doubtnut
India's Number 1 Education App

MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

SEQUENCES AND SERIES

Exercise 1 Topical Problems

1. In a triangle , the lengths of two larger are 10 cm and 9 cm . If the angles of the triangle are in AP, then the length of the third side is

A. $\sqrt{5}-\sqrt{6}$

B. $\sqrt{5}+\sqrt{6}$

C. $\sqrt{5}\pm\sqrt{6}$

D. $5\pm\sqrt{6}$

Answer: d

Watch Video Solution

2. Let $x_1, x_2, \ldots\ldots, x_n$ be is an AP . If $x_1 + x_4 + x_9 + x_{11} + x_{20} + x_{22} + x_{27} + x_{30} = 272,$ then $x_1 + x_2 + x_3 + \ldots + x_{30}$ is equal to

A. 1020

B. 1200

C. 716

D. 2720

Answer: a

Watch Video Solution

3. Angles A, B, C of a δABC are in AP and $b: c = \sqrt{3}: \sqrt{2}$, then $\angle A$ is given by

A. 45°

B. 60°

C. 75°

D. 90°

Answer: c

Watch Video Solution

4. If 100 times the 100^{th} term of an AP with non zero common difference equals the 50 times its 50^{th} term, then the 150^{th} term of this AP is (1) 150 (2) 150 times its 50^{th} term (3) 150 (4) zero

A. -150

B. 150 times its 50th term

C. 150

D. Zero

Answer: d

Watch Video Solution

5. Six numbers are in AP such that their sum is 3 . The first term is 4 times the third term . Then , the fifth term is

A. -15

B. -3

C. 9

D. -4

Answer: d

Watch Video Solution

6. Let a_n be the n^{th} term of an A.P. If $\sum_{r=1}^{100} a_{2r} = \alpha \& \sum_{r=1}^{100} a_{2r-1} = \beta,$ then the common difference of the A.P. is $\alpha - \beta$ (b) $\beta - \alpha$ $\frac{\alpha - \beta}{2}$ (d) None of these

A. $\frac{\alpha - \beta}{200}$

B. $\alpha - \beta$

C. $\frac{\alpha - \beta}{100}$

D. $\beta - \alpha$

Answer: c

Watch Video Solution

7. A person is to count 4500 currency notes. Let an denote the number of notes he counts in the nth minute. If $a_1 = a_2 = \ldots\ldots = a_{10} = 150$ and $a_{10}, a_{11}, \ldots\ldots$ are in A.P. with common difference 2, then the time taken by him to count all notes is (1) 34 minutes (2) 125 minutes (3) 135 minutes (4) 24 minutes

A. 24 min

B. 34 min

C. 125 min

D. 135 min

Answer: b

Watch Video Solution

8. The sum of all two digit natural numbers which leave a remainder 5 when they are divided by 7 equal to

A. 715

B. 702

C. 615

D. 602

Answer: b

Watch Video Solution

9. If the first, second and last terms of an arithmetic series are a,b and c respectively , then the number of terms is

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

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

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

D. $\frac{b+c+2a}{b+a}$

Answer: a

Watch Video Solution

10. The arithmetic mean of first n odd natural numbers, is

A. n^2

B. 2 n

C. n

D. 3 n

Answer: c

Watch Video Solution

11. If the sum to 2n terms of an Ap 2,5,8,11 , ... is equal to the sum to n terms of an AP 57,59,61,63, ... , then n is equal to

A. 10

B. 11

C. 12

D. 13

Answer: b

Watch Video Solution

12. If a^2, b^2, c^2 are in AP, then which of the following is also an AP?

A. sin A , sin B,sin C

B. tan A,tanB,tanC

C. cot A, cotB, cotC

D. None of these

Answer: c

Watch Video Solution

13. 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.

A. -1

B. 0

C. 1

D. None of these

Answer: c

Watch Video Solution

14. Let T_r be the r^{th} term of an A.P whose first term is a and common difference is d IF for some integer m,n, $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$ then $a - d =$

A. 0

B. 1

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

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

Answer: a

Watch Video Solution

15. consider an infinite geometric series with first term a and comman ratio r if the sum is 4 and the second term is $\frac{3}{4}$ then find $a\&r$

A. $a = 2, r = \frac{3}{8}$

B. $a = \frac{4}{7}, r = \frac{3}{7}$

C. $a = \frac{3}{2}, r = \frac{1}{2}$

D. $a = 3, r = \frac{1}{4}$

Answer: d

Watch Video Solution

16. If a, b and c are positive numbers in a GP, then the roots of the quadratic equation $(\log_e a)^2 - (2\log_e b)x + (\log_e c) = 0$ are

A. -1 and $\frac{\log_e c}{\log_e a}$

B. 1 and $= \frac{\log_e c}{\log_e a}$

C. 1 and $\log_a c$

D. $= 1$ and $\log_c a$

Answer: c

Watch Video Solution

17. The sum of the first three erms of a GP is 7/9 and their product is $-8/27$ Find the common ratio of the series

A. $r = -22/3$ or $-3/2$

B. $r = -2/3$ or $3/2$

C. $r = 2/3$ or $-3/2$

D. $r = 2/3$ or $3/2$

Answer: a

Watch Video Solution

18. The sum of first 20 terms of the sequence 0.7, 0.77, 0.777, .. , is (1) $\frac{7}{9}(99-10^{-20})$ (2) $\frac{7}{81}(179+10^{-20})$ (3) $\frac{7}{9}(99+10^{-20})$ (3) $\frac{7}{81}(179-10^{-20})$

A. $\frac{7}{18}(179-10^{-20})$

B. $\frac{7}{9}(99-10^{20})$

C. $\frac{7}{81}(179+10^{-20})$

D. $\frac{7}{9}(99+10^{-20})$

Answer: c

Watch Video Solution

19. The value of x which satisfies $8^{1+\cos x+\cos^2 x+\cdots}$ = 64 in $[-\pi, \pi]$ is

A. $\pm\frac{\pi}{2}, \pm\frac{\pi}{3}$

B. $\pm\frac{\pi}{3}$

C. $\pm\frac{\pi}{2}, \frac{\pi}{6}$

D. $\pm\frac{\pi}{6}, \pm\frac{\pi}{3}$

Answer: b

Watch Video Solution

20. The value of n for which $\frac{x^{n+1}+y^{n+1}}{x^n+y^n}$ is the geometric mean of x nd y is

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

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

C. $n = 1$

D. $n = -1$

Answer: a

Watch Video Solution

21. If G is the GM of the product of r sets of observations with geometric means $G_1, G_2, \ldots, G_r$ respectively, then G is equal to

A. $\log G_1 + \log G_2 + \ldots . + \log G_n$

B. $G_1 G_2, \ldots G_r$

C. $\log G_1, \log G_2, \ldots . \log G_n$

D. None of the above

Answer: b

Watch Video Solution

22. the value of $\left[(0.16)^{\log_{0.25}\left(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots+\infty\right)}\right]^{\frac{1}{2}}$ is

A. 1

B. -1

C. 0

D. None of these

Answer: d

Watch Video Solution

23. If S be the sum P the product and R be the sum of the reciprocals of n terms of a GP then p^2 is equal to S/R b. R/S c. $(R/S)^n$ d. $(S/R)^n$

A. $\left(\frac{S}{R}\right)^n$

B. $\frac{S}{R}$

C. $\left(\frac{R}{S}\right)^n$

D. $\frac{R}{S}$

Answer: a

Watch Video Solution

24. 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. $\frac{1}{2}(1-\sqrt{5})$

B. $\frac{1}{2}\sqrt{5}$

C. $\sqrt{5}$

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

Answer: d

Watch Video Solution

25. 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.

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

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

C. $\frac{4}{5}$

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

Answer: d

Watch Video Solution

26. If $a_1, a_2, \ldots . a_{50}$ are in GP, then $\frac{a_1 - a_2 + a_5 - \ldots . + a_{49}}{a_2 - a_4 + a_6 - \ldots . + a_{50}}$ is

A. 0

B. 1

C. $\frac{a_1}{a_2}$

D. $\frac{a_{25}}{a_{24}}$

Answer: c

Watch Video Solution

27. If $f(x) = x + 1/2$ Then. The number of real values of x for which the three unequal terms f(x) , f(2x) and f(4x) are in HP is

A. 1

B. 0

C. 3

D. 2

Answer: a

Watch Video Solution

28. If $\frac{1}{b-a} + \frac{1}{b-c} = \frac{1}{a} + \frac{1}{c}$, then a,b and c are in

A. AP

B. HP

C. GP

D. Both (b) and (c)

Answer: b

Watch Video Solution

29. Let $a_1, a_2, a_3, \ldots$ be a harmonic progression with $a_1 = 5$ and $a_{20} = 25$. The least positive integer n for which $a_n < 0$, is

A. 22

B. 23

C. 24

D. 25

Answer: d

Watch Video Solution

30. If three real numbers a,b and c are in harmonic progression, then which of the folllowing is true ?

A. $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ are in HP

B. ab,bc,ca are inHP

C. ab,bc,ca are in HP

D. $\frac{a}{b}, \frac{b}{c}, \frac{c}{a}$ are in HP

Answer: b

Watch Video Solution

31. If H is the harmonic mean between $PandQ$ then find the value of $H/P + H/Q$.

A. 2

B. $\frac{PQ}{P+Q}$

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

D. $\frac{P+Q}{PQ}$

Answer: a

Watch Video Solution

32. The $7th$ term of an $H.P.$ is $\frac{1}{10}$ and $12th$ term is $\frac{1}{25}$ Find the $20th$ term

A. $\frac{1}{41}$

B. $\frac{1}{45}$

C. $\frac{1}{49}$

D. $\frac{1}{37}$

Answer: c

Watch Video Solution

33. If x,y,z are in HP, then $\log(x+z)+\log(x-2y+z)$ is equal to

A. $\log(x-z)$

B. $2\log(x-z)$

C. $3\log(x-z)$

D. $4\log(x-z)$

Answer: b

Watch Video Solution

34. If $4a^2+9b^2+16c^2=2(3ab+6bc+4ca)$, where a, b, c are non-zero numbers, then a,b,c are in

A. AP

B. GP

C. HP

D. None of these

Answer: c

Watch Video Solution

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

A. $6:1$

B. $3:2$

C. $2:1$

D. $3:1$

Answer: d

Watch Video Solution

36. The least value of $2^{\sin x}+2^{\cos x}$, is

A. $2^{1-1\sqrt{2}}$

B. $2^{1+1\sqrt{2}}$

C. $2^{\sqrt{2}}$

D. 2

Answer: a

Watch Video Solution

37. If the AM and HM of two numbers are 27 and 12 respectively, then what is their GM equal to ?

A. 9

B. 18

C. 24

D. 36

Answer: b

Watch Video Solution

38. 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 $x^2 - 2Ax + G^2 = 0$

A. $A = G$

B. $A = 2G$

C. $2A = G$

D. $A^2 = G$

Answer: a

Watch Video Solution

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

A. $A \pm \left(A^2 - G^2\right)$

B. $\sqrt{A} \pm \sqrt{A^2 - G^2}$

C. $A \pm \sqrt{(A = G)(A - G)}$

D. $\dfrac{A \pm \sqrt{(A + G)(A - G)}}{2}$

Answer: c

Watch Video Solution

40. If H_1 and H_2 are two harmonic means between two positive numbers a and b $(a \neq b)$, A and G are the arithmetic and geometric menas between a and b , then $\frac{H_2 + H_1}{H_2 H_1}$ is

A. $\frac{A}{G}$

B. $\frac{2A}{G}$

C. $\frac{A}{2G^2}$

D. $\frac{2A}{G^2}$

Answer: d

Watch Video Solution

41. If A_1, A_2, G_1, G_2 and H_1, H_2 be two AMs, GMs and HMs between two quantities then the value of $\frac{G_1G_2}{H_1H_2}$ is

A. $\frac{A_1 + A_2}{H_1 + H_2}$

B. $\frac{A_1 - A_2}{H_1 + H_2}$

C. $\frac{A_1 + A_2}{H_1 - H_2}$

D. $\frac{A_1 - A_2}{H_1 - H_2}$

Answer: a

Watch Video Solution

42. Let a,b,c be in A.P. and $|a| < 1, |b| < 1|c| < 1.$ if $x = 1 + a + a^2 + \ldots . \text{to } \infty, y = 1 + b + b^2$, then x,y,z are in

A. AP

B. GP

C. HP

D. None of these

Answer: c

Watch Video Solution

43. If AM and GM of x and y are in the ratio of p:q, then x:y is

A. $p-\sqrt{p^2+q^2}:\sqrt{p^2+q^2}$

B. $p+\sqrt{p^2-q^2}:p-\sqrt{p^2-q^2}$

C. $p:q$

D. $p+\sqrt{p^2+q^2}:p-\sqrt{p^2+q^2}$

Answer: b

Watch Video Solution

44. find sum of $1 + 3x + 6x^2 + 10x^3 + 15x^4 + - - - - - - - - \infty$

where $|x| < 1, x \neq 0$

A. $\frac{1}{(1-x)^2}$

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

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

D. $\frac{1}{(1-x)^3}$

Answer: d

Watch Video Solution

45. Find the sum to n terms of the series : $1 + 2x + 3x^2 + 4x^3 + ...$

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

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

C. $\frac{1}{1+x^2}$

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

Answer: d

Watch Video Solution

46. The value of $2^{\frac{1}{4}}.4^{\frac{1}{8}}.8^{\frac{1}{16}}, , , , , , , \infty$ is equal to.

A. 1

B. 2

C. $3/2$

D. 4

Answer: b

Watch Video Solution

47. $\sum_{k=1}^{2n+1}(-1)^{k-1}k^2 =$

A. $(n-1)(2n-1)$

B. $(n+1)(2n+1)$

C. $(n+1)(2n-1)$

D. $(n-1)(2n+1)$

Answer: b

Watch Video Solution

48. The sum to 50 terms of the series

$$\frac{3}{1^2}+\frac{5}{1^2+2^2}+\frac{7}{1^+2^2+3^2}+\ldots.\ +\ldots is$$

A. $\frac{k+1}{1}$

B. $\frac{k}{k+1}$

C. $\frac{6k}{k+1}$

D. $\frac{6(k-1)}{k}$

Answer: c

Watch Video Solution

49. Sum of n terms of the following series$1^3 + 3^3 + 5^3 + 7^3 +$

A. $n^2\left(2n^2 - 1\right)$

B. $n^3(n - 1)$

C. $n^3 + 8n + 4$

D. $2n^4 + 3n^2$

Answer: a

Watch Video Solution

50. The sum of the series $(1 + 2) + \left(1 + 2 + 2^2\right) + \left(1 + 2 + 2^2 + 2^3\right) + \ldots.$ upto n terms is

A. $2^{n+2} - n - 4$

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

C. $2^{n+1} - n$

D. $2^{n+1} - 1$

Answer: a

Watch Video Solution

51. If $S_n = \frac{1}{6 \cdot 11} + \frac{1}{11 \cdot 16} + \frac{1}{16 \cdot 21} + \ldots$ upto n terms , then $6S_n$ equals

A. $\frac{5n-4}{5n+6}$

B. $\frac{n}{5n+6}$

C. $\frac{2n-1}{5n+6}$

D. $\frac{1}{5n+6}$

Answer: b

Watch Video Solution

52. The sum of 24 terms of the following series $\sqrt{2}+\sqrt{8}+\sqrt{18}+\sqrt{32}+\ldots\ldots$ is

A. 300

B. $200\sqrt{2}$

C. $300\sqrt{2}$

D. $250\sqrt{2}$

Answer: c

Watch Video Solution

53. The sum of n terms of the series $1^2+2.2^2+3^2+2.4^2+5^2+2.6^2+\ldots.$ is $\frac{n(n+1)^2}{2}$ when n is even . when n is odd , the sum is

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

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

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

D. $\left[\frac{n(n+1)}{2}\right]^2$

Answer: b

Watch Video Solution

54. The sum of the series

$$\frac{3}{4\cdot 8}-\frac{3\cdot 5}{4\cdot 8\cdot 12}+\frac{3\cdot 5\cdot 7}{4\cdot 8\cdot 12\cdot 16}-\ldots \text{ is}$$

A. $\sqrt{\frac{3}{2}}-\frac{3}{4}$

B. $\sqrt{\frac{4}{3}}-\frac{3}{4}$

C. $\sqrt{\frac{3}{2}}-\frac{1}{4}$

D. $\sqrt{\frac{2}{3}}-\frac{1}{4}$

Answer: b

Watch Video Solution

55. The sum of n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{5}}+\ldots$ is

A. $\sqrt{2n+1}$

B. $\sqrt{2n+1}-1$

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

D. $\frac{1}{2}\left(\sqrt{2n+1}-1\right)$

Answer: d

Watch Video Solution

56. If $\frac{1}{1^4}+\frac{1}{2^4}+\frac{1}{3^4}+\ldots+\infty=\frac{\pi^4}{90}$, then $\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+\ldots+\infty=$

A. $\frac{\pi^4}{96}$

B. $\frac{\pi^4}{45}$

C. $\frac{89}{90}\pi$

D. None of these

Answer: a

Watch Video Solution

57. Sum of the series $\frac{1}{1\cdot 2\cdot 3}+\frac{5}{3\cdot 4\cdot 5}+\frac{9}{5\cdot 6\cdot 7}+\ldots$ is equal to

A. $\frac{3}{2}-3\log_e 2$

B. $\frac{5}{2}-3\log_e 2$

C. $1-4\log_e 2$

D. None of these

Answer: b

Watch Video Solution

58. $\log_e . \frac{1+3x}{1-2x}$ is equal to

A. $-5x-\frac{5x^2}{2}-\frac{35x^3}{3}-\ldots$

B. $-5x+\frac{5x^2}{2}-\frac{35x^2}{3}+....$

C. $1-4\log_e 2$

D. None of these

Answer: c

Watch Video Solution

59. The sum of the series $1+\frac{1}{3}\cdot\frac{1}{4}+\frac{1}{5}\cdot\frac{1}{4^2}+\frac{1}{7}\cdot\frac{1}{4^3}+...$ is

A. $\log_e 1$

B. $\log_e 2$

C. $\log_e 3$

D. $\log_e 4$

Answer: c

Watch Video Solution

60. The coeffiecient of x^n in the expansion of $\log_n(1+x)$ is

A. $\frac{(-1)^{n-1}}{n}$

B. $\frac{(-1)^{n-1}}{n}\log_e e$

C. $\frac{(-1)^{n-1}}{n}\log_e a$

D. $\frac{(-1)^n}{n}\log_a e$

Answer: b

Watch Video Solution

61. In the expansion of $2\log_n x - \log_n(x+1) - \log_e(x-1)$, the coefficient of x^{-4} is

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

B. -1

C. 1

D. None of these

Answer: a

Watch Video Solution

62. If $\frac{e^x}{1-x} = B_0 + B_1 x + B_2 x^2 + \ldots + B_n x^n + \ldots$, then the value of $B_n - B_{n-1}$ is

A. 1

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

C. $\frac{1}{n!}$

D. None of these

Answer: c

Watch Video Solution

63. Sum of the series

$$(x+y)(x-y) + \frac{1}{2!}(x+y)(x-y)\left(x^2+y^2\right)$$

$\frac{1}{3!}(x+y)(x-y)\left(x^4+y^4+x^2y^2\right)+\ldots$ is

A. e^x+e^y

B. e^{x-e^y}

C. $e^{x^2}+e^{y^2}$

D. $e^{x^2}-e^{y^2}$

Answer: c

Watch Video Solution

64. $\frac{1+\frac{1}{2!}+\frac{2}{3!}+\frac{2^2}{4!}+\frac{2^2}{5!}+\ldots}{1+\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\ldots}$ is equal to

A. e/4

B. βe

C. e/2

D. $\frac{e\left(e^2-1\right)}{2\left(e^2+1\right)}$

Answer: c

Watch Video Solution

65.

$$\frac{1}{e^{3x}}\left(e^{x}+e^{5x}\right)=a_0+a_1x+a_2x^2+\ldots\ldots\ldots\Rightarrow 2a_1+2^3a_3+2^5a_5+\ldots\ldots$$

A. e/4

B. e^{-1}

C. 1

D. 0

Answer: d

Watch Video Solution

66. The coefficent of x^n in the series

$$1+\frac{a+bx}{1!}+\frac{(a+bx)^2}{2!}+\frac{(a+bx)^3}{3!}+\ldots\text{is}$$

A. $\frac{(ab)n}{n!}$

B. $e^b \cdot \frac{a^n}{n!}$

C. $e^a \cdot \frac{b^n}{n!}$

D. $e^{a+b} \cdot \frac{(ab)^n}{n!}$

Answer: c

Watch Video Solution

Exercise 2

1. If $-5, k \text{ and } -1$ are in AP, then the value of k is equal to

A. -5

B. -3

C. -1

D. 3

Answer: b

Watch Video Solution

Exercise 3

1. If $a_1, a_, a_3 \ldots a_n$ are in A.P then prove that $a_1^2 - a_2^2 + a_3^2 - a_4^2 + \ldots . a_{2k-1}^2 - a_{2k}^2 = \left(\frac{k}{2k-1}\right)(a_1^2 - a_{2k}^2)$

A. $\frac{k}{2k-1}(a_1^2 - a_{2k}^2)$

B. $\frac{2k}{k-1}(a_{2k}^2 - a_1^2)$

C. $\frac{k}{k+1}(a_1^2 - a_{2k}^2)$

D. None of these

Answer: a

Watch Video Solution

Exercise 4

1. Let a_n be the n^{th} term of an A.P. If $\sum_{r=1}^{100} a_{2r} = \alpha \& \sum_{r=1}^{100} a_{2r-1} = \beta,$ then the common difference of the A.P. is $\alpha - \beta$ (b) $\beta - \alpha$ $\frac{\alpha - \beta}{2}$ (d) None of these

A. $\frac{\alpha - \beta}{200}$

B. $\alpha - \beta$

C. $\frac{\alpha - \beta}{100}$

D. $\beta - \alpha$

Answer: c

Watch Video Solution

Exercise 5

1. The first four terms of an AP are a, 9, $3a - b$, $3a + b$.

The 2011 th term of an AP is

A. 2015

B. 4025

C. 5030

D. 8045

Answer: d

Watch Video Solution

Exercise 6

1. If $a_1, a_2, a_3, , a_n$ are in A.P., where $a_i > 0$ for all i , show that $\frac{1}{\sqrt{a_1} + \sqrt{a_2}} + \frac{1}{\sqrt{a_1} + \sqrt{a_3}} + + \frac{1}{\sqrt{a_{n-1}} + \sqrt{a_n}} = \frac{n-1}{\sqrt{a_1} + \sqrt{a_n}}$.

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

B. $\frac{n-1}{\sqrt{a}_1+\sqrt{a}_n}$

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

D. None of these

Answer: b

Watch Video Solution

Exercise 7

1. If $(10)^9+2(11)^1(10)^8+3(11)^2(10)^7+\ldots\ldots\ldots+10(11)^9=k(10)^9$, then k is equal to :

A. $\frac{121}{10}$

B. $\frac{441}{100}$

C. 100

D. 110

Answer: c

Watch Video Solution

Exercise 8

1. The sum of $0.2 + 0.22 + 0.222 + \ldots$ to n terms is equal to

A. $\left(\frac{2}{9}\right) - \left(\frac{2}{81}\right)(1 - 10^{-n})$

B. $n - \left(\frac{1}{9}\right)(1 - 10^{-n})$

C. $\left(\frac{2}{9}\right)\left[n - \left(\frac{1}{9}\right)(1 - 10^{-n})\right]$

D. $\left(\frac{2}{9}\right)$

Answer: c

Watch Video Solution

Exercise 9

1. $\sum_{r=1}^{\infty} \frac{1+a+a^2+\ldots+a^{r-1}}{r!}$ is equal to

A. $\frac{e^a-e}{a-1}$

B. e^a-e

C. $\frac{e^a}{a-1}$

D. $\frac{e^a-e}{e-1}$

Answer: a

Watch Video Solution

Exercise 10

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

A. are in AP

B. are in GP

C. are in HP

D. satisfy ab = cd

Answer: b

Watch Video Solution

Exercise 11

1. let $0 < \phi < \frac{\pi}{2}$, $x = \sum_{n=0}^{\infty} \cos^{2n}\phi$, $y = \sum_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\phi \sin^{2n}\phi$

A. $xyz = xz + y$

B. $xyz = xy + z$

C. $xyz = x + y + z$

D. $xyz = yz + x$

Answer: b

Watch Video Solution

Exercise 12

1. If $a_1, a_2, a_3, \ldots . a_n$ are in H.P. and $a_1a_2 + a_2a_3 + a_3a_4 + \ldots\ldots a_{n-1}a_n = ka_1a_n$, then k is equal to

A. $(bn-1)(a_1 - a_n)$

B. na_1a_n

C. $(n-1)a_1a_n$

D. $n(a_1 - a_n)$

Answer: c

Watch Video Solution

Exercise 13

1. Three positive numbers form an increasing GP. If the middle term in this GP is doubled, then new numbers are in AP. Then, the common ratio of the GP is

A. $\sqrt{2}+\sqrt{3}$

B. $3+\sqrt{2}$

C. $2-\sqrt{3}$

D. $2+\sqrt{3}$

Answer: d

Watch Video Solution

Exercise 14

1. $G.M$ and $H.M$ of two numbers are 10 and 8 respectively. The numbers are

A. 5,20

B. 4,25

C. 2,50

D. 1100

Answer: a

Watch Video Solution

Exercise 15

1. In a sequence of 21 terms the first 11 terms are in A.P. with common difference 2. and the lastterms are in G.P. with common ratio 2. If the middle tem of the A.P. is equal to themiddle term of the G.P., then the middle term of the entire sequence is

A. $-\frac{10}{31}$

B. $\frac{10}{31}$

C. $\frac{32}{31}$

D. $-\frac{31}{32}$

Answer: a

Watch Video Solution

Exercise 16

1. If AM of two numbers is twice of their GM, then the ratio of greatest number to smallest number is

A. $7-4\sqrt{3}$

B. $7+4\sqrt{3}$

C. 21

D. 5

Answer: b

Watch Video Solution

Exercise 17

1. If p, q, r are in G.P and $\tan^{-1} p, \tan^{-1} q, \tan^{-1} r$ are in A.P then p, q, r satisfies the relation

A. $p = q = r$

B. $p \neq q \neq r$

C. $p + q = r$

D. None of these

Answer: a

Watch Video Solution

Exercise 18

1. Let α, β, γ and δ are four positive real numbers such that their product is unity, then the least value of $(1+\alpha)(1+\beta)(1+\gamma)(1+\delta)$ is :

A. 6

B. 16

C. 0

D. 32

Answer: b

Watch Video Solution

Exercise 19

1. The sum o f series $1+\frac{4}{5}+\frac{7}{5^2}+\frac{10}{5^3}+\infty$ is $7/16$ b. $5/16$ c. $104/64$ d. $35/16$

A. $\frac{16}{35}$

B. $\frac{11}{8}$

C. $\frac{35}{16}$

D. $\frac{7}{16}$

Answer: c

Watch Video Solution

Exercise 20

1. Let $S_n=\sum_{k=1}^{4n}(-1)^{\frac{k(k+1)}{2}}k^2$. Then S_n can take values

A. 1056

B. 1088

C. 1120

D. 1232

Answer: a

Watch Video Solution

Exercise 21

1. The sum to infinity of the series $1+\frac{2}{3}+\frac{6}{3^2}+\frac{10}{3^3}+\frac{14}{3^4}\ldots\ldots$ is (1) 2 (2) 3 (3) 4 (4) 6

A. 3

B. 4

C. 6

D. 2

Answer: a

Watch Video Solution

Exercise 22

1. The value of $\frac{1}{2!}+\frac{2}{3!}+\ldots+\frac{999}{1000!}$ is equal to

A. $\frac{1000!-1}{1000!}$

B. $\frac{1000!+1}{1000!}$

C. $\frac{999!-1}{999}$

D. $\frac{999!+1}{999}$

Answer: a

Watch Video Solution

Exercise 23

1. The value of $1\cdot 1!+2\cdot 2!+3\cdot 3!+\ldots+N\cdot N!$ is

A. $(n+1)!$

B. $(n+1)!+1$

C. $(n+1)!-1$

D. None of these

Answer: b

Watch Video Solution

Exercise 24

1. $\frac{1}{1(n-1)!}+\frac{1}{2!(n-)!}+\frac{1}{5!(n-5)!}+\ldots$ is equal to

A. $\frac{2^{n-4}}{n!}$ for even values of n only

B. $\frac{2^{n-4}+1}{n!}-1$ for odd values of n only

C. $\frac{2^{n-1}}{n!}$ for all values of n

D. None of the above

Answer: c

Watch Video Solution

Exercise 25

1. If α and β are the roots of the equation $x^2 - px + q = 0$, then the value of αβ is

A. $\log\left(1 - px + qx^2\right)$

B. $\log\left(1 + px - qx^2\right)$

C. $\log\left(1 + px + qx^2\right)$

D. None of these

Answer: a

Watch Video Solution

Exercise 26

1. The value of $4+2(1+2)\log 2+\left(2\frac{1+2^2}{2!}(\log 2)^2+\left(2\frac{1+2^3}{3!}(\log 2)^3+\ldots\right.\right.$ is

A. 10

B. 12

C. $\log\left(3^2.4^2\right)$

D. $\log\left(2^2.3^2\right)$

Answer: b

Watch Video Solution

Exercise 27

1. The sum of the series $\frac{1}{1\cdot 2\cdot 3}+\frac{1}{3\cdot 4\cdot 5}+\frac{1}{5\cdot 6\cdot 7}+\ldots$ is

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

B. $\log_e 2$

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

D. $\log_e 2 + 1$

Answer: a

View Text Solution

Exercise 28

1. The sum of series $2\left[7^{-1} + 3^{-1}.7^{-3} + 5^{-1}.7^{-5} + \ldots\right]$ is

A. $\log_e\left(\frac{4}{3}\right)$

B. $\log_e\left(\frac{3}{4}\right)$

C. $2\log_e\left(\frac{3}{4}\right)$

D. $2\log_e\left(\frac{4}{3}\right)$

Answer: a

Watch Video Solution

Exercise 29

1. The sum of the series $1+\frac{1}{4\cdot 2!}+\frac{1}{16\cdot 4!}+\frac{1}{64\cdot 6!}+\ldots$ is

A. $\frac{e+1}{2\sqrt{e}}$

B. $\frac{e-1}{2\sqrt{e}}$

C. $\frac{e+1}{\sqrt{e}}$

D. $\frac{e-1}{\sqrt{e}}$

Answer: a

Watch Video Solution

Exercise 30

1. If $e^{e^x} = a_0 + a_1 x + a_2 x^2 + \ldots$,then find the value of a_ (0)

A. $a_0 = 1$

B. $a_0 = e$

C. $a_0 = e^e$

D. $a_0 = e^2$

Answer: b

Watch Video Solution

Exercise 31

1. The coefficient of x^3 in the expansion of 3^x is

A. $\frac{3^3}{6}$

B. $\frac{(\log 3)^3}{3}$

C. $\frac{\log(3)^3}{6}$

D. $\frac{(\log 3)^3}{6}$

Answer: d

Watch Video Solution