, \dots$ is the first negative term ?

(b) Which term of the progression $4, 3\frac{5}{7}, 3\frac{3}{7}, \dots$ is the first negative term ?

 [Watch Video Solution](#)

15. Each of two arithmetic progressions $2, 4, 6, \dots$ and $3, 6, 9, \dots$ are taken upto 200 terms. How many terms are common in these two progressions ?

 [Watch Video Solution](#)

16. If $a_1, a_2, a_3, \dots, a_n$ are in A.P., where $a_i > 0$ for all i , show that

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

 [Watch Video Solution](#)

17. If the numbers a, b, c, d, e are in arithmetic progression then find the value of $a - 4b + 6c - 4d + e$.



[Watch Video Solution](#)

Exercise 9 C

1. Find the sum of 50 terms of the A.P. $1 + 4 + 7 + \dots$



[Watch Video Solution](#)

2. (i) Find the sum of first 200 even natural numbers.

(ii) Find the sum of all numbers lying between 201 and 424 which are divisible by 5.

(iii) Find the sum of all numbers from 1 to 200 which are divisible by either 2 or 3.



[Watch Video Solution](#)

3. (a) Find the value of x if $1 + 6 + 11 + \dots + x = 189$.

(b) Find the value of x if $3 + 6 + 9 + \dots + 96 = x$.



[Watch Video Solution](#)

4. (a) How many terms of the A.P. $6 + 10 + 14 + \dots$ has the sum 880 ? (b)

How many terms of the A.P. $3 + 9 + 15 + \dots$ has the sum 7500 ?



[Watch Video Solution](#)

5. (a) The sum of ' n ' terms of a progression is $n(n + 1)$. Prove that it is an

A.P. Also find its 10th term. (b) The sum of ' n ' terms of a progression is

$(3n^2 - 5n)$. Prove that it is an A.P. (c) If the sum of n terms of a series is

$(5n^2 + 3n)$ then find its first five terms.



[Watch Video Solution](#)

6. The sum of 5 and 15 terms of an A.P. are equal. Find the sum of 20 terms of this A.P.

 [Watch Video Solution](#)

7. The sum of 20 and 28 terms of an A.P. are equal. Find the sum of 48 terms of this A.P.

 [Watch Video Solution](#)

8. The p th and q th terms of an A.P. are $\frac{1}{4}$ and $\frac{1}{p}$ respectively. Prove that the sum of (pq) terms will be $\frac{1}{2}(pq + 1)$ where $p \neq q$.

 [Watch Video Solution](#)

9. The sum of 15 terms of A.P. is zero. Its 4th term is 12. Find its 14th term.

 [View Text Solution](#)

10. The common difference, last term and sum of terms of an A.P. are 4, 31, and 136 respectively. Find the number of terms.



[View Text Solution](#)

11. The sum of m and n terms of an A.P. are n and m respectively. Prove that the sum of $(m + n)$ terms will be $-(m+n)$.



[Watch Video Solution](#)

12. In an A.P., if $T_1 + T_5 + T_{10} + T_{15} + T_{20} + T_{24} = 225$, find the sum of its 24 terms.



[Watch Video Solution](#)

13. The n th term of an A.P. is $(5n-1)$. Find the sum of its ' n ' terms.



[View Text Solution](#)



[Watch Video Solution](#)

14. The sum of 8 terms of an A.P. is -64 and sum of 17 terms is 289. Find the sum of its 'n' terms.



[Watch Video Solution](#)

15. The ratio of sums of n terms of two A.P.'s is $(2n + 1) : (2n - 1)$. Prove that the ratio of their 12th terms will be 47 : 45.



[Watch Video Solution](#)

16. The ratio of sums of n terms of two A.P.'s is $(7n + 1) : (4n + 27)$. Find the ratio of their 11th terms.



[Watch Video Solution](#)

17. The ratio of the sums of m terms and n terms of an A.P. is $m^2 : n^2$.

Prove that the ratio of their m th and n th term will be $(2m - 1) : (2n - 1)$.

 [Watch Video Solution](#)

18. How many terms of the progression $54 + 51 + 48 + \dots$ has the sum 513 ?

Explain the double answer.

 [Watch Video Solution](#)

19. The p th and q th terms of an A.P. are x and y respectively. Prove that the sum of $(p + q)$ terms is.

$$\frac{p + q}{2} \left[x + y + \frac{x - y}{p - q} \right].$$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

21. If the first term of an A.P. is 100 and sum of its first 6 terms is 5 times the sum of next 6 terms, then find the common difference of the A.P.

 [Watch Video Solution](#)

22. The first term, last term and common difference of an A.P are respectively a , l and 1 . Prove that the sum of this A.P. is $\frac{1}{2}(a + b)(1 - a + b)$.

 [Watch Video Solution](#)

23. Write the sum of first n even natural numbers.



[Watch Video Solution](#)

24. If S_n denotes the sum of n terms of an A.P. whose common difference is d and first term is a , find $S_n - 2S_{n-1} + S_{n-2}$



[Watch Video Solution](#)

25. The sums of n terms of three arithmetical progressions are S_1, S_2 and S_3 . The first term of each is unity and the common differences are $1, 2$ and 3 respectively. Prove that $S_1 + S_3 = 2S_2$.



[Watch Video Solution](#)

Exercise 9 D

1. Find the arithmetic mean of the following numbers : (a) 6 and 26 (b) -2 and 18

(c) $(x-y)$ and $(x+y)$

(d) $(x + y)^3$ and $(x - y)^3$

 [Watch Video Solution](#)

2. Find 4 arithmetic means between -5 and 15.

 [Watch Video Solution](#)

3. Find 6 arithmetic means between 8 and 29.

 [Watch Video Solution](#)

4. Find 4 arithmetic means between 3 and 18.

 [Watch Video Solution](#)

5. There are 'n' A.M.'s between 2 and 41. The ratio of 4th and (n - 1)th mean is 2 : 5, find the value of n.

 [Watch Video Solution](#)

6. Between 1 and 31 are inserted m arithmetic mean so that the ratio of the 7th and $(m - 1)th$ means is 5:9. Find the value of m .

 [Watch Video Solution](#)

7. Insert AMs between 7 and 71 such that 5^{th} AM is 27. Also find the number of AMs

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

9. If the A.M. between p th and q th terms of an A.P. be equal to the A.M. between r th and s th terms of the A.P., then show that $p + q = r + s$

 [Watch Video Solution](#)

10. If eleven A.M. s are inserted between 28 and 10, then find the number of integral A.M. s.

 [Watch Video Solution](#)

11. n arithmetic means are inserted between x and $2y$ and then between $2x$ and y . If the r th means in each case be equal, then find the ratio x/y .

 [Watch Video Solution](#)

1. The sum of the first three terms of an $A.P.$ is 9 and the sum of their squares is 35. The sum to first n terms of the series can be

 [Watch Video Solution](#)

2. Find three numbers in A.P. whose sum is 21 and the product of last two numbers is 63.

 [Watch Video Solution](#)

3. Find three numbers in A.P. whose sum is 12 and product is 60.

 [Watch Video Solution](#)

4. Find three numbers in A.P. whose sum is 9 and sum of whose cubes is 99.

 [Watch Video Solution](#)

5. The internal angles of a triangle are in A.P. . If the smallest angle is 45° , find the remaining angles.

 [Watch Video Solution](#)

6. Find 4 numbers in A.P. whose sum is 4 and sum of whose squares is 84.

 [Watch Video Solution](#)

7. Find 4 numbers in A.P. such that the sum of first and fourth number is 14 and the product of second and third number is 45.

 [Watch Video Solution](#)

8. Divide 32 into four parts which are in A.P. such that the ratio of the product of extremes to the product of means is 7:15.

 [Watch Video Solution](#)

9. Find 4 numbers in A.P. whose sum is 50 and greatest number is 4 times the smallest number.



[Watch Video Solution](#)

10. If a, b, c are in A.P., then prove that :

$$(i) ab + bc = 2b^2$$

$$(ii) (a - c)^2 = 4(b^2 - ac)$$

$$(iii) a^2 + c^2 + 4ca = 2(ab + bc + ca).$$



[Watch Video Solution](#)

11. If $a^2(b + c), b^2(c + a), c^2(a + b)$ are in in A.P. then prove that $a, b, c,$ are also in A.P. or $ab + bc + ca = 0$.



[Watch Video Solution](#)

12. If a, b and c are in A.P then $\frac{1}{\sqrt{b} + \sqrt{c}}$, $\frac{1}{\sqrt{c} + \sqrt{a}}$, $\frac{1}{\sqrt{a} + \sqrt{b}}$ are in

 [Watch Video Solution](#)

Exercise 9 F

1. The nth term of a progression is 3^{n+1} . Show that it is a G.P. Also find its 5th term.

 [Watch Video Solution](#)

2. Find the 7th term of the G.P. 4, 12, 36, ...

 [Watch Video Solution](#)

3. Find the 9th term of the G. P. 2, 1, $\frac{1}{2}$, ...

 [Watch Video Solution](#)

4. Find the 8th term of the G.P. $\sqrt{3}, \frac{1}{\sqrt{3}}, \frac{1}{3\sqrt{3}}, \dots$

 [Watch Video Solution](#)

5. Find the number of terms in the G.P. 1, 2, 4, 8, ... 4096.

 [Watch Video Solution](#)

6. Find the number of terms in the G.P. 1, - 3, 9, ... - 2187.

 [Watch Video Solution](#)

7. Find the 5th term from the end of the G.P. $\frac{1}{512}, \frac{1}{256}, \frac{1}{128}, \dots, 256$.

 [Watch Video Solution](#)

8. Find the 4th term from the end of the G.P. $\frac{5}{2}, \frac{15}{8}, \frac{45}{32}, \dots, \frac{10935}{32768}$.



[Watch Video Solution](#)

9. Which term of the progression $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729 ?



[Watch Video Solution](#)

10. Which term of the progression 2, 8, 32, ... is 131072 ?



[Watch Video Solution](#)

11. If the n th terms of the progression 5, 10, 20, ... and progression 1280, 640, 320, ... are equal, then find the value of n .



[Watch Video Solution](#)

12. The 3rd, 7th and 11th terms of a G.P. are x, y and z respectively, then prove that $y^2 = xz$.



Watch Video Solution

13. The 3rd and 6th terms of a G.P. are 40 and 320, then find the progression.

A. 10,20,40,80...

B. 5,10,20,40,...

C. 1,2,4,8...

D. 80,40,20,10...

Answer: A



Watch Video Solution

14. Find the G.P. whose 2nd and 5th terms are $-\frac{3}{2}$ and $\frac{81}{16}$ respectively.



Watch Video Solution

15. if a G.P $(p+q)$ th term = m and $(p-q)$ th term = n , then find its p th term



Watch Video Solution

16. Find the G.P. whose 2nd term is 12 and 6th term is 27 times the 3rd term.



Watch Video Solution

17. The first term of a G.P. is -3 . If the 4th term of this G.P. is the square of the 2nd term, then find its 7th term.



Watch Video Solution

18. The 4th, 7th and last terms of a G.P. are 10,80 and 2560 respectively. Find the number of terms of the G.P.



Watch Video Solution

19. Find the 4 terms in G.P. in which 3rd term is 9 more than the first term and 2nd term is 18 more than the 4th term.



[Watch Video Solution](#)

20. 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](#)

21. In a G.P. it is given that $T_{p-1} + T_{p+1} = 3T_p$. Prove that its common ratio is an irrational number.



[Watch Video Solution](#)

22. If k , $k + 1$ and $k + 3$ are in G.P. then find the value of k .

 [Watch Video Solution](#)

23. The product of 3rd and 8th terms of a G.P. is 243 and its 4th term is 3.
Find its 7th term.

 [Watch Video Solution](#)

Exercise 9 G

1. Find the sum of 6 terms of the series $2+6+18+\dots$

 [Watch Video Solution](#)

2. Find the sum of 7 terms of the series $\frac{16}{27} - \frac{8}{9} + \frac{4}{3} - \dots$

 [Watch Video Solution](#)

3. Find the sum of 10 terms of the series $1 + \sqrt{3} + 3 + \dots$

 [Watch Video Solution](#)

4. Find the sum of 7 terms of the series $2+0.2+0.02+\dots$

 [Watch Video Solution](#)

5. How many terms of the series $1+2+4+\dots$ Has the sum 511 ?

A. 7

B. 8

C. 9

D. 10

Answer: C

 [Watch Video Solution](#)

 Watch Video Solution

6. How many terms of the series $\frac{2}{3} - 1 + \frac{3}{2} \dots$ has the sum $\frac{463}{96}$?

 Watch Video Solution

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

 Watch Video Solution

8. The n th term of a G.P. is $3 \cdot (-2)^n$. Find the sum of its 7 terms.

 Watch Video Solution

9. The common ratio, last term and sum of n terms of a G.P. are 2, 128 and 255 respectively. Find the value of n .

 Watch Video Solution

10. Find the sum of n terms of the series

$$(x + y) + (x^2 + 2y) + (x^3 + 3y) + \dots$$

 [Watch Video Solution](#)

11. Find the sum of 20 terms of the series

$$\left(x + \frac{1}{2}\right) + \left(3x - \frac{1}{6}\right) + \left(5x + \frac{1}{18}\right) + \dots$$

 [Watch Video Solution](#)

12. The ratio of the sum of first three terms to the sum of first six terms is 125 : 152. Find the common ratio of G.P.

 [Watch Video Solution](#)

13. Find the sum of n terms of the following series :

(i) $5+55+555+\dots$

(ii) $4+44+444+\dots$

(iii) $0.3+0.33+0.333+\dots$

(iv) $0.7+0.77+0.777+\dots$



[View Text Solution](#)

14. The sum of first three terms of a G.P. is $\frac{1}{8}$ of the sum of the next three terms. Find the common ratio of G.P.



[Watch Video Solution](#)

15. Prove that the sum of n terms of the reciprocals of the terms of the series a, ar, ar^2, \dots is $\frac{1 - r^n}{a(1 - r)r^{n-1}}$



[Watch Video Solution](#)

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



[Watch Video Solution](#)

17. The number of terms of a G.P. are even. If the sum of all terms of the series is 5 times the sum of all terms at odd positions, then find the common ratio.



[View Text Solution](#)

Exercise 9 H

1. Find the sum of infinite term of the following series : $16 + 8 + 4 \dots \infty$



[Watch Video Solution](#)

2. If $|a| < 1$, $|b| < 1$, then find the sum to infinity of the following series :

$$(i) (a + b) + (a^2 + ab + b^2) + (a^3 + a^2b + ab^2 + b^3) + \dots \infty$$

$$(ii) 1 + (1 + a)b + (1 + a + a^2) \cdot b^2 + \dots \infty$$

 [View Text Solution](#)

3. The sum to infinity of a G.P. is 15 and the sum of squares of its terms is 45. Find the G.P.

 [Watch Video Solution](#)

4. The sum to infinity of a G.P. is 3 and the sum of squares of its terms is also 3. Find the G.P.

 [Watch Video Solution](#)

5. Find the G.P. if the sum of its first two terms is 5 and each term is equal to 3 times the sum of its succeeding terms.

 [Watch Video Solution](#)

6.

If $x = 1 + a + a^2 + \dots\infty$, $|a| < 1$, $y = 1 + b + b^2 + \dots\infty$, $|b| < 1$, then pr



Watch Video Solution

7. Convert the following recurring decimals into rational numbers :

(i) $0.\dot{4}3\dot{7}$ (ii) $1.\dot{7}2\dot{3}$

(iii) $0.\dot{2}3\dot{1}$ (iv) $0.\dot{4}5\dot{6}$



Watch Video Solution

8.

If $x = a + \frac{a}{r} + \frac{a}{r^2} + \dots\infty$, $y = b - \frac{b}{r} + \frac{b}{r^2} - \dots\infty$, and $z = c + \frac{c}{r^2} +$



Watch Video Solution

1. Find the G.M. of the following numbers :

(i) $\frac{1}{3}$ and $\frac{1}{27}$ (ii) x^2 and y^2



[Watch Video Solution](#)

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



[Watch Video Solution](#)

3. Insert 6 geometric means between 27 and $\frac{1}{81}$.



[Watch Video Solution](#)

4. (i) Insert 4 geometric means between 256 and -8.

(ii) Insert 4 geometric means between 3 and 96.



[Watch Video Solution](#)

5. G is the geometric mean and p and q are two arithmetic means between two numbers a and b , prove that :

$$G^2 = (2p - q)(2q - p)$$



[Watch Video Solution](#)

6. The A.M of two numbers is 17 and their G.M. is 8. Find the numbers.

A. 2, 32

B. 4, 30

C. 10, 24

D. None of these

Answer: A



[Watch Video Solution](#)

7. If the ratio of A.M. and G.M. of two positive numbers a and b is $m : n$, then prove that :

$$a : b = \left(m + \sqrt{m^2 - n^2} \right) : \left(m - \sqrt{m^2 - n^2} \right)$$



[Watch Video Solution](#)

8. If the G.M. of a and b is $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ then find the value of n .



[Watch Video Solution](#)

Exercise 9 J

1. Find three numbers in G.P. whose sum is 19 and product is 216.



[Watch Video Solution](#)

2. Find three consecutive numbers in G.P. whose sum is 28 and product is 512.



[Watch Video Solution](#)

3. (i) The sum of three numbers in G.P. is 21 and sum of their squares is 189. Find the numbers.

(ii) The sum of 3 numbers in a G.P. is 19 and the sum of their squares is 133. Find the numbers.



[View Text Solution](#)

4. The product of three consecutive numbers in G.P. is 27 and the sum of the products of numbers taken in pair is 39. Find the numbers.



[Watch Video Solution](#)

5. The sum of three consecutive numbers in a G.P. is 56. If we subtract 1, 7, 21 respectively from these numbers, the new numbers form an A.P. Find the numbers.

 [Watch Video Solution](#)

6. The sum of three consecutive numbers of a G.P. is 14. If 1 is added in first and second term each and 1 subtracted from third, the new numbers form an A.P. Find the numbers.

 [Watch Video Solution](#)

7. Four numbers are in G.P. The sum of first two numbers is 4 and the sum of last two numbers is 36. Find the numbers.

 [Watch Video Solution](#)

8. Three numbers are in G.P. Their sum is 14. If we multiply the first and third numbers by 4 and 2nd number by 5, the new numbers form an A.P. Find the numbers.



[Watch Video Solution](#)

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

$$A^2 b^2 c^2 \left(\frac{1}{a^3} + \frac{1}{b^3} + \frac{1}{c^3} \right) = a^3 + b^3 + c^3 \quad \frac{(a + b + c)^2}{a^2 + b^2 + c^2} = \frac{a + b + c}{a - b + c}$$
$$\frac{1}{a^2 - b^2} + \frac{1}{b^2} = \frac{1}{b^2 - c^2} \quad (a+2b=2c)(a-2b+2c) = a^2 + 4c^2.$$



[Watch Video Solution](#)

10. If $\frac{1}{a+b}, \frac{1}{2b}, \frac{1}{b+c}$ are in A.P., then prove that a, b, c are in G.P.



[Watch Video Solution](#)

11. If a, b, c are in A.P. and a, x, b, y, c are in G.P., then prove that b^2 is the arithmetic mean of x^2 and y^2 .

 [Watch Video Solution](#)

12. a, b, c are positive real numbers forming a G.P. If $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then prove that $d/a, e/b, f/c$ are in A.P.

 [Watch Video Solution](#)

13. If $-\frac{2}{7}, x, -\frac{7}{2}$ are in G.P. Find the value of x .

 [Watch Video Solution](#)

1. Find the sum of the n terms of the series whose n th term are given

below : (i) $3n^2 + 2n$ (ii) $2n^3 + 4n + 1$

(iii) $2^n + 3^n$ (iv) $3^n + n^3$



[Watch Video Solution](#)

2. Find the sum of the series:

$(2^2 + 4^2 + 6^2 + 8^2 + \dots \text{to } n \text{ terms})$



[Watch Video Solution](#)

3. Find the sum of the series : $5^2 + 6^2 + 7^2 + \dots + 20^2$.



[View Text Solution](#)

4. Find the sum of the series $\frac{1^3}{1} + \frac{1^3 + 2^3}{1 + 3} + \frac{1^3 + 2^3 + 3^3}{1 + 3 + 5} + \dots$ up to n terms.

 [Watch Video Solution](#)

5. Find the sum of n terms of the following series :

(i) $3 + 7 + 13 + 21 + 31 + \dots$

(ii) $1 + 5 + 12 + 22 + 35 + \dots$

(iii) $5 + 7 + 13 + 31 + 85 + \dots$

(iv) $2 + 4 + 7 + 11 + 16 + \dots$

 [View Text Solution](#)

6. Find the sum of n terms and sum to infinity of the following series :

$$\frac{1}{2 \cdot 4} + \frac{1}{4 \cdot 6} + \frac{1}{6 \cdot 8} + \dots$$

 [Watch Video Solution](#)

Exercise 9 L

1. In the arithmetic mean of a and b is $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ then $n = ?$

A. 0

B. 1

C. -1

D. None of these

Answer: B



[Watch Video Solution](#)

2. If the geometric mean of a and b is $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ then n = ?

A. $-\frac{1}{2}$

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

C. 1

D. None of these

Answer: A



[Watch Video Solution](#)

3. The sum of the squares of first n natural numbers is :

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

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

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

D. None of these

Answer: A



[View Text Solution](#)

4. The n th term of an A.P. is $\frac{1}{n}$ and m th term is $\frac{1}{m}$. Its (mn) th term is :

A. mn

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

C. 1

D. None of these

Answer: C



[Watch Video Solution](#)

5. First negative term of the series $4, 3\frac{5}{7}, 3\frac{3}{7}, \dots$ is :

A. 15

B. 16

C. 17

D. None of these

Answer: B



[Watch Video Solution](#)

6. The sum of n terms of an A.P. is $(n^2 + 5n)$. Its common difference is :

A. 1

B. 4

C. 2

D. None of these

Answer: C



Watch Video Solution

7. If n arithmetic means are inserted between 7 and 71 such that 5^{th} A.M. is 27 then $n = ?$

A. 10

B. 11

C. 12

D. None of these

Answer: D

 [Watch Video Solution](#)

8. No. of terms in the series $4, 2, 1, \dots, \frac{1}{128}$ is :

A. 10

B. 12

C. 14

D. None of these

Answer: A

 [Watch Video Solution](#)

9. How many terms are needed of the series $\frac{2}{9} - \frac{1}{3} + \frac{1}{2} - \dots$ to give the sum $\frac{55}{72}$?

A. 8

B. 7

C. 5

D. 4

Answer: C



[Watch Video Solution](#)

10. The ratio of the sum of 3 terms to the sum of 6 terms of a G.P. is

125:152. Its common ratio is :

A. $\frac{3}{5}$

B. $\frac{2}{5}$

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

D. 2

Answer: A



[Watch Video Solution](#)

Exercise 9 M

1. If $1, \log_y x, \log_z y, -15 \log_x z$ are in A.P. then the correct statement is :

A. $z^3 = x$

B. $x^3 = z$

C. $z^3 = y$

D. None of these

Answer: A



[View Text Solution](#)

2. The first term, second term and middle term of an A.P. are a, b and c respectively. The sum of this A.P. is :

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

B. $\frac{2a(a - b)}{b - c}$

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

D. None of these

Answer: C



[View Text Solution](#)

3. The number of common terms in the series $17+21+25+\dots+417$ and the series $16+21+26+\dots+466$ are :

A. 19

B. 20

C. 21

D. None of these

Answer: B



[View Text Solution](#)

4. The sum of $(2n+1)$ terms of the series

$a - (a + d) + a(a + ad) - (a + 3d) + \dots$ is :

- A. $a+3nd$
- B. $3a+nd$
- C. $2a+3nd$
- D. $a+nd$

Answer: D



[View Text Solution](#)

5. If a, b, c are in A.P. as well as in G.P. then correct statement is :

- A. $a = b = c$
- B. $a \neq b \neq c$
- C. $a = b \neq c$
- D. None of these

Answer: A



Watch Video Solution

6. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P. then $\frac{b+c}{a}, \frac{c+a}{b}, \frac{a+b}{c}$ are in :

A. A.P.

B. G.P.

C. miscellaneous

D. None of these

Answer: A



Watch Video Solution

7. If $x = 1 + a + a^2 + \dots\infty, a < 1$ and $y = 1 + b + b^2 + \dots\infty, b < 1$,
then $1 + ab + a^2b^2 + \dots\infty$:

A. $\frac{x + y + xy}{x + y - 1}$

B. $\frac{x + y}{x + y - 1}$

C. $\frac{xy}{x + y - 1}$

D. None of these

Answer: C

 [View Text Solution](#)

8. If a, b, c are in A.P. and $b-a, c-b, a$ are in G.P. then $a:b:c=?$

A. 1 : 3 : 5

B. 1 : 2 : 3

C. 1 : 4 : 7

D. None of these

Answer: B

 [Watch Video Solution](#)

9. If $5^{1+x} + 5^{1-x}, \frac{a}{2}, 25^x + 25^{-x}$ are three consecutive terms of an A.P.

then the minimum value of 'a' is :

A. 15

B. 12

C. 10

D. 8

Answer: C



[View Text Solution](#)

10. If the ratio of the sum of n terms of two arithmetic progressions is

$(3n + 8) : (7n + 15)$ then the ratio of their 12th terms is :

A. 7: 16

B. 16: 7

C. 7:9

D. None of these

Answer: A



[Watch Video Solution](#)

Exercise 9 1

1. Write the first five terms of each of the sequences in Questions 1 to 6

whose n th terms are :

$$a_n = n(n + 2)$$



[Watch Video Solution](#)

2. Write the first five terms of each of the sequences in Questions 1 to 6

whose n th terms are :

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



[Watch Video Solution](#)

3. Write the first five terms of each of the sequences in Questions 1 to 6 whose n th terms are :

$$a_n = 2^n$$



[Watch Video Solution](#)

4. Write the first five terms of each of the sequences in Questions 1 to 6 whose n th terms are :

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



[Watch Video Solution](#)

5. Write the first five terms of the sequences in whose n th terms is :

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

A. 5 terms of given sequence are

$$a_1 = 25, a_2 = -125, a_3 = 625, a_4 = -3125, a_5 = 15625.$$

B. 5 terms of given sequence are

$$a_1 = 25, a_2 = 125, a_3 = 625, a_4 = 3125, a_5 = 15625.$$

C. 5 terms of given sequence are

$$a_1 = -25, a_2 = 125, a_3 = -625, a_4 = 3125, a_5 = -15625.$$

D. None of these

Answer: A



[Watch Video Solution](#)

6. Write the first five terms of each of the sequences in Questions 1 to 6

whose n th terms are :

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



[Watch Video Solution](#)

7. Find the indicated terms in each of the sequences in Questions 7 to 10

whose n th term are :

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



[Watch Video Solution](#)

8. Find the indicated terms in each of the sequences in Questions 7 to 10

whose n th term are :

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



[Watch Video Solution](#)

9. Find the indicated terms in each of the sequences in Questions 7 to 10

whose n th term are :

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



[Watch Video Solution](#)

10. Find the indicated terms in each of the sequences in Questions 7 to 10

whose n th term are :

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



[Watch Video Solution](#)

11. Write the first five terms of each of the sequences in Questions 11 to 13

and obtain the corresponding series :

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



[Watch Video Solution](#)

12. Write the first five terms of each of the sequences in Questions 11 to 13

and obtain the corresponding series :

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



[Watch Video Solution](#)

13. Write the first five terms of each of the sequences in Questions 11 to 13 and obtain the corresponding series :

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

 [Watch Video Solution](#)

14. The Fibonacci sequence is defined by

$$1 = a_1 = a_2 \text{ and } a_n = a_{n-1} + a_{n-2}, n > 2.$$

Find $\frac{a_{n+1}}{a_n}$, for $n = 1, 2, 3, 4, 5$.

 [Watch Video Solution](#)

Exercise 9 2

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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 20th term is -112.

 [Watch Video Solution](#)

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

A. 5, 20

B. 5, 10

C. 6, 12

D. 6, 10

Answer: A



Watch Video Solution

5. In an A.P., if p th term is $\frac{1}{q}$ and q th term is $\frac{1}{p}$ prove that the sum of first pq terms is

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

B. $\frac{1}{3}(pq + 1)$

C. $(pq + 1)$

D. None

Answer: A



Watch Video Solution

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

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.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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 .

[Watch Video Solution](#)

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

[Watch Video Solution](#)

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.

[Watch Video Solution](#)

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 7th and (m-1)th numbers is 5 : 9. Find the value of m.

[Watch Video Solution](#)

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



[Watch Video Solution](#)

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



[View Text Solution](#)

Exercise 9 3

1. Find the 20th and nth term of the G.P. $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \dots$



[Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

5. Which term of the following sequences :

(a) $2, 2\sqrt{2}, 4, \dots$ is 128?

(b) $\sqrt{3}, 3, 3\sqrt{3}, \dots$ is 729?

(c) $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$ is $\frac{1}{19683}$



[Watch Video Solution](#)

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



[Watch Video Solution](#)

7. Find the sum to indicated number of terms in each of the geometric progressions in Questions 7 to 10 :

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



[Watch Video Solution](#)

8. Find the sum to indicated number of terms in each of the geometric progressions in Questions 7 to 10 :

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



Watch Video Solution

9. Find the sum to indicated number of terms in each of the geometric progressions in Questions 7 to 10 :

$$1, -a, a^2, -a^3, \dots n \text{ terms (if } a \neq -1)$$



Watch Video Solution

10. Find the sum to indicated number of terms in each of the geometric progressions in Questions 7 to 10 :

$$x^3, x^5, x^7, \dots n \text{ terms (if } x \neq \pm 1)$$



Watch Video Solution

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



Watch Video Solution

12. 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](#)

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

 [Watch Video Solution](#)

14. 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](#)

15. Given a G.P with $a=729$ and 7th term 64,determine S_7 .

 [Watch Video Solution](#)

16. 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](#)

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

 [Watch Video Solution](#)

18. Find the sum to n terms of the sequence $8, 88, 888, 8888, \dots$

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

20. Show that the products of the corresponding terms of the sequence $a, ar, ar^2, \dots, ar^{n-1}$ and $A, AR, AR^2, \dots, AR^{n-1}$ from a G.P. and find the common ratio.

 [Watch Video Solution](#)

21. 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 4th by 18.

 [Watch Video Solution](#)

22. 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](#)

Watch Video Solution

23. 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](#)

24. 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 $\frac{1}{r^n}$.

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

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

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

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

Answer: C

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

30. 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](#)

31. 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](#)

32. 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 the series
 $1 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + \dots$

 [Watch Video Solution](#)

2. Find the sum to n terms of the series

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

 [Watch Video Solution](#)

3. Find the sum of the following series to n term:

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

 [Watch Video Solution](#)

4. Find the sum of n terms of the series:

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{nn+1}$$

 [Watch Video Solution](#)

5. Find the sum to n terms of the series : $5^2 + 6^2 + 7^2 + \dots + 20^2$

 [Watch Video Solution](#)

6. Sum the series $3. 8 + 6. 11 + 9. 14 + \dots$ to n terms.

 [Watch Video Solution](#)

7. Find the sum to n terms of the series :

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

 [Watch Video Solution](#)

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

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

 [Watch Video Solution](#)

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

$$n^2 + 2^n$$



[Watch Video Solution](#)

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

$$(2n - 1)^2$$



[Watch Video Solution](#)

Miscellaneous Exercise

1. 32. Show that the sum of $(m + n)^{\text{th}}$ and $(m - n)^{\text{th}}$ 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 \mathbb{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.

- A. last term = 150 and number of terms = 5
- B. last term = 159 and number of terms = 7
- C. last term = 161 and number of terms = 7
- D. last term = 160 and number of terms = 6

Answer: D

[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 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](#)

11. 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 the odd places. Find the common ratio of the G.P.

A. $r = 4$

B. $r = 5$

C. $r = 6$

D. $r = 7$

Answer: A



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. if S is the sum , P the product and R the sum of reciprocals of n terms in G . P . prove that $P^2 R^n = S^n$



[Watch Video Solution](#)

15. If p th, q th and r th terms of an A.P. are a , b , c respectively, then show that (i) $a(q-r)+b(r-p)+c(p-q)=0$



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

 [Watch Video Solution](#)

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

 [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 G.P.

 [Watch Video Solution](#)

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

$$5 + 55 + 555 + \dots \quad \text{(ii)}$$

$$.6 + .66 + .666 + \dots$$

 [Watch Video Solution](#)

22. Find the 20th term and the sum of 20 terms of the series:

$$2 \times 4 + 4 \times 6 + 6 \times 8 + \dots$$

 [Watch Video Solution](#)

23. Find the sum of the first n terms of the series :

$$3 + 7 + 13 + 21 + 31 + \dots$$

 [Watch Video Solution](#)

24. If S_1, S_2, S_3 are the sums of first n natural numbers, their squares and their cubes respectively then $S_3(1 + 8S_1) =$



Watch Video Solution

25. Find the sum of the series $\frac{1^3}{1} + \frac{1^3 + 2^3}{1 + 3} + \frac{1^3 + 2^3 + 3^3}{1 + 3 + 5} + \dots$ up to n terms.

A. $\frac{1}{8}n(2n^2 + 9n + 13)$

B. $\frac{1}{24}n(2n^2 + 9n + 13)$

C. $\frac{1}{4}(2n^2 + 9n + 13)$

D. $\frac{1}{2}n(2n^2 + 9n + 13)$

Answer: B



Watch Video Solution

26. Show that
$$\frac{1 \times 2^2 + 2 \times 3^2 + \dots + n \times (n+1)^2}{1^2 \times 2 + 2^2 \times 3 + \dots + n^2 \times (n+1)} = \frac{3n+5}{3n+1}$$



Watch Video Solution

27. 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?



[Watch Video Solution](#)

28. 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?



[Watch Video Solution](#)

29. 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



[Watch Video Solution](#)

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



[Watch Video Solution](#)

31. 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](#)

32. 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 the third day and so on. It took 8 more days to finish the work. Find the number of days in which the work was complete.



[Watch Video Solution](#)

