MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

SOME SPECIAL SERIES

Others

1. If $S_k = \frac{1 + 2 + \ldots\ldots\ldots + k}{k}$, find the value of $S1^2 + S2^2 + \ldots\ldots\ldots + Sn^2$.

Watch Video Solution

2. Find the sum of n terms of the series $1.\ 2^2 + 2.\ 3^2 + 3.\ 4^2 +$

Watch Video Solution

3. Prove that :$1 + 2 + 3 + \ + n = \frac{n(n+1)}{2}$

Watch Video Solution

4. The sum of the series $\frac{2}{3} + \frac{8}{9} + \frac{26}{27} + \frac{80}{81} +$ to n terms is $(a) n - \frac{1}{2}\left(3^{-n} - 1\right)$ (b) $n - \frac{1}{2}\left(1 - 3^{-n}\right)$ (c) $n + \frac{1}{2}(3^n - 1)$ (d) $n - \frac{1}{2}(3^n - 1)$

Watch Video Solution

5. Prove that : $1^3 + 2^3 + 3^3 + \ + n^3 = \left\{ \frac{n(n+1)}{2} \right\}^2$.

Watch Video Solution

6. Prove that :

$$1^2 + 2^2 + 3^2 + \ + n^2 = \frac{n(n+1)(2n+1)}{6}$$

Watch Video Solution

7. Find the sum of the series $2^2 + 4^2 + 6^2 + \ + (2n)^2$

Watch Video Solution

8. Find the sum of nth term of this series and S_n denote the sum of its n terms. Then, $T_n = \left[1 + (n - 1 \times 2)^2\right] = (2n - 1)^2 = 4n^2 - 4n + 1$

Watch Video Solution

9. Sum the following series to n terms: $\frac{1}{1.6} + \frac{1}{6.11} + \frac{1}{11.16} + \frac{1}{16.21} + + \frac{1}{(5n-4)(5n+1)}$

Watch Video Solution

10. Sum the following series to n terms: $1 + 4 + 13 + 40 + 121 +$

Watch Video Solution

11. Find the sum of all possible products of the first n natural numbers taken two by two.

Watch Video Solution

12. Sum of n terms the series : $1^2 - 2^2 + 3^2 - 4^2 + 5^2 - 6^2 + ...$

Watch Video Solution

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

Watch Video Solution

14. Sum the following series to n terms:

$4 + 6 + 9 + 13 + 18 +$

Watch Video Solution

15. Find the sum : $\sum_{r=1}^{n} \frac{1}{(ar+b)(ar+a+b)}$

Watch Video Solution

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

$\frac{3}{1^2.2^2} + \frac{5}{2^2.3^2} + \frac{7}{3^2.4^2} + \ldots\ldots$

Watch Video Solution

17. Sum the following series to n terms:

$5 + 7 + 13 + 31 + 85 +$

Watch Video Solution

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

$\frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} +$

Watch Video Solution

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

$3 + 15 + 35 + 63 +$

Watch Video Solution

20. Find the sum to n terms of the series: $1 + 5 + 12 + 22 + 35 + \ldots\ldots .$

Watch Video Solution

21. Find the sum of the series: $1.n + 2.(n-1) + 3.(n-2) + \ + (n-1).2 + n.1.$

Watch Video Solution

22. Find the sum of series $(3^3 - 2^3) + (5^3 - 4^3) + (7^3 - 6^3) + \ldots n$ terms.

Watch Video Solution

23. If $S_n = \sum_{r=1}^{n} \frac{1 + 2 + 2^2 + \ldots\ldots + 2^r}{2^r}$, then S_n is equal to (a)$2^n n - 1$ (b) $1 - \frac{1}{2^n}$ (c) n$-1 + \frac{1}{2^n}$ (d) $2^n - 1$

Watch Video Solution

24. The value of $\sum_{r=1}^{n} \left\{ (2r - 1)a + \frac{1}{b^r} \right\}$ is equal to (a) $an^2 + \frac{b^{n-1} - 1}{b^n(b - 1)}$. (b) $an^2 + \frac{b^n - 1}{b^n(b - 1)}$ (c) $an^3 + \frac{b^{n-1} - 1}{b^n(b - 1)}$ (d) none of these

Watch Video Solution

25. The sum of the series: $\frac{1}{(\log)_2 4}+\frac{1}{(\log)_4 4}+\frac{1}{(\log)_8 4}++\frac{1}{(\log)_{2n} 4}$ is $\frac{n(n+1)}{2}$ (b) $\frac{n(n+1)(2n+1)}{12}$ (c) $\frac{n(n+1)}{4}$ (d) none of these

Watch Video Solution

26. The sum n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{7}}+$ is $\sqrt{2n+1}$ (b) $\frac{1}{2}\sqrt{2n+1}$ (c) $\frac{1}{2}\sqrt{2n+1}-1$ (d) $\frac{1}{2}\left\{\sqrt{2n+1}-1\right\}$

Watch Video Solution

27. Find the sum of n terms of the series $1 \cdot 2 \cdot 3 + 2 \cdot 3 \cdot 4 + 3 \cdot 4 \cdot 5 \ldots\ldots\ldots$.

Watch Video Solution

28. Sum the series $3.8 + 6.11 + 9.14 + \ldots\ldots\ldots\ldots$ to n terms.

Watch Video Solution

29. Find the sum of n terms of the series whose nth term is: $2n^2 - 3n + 5$

Watch Video Solution

30. Find the sum to n terms of the series whose nth term is $n^2 + 2^n$.

Watch Video Solution

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

Watch Video Solution

32. Show that

$$\frac{1 \times 2^2 + 2 \times 3^2 + \vdots + n \times (n+1)^2}{1^2 \times 2 + 2^2 \times 3 + \vdots + n^2 \times (n+1)} = \frac{3n+5}{3n+1}.$$

Watch Video Solution

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

Watch Video Solution

34. Find the sum to n terms of the series : $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + ...$

Watch Video Solution

35. The sequence N of natural numbers is divided into classes as follows. Show that the sum of the numbers in nth row is $(2n^2 + 1)$

Watch Video Solution

36. Find the sum of the following series to n term: $1^3 + 3^3 + 5^3 + 7^3 + ...$

Watch Video Solution

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

$2^3 + 4^3 + 6^3 + 8^3 + \ldots\ldots\ldots$

Watch Video Solution

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

$1.2.5 + 2.3.6 + 3.4.7 + \ldots\ldots\ldots$

Watch Video Solution

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

$1.2.4 + 2.3.7 + 3.4.10 + \ldots\ldots$

Watch Video Solution

40. Find the sum to n terms of the series $1 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 + \ldots\ldots$

Watch Video Solution

41. Find the sum of the following series to n term: $3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \ldots\ldots\ldots\ldots$

Watch Video Solution

42. Find the sum of the following series whose nth term is: $2n^3 + 3n^2 - 1$.

Watch Video Solution

43. Find the sum of the following series whose nth term is: $n^3 - 3^n$.

Watch Video Solution

44. Find the sum of the following series whose nth term is: $n(n+1)(n+4)$.

Watch Video Solution

45. Find the sum of the following series whose nth term is: $(2n-1)^2$.

Watch Video Solution

46. Find the 20th term and the sum of 20 terms of the series: $2 \times 4 + 4 \times 6 + 6 \times 8 + \ldots\ldots\ldots$

Watch Video Solution

47. Find the sum of the first n terms of the series : $3 + 7 + 13 + 21 + 31 + \vdots$

Watch Video Solution

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

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

Watch Video Solution

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

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots\ldots\ldots\ldots + \frac{1}{n.(n+1)}$$

Watch Video Solution

50. Sum of the following series to n term:

$3 + 5 + 9 + 15 + 23 + \ldots\ldots .$

Watch Video Solution

51. Sum of the following series to n term:

$1 + 3 + 7 + 13 + 21 + \ldots\ldots\ldots\ldots$

Watch Video Solution

52. Sum of the following series to n term:

$1 + 3 + 6 + 10 + 15 + \ldots\ldots\ldots\ldots$

Watch Video Solution

53. Sum of the following series to n term:

$\frac{1}{1 \cdot 4} + \frac{1}{4 \cdot 7} + \frac{1}{7 \cdot 10} + \ldots\ldots\ldots\ldots\ldots$

Watch Video Solution

54. Find the sum $2 + 5 + 10 + 17 + 26 + \ldots$.

Watch Video Solution

55. Find the sum of the series to n terms :3+7+14+24+37....

Watch Video Solution

56. Sum of the following series to n term: $2 + 4 + 7 + 11 + 16 + \ldots\ldots$

Watch Video Solution

57. Write the sum of the series $2+4+6+8+\ldots\ldots\ldots .\ +2n$

Watch Video Solution

58. Write the sum of the series $1^2-2^2+3^2-4^2+5^2-6^2\ldots\ldots\ldots .\ +(2n-1)^2-(2n)^2$.

Watch Video Solution

59. Write the sum of n term fo a series whose r^{th} term is: $r+2^r$.

Watch Video Solution

60. If $\sum_{r=1}^{n} r = 55, Find \sum_{r=1}^{n} r^3.$

Watch Video Solution

61. If the sum of first n even natural numbers is equal to k times the sum of first n odd natural number then $k =$

$\frac{1}{n}$ b. $\frac{n-1}{n}$ c. $\frac{n+1}{2n}$ d. $\frac{n+1}{n}$

Watch Video Solution

62. Write the sum of 20 terms of the series: $1+\frac{1}{2}(1+2)+\frac{1}{3}(1+2+3)+$

Watch Video Solution

63. If t_n denotes the nth term of the series $2+3+6+11+18+\ldots$ then t_{50} a.49^2-1 b. 49^2 c. 50^2+1 d. 49^2+2

Watch Video Solution

64. Let S_n denote the sum of the cubes of the first n natural numbers and s_n denote the sum of the first n

natural numbers. Then $\sum_{r=1}^{n} \frac{S_r}{s_r}$ is equal to

Watch Video Solution

65. If $\sum n = 210$, then $\sum n^2 =$

Watch Video Solution

66. If $1 + \frac{1+2}{2} + \frac{1+2+3}{3} + \overset{..}{\longrightarrow} n$ terms is S. Then, S is equal to a. $\frac{n(n+3)}{4}$ b. $\frac{n(n+2)}{4}$ c. $\frac{n(n+1)(n+2)}{6}$ d. n^2

Watch Video Solution

67. What is the sum of n terms of the series $\sqrt{2}+\sqrt{8}+\sqrt{18}+\sqrt{32}+..$

Watch Video Solution

68. The sum of 10 terms of the series $\sqrt{2}+\sqrt{6}+\sqrt{18}+\ldots$ is

Watch Video Solution

69. The sum of the series 1^2+3^2+5^2+ ..... n

Watch Video Solution