



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SEQUENCE AND SERIES



1. Find the rule that determines the sequence -2, -1, 0,1, Use this rule to

find the fifth, sixth, seventh and eighth terms of the sequence .



2. Find the general term of the sequence 4,10 ,28 ,82 ,....

3. If for a sequence $(T_n), (i)S_n = 2n^2 + 3n + 1(ii)S_n = 2(3^n-1)$ find

 T_n and hence T_1 and T_2



4. The nth term of an A.P. is 4n -1. Write down the first 4 terms and the 18

th term of the A.P..

Watch Video Solution

5. Find the 9th and pth terms of the A.P. 2,5,8.

Watch Video Solution

6. Which term of the series 31 + 29 + 27 + Is 3?

7. The 8th term of a series in an A.P. is 23 and the 102nd term is 305. Find

the series .

Watch Video Solution

8. In a certain A.P., the 24th term is twice the 10th term . Prove that the 72nd term is twice the 34th term .

Watch Video Solution

9. If p times the pth terms of an A.P. is equal to q times the qth term prove that (p+q) th terms is zero .

(a) p + q

(b) pq

- (c) 1
- (d) 0

10. If a , b and c b respectively the pth , qth and rth terms of an A.P. prove

that

a(q-r) +b(r-p) +c (p-q) =0



14. How many terms of the A.P. 24,20, 16, ... must be taken so that the sum

may be 72? Explain the double answer.



16. The sums of n terms of two arithmetic series are in the ratio of 2n +1 :

2n-1. Find the ratio of their 10 th terms .



17. The sums of first p, q, r terms of an A.P. are a, b, c respectively. Prove

that

$$rac{a}{p}(q-r)+rac{b}{q}(r-p)+rac{c}{r}(p-q)=0$$

Watch Video Solution

18. A man saved 자 16,500 in 10 years. In each year after the first he saved 100 more than he did in the preceding year. How much did he save in the first year?

```
Watch Video Solution
```

19. 80 coins are placed in a st. line on the ground. The distance between any two consecutive coins is 10 metres. How far must a person travel to bring them one by one to a basket placed 10 metres behind the first coin?



216. Find the number's.



24. If a,b,c are in A.P. prove that the following are also in A.P.

 $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ Solution
25. If a,b,c are in A.P. prove that the following are also in A.P. b + c, c + a, a + bSolution
Watch Video Solution

26. If a,b,c are in A.P. prove that the following are also in A.P.

$$a^2(b+c), b^2(c+a), c^2(a+b)$$

Watch Video Solution

27. If a,b,c are in A.P. prove that the following are also in A.P.

$$rac{a(b+c)}{bc}, rac{b(c+a)}{ca}, rac{c(a+b)}{ab}$$

28. The first three terms of a geometric progression are 48,24,12 . What

are the common ratio and fourth term of this sequence ?



31. Write the G.P. whose 4th term is 54 and the 7th term is 1458.



36. Find two number whose arithmetic mean is 34 and the geometric

mean is 16.

Watch Video Solution

37. Find the sum of each of the series :

5-10 +20 - .. "to" 6 terms.

Watch Video Solution

38. Find the sum of each of the series :

4+2 +1 + $\frac{1}{2}$ + $\frac{1}{4}$ + ... to 10 terms

Watch Video Solution

39. Find the sum of each of the series :

243 + 324 + 432 + to n terms



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



41. How many terms of the series 2 +6+ 18+ ... must be taken to make the

sum equal to 728?

Watch Video Solution

42. An insect starts from a point and travels in a straight path one mm in the first second and half of the distance covered in the previous second

in the succeeding second. In how much time would it reach a point 3 mm
away from its starting point?
Watch Video Solution
43. Sum to n terms the series :
7+77+777+
Vatch Video Solution
44. Sum to n terms the series :
0.7+0.77 + 0.777+

Watch Video Solution

45. Sum the following series to n terms and to infinity

$$1 - rac{1}{2} + rac{1}{4} - rac{1}{8} +$$

46. The first term of a G.P. is 2 more than the second term and the sum to

infinity is 50. Find the G.P.

Watch Video Solution	
47. Find the value of $0.4\overline{23}$	

48. The side of a given square is equal to a. The mid-points of its sides are joined to form a new square. Again, the mid-points of the sides of this new square are joined to form another square. This process is continued indefinitely. Find the sum of the areas of the squares and the sum of the perimeters of the squares.

Watch Video Solution



52. Find the nth term of the series

$$\frac{1}{3} + \frac{3}{9} + \frac{5}{27} + \frac{7}{81} + \dots$$

53. Find the nth term of the series

 $1 + 2^2 x + 3^2 x^2 + 4^2 x^3 + \dots$

Watch Video Solution

54. Find the sum of the series

1+4x+7 x^2 + ... to n terms . Hence write down the sum to infinity when

x < 1 numerically .

Watch Video Solution

55. Sum to infinity

 $1^2 + 2^2 x + 3^2 x^2 + 4^2 x^3 + X < 1$ numerically .

56. Sum to infinity

$$1+(1+b)r+ig(1+b+b^2ig)r^2+ig(1+b+b^2+b^3ig)r^3+...$$
 ,r and b

being proper fractions.

57. Show that
$$2^{\frac{1}{4}} \times 4^{\frac{1}{8}} \times 8^{\frac{1}{16}} \times 16^{\frac{1}{32}} \times \infty = 2$$
.

Watch Video Solution

58. Find the nth term and then the sum to n terms of the series 3.5 +4.7+

5.9 +....



59. Find the nth terms and the sum to n term of the series :

$$1^2 + \left(1^2 + 2^2
ight) + \left(1^2 + 2^2 + 3^2
ight) + ...$$



60. Find the nth terms and the sum to n term of the series :



63. The natural numbers are grouped as follows :

(1),(2,3) , (4,5,6), (7,8,9,10), ...

Find an expression for the first term of the nth group.

Watch Video Solution
64. Find the nth term and deduce the sum to n terms of the series
4+11+22+37+ 56 +
Watch Video Solution

65. Find the nth term and deduce the sum to n terms of the series

1+5+13+29+....



66. Sum up 5+55+555+.... to n terms .



67. Find the nth term sum of n terms and sum to infinity terms of the

series
$$\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \dots$$

Watch Video Solution







1. Write the first five terms of the sequence using the given rule. In each case, the initial value of the index is 1.

 $a_n = 2n$

2. Write the first five terms of the sequence using the given rule. In each case, the initial value of the index is 1.

$$a_n=3n-2$$

Watch Video Solution

3. Write the first five terms of the sequence using the given rule. In each case, the initial value of the index is 1.

$$a_n = n^2 + 5$$

Watch Video Solution

4. Write the first five terms of the sequence using the given rule. In each

case, the initial value of the index is 1.

$$a_n=rac{{ig(-1)}^{n-1}}{n^3}$$

5. Write the first five terms of the sequence using the given rule. In each

case, the initial value of the index is 1.

 a_n = nth prime number for all natural numbers n .



 $rac{n^2+1}{n}$

Watch Video Solution

8. Write the first four terms of the sequence whose nth term is given

 $\frac{2^n}{n^2}$



10. Write the first four terms of the sequence whose nth term is given

$$(\,-1)^n \sin rac{n\pi}{2}$$

Watch Video Solution

11. Write the first four terms of the sequence whose nth term is given

$${(-1)}^{n-1}\cosrac{n\pi}{4}$$

12. Find the first 4 terms and the 20th term of the sequence whose

13. Find the 10th term of the sequence whose sum to n terms is
$$6n^2 + 7$$

13. Find the 10th term of the sequence whose sum to n terms is $6n^2 + 7$
Watch Video Solution
Exercise 14 B
1. Write the first six terms of an A.P. in which
a=5 ,d =4

2. Write the first six terms of an A.P. in which

a=98, d=-3



3. Write the first six terms of an A.P. in which

$$a=7\frac{1}{2}, d=1\frac{1}{2}$$

Watch Video Solution

4. Write the first six terms of an A.P. in which

a=x ,d = 3x +2



5. Write the 5th and 8th terms of an AP whose 10th term is 43 and the

common difference is 4.



6. In each of the following find the terms required. (a) The seventh term of

2, 7, 12.... (b) The fifth term of 21, 28, 35, ... (c) The eighteenth term of 9, 5,

1,....

Watch Video Solution

7. Find the first four terms and the eleventh term of the series whose nth

term is 4n-2

Watch Video Solution

8. The 5th term of an A.P. is 11 and the 9th term is 7. Find the 16th term.

Watch Video Solution

10. The fourth term of an A.P. is ten times the first. Prove that the sixth

term is four times as greater as the second term.

Watch Video Solution

11. The fourth term of an A.P. is equal to 3 times the first term, and the seventh term exceeds twice the third term by 1. Find the first term and the common difference.

Watch Video Solution

12. Which term of the progression 19, $18\frac{1}{5}$, $17\frac{2}{5}$,.... is the first negative

term?









Find the first term and the number of terms.

Watch Video Solution

18. If 7 times the 7th term of an A.P. is equal to 11 times its 11th term, show

that the 18th term of the A.P. is zero.

Watch Video Solution

19. Determine k so that k + 2, 4k - 6 and 3k - 2 are three consecutive terms

of an A.P

20. The pth term of an A.P. is q and the qth term is p, show that the mth

term is p + q -m.



21. Let T be the rth term of an A.P. whose first term is a and common difference is d. If for some positive integers $m, n, T_n = \frac{1}{m}, T_m = \frac{1}{n}$ then (a-d) equals

Watch Video Solution

22. Given that the (p+1)th term of an A.P. is twice the (q+1)th term, prove

that the (3p+1)th term is twice the (p+q+1)th term.





1. Find the sum of:

10 terms of 5 +8 + 11+,

Watch Video Solution

2. Find the sum of:

18 terms of 57 + 49 + 41 +,

Watch Video Solution

3. Find the sum of:

n terms of 4, 7, 10,

Watch Video Solution

4. Find the sum of:

24 terms and n terms of
$$2\frac{1}{2}, 3\frac{1}{3}, 4\frac{1}{6}, 5, \dots,$$

5. Find the sum of:

 $101 + 99 + 97 + \dots 47.$

Watch Video Solution

6. Find the sum of all the numbers between 100 and 200 which are divisible by 7.

Watch Video Solution

7. The sum of a series of terms in A.P. is 128. If the first term is 2 and the

last term is 14, find the common difference.

8. The sum of 30 terms of a series in A.P., whose last term is 98, is 1635.

Find the first term and the common difference.

Watch Video Solution

9. If the sums of the first 8 and 19 terms of an A.P. are 64 and 361 respectively, find (i) the common difference and (ii) the sum of n terms of the series.

Watch Video Solution

10. Find the number of terms of the series 21, 18, 15, 12...which must be

taken to give a sum of zero.



11. The sum of n terms of an A.P. series is $(n^2 + 2n)$ for all values of n.

Find the first 3 terms of the series:



12. The third term of an arithmetical progression is 7, and the seventh term is 2 more than 3 times the third term. Find the first term, the common difference and the sum of the first 20 terms.

Watch Video Solution

13. The interior angles of a polygon are in arithmetic progression. The smallest angle is 52° and the common difference is 8° . Find the number of sides of the polygon.

14. Determine the sum of first 35 terms of an A.P. if t_2 , = 1 and t_7 , = -22.

Watch Video Solution

15. Find the sum of all natural numbers between 100 and 1000 which are

multiples of 5.

Watch Video Solution

16. How many terms of the A.P. 1,4,7.... are needed to give the sum 715?

Watch Video Solution

17. Find the rth term of an A.P., sum of whose first n terms is $2n + 3n^2$.

18. In an arithmetical progression, the sum of p terms is m and the sum of

q terms is also m. Find the sum of (p + q) terms.



19. The sum of the first fifteen terms of an arithmetical progression is 105 and the sum of the next fifteen terms is 780. Find the first three terms of the arithmetical progression,.

Watch Video Solution

20. The sum of the first six terms of an arithmetic progression is 42. The ratio of the 10th term to the 30th term of the A.P. is $\frac{1}{3}$ Calculate the first term and the 13th term.


21. A sum of \overline{v} 6240 is paid off in 30 instalments, such that each instalment is 10 more than the preceding instalment. Calculate the value of the first instalment.

Watch Video Solution

22. The nth term of an A.P. is p and the sum of the first n term is s. Prove

that the first term is

2s - pn

n



23. The sum of the first n terms of the arithmetical progression 3, $5\frac{1}{2}, 8, ...$ is equal to the 2nth term of the arithmetical progression $16\frac{1}{2}, 28\frac{1}{2}, 40\frac{1}{2}$. Calculate the value of n.

24. If the sum of the first 4 terms of an arithmetic progression is p, the sum of the first 8 terms is q and the sum of the first 12 terms is r, express 3p+r in terms of q.

Watch Video Solution

25. The last term of an A.P. 2, 5, 8, 11, is .x. The sum of the terms of the A.P. is 155. Find the value of x.

Watch Video Solution

26. A gentleman buys every year Banks' certificates of value exceeding the last year's purchase by 25. After 20 years he finds that the total value of the certificates purchased by him is 7,250. Find the value of the certificates purchased by him in the 1st year and in the 13th year.

27. If the sums of the first n terms of two A.P.'s are in the ratio 7n - 5:5n + 17, show that the 6th terms of the two series are equal.



28. If the ratio of the sum of m terms and n terms of an A.P. be $m^2 : n^2$, prove that the ratio of its mth and nth terms is (2m - 1) : (2n - 1).

Watch Video Solution



30. If the sum of n, 2n, 3n terms of an A.P are $S_1,\,S_2,\,S_3$, respectively, prove that $S_3=3(S_2-S_1).$

31. If the sum of p terms of an A.P. is q and the sum of q terms is p, show

that the sum of (p+q) terms is -(p+q).

Watch Video Solution

32. The ratio between the sum of n terms of two A.P.'s is (7n + 1): (4n+27).

Find the ratio of their 11 th terms.

Watch Video Solution

Exercise 14 D

1. Find the A.M. between:

6 and 12

2. Find the A.M. between:

5 and 22



3. Find the A.M. between:

$$(\cos heta+\sin heta)^2$$
 and $(\cos heta-\sin heta)^2$

Watch Video Solution

4. Find the A.M. between:

$$\left(x+y
ight)^2$$
 and $\left(x-y
ight)^2$

Watch Video Solution

5. Insert :

(i) 3 arithmetic means between 5 and 17 .



9. There are four numbers in A. P., the sum of the two extremes is 8, and the product of the middle two is 15. What are the numbers?

Watch Video Solution

10. The sum of the first three terms of an A.P. is 36 while their product is

1620. Find the A.P.

Watch Video Solution

11. The angles of a triangle are in A.P. If the greatest angle is double the

least, find the angles.



12. The sum of the first three consecutive terms of an A.P. is 9 and the sum

of their squares is 35. Find S_n



13. a_1, a_2, a_3, a_4, a_5 , are first five terms of an A.P. such that $a_1 + a_3 + a_5 = -12$ and $a_1. a_2. a_3 = 8$. Find the first term and the

common difference.

Watch Video Solution

14. The angles of a quadrilateral are in A.P. and the greatest angle is double the first angle. Find the circular measure of the least angle.

Watch Video Solution

15. If a,b,c are in A.P. show that

$$a \bigg(rac{1}{b} + rac{1}{c} \bigg), b \bigg(rac{1}{c} + rac{1}{a} \bigg), c \bigg(rac{1}{a} + rac{1}{b} \bigg)$$
 are in A.P.

16. If
$$\frac{1}{x}, \frac{1}{y}, \frac{1}{z}$$
 are A.P. show that

xy,zx,yz are in A.P.



17. If
$$rac{1}{x}, rac{1}{y}, rac{1}{z}$$
 are A.P. show that

xy,zx,yz are in A.P.



18. If
$$\frac{1}{x}$$
, $\frac{1}{y}$, $\frac{1}{z}$ are A.P. show that $\frac{y+z}{x}$, $\frac{z+x}{y}$, $\frac{x+y}{z}$ are in A.P.

Watch Video Solution

19. If $(b+c)^{-1}$, $(c+a)^{-1}$, $(a+b)^{-1}$ are in A.P. then show that $\frac{a}{b+c}$, $\frac{b}{c+a}$, $\frac{c}{a+b}$ are also in A.P.

20. If
$$\frac{b+c-a}{a}$$
, $\frac{c+a-b}{b}$, $\frac{a+b-c}{c}$ are in A.P. then prove that $\frac{1}{a}$, $\frac{1}{b}$, $\frac{1}{c}$ are also in A.P.
Watch Video Solution
21. If x, yz are in A.P. show that $(xy)^{-1}$, $(zx)^{-1}$, $(yz)^{-1}$ are also in A.P.
Watch Video Solution
22. If a^2 , b^2 , c^2 are in A.P., pove that $\frac{a}{a+c}$, $\frac{b}{c+a}$, $\frac{c}{a+b}$ are in A.P.
Watch Video Solution

Exercise 14 E



4. If 5, x, y, z, 405 are the first five terms of a geometric progression, find

the values of x, y, and z.



7. If the A.M. and G.M. between two numbers are respectively 17 and 8, find

the numbers.



8. The second, third and sixth terms of an A.P. are consecutive terms of a geometric progression. Find the common ratio of the geometric progression.

9. The 5th, 8th and 11th terms of a G.P. are P, Q and S respectively. Show that $Q^2 = 'PS$.

Watch Video Solution

10. The (p+q)th term and (p-q)th terms of a G.P. are a and b respectively.

Find the pth term.



11. If the pth, th, rth terms of a G.P. are x, y, z respectively, prove that x^{q-r} . y^{r-p} . $z^{p-q} = 1$.

Watch Video Solution

12. In a set of four numbers, the first three are in G.P. and the last three are in A.P. with difference 6. If the first number is the same as the fourth, find the four numbers.

Watch Video Solution

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

Watch Video Solution

14. If one G.M., G and two A.M's p and q be inserted between two given

numbers, prove that

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

Watch Video Solution

15. Construct a quadratic equation in x such that the A.M. of its roots is A

and G.M. is G.

Watch Video Solution

16. The fourth term of a G.P. is greater than the first term, which is positive, by 372. The third term is greater than the second by 60. Calculate the common ratio and the first term of the progression.

Watch Video Solution

17. The first, eighth and twenty-second terms of an A.P. are three consecutive terms of a G.P. Find the common ratio of the G.P. Given also

that the sum of the first twenty-two terms of the A.P.is 275, find its first	
term.	
Watch Video Solution	

Exer	cis	e 14	F

- 1. Find the sum to 8 terms of
- $3+6+12+\ldots$

Watch Video Solution

2. Find the sum to

20 terms of 2 + 6 + 18 +



3. Find the sum to

10 terms of $1 + \sqrt{3} + 3 + ...$



n terms of
$$3rac{3}{8}+2rac{1}{4}+1rac{1}{2}+....$$
 .

Watch Video Solution

5. Sum the series to infinity :

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

Watch Video Solution

6. Sum the series to infinity :

16 ,-8,4 ,



7. Sum the series to infinity :

$$\sqrt{2} - rac{1}{\sqrt{2}} + rac{1}{2\left(\sqrt{2}
ight)} - rac{1}{4\sqrt{2}} + \dots$$

Watch Video Solution

8. Sum the series to infinity :

$$\sqrt{3} + rac{1}{\sqrt{3}} + rac{1}{3\sqrt{3}} + ...$$

Watch Video Solution

9. Find the sum of a geometric series in which $a=16, r=rac{1}{4}, l=rac{1}{64}$.

10. Find the sum of the series 81 -27 +9 -
$$-rac{1}{27}$$
 .





the sum of the first 10 terms, correct to 3 significant figures.

Watch Video Solution

19. A geometrical progression of positive terms and an arithmetical progression have the same first term. The sum of their first terms is 1, the sum of their second terms is $\frac{1}{2}$ and the sum of their third terms is 2. Calculate the sum of their fourth terms.

Watch Video Solution

20. In a geometric progression, the third term exceeds the second by 6 and the second exceeds the first by 9. Find (i) the first term, (ii) the common ratio and (iii) the sum of the first ten terms.

21. In an infinite geometric progression, the sum of first two terms is 6 and every terms is four times the sum of all the terms that it . Find :(i) the geometric progression and (ii) its sum to infinity .



22. Three numbers are in A.P. and their sum is 15. If 1,4 and 19 be added to

these numbers respectively the number are in G.P. Find the numbers .

Watch Video Solution

23. Calculate the least number of terms of the geometric progression 5 +

10 + 20 + ... whose sum would exceed 10,00,000.



24. If S is the sum, P the product and R the sum of the reciprocals of n

terms in G.P., prove that
$$P^2 = \left(rac{S}{R}
ight)^n$$

Watch Video Solution

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

 $0.2+0.22+0.222+\ldots n-terms$

Watch Video Solution

26. If
$$rac{2}{3}=\left(x-rac{1}{y}
ight)+\left(x^2-rac{1}{y^2}
ight)+... ext{To}\infty$$

and xy = 2 then calculate the values of x and y with the condition that x

< 1.

27. $S_1, S_2, S_3, ..., S_n$ are sums of n infinite geometric progressions. The first terms of these progressions are $1, 2^2 - 1, 2^3 - 1, ..., 2^n - 1$ and the common ratios are $\frac{1}{2}, \frac{1}{2^2}, \frac{1}{2^3}, ..., \frac{1}{2^n}$. Calculate the value of $S_1, +S_2, +... + S_n$.

Watch Video Solution

28. Find three numbers a, b, c between 2 and 18 such that:

(i) their sum is 25, and

(ii) the numbers 2, a, b are consecutive terms of an arithmetic progression, and

(iii) the numbers b, c, 18 are consecutive terms of a geometric progression.



29. Three numbers, whose sum is 21, are in A.P. If 2, 2, 14 are added to

them respectively, the resulting numbers are in G.P. Find the numbers.

30.

$$X = 1 + a + a^2 + a^3 + ... + \infty \ \ ext{and} \ \ y = 1 + b + b^2 + b^3 + ... + \infty$$

show

that

If

$$1 + ab + a^2b^2 + a^3b^3 + ... + \infty = rac{xy}{x + y - 1}, ext{ where } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ ext{and } \ \ 0 < a < 1 \ \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 \ \ 0 < a < 1 \ \ 0 \ \ 0 < a < 1 \ \ 0 < a < 1 \ \ 0 \ \ 0 < a < 1 \ \ 0 \ \ 0 < a < 1 \ \ 0 \ \ 0 <$$

Watch Video Solution

31. If $S_1, S_2, S_3, \ldots, S_p$ are the sums of infinite geometric series whose first terms are 1, 2, 3..... p and whose common ratios are $\frac{1}{2}, \frac{1}{3}, \ldots, \frac{1}{p+1}$ respectively, prove that

$$S_1+S_2+S_3+....\ +S_p=rac{1}{2}p(p+3)\,.$$

Watch Video Solution

Exercise 14 G

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



$$\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$$



5. If a, b, c are in G.P. show that

$$rac{1}{a^2}, rac{1}{b^2}, rac{1}{c^2}$$
 are also in G.P.

Watch Video Solution

6. If a, b, c are in G.P. show that the are also in G.P.

 a^2, b^2, c^2

Watch Video Solution

7. If a, b, c, d are in G. P., show that the following are also in G. P.

 b^2c^2, c^3a^2, a^2b^2

8. If a, b, c, d are in G. P., show that a + b, b + c, c + dare also in G. P.



10. If a ,b,c , d are in G.P. prove that

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

Watch Video Solution

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

$${\left({a - d} \right)^2} = {\left({b - c} \right)^2} + {\left({c - a} \right)^2} + {\left({d - b} \right)^2}$$

12. If the pth, qth and rth terms of an A. P. are in G.P., prove that the common ratio of the G.P. is $\frac{q-r}{p-q}.$

Watch Video Solution

13. If $\frac{1}{x+y}, \frac{1}{2y}, \frac{1}{y+z}$ are the three consecutive terms of an A.P. prove

that x ,y,z are the three consecutive terms of a G.P.

Watch Video Solution

Exercise 14 H

1. Sum up to n terms the series

1+ 2x +
$$3x^2 + 4x^3 + \dots$$

2. Sum up to n terms the series

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

Watch Video Solution

- 3. Sum up to n terms the series
- $2.1 + 3.2 + 4.4 + 5.8 + \dots$.

Watch Video Solution

4. Sum up to n terms of series

 $\frac{1}{2} + \frac{3}{6} + \frac{5}{18} + \dots$

Watch Video Solution

5. Sum up to n terms the series

$$\frac{3}{2} - \frac{5}{6} + \frac{7}{18}$$
...

6. Sum up to n terms the series

$$1 - rac{2}{5} + rac{3}{5^2} - rac{4}{5^3}$$
+..

Watch Video Solution

7. Sum up the series

 $\frac{2}{3} + \frac{5}{9} + \frac{8}{27} + \frac{11}{81} + \dots$ to n terms and hence find the sum to

infinity.

Sum up to infinity given that $x \ < \ numerically$.

Watch Video Solution

8.
$$1 + 4x^2 + 7x^4 + \dots$$

9. Find the sum of

$$x + 2x^2 + 3x^3 + 4x^4$$
+...

Watch Video Solution

10.
$$1^2 + 3^2 x + 5^2 x^2 + 7^2 x^3 + \dots$$

Watch Video Solution

11. Show that the square root of $3^{rac{1}{2}} imes 9^{rac{1}{4}} imes 27^{rac{1}{8}} imes 81^{rac{1}{16}} imes ...$ to infinity is 3.

[Note : When we are asked to find the square root of a number, it is presumed that we have to find the principal square root.] Find the sum of the series $\frac{1}{2} + \frac{2}{4} + \frac{3}{8} + \frac{4}{10} + ...\infty$ and substitute in

(1).]

12. Find the sum to n terms of the series whose nth term is

n (n+2)

Watch Video Solution

13. Find the sum to n terms of the series whose nth term is

 $3n^2+2n$

Watch Video Solution

14. Find the sum to n terms of the series whose nth term is

 $4n^3+6n^2+2n$

Watch Video Solution

15. Find the sum of the series

 $3\times5+5\times7+7\times9+$. . to n terms

16. Find the sum of the series

 $1^2+3^2+5^2+\ldots$ to n terms

Watch Video Solution

17. Find the sum of the series

 $2^2 + 4^2 + 6^2 + \dots$ to n terms.

Watch Video Solution

18. Find the nth term and the sum to n terms of the series 1.2+ 2.3 +3.4 +

Watch Video Solution

•••

19. Sum up to n terms the series $1.2^2+2.3^2+3.4^2+...$



22. Sum up to n terms the series where nth terms is 2^n-1





26. Sum to n terms the series 1 + 3 + 7 + 15 + 31 + ...
27. Find the sum to n terms of the series (1.2.3) + (2.3.4) + (3.4.5) ...`



Show that the sum of number in the nth group is $rac{n}{2}(n+1)$.

31. If the sum of first n terms of an A.P. is cn^2 then the sum of squares of

these n terms is



Watch Video Solution

2. If the 3rd and the 6th terms of an A.P. are 7 and 13 respectively, find the

first' term and the common difference.

3. Find the sum of all natural numbers between 100 and 1000 which are

multiple of 5.



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

sum-25 ?

Watch Video Solution

5. Determine the sum of the first 35 terms of an A.P. if $a_2,\ =2$ and

 $a_7, = 22.$



6. If the first term of an A.P. is 2 and the sum of first five terms is equal to one-fourth of the sum of the next five terms, show that the 20th term is

-112.
Watch Video Solution
7. Insert 3 arithmetic means between 2 and 10.
Watch Video Solution
8. Find 12th term of a G.P. whose 8th term is 192 and the common ratio is 2.
Watch Video Solution
9. The first term of a G.P. is 1. The sum of the third and fifth terms is 90.

Find the common ratio of the G.P.

10. 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.

0	Watch	Video	So	ution
	watch	viaco	501	ucion

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

Watch Video Solution

12. Find the sum of the series 0.6 +0.66 +0.666+ ... to the n terms



13. The sum of an infinite series is 15 and the sum of the squares of these

terms is 45. Find the series.







17. Find the sum
$$5^2 + 6^2 + 7^2 + ... + 20^2$$
.

18. If in a geometric progression consisting of positive terms, each term equals the sum of the next two terms, then the common ratio of this progression equals

A. $\sqrt{5}$ B. $\frac{1}{2}(\sqrt{5}-1)$ C. $\frac{1}{2}(1-\sqrt{5})$ D. $\frac{1}{2}\sqrt{5}$

Answer: B

Watch Video Solution

19. If the first term of an infinite G.P. is 1 and each term is twice the sum of

the succeeding terms, then the sum of the series is

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

C. $\frac{7}{2}$
D. $\frac{3}{2}$

Answer: D

Watch Video Solution

20. If fifth term of a G.P. is 2, then the product of its first 9 terms is

A. 256

B. 512

C. 1024

D. none of these

Answer: B

21. The sum of three decreasing numbers in A.P. is 27. If-1,-1, 3 are added to

them respectively, the resulting series is in G.P. The numbers are

A. 5,9,13

B. 15,9,3

C. 13,9,5

D. 17,9,1

Answer: D

Watch Video Solution

22. The first two terms of a geometric progression add up to 12. The sum of the third and the fourth terms is 48. If the terms of the geometric progression are alternately positive and negative, then the first term is

 $\mathsf{A.}-4$

 $\mathsf{B.}-12$

C. 12

D. 4

Answer: B

D Watch Video Solution



24. The sum of all odd numbers between 1 and 100 which are divisible by

3, is

A. 83667

B. 90000

C. 83660

D. None of these

Answer: A

Watch Video Solution

25. If a, b, c are in G. P. and x, y are arithmetic means of a, b and b, c respectively, then $\frac{1}{x} + \frac{1}{y}$ is equal to

A.
$$\frac{2}{b}$$

B. $\frac{3}{b}$
C. $\frac{b}{3}$

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

Answer: A

