MATHS

BOOKS - VK JAISWAL MATHS (HINGLISH)

SEQUENCE AND SERIES

Exercise Single Choice Problems

1. If a, b, c are positive real numbers such that $a+b+c=1$, then the greatest value of `(1-a)(1-b)(1-c), is

A. 1

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

C. $\frac{8}{27}$

D. $\frac{4}{9}$

Answer: C

Watch Video Solution

2. If $xyz = (1-x)(1-y)(1-z)$ Where $0 \leq x, y, z \leq 1$, then the minimum value of $x(1-z) + y(1-x) + z(1-y)$ is

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

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

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

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

Answer: C

Watch Video Solution

3. If $\sec(\alpha - 2\beta), \sec\alpha, \sec(\alpha + 2\beta)$ are in arithmetical progressin then $\cos^2\alpha = \lambda\cos^2\beta(\beta \neq n\pi, n \in I)$ the value of λ is:

A. 1

B. 2

C. 3

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

Answer: B

Watch Video Solution

4. Let a,b,c,d, e ar non-zero and distinct positive real numbers. If a,b, c are

In a,b,c are in A.P, b,c, dare in G.P. and c,d e are in H.P, the a,c,e are in :

A. A.P.

B. G.P.

C. H.P.

D. Nothing can be said

Answer: B

Watch Video Solution

5. if $(m+1)th, (n+1)th$ and $(r+1)th$ term of an AP are in GP.and m, n and r in HP. . find the ratio of first term of A.P to its common difference

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

B. $-n$

C. $-2n$

D. $+n$

Answer: A

Watch Video Solution

6. If the equation $x^4-4x^3+ax^2+bx+1=0$has four positive roots, then the value of (a+ b) is :

A. -4

B. 2

C. 6

D. can not be determined

Answer: B

Watch Video Solution

7. If S_1, S_2 and S_3 are the sums of first n natureal numbers, their squares and their cubes respectively, then $\dfrac{S_1^4 S_2^2 - S_2^2 S_3^2}{S_1^2 + S_2^2} =$

A. 4

B. 2

C. 1

D. 0

Answer: D

Watch Video Solution

8. If $S_n = \frac{1.2}{3!} + \frac{2.2^2}{4!} + \frac{3.2^3}{5!} + \dots$ upto n terms then the sum infinite terms is

A. 1

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

C. e

D. $\frac{\pi}{4}$

Answer: A

Watch Video Solution

9. If $\tan\left(\frac{\pi}{12} - x\right), \tan\left(\frac{\pi}{12}\right), \tan\left(\frac{\pi}{12} + x\right)$ in G.P. then sum of all the solutions in [0,314] is $k\pi$. Find k

A. 4950

B. 5050

C. 2525

D. 5010

Answer: A

Watch Video Solution

10. Let $S_k = 1 + 2 + 3 + \ldots . + k$ and $Q_n = \frac{S_2}{S_2 - 1} \cdot \frac{S_3}{S_3 - 1} \ldots \frac{S_n}{S_n - 1}$ where k,nεN . $\lim_{x \to \infty} Q_n =$

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

B. 1

C. 3

D. 0

Answer: C

Watch Video Solution

11. l, m,n are the p^{th}, q^{th} and r^{th} term of a G.P. all positive, then $\begin{vmatrix} \log l & p & 1 \\ \log m & q & 1 \\ \log n & r & 1 \end{vmatrix}$ equals :

A. -1

B. 2

C. 1

D. 0

Answer: D

Watch Video Solution

12. The numbers of natural numbers < 300 that are divisible by 6 but not by 9 :

A. 49

B. 37

C. 33

D. 16

Answer: C

Watch Video Solution

13. If $x, y, x > 0$ and $x + y + z = 1$ then $\dfrac{xyz}{(1-x)(1-y)(1-z)}$ is necessarily.

A. ≥ 8

B. $\leq \dfrac{1}{8}$

C. 1

D. None of these

Answer: B

Watch Video Solution

14. If the roots of the equation $px^2 + qx + r = 0$, where $2p, q, 2r$ are in G.P, are of the form $\alpha^2, 4\alpha - 4$. Then the value of $2p + 4q + 7r$ is :

A. 0

B. 10

C. 14

D. 18

Answer: C

Watch Video Solution

15. Let $x_1, x_2, x_3, \ldots, x_k$ be the divisors of positive integer 'n' (including 1 and x). If $x_1 + x_2 + \ldots + x_k = 75$, then $\sum_{i=1}^{k} \frac{1}{x_i}$ is equal to

A. $\frac{75}{k}$

B. $\frac{75}{n}$

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

D. $\frac{1}{75}$

Answer: B

Watch Video Solution

16. If $a_a, a_2, a_3, \ldots.., a_n$ are in H.P. and $f(k)=\sum_{r=1}^{n} a_r - a_k$ then $\frac{a_1}{f(1)}, \frac{a_2}{f(2)}, \frac{a_3}{f(n)}$ are in :

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: C

Watch Video Solution

17. if α, β be roots of equation $375x^2 - 25x - 2 = 0$ and $s_n = \alpha^n + \beta^n$

then $\lim_{n \to \infty} \left(\sum_{r=1}^{n} S_r \right) = \ldots\ldots.$

A. $\frac{1}{12}$

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

C. $\frac{1}{3}$

D. 1

Answer: A

Watch Video Solution

18. If $a_i, i = 1, 2, 3, 4$ be four real members of same sign, then the minimum value of $\sum \left(\frac{a_i}{a_j} \right), i, j \in \{1, 2, 3, 4\}, i \neq j$ is : (a) 6 (b) 8 (c) 12 (d) 24

A. 6

B. 8

C. 12

D. 24

Answer: C

Watch Video Solution

19. Given that x, y, z are positive reals such that $xyz = 32$. The minimum value of $x^2 + 4xy + 4y^2 + 2z^2$ is equal to :

A. 64

B. 256

C. 96

D. 216

Answer: C

Watch Video Solution

20. In an A.P. five times the fifth term is equal tyo eight times thte eight term. Then the sum of the first twenty five terms is equal to :

A. 25

B. $\frac{25}{2}$

C. -25

D. 0

Answer: D

Watch Video Solution

21. Let α, β be two distinct values of x lying in $(0, \pi)$ for which $\sqrt{5}\sin x, 10\sin x, 10(4\sin^2 x + 1)$ are 3 consecutive terms of a G.P. Then minimum value of $|\alpha - \beta| =$

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

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

C. $\frac{2\pi}{5}$

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

Answer: B

Watch Video Solution

22. In an infinite G.P. the sum of first three terms is 70. If the externme terms are multipled by 4 and the middle term is multiplied by 5, the resulting terms form an A.P. then the sum to infinite terms of G.P. is :

A. 120

B. 40

C. 160

D. 80

Answer: D

Watch Video Solution

23. Find the $\sum_{k=1}^{\infty} \sum_{n=1}^{\infty} \frac{k}{2^{n+k}}$.

A. 5

B. 4

C. 3

D. 2

Answer: D

Watch Video Solution

24. Let $p, q, r \varepsilon R^{+}$ and $27pqr \geq (p+q+r)^{3}$ and $3p+4q+5r=12$ then $p^{3}+q^{4}+r^{5}$ is equal to

A. 3

B. 6

C. 2

D. 4

Answer: A

Watch Video Solution

25. Find the sum of the infinte series $\frac{1}{9}+\frac{1}{18}+\frac{1}{30}+\frac{1}{45}+\frac{1}{63}+\ldots$

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

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

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

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

Answer: A

Watch Video Solution

26. If S_r denote the sum of first 'r' terms of a non constaint A.P. and $\frac{S_a}{a^2} = \frac{S_b}{b^2} = c$, where a,b,c are distinct then $S_c =$

A. c^2

B. c^3

C. c^4

D. abc

Answer: B

Watch Video Solution

27. In an infinite $G.P.$ second term is x and its sum is 4, then complete set of values of x is in

A. $(-8, 0)$

B. $\left[-\frac{1}{8}, \frac{1}{8}\right) - \{0\}$

C. $\left[-1, -\frac{1}{8}\right) \cup \left(\frac{1}{8}, 1\right]$

D. $(-8, 1] - \{0\}$

Answer: D

Watch Video Solution

28. The number of terms of an A.P. is odd. The sum of the odd terms $\left(1^{st}, 3^{rd} etc, \right)$ is 248 and the sum of the even terms is 217. The last term exceeds the first by 56 then :

A. the number of terms is 17

B. the first term is 3

C. the number of terms is 13

D. the first term is 1

Answer: B

Watch Video Solution

29. Let $A_1, A_2, A_3, \ldots\ldots, A_n$ be squares such that for each $n \geq 1$ the length of a side of A_n equals the length of a diagonal of A_{n+1}. If the side of A_1 be 20 units then the smallest value of 'n' for wheich area of A_n is less than 1.

A. 7

B. 8

C. 9

D. 10

Answer: D

Watch Video Solution

30. Let $S_k = \lim_{n \to \infty} \sum_{i=0}^{n} \frac{1}{(k+1)^i}$. Then $\sum_{k=1}^{n} kS_k$ equals

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

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

C. $\dfrac{n(n+2)}{2}$

D. $\dfrac{n(n+3)}{2}$

Answer: D

Watch Video Solution

31. The sum of the series $\dfrac{2}{1.2}+\dfrac{5}{2.3}2^1+\dfrac{10}{3.4}2^2+\dfrac{17}{4.5}2^3+\ldots.$ upto n terms is equal :

A. $\dfrac{n2^n}{n+1}$

B. $\left(\dfrac{n}{n+1}\right)2^n+1$

C. $\dfrac{n2^n}{n+1}-1$

D. $\dfrac{(n-1)2^2}{n+1}$

Answer: A

Watch Video Solution

32. If $(1.5)^{30} = k$, then the value of $\sum_{(n=2)}^{29} (1.5)^n$, is :

A. $2k - 3$

B. $k + 1$

C. $2k + 7$

D. $2k - \frac{9}{2}$

Answer: D

Watch Video Solution

33. n aritmetic means are inserted between 7 and 49 and their sum is found to be 364, then n is :

A. 11

B. 12

C. 12

D. 14

Answer: C

View Text Solution

34. The third term of a G.P. is 2. Then the product of the first five terms, is :

A. 2^3

B. 2^4

C. 2^5

D. None of these

Answer: C

Watch Video Solution

35. The sum of first n terms of an A.P. is $5n^2 + 4n,$ its common difference is :

A. 9

B. 10

C. 3

D. -4

Answer: B

Watch Video Solution

36. If $x+y=a$ and $x^2+y^2=b$, then the value of $\left(x^3+y^3\right)$, is

A. ab

B. a^2+b

C. $a+b^2$

D. $\dfrac{3ab-a^3}{2}$

Answer: D

Watch Video Solution

37. If $S_1, S_2, S_3, \ldots\ldots, S_n$ are the sum of infinite geometric series whose first terms are $1, 3, 5 \ldots, (2n-1)$ and whose common rations are $\frac{2}{3}, \frac{2}{5}, \ldots, \frac{2}{2n+1}$ respectively, then $\left\{\frac{1}{S_1S_2S_3} + \frac{1}{S_2S_3S_4} + \frac{1}{S_3S_4S_5} + \ldots\ldots\ldots\text{upon infinite terms}\right\} =$

A. $\frac{1}{15}$

B. $\frac{1}{60}$

C. $\frac{1}{12}$

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

Answer: B

Watch Video Solution

38. Sequence $\{t_n\}$ of positive terms is a G.P If $t_6 2, 5, t_{14}$ form another G.P in that order then the product $t_1 t_2 t_3 \ldots\ldots.\, t_{18} t_{19}$ is equal to

A. 10^{9}

B. 10^{10}

C. $10^{17/2}$

D. $10^{19/2}$

Answer: D

Watch Video Solution

39. The minimum value of $\frac{(A^2+A+1)(B^2+B+1)(C^2+C+1)}{ABCD}$ where $A, B, C, D > 0$ is :

A. $\frac{1}{3^4}$

B. $\frac{1}{2^4}$

C. 2^4

D. 3^4

Answer: D

Watch Video Solution

40. if $\sum_{1}^{20} r^3 = a, \sum_{1}^{20} r^2 = b$ then sum of products of 1,2,3,4,....20 taking two at a time is :

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

B. $\frac{a^2-b^2}{2}$

C. $a-b$

D. a^2-b^2

Answer: A

Watch Video Solution

41. The sum of the first 2n terms of an A.P. is x and the sum of the next n terms is y, its common difference is :

A. $\frac{x-2y}{3n^2}$

B. $\dfrac{2y - x}{3n^2}$

C. $\dfrac{x - 2y}{3n}$

D. $\dfrac{2y - x}{3n}$

Answer: B

View Text Solution

42. The number of non-negative integers 'n' satisfying $n^2 = p + q$ and $n^3 = p^2 + q^2$ where p and q are integers

A. 2

B. 3

C. 4

D. Infinite

Answer: B

Watch Video Solution

43. Concentric circles of radii $1, 2, 3, \dots, 100 cm$ are drawn. The interior of the smallest circle is colored red and the angular regions are colored alternately green and red, so that no two adjacent regions are of the same color. Then, the total area of the green regions in sq. cm is equal to 1000π b. 5050π c. 4950π d. 5151π

A. 1000π

B. 5050π

C. 4950π

D. 5151π

Answer: B

Watch Video Solution

44. If $\log 4$, $\log 8$ and$\log 9k - 1)$ are consecutive terms of a geometric sequence,then the number of integers that satisfy the system of inequalities $x^2 - x > 6$and $Ixl < k^2$ is

A. 193

B. 194

C. 195

D. 196

Answer: A

Watch Video Solution

45. Let T_r be the rth term of an A.P. whose first term is -1/2 and common difference is 1, then $\sum_{r=1}^{n} \sqrt{1 + T_r T_{r+1} T_{r+2} T_{r+3}}$

A. $\frac{n(n+1)(2n+1)}{6} - \frac{5n}{4}$

B. $\frac{n(n+1)(2n+1)}{6} - \frac{5n}{4} + \frac{1}{4}$

C. $\frac{n(n+1)(2n+1)}{6} - \frac{5n}{4} + \frac{1}{2}$

D. $\frac{n(n+1)(2n+1)}{12} - \frac{5n}{8} + 1$

Answer: C

Watch Video Solution

46. If $\sum_{r-1}^{n} T_r = \frac{n(n+1)(n+2)}{3}, then \lim_{x \to \infty} \sum_{r=1}^{n} \frac{3012}{T_r} =$

A. 2008

B. 3012

C. 4016

D. 8032

Answer: A

View Text Solution

47. The sum of the infinite series, $1^2 - \frac{2^2}{5} + \frac{3^2}{5^3} + \frac{3^2}{5^3} + \frac{5^2}{5^4} - \frac{6^2}{5^5} + \dots .$ is:

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

B. $\frac{25}{24}$

C. $\frac{25}{54}$

D. $\frac{125}{252}$

Answer: C

Watch Video Solution

48. The absolute term in P(x) = $\sum_{r=1}^{n}\left(x-\frac{1}{r}\right)\left(x-\frac{1}{r+1}\right)\left(x-\frac{1}{r+2}\right)$ as n approches to infinity is :

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

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

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

D. $\frac{-1}{4}$

Answer: D

Watch Video Solution

49. Let a,b,c are positive real numbers such that $p = a^2b + ab^2c - ac^2$, $q = b^2c + bc^2 - a^2b - ab^2$ and $r = ac^2 + a^2c - cb^2$ and the quadratic equation $px^2 + qx + r = 0$ has equal roots , then a,b,c are in :

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: C

View Text Solution

50. It T_k denotes the k^{th} term of an H.P. from the bgegining and $\frac{T_2}{T_6} = 9$, then $\frac{T_{10}}{T_4}$ equals :

A. $\frac{17}{5}$

B. $\frac{5}{17}$

C. $\frac{7}{19}$

D. $\frac{19}{7}$

Answer: B

Watch Video Solution

51. number of terms common to the two sequences $17, 21, 21, \ldots\ldots, 417$ and $16, 21, 26, \ldots\ldots, 466$ is (A) 19 (D) 22 (B) 20 (C) 21

A. 19

B. 20

C. 21

D. 22

Answer: B

Watch Video Solution

52. The sum of the series $1+\frac{2}{3}+\frac{1}{3^2}+\frac{2}{3^3}+\frac{1}{3^4}+\frac{2}{3^5}+\frac{1}{3^6}+\frac{2}{3^7}+\ldots\ldots$ upto infinite terms is equal to :

A. $\frac{15}{8}$

B. $\frac{8}{15}$

C. $\frac{27}{8}$

D. $\frac{21}{8}$

Answer: A

Watch Video Solution

53. The coefficient of x^8 in the polynomial $(x-1)(x-2)(x-3)\ldots.(x-10)$ is :

A. 2640

B. 1320

C. 1370

D. 2740

Answer: B

Watch Video Solution

54. Let $\alpha = \lim_{x \to \infty} \left(\left(1^3 - 1^2\right) + \left(2^3 - 2^2\right) + \ldots + \frac{n^3 n^2}{\pi^4}\right.$, then α is equal is:

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

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

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

D. non-exisitent

Answer: B

Watch Video Solution

55. If $16x^4 - 32x^3 + ax^2 + bx + 1 = 0, a, b, \in R$has positive real roots only, then $|b - a|$ is equal to :

A. -32

B. 32

C. 49

D. -49

Answer: B

View Text Solution

56. if ABC is a triangle and $\tan\left(\frac{A}{2}\right), \tan\left(\frac{B}{2}\right), \tan\left(\frac{C}{2}\right)$ are in H.P. Then find the minimum value of $\cot\left(\frac{B}{2}\right)$

A. $\sqrt{3}$

B. 1

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

D. $\frac{1}{\sqrt{3}}$

Answer: A

Watch Video Solution

57. If α and β are the roots of the quadratic equation $4x^2 + 2x - 1 = 0$ then the value of $\sum_{r=1}^{\infty} (a^r + \beta^r)$ is :

A. 2

B. 3

C. 6

D. 0

Answer: D

Watch Video Solution

58. The sum of the series : $(2)^2 + 2(4)^2 + 3(6)^2 + ...$ Upon 10 terms is

A. 11300

B. 12100

C. 12300

D. 11200

Answer: B

Watch Video Solution

59. If a and b are positive real numbers such that $a + b = c$, then the minimum value of $\left(\frac{4}{a} + \frac{1}{b}\right)$ is equal to :

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

B. $\frac{1}{3}$

C. 1

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

Answer: D

Watch Video Solution

60. The first term of an infinite G.R is the value of satisfying the equation $\log_4(4^x - 15) + x - 2 = 0$ and the common ratio is $\cos\left(2011\frac{\pi}{3}\right)$ The sum of G.P is ?

A. 1

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

C. 4

D. 2

Answer: C

Watch Video Solution

61. Let a, b, c be positive numbers, then the minimum value of

$$\frac{a^4 + b^4 + c^2}{abc}$$

A. 4

B. $2^{3/4}$

C. $\sqrt{2}$

D. $2\sqrt{2}$

Answer: D

Watch Video Solution

62. If $xy = 1$, then minimum value of $x^2 + y^2$ is :

A. 1

B. 2

C. $\sqrt{2}$

D. 4

Answer: B

Watch Video Solution

63. Find the value of $\frac{2}{1^3} + \frac{6}{1^3 + 2^3} + \frac{12}{1^3 + 2^3 + 3^3} + \frac{20}{1^3 + 2^3 + 3^3 + 4^3} + \ldots\ldots\ldots$ upto 60 terms :

A. 2

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

C. 4

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

Answer: C

Watch Video Solution

64. $\sum_{n=1}^{\infty} \frac{1}{(n+1)(n+2)(n+3)\ldots\ldots\ldots(n+k)}$

A. $\frac{1}{(k-1)(k-1)!}$

B. $\frac{1}{k \cdot kl}$

C. $\frac{1}{(-1)kl}$

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

Answer: C

Watch Video Solution

65. Consider two positive numbers a and b. If arithmetic mean of a and b exceeds their geometric mean by 3/2, and geometric mean of aand b exceeds their harmonic mean by 6/5 then the value of $a^2 + b^2$ will be

A. 150

B. 153

C. 156

D. 159

Answer: D

Watch Video Solution

66. Sum of first 10 terms of the series, $S = \frac{7}{2^2 \cdot 5^2} + \frac{12}{5^2 \cdot 7^2} + \frac{19}{8^2 \cdot 11^2} + \ldots\ldots$ is :

A. $\frac{255}{1024}$

B. $\frac{88}{1024}$

C. $\frac{264}{1024}$

D. $\frac{85}{1024}$

Answer: D

Watch Video Solution

67. $\sum_{r=1}^{10} \frac{r}{1 - 3r^2 + r^4}$

A. $-\frac{50}{109}$

B. $-\frac{54}{109}$

C. $-\frac{55}{111}$

D. $-\frac{55}{109}$

Answer: D

Watch Video Solution

68. The rth term of a series is given by $t_r = \frac{r}{1 + r^2 + r^4}$, then

$$\lim (n \to \infty) \sum_{r=1}^{n} (t_r)$$

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

B. 1

C. 2

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

Answer: A

Watch Video Solution

69. The sum to infinity of the series

$1+\frac{4}{5}+\frac{7}{5^2}+\frac{10}{5^3}+\ldots,$ is

A. $\frac{31}{12}$

B. $\frac{41}{16}$

C. $\frac{45}{16}$

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

Answer: D

Watch Video Solution

70. The third term of a G.P. is 2. Then product of the first five terms, is :

A. 2^3

B. 2^4

C. 2^5

D. None of these

Answer: C

Watch Video Solution

71. If $x_1, x_2, x_3, \ldots\ldots x2_n$ are in $A.P$, then $\sum_{r=1}^{2n}(-1)^{r+1}x_r^2$ is equal to

A. $\frac{n}{(2n-1)}\left(x_1^2 - x_{2n}^2\right)$

B. $\frac{2n}{(2n-1)}\left(x_1^2 - x_{2n}^2\right)$

C. $\frac{n}{(n-1)}\left(x_1^2 - x_{2n}^2\right)$

D. $\frac{n}{(2n+1)}\left(x_1^2 - x_{2n}^2\right)$

Answer: A

Watch Video Solution

72. Let two numbers have arithmatic mean 9 and geometric mean 4.Then these numbers are roots of the equation (a) $x^2 + 18x + 16 = 0$ (b) $x^2 - 18x - 16 = 0$ (c) $x^2 + 18x - 16 = 0$ (d) $x^2 - 18x + 16 = 0$

A. $x^2 + 18x + 16 = 0$

B. $x^2 - 18x - 16 = 0$

C. $x^2 + 18x - 16 = 0$

D. $x^2 - 18x + 16 = 0$

Answer: D

Watch Video Solution

73. If p and q are positive real numbers such that $p^2 + q^2 = 1$ then find the maximum value of $(p + q)$

A. 2

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

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

D. $\sqrt{2}$

Answer: D

Watch Video Solution

74. A person is to cout 4500 currency notes. Let a_n denotes the number of notes he counts in the nth minute. If $a_1 = a_2 = \dots\dots = a_{10} = 150$ and $a_{10}, a_{11}, \dots\dots,$ are in AP with common difference -2, then the time taken by him to count all notes is

A. 34 minutes

B. 24 minutes

C. 125 minutes

D. 35 minutes

Answer: A

Watch Video Solution

Watch Video Solution

75. A non constant arithmatic progression has common difference d and first term is $(1 - ad)$ If the sum of the first 20 term is 20, then the value of a is equal to :

A. $\frac{2}{19}$

B. $\frac{19}{2}$

C. $\frac{2}{9}$

D. $\frac{9}{2}$

Answer: B

Watch Video Solution

76. The value of $\sum_{n=3}^{\infty} \frac{1}{n^5 - 5n^3 + 4n}$ is equal to -

A. $\frac{1}{120}$

B. $\frac{1}{96}$

C. $\frac{1}{24}$

D. $\frac{1}{144}$

Answer: B

Watch Video Solution

77. Find the value of $\frac{2}{1^3} + \frac{6}{1^3 + 2^3} + \frac{12}{1^3 + 2^3 + 3^3} + \frac{20}{1^3 + 2^3 + 3^3 + 4^3} + \ldots$ upto infinite terms

A. 2

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

C. 4

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

Answer: C

Watch Video Solution

78. The minimum value of the expression $2^{x}+2^{2x+1}+\frac{5}{2^{x}}, x \in R$ is :

A. 7

B. $(7.2)^{1/7}$

C. 8

D. $(3.10)^{1/3}$

Answer: C

Watch Video Solution

79. $\sum_{r=1}^{\infty}\frac{(4r+5)5^{-r}}{r(5r+5)}$

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

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

C. $\frac{1}{25}$

D. $\frac{2}{25}$

Answer: A

Watch Video Solution

Exercise One Or More Than One Answer Is Are Correct

1. If the first and $(2n-1)^{th}$ terms of an A.P, a G.P and an H.P of positive terms are equal and their $(n+1)^{th}$ terms are $a, b\&c$ respectively then

A. $a+c=2b$

B. $a \geq b \geq c$

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

D. $ac=b^2$

Answer: B::D

Watch Video Solution

2. If a, b, c are distinct positive real numbers such that the quadratic expression $Q_1(x) = ax^2 + bx + c$, $Q_2(x) = bx^2 + cx + a$, $Q_3(x) = cx^2 + x + b$ are always non-negative, then possible integer in the range of the expression $y = \frac{a^2b^2 + c^2}{ab + bc + ca}$ is

A. 1

B. 2

C. 3

D. 4

Answer: B::C

Watch Video Solution

3. If a,b,c are in H.P, where $a > c > 0$, then :

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

B. $\frac{1}{a-b} - \frac{1}{b-c} < 0$

C. $ac > b^2$

D. $bc(1-a), ac(1-b), ab(1-c)$ are in A.P.

Answer: B::C::D

Watch Video Solution

4. In an A.P. let T_r denote r^{th} term from beginning, $T_p - \dfrac{1}{q(p+q)}, T_q - \dfrac{1}{p(p+q)}$, then :

A. $T_1 =$ common difference

B. $T_{p+q} = \dfrac{1}{pq}$

C. $T_{pq} = \dfrac{1}{p+q}$

D. $T_{p+q} = \dfrac{1}{p^2q^2}$

Answer: A::B::C

Watch Video Solution

5. Which of the following statement (s) is (are) correct ?

A. Sum of the reciprocal of all the n harmonic means inserted between a and b is equal to n times the harmonic mean between two given numbers a and b.

B. Sum of the cubes of first n natural number is equal to square of the sum of the first a natural numbers.

C. If $a, A_1, A_2, A_3, \ldots\ldots, A_{2n}, b$ are in A.P. then $\sum_{I=1}^{2n} A_l = n(a+b)$.

D. If the first term of the geometric progression $g_1, g_2, g_3, \ldots\ldots, \infty$ is unity, then the value of the common ratio of the progression such that $(4g_2 + 5g_3)$ is minimum equals $\frac{2}{5}$.

Answer: B::C

View Text Solution

6. If a,b,c are in 3 distinct numbers in H.P. $a, b, c > 0$, then :

A. $\frac{b+c-a}{a}, \frac{a+b-c}{b}, \frac{a+b-c}{c}$ are in AP

B. $\frac{b+c}{a}, \frac{c+a}{b}, \frac{a+b}{c}$ ar in A.P.

C. $a^5 + c^5 \geq 2b^5$

D. $\frac{a-b}{b-c} = \frac{a}{c}$

Answer: A::B::C::D

Watch Video Solution

7. All roots of equation $x^5 - 40x^4 + \alpha x^3 + \beta x^2 + \gamma x + \delta = 0$ are in G.P. if the sum of their reciprocals is 10, then δ can be equal to :

A. 32

B. -32

C. $\frac{1}{32}$

D. $-\frac{1}{32}$

Answer: A::B

Watch Video Solution

8. Let $a_1, a_2, a_3 \ldots \ldots$ be a sequence of non-zero rela numbers with are in A.P. for $k \in N$. Let $f_k(x) = a_k x^2 + 2a_{k+1}x + a_{k+2}$

A. $f_k(x) = 0$ has real roots for each $k \in N$.

B. Each of $f_k(x) = 0$ has one root in common.

C. Non-common roots of $f_1(x) = 0, f_2(x) = 0, f_3(x) = 0, \ldots \ldots$ from an A.P.

D. None of these

Answer: A::B

Watch Video Solution

9. Given a,b,c are in A.P. b,c,d are in G.P. and c,d,e are in H.P. if $a = 2$ and $e = 18$, then the possible value of 'c' can be :

A. 9

B. -6

C. 6

D. -9

Answer: B::C

Watch Video Solution

10. The number a, b, c in that order form a term A.P and $a+b+c=60$. The number $(a-2), b, (c+3)$ in that order form a three G.P. All possible values of $(a^2+b^2+c^2)$ is/are

A. 1218

B. 1208

C. 1288

D. 1298

Answer: B::D

Watch Video Solution

11. If

$$(x^2 + x + 1) + (x^2 + 2x + 3) + (x^2 + 3x + 5) + \ldots\ldots + (x^2 + 20x + 39$$

then x is equal to :

A. 10

B. -10

C. 20.5

D. -20.5

Answer: A::D

Watch Video Solution

12. For ΔABC, if $81 + 144a^4 + 16b^4 + 9c^4 = 144$ abc, (where notations have their usual meaning), then :

A. $a > b > c$

B. $A < B < C$

C. Area of $\Delta ABC = \frac{3\sqrt{3}}{8}$

D. Triangle ABC is right angled

Answer: B::C::D

Watch Video Solution

13. Let $x, y, z \in \left(0, \frac{\pi}{2}\right)$ are first three consecutive terms of an arithmatic progression such that $\cos x + \cos y + \cos x = 1$ and $\sin x + \sin y + \sin x = \frac{1}{\sqrt{2}}$, then which of the following is/are correct ?

A. $\cot y = \sqrt{2}$

B. $\cos(x-y)=\frac{\sqrt{3}-\sqrt{2}}{2\sqrt{2}}$

C. $\tan 2y=\frac{2\sqrt{2}}{3}$

D. $\sin(x-y)+\sin(y-z)=0$

Answer: A::B

Watch Video Solution

14. If the number $16, 20, 16, d$ form a A.G.P. then d can be equal to :

A. 3

B. 11

C. -8

D. -16

Answer: B

Watch Video Solution

15. Given

$$\frac{\underbrace{1000.....01}_{n \text{ zeroes}}}{\underbrace{1000.....01}_{(n+1) \text{ zeroes}}} < \frac{\underbrace{1000.....01}_{m \text{ zeroes}}}{\underbrace{1000.....01}_{(m+1) \text{ zeroes}}}$$

then which of the following true

A. $m+1<n$

B. $m<n$

C. $m<n+1$

D. $m>n+1$

Answer: B::C

View Text Solution

16. If $S_r = \sqrt{r + \sqrt{r + \sqrt{r + \sqrt{......\infty}}}}, r > 0$ then which the following is\are correct.

A. S_2, S_6, S_{13}, S_{20} are in A.P.

B. S_4, S_9, S_{16} are irrational

C. $(2S_3 - 1)^2, (2S_4 - 1)^2, (2S_2 - 1)^2$ are in A.P.

D. S_2, S_{12}, S_{36} are in G.P.

Answer: A::B::C::D

Watch Video Solution

17. Consider the A.P. $50, 48, 46, 44. \dots\dots IfS_n$ denotes the sum to n terms of this A.R. then

A. S_n is maximum for $\pi = 25$

B. the first negative terms is 26^{th} term

C. the first negative term is 27^{th} term

D. the maximum value of S_n is 650

Answer: A::C::D

Watch Video Solution

18. Let S_n be the sum to n terms of the series $\frac{2}{1^2}+\frac{5}{1^2+2^2}+\frac{7}{1^2+2^2+3^2}+\frac{9}{1^2+2^2+3^2+6^2}+\ldots\ldots$ then

A. $S_5=5$

B. $S_{50}=\frac{100}{17}$

C. $\left(S_{1001}=\frac{1001}{97}\right.$

D. $S_{\infty}=6$

Answer: A::B::D

Watch Video Solution

19. For ΔABC, if $81 + 144a^4 + 16b^4 + 9c^4 = 144$ abc, (where notations have their usual meaning), then :

A. $a > b > c$

B. $A < B < C$

C. Area of $\Delta ABC = \frac{3\sqrt{3}}{8}$

D. Triangle ABC is right angled

Answer: B::C::D

Watch Video Solution

Exercise Comprehension Type Problems

1. The first four terms of a sequence are given by $T_1 = 0, T_2 = 1, T_3 = 1, T_4 = 2. The \geq \neq raltermsisgivenby$ T_(n)=Aalpha ^(n -1) +B beta ^(n-1)$whereA, B$ alpha, beta

$are \in dependentofa$ and $Aispositive. Thevalueof$(alpha ^(2) + beta ^(2)+ alpha beta)` is equal to :

A. 1

B. 2

C. 5

D. 4

Answer: B

Watch Video Solution

2. The first four terms of a sequence are given by $T_1 = 0, T_2 = 1, T_3 = 1, T_4 = 2. The \geq \neq raltermsisgivenby$ T_(n)=Aalpha ^(n -1) +B beta ^(n-1)$whereA, B$ alpha, beta $are \in dependentofa$ and $Aispositive. Thevalueof$5 (A^(2) + B ^(2)` is equal to :

A. 2

B. 4

C. 6

D. 8

Answer: A

Watch Video Solution

3. There are two sets A and B each of which consists of three numbers in A.P.whose sum is 15 and where D and d are the common differences such that $D-d=1. If \frac{p}{q}=\frac{7}{8}$, where p and q are the product of the numbers ,respectively, and $d>0$ in the two sets .

The sum of the product of the numbers in set B taken two at a time is

A. 51

B. 71

C. 74

D. 86

Answer: B

Watch Video Solution

4. There are two sets A and B each of which consists of three numbers in A.P.whose sum is 15 and where D and d are the common differences such that $D-d=1. If \frac{p}{q}=\frac{7}{8}$, where p and q are the product of the numbers ,respectively, and $d>0$ in the two sets .

The sum of the product of the numbers in set B taken two at a time is

A. 52

B. 54

C. 64

D. 74

Answer: D

Watch Video Solution

5. Let x, y, z are positive reals and $x + y + z = 60 \text{ and } x > 3.$

Maximum value of $(x - 3)(y + 1)(x + 5)$ is :

A. $(17)(21)(25)$

B. $(20)(21)(23)$

C. $(21)(21)(21)$

D. $(23)(19)(15)$

Answer: C

Watch Video Solution

6. Let x, y, z are positive reals and $x + y + z = 60 \text{ and } x > 3.$

Maximum value of xyz is :

A. $\dfrac{(355)^3}{3^3 . 6^2}$

B. $(355)^3$

C. $\dfrac{(355)^3}{3^2 \cdot 6^3}$

D. None of these

Answer: A

Watch Video Solution

7. Let x, y, z are positive reals and $x + y + z = 60 \text{ and } x > 3.$

Maximum value of xyz is :

A. 8×10^3

B. 27×10^3

C. 64×10^3

D. 125×10^3

Answer: A

Watch Video Solution

8. Two consecutive number from n natural numbers $1, 2, 3, \ldots\ldots, $ n are removed. Arithmetic mean of the remaining numbers is $\frac{105}{4}$.

The value of n is:

A. 48

B. 50

C. 52

D. 49

Answer: B

Watch Video Solution

9. Two consecutive number from n natural numbers $1, 2, 3, \ldots\ldots, $ n are removed. Arithmetic mean of the remaining numbers is $\frac{105}{4}$.

The G.M. of the removed numbers is :

A. $\sqrt{30}$

B. $\sqrt{42}$

C. $\sqrt{56}$

D. $\sqrt{72}$

Answer: C

Watch Video Solution

10. Two consecutive number from n natural numbers $1, 2, 3, \ldots\ldots,$ n are removed. Arithmetic mean of the remaining numbers is $\frac{105}{4}$.

Let removed numbers are x_1, x_2 then $x_1 + x_2 + n =$

A. 61

B. 63

C. 65

D. 69

Answer: C

Watch Video Solution

11. The sequence $\{a_n\}$ is defined by formula $a_0 = 4$ and $a_{m+1} = a_n^2 - 2a_n + 2$ for $n \geq 0$. Let the sequence $\{b_n\}$ is defined by formula $b_0 = \frac{1}{2}$ and $b_n = \frac{2a_0 a_1 a_2 \ldots \ldots a_{n-1}}{\forall n \geq 1.}$

The value of a_{10} is equal to :

A. $1 + 2^{1-24}$

B. 4^{1024}

C. $1 + 3^{1024}$

D. 6^{1024}

Answer: C

Watch Video Solution

12. The sequence $\{a_n\}$ is defined by formula $a_0 = 4$ and $a_{m+1} = a_n^2 - 2a_n + 2$ for $n \geq 0$. Let the sequence $\{b_n\}$ is defined by formula $b_0 = \frac{1}{2}$ and $b_n = \frac{2a_0a_1a_2......a_{n-1}}{\forall n \geq 1.}$

The value of a_{10} is equal to :

A. 2

B. 3

C. 4

D. 5

Answer: B

Watch Video Solution

13. The sequence $\{a_n\}$ is defined by formula $a_0 = 4$ and $a_{m+1} = a_n^2 - 2a_n + 2$ for $n \geq 0$. Let the sequence $\{b_n\}$ is defined by formula $b_0 = \frac{1}{2}$ and $b_n = \frac{2a_0a_1a_2......a_{n-1}}{\forall n \geq 1.}$

The value of a_{10} is equal to :

A. $b_{n+1} = \frac{2b_n}{1 - b_n^2}$

B. $b_{n+1} = \frac{2b_n}{1 + b_n^2}$

C. $\dfrac{b_n}{1+b_n^2}$

D. $\dfrac{b_n}{1-b_n^2}$

Answer: B

Watch Video Solution

14. Let

$$f(n)=\sum_{r=2}^{n}\frac{r}{{}^{®}C_2{}^{r+1}C_2}, a=\lim_{x\to\infty} f(n) \text{ and } x^2-\left(2n-\frac{1}{2}\right)x+t=0$$

has two positive roots α and β.

If value of $f(7)+f(8) is \dfrac{p}{q}$ where p and q are relatively prime, then $(p-q)$ is :

A. 53

B. 55

C. 57

D. 59

Answer: D

Watch Video Solution

15. Let

$$f(n)=\sum_{r=2}^{n}\frac{r}{^{®}C_2{}^{r+1}C_2},\ a=\lim_{x\to\infty}f(n)\ \text{and}\ x^2-\left(2n-\frac{1}{2}\right)x+t=0$$

has two positive roots α and β.

If value of $f(7)+f(8)is\frac{p}{q}$ where p and q are relatively prime, then $(p-q)$ is :

A. 2

B. 6

C. 3

D. 4

Answer: B

Watch Video Solution

16. Given that sequence of number $a_1, a_2, a_3, \ldots\ldots, a_{1005}$ which satisfy

$$\frac{a_1}{a_1+1} = \frac{a_2}{a_2+3} + \frac{a_3}{a_3+5} = \ldots\ldots = \frac{a_{1005}}{a_{1005}+2009}$$

$a_1 + a_2 + a_3 \ldots\ldots a_{1005} = 2010$ find the 21^{st} term of the sequence is equal to :

A. A.P.

B. G.P.

C. A.G.R

D. H.R.

Answer: A

Watch Video Solution

17. Given that sequence of number $a_1, a_2, a_3, \ldots\ldots, a_{1005}$ which satisfy

$$\frac{a_1}{a_1+1} = \frac{a_2}{a_2+3} + \frac{a_3}{a_3+5} = \ldots\ldots = \frac{a_{1005}}{a_{1005}+2009}$$

$a_1 + a_2 + a_3 \ldots\ldots a_{1005} = 2010$ find the 21^{st} term of the sequence is equal to :

A. $\frac{86}{1065}$

B. $\frac{83}{1005}$

C. $\frac{82}{1005}$

D. $\frac{79}{1005}$

Answer: C

Watch Video Solution

Exercise Matching Type Problems

1.

	Column-I		Column-II
(A)	If three unequal numbers a, b, c are in A.P. and $b-a$, $c-b$, a are in G.P., then $\frac{a^3+b^3+c^3}{3abc}$ is equal to	(P)	1
(B)	Let x be the arithmetic mean and y, z be two geometric means between any two positive numbers, then $\frac{y^3+z^3}{2xyz}$ is equal to	(Q)	4
(C)	If a, b, c be three positive number which form three successive terms of a G.P. and $c > 4b-3a$, then the common ratio of the G.P. can be equal to	(R)	2
(D)	Number of integral values of x satisfying inequality, $-7x^2+8x-9>0$ is	(S)	0

View Text Solution

2.

	Column-I		Column-II
(A)	The sequence $a, b, 10, c, d$ are in A.P., then $a+b+c+d=$	(P)	6
(B)	Six G.M.'s are inserted between 2 and 5, if their product can be expressed as $(10)^n$. Then $n=$	(Q)	2
(C)	Let $a_1, a_2, a_3, \ldots, a_{10}$ are in A.P. and $h_1, h_2, h_3, \ldots, h_{10}$ are in H.P. such that $a_1 = h_1 = 1$ and $a_{10} = h_{10} = 6$, then $a_4 h_7 =$	(R)	3
(D)	If $\log_3 2$, $\log_3(2^x - 5)$ and $\log_3\left(2^x - \frac{7}{2}\right)$ are in A.P., then $x =$	(S)	20
		(T)	40

View Text Solution

3.

	Column-I		Column-II
(A)	The number of real values of x such that three numbers $2^x, 2^{x^2}$ and 2^{x^3} form a non-constant arithmetic progression in that order, is	(P)	0
(B)	Let $S=(a_2-a_3)\left(\frac{1}{\sqrt{a_1}+\sqrt{a_2}}+\frac{1}{\sqrt{a_2}+\sqrt{a_3}}+\ldots+\frac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}\right)$ where $a_1, a_2, a_3, \ldots, a_n$ are n consecutive terms of an A.P. and $a_i > 0\ \forall i \in \{1, 2, \ldots, n\}$. If $a_1 = 225$, $a_n = 400$, then the value of $S+7$ is equal to	(Q)	1
(C)	Let S_n denote the sum of first n terms of an non constant A.P. and $S_{2n} = 3S_n$, then $\frac{S_{3n}}{2S_n}$ is equal to	(R)	2
(D)	If t_1, t_2, t_3, t_4 and t_5 are first 5 terms of an A.P., then $\frac{4(t_1 - t_2 - t_4) + 6t_3 + t_5}{3t_1}$ is equal to	(S)	3
		(T)	4

View Text Solution

	Column-I		Column-II
(A)	$S=\sum_{n=1}^{11}(2n-1)^2$	(P)	0
(B)	$S=\sum_{n=1}^{10}(2n-1)^3$	(Q)	1
(C)	$S=\sum_{n=1}^{18}(2n-1)^2(-1)^n$	(R)	3
(D)	$S=\sum_{n=1}^{15}(2n-1)^3(-1)^{n-1}$	(S)	5
		(T)	8

4.

View Text Solution

	Column-I		Column-II
(A)	If $x, y \in R^+$ satisfy $\log_8 x+\log_4 y^2=5$ and $\log_8 y+\log_4 x^2=7$ then the value of $\frac{x^2+y^2}{2080}=$	(P)	6
(B)	In ΔABC A, B, C are in A.P. and sides a, b and c are in G.P. then $a^2(b-c)+b^2(c-a)+c^2(a-b)=$	(Q)	3
(C)	If a, b, c are three positive real numbers then the minimum value of $\frac{b+c}{a}+\frac{a+c}{b}+\frac{a+b}{c}$ is	(R)	0
(D)	In ΔABC, $(a+b+c)(b+c-a)=\lambda bc$ where $\lambda \in I$, then greatest value of λ is	(S)	2

5.

View Text Solution

6. Let $f(x) = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots\ldots\ldots + \frac{1}{n}$ such that $P(n)f(n+2) = P(n)f(n) + q(n)$. Where $P(n)Q(n)$ are polynomials of least possible degree and $P(n)$ has leading coefficient unity. Then match the following Column-I with Column-II.

	Column-I		Column-II
(A)	$\sum_{n=1}^{m} \frac{p(n)-2}{n}$	(P)	$\frac{m(m+1)}{2}$
(B)	$\sum_{n=1}^{m} \frac{q(n)-3}{2}$	(Q)	$\frac{5m(m+7)}{2}$
(C)	$\sum_{n=1}^{m} \frac{p(n)+q^2(n)-11}{n}$	(R)	$\frac{3m(m+7)}{2}$
(D)	$\sum_{n=1}^{m} \frac{q^2(n)-p(n)-7}{n}$	(S)	$\frac{m(m+7)}{2}$

View Text Solution

Exercise Subjective Type Problems

1. Let a, b, c, d be four distinct real numbers in A.P. Then half of the smallest positive valueof k satisfying $a(a-b) + k(b-c)^2 = (c-a)^3 = 2(a-x) + (b-d)^2 + (c-d)^3$ is

_________.

Watch Video Solution

2. The sum of all digits of n for which $\sum_{r=1}^{n} r2^r = 2 + 2^{n+10}$ is :

Watch Video Solution

3. If $\lim_{x \to \infty} \frac{r+2}{2^{r+1} r(r+1)} = \frac{1}{k}$, then k =

Watch Video Solution

4. The value of $\sum_{r=1}^{\infty} \frac{8r}{4r^4+1}$ is equal to :

Watch Video Solution

5. Three distinct non-zero real numbers form an A.P. and the squares of these numbers taken in same order form a G.P.If possible common ratio of G.P. are $3 \pm \sqrt{n}$, $n \in N$ then $n =$

Watch Video Solution

6. which term of an AP is zero -48,-46,-44.......?

Watch Video Solution

7. In an increasing sequence of four positive integers, the first 3 terms are in A.P., the last 3 terms are in G.P. and the fourth term exceed the first term by 30, then the common difference of A.P. lying in interval $[1, 9]$ is:

Watch Video Solution

8. The limit of $\frac{1}{n^4}\sum_{k=1}^{n} k(k+2)(k+4) as n \rightarrow \infty$ is equal to $\frac{1}{\lambda}$, then $\lambda =$

Watch Video Solution

9. Which is the last digit of $1 + 2 + 3 + \ldots\ldots + $ n if the last digit of $1^3 + 2^3 + \ldots\ldots + n^3$ is 1 ?

Watch Video Solution

10. There distinct positive numbers, a,b,c are in G.P. while $\log_c a, \log_b c, \log_a b$ are in A.P. with non-zero common difference d, then $2d =$

Watch Video Solution

11. The numbers $\frac{1}{3}, \frac{1}{3}\log_x y, \frac{1}{3}\log_y z, \frac{1}{7}\log_x x$ are in H.P. If $y = x^{®}$ and $z = x^s$, then $4(r + s) =$

Watch Video Solution

12. If $\sum_{k=1}^{\infty} \frac{k^2}{3^k} = \frac{p}{q}$, where p and q are relatively prime positive integers. Find the value of $(p - q)$,

View Text Solution

13. The sum of the terms of an infinitely decreassing Geometric Progression (GP) is equal to the greatest value of the function $f(x) = x^3 + 3x - 9$ where $x \in [-4, 3]$ and the difference between the first and second term is $f'(0)$. The common ratio $r = \frac{p}{q}$ where p and q are relatively prime positive integers. Find $(p + q)$.

Watch Video Solution

14. A cricketer has to score 4500 runs. Let a_n denotes the number of runs he scores in the n^{th} match. If $a_1 = a_2 = \dots a_{10} = 150$ and $a_{10}, a_{11}, a_{12} \dots$ are in A.P. with common difference (-2). If N be the total number of matches played by him to scoere 4500 runs. Find the sum of the digits of N.

Watch Video Solution

15. If $x = 10\sum_{r=3}^{100} \frac{1}{(r^2 - 4)}$, then $[x] =$

(where [.] denotes gratest integer function)

Watch Video Solution

16. Let $f(n) = \frac{4n + \sqrt{4n^2 + 1}}{\sqrt{2n + 1} + \sqrt{2n - 1}}, n \in N$ then the remainder when $f(1) + f(2) + f(3) + \ldots. + f(60)$ is divided by 9 is.

Watch Video Solution

17. Find the sum of series $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{6} + \frac{1}{8} + \frac{1}{9} + \frac{1}{12} + \ldots\ldots\infty,$ where the term are the reciprocals of the positive integers whose only prime factors are two's and three's :

Watch Video Solution

18. Let $a_1, a_2, a_3, \ldots\ldots, a_n$ be real numbers in arithmatic progressin such that $a_1 = 15$ and a_2 is an integer.Given $\sum_{r=1}^{10} (a_r)^2 = 1185. If S_n = \sum_{r=1}^{n} a_r$ and maximum value of n is N for which $S_n \geq S_{(n+1)}$, then find $N - 10.$

Watch Video Solution

19. Let the roots of the equation $24x^3 - 14x^2 + kx + 3 = 0$ form a geometric sequence of real numbers. If absolute value of k lies between the roots of the equation $x^2 + \alpha^2 x - 122 = 0,$ then the largest integral value of α is :

Watch Video Solution

20. How many ordered pair (s) satisfy

$$\log\left(x^2+\frac{1}{3}y^3+\frac{1}{9}\right)=\log x+\log y$$

Watch Video Solution

21. Let a and b be positive integers. The values. The value of xyz is 55 and $\frac{343}{55}$ when a,x,y,z,b are in arithmatic and harmonic progression respectively. Find the value of $(a+b)$

View Text Solution