# MATHS

## BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

## SEQUENCES AND SERIES

**Examples**

**1.** If $a_n = \frac{n-3}{4}$, then find $a_{11}$, $a_{15}$ and hence find $\frac{a_{15}}{a_{11}}$.

Watch Video Solution

**2.** The Fibonacci sequence is defined by $1 = a_1 = a_2$ and $a_n = a_{n-1} + a_{n-2}, n > 2$. Find $\frac{a_{n+1}}{a_n}$, for $n = 1, 2, 3, 4, 5,$

Watch Video Solution

**3.** Consider an A.P whose $n^{th}$ term is $5n + 1$. Find its first two terms

Watch Video Solution

**4.** Find the sum of multiples of $8$ between $300$ and $500$.

Watch Video Solution

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

Watch Video Solution

**6.** In an A.P, the first term is $5$ and the sum of the first two terms is $\frac{15}{2}$.

(i) Find the common difference

Watch Video Solution

**7.** Show that the sum of $(m+n)^{th}$ and $(m-n)^{th}$ term of an A.P is equal to twice the $m^{th}$ term.

Watch Video Solution

**8.** The difference between any two consecutive interior angles of a polygon is $5^\circ$ .If the smallest angle is $120^\circ$ , find the number of the sides of the polygon.

Watch Video Solution

**9.** In an A.P. if the $m^{th}$ term is $n$ and the $n^{th}$ term is $m$, where $m \neq n$, find the $p^{th}$ term.

View Text Solution

**10.** In an A.P, the first term is $2$ and the sum of the first two terms is $5$.

(i) Find the common difference

Watch Video Solution

**11.** Write the sum of $p$ terms of an A.P, given that the first term is $'a'$ and the common difference $'d'$.

Watch Video Solution

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

Watch Video Solution

**13.** If $a\left(\frac{1}{b}+\frac{1}{c}\right), b\left(\frac{1}{c}+\frac{1}{a}\right), c\left(\frac{1}{a}+\frac{1}{b}\right)$ are in A.P., prove that a, b, c, are in A.P.

Watch Video Solution

**14.** The income of a person is Rs. 3,00,000 in the first year and he receives an increases of Rs. 10,000 to his income per year for the next 19 years. Find the total amount he received in 20 years.

Watch Video Solution

**15.** If $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the A.M. between a and b, then find the value of n.

Watch Video Solution

**16.** Insert 6 Arithmetic Means between 3 and 24.

Watch Video Solution

**17.** In an A.P., if $p^{th}$ term is $\frac{1}{q}$ and $q^{th}$ term is $\frac{1}{p}$, prove that the sum of first $pq$ terms is $\frac{1}{2}(pq+1)$, where $p \neq q$

View Text Solution

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

Watch Video Solution

**19.** The sums of n terms of two arithmetic progressions are in the ratio 5n + 4 : 9n + 6. Find the ratio of their $18^{th}$ terms.

Watch Video Solution

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

Watch Video Solution

**21.** If the sum of $n$ terms of an A.P. is $3n^2 + 5n$ and its $m^{th}$ term is 164, find the value of $m$.

Watch Video Solution

**22.** Between 1 and 31, m numbers have been inserted in such a way that the resulting sequence is an A. P. and the ratio of $7^{th}$ and $(m-1)^{th}$ numbers is 5 : 9. Find the value of m.

Watch Video Solution

**23.** Given the sum of two consecutive terms in an A.P is 21 and their product is 90.

Find the common difference.

Watch Video Solution

**24.** In a G.P., the $3^{rd}$ term is 24 and the $6^{th}$ term is 192. Find the $10^{th}$ term.

View Text Solution

**25.** The $n^{th}$ term of the G.P. $5, \frac{-5}{2}, \frac{5}{4}, \frac{-5}{8}, \ldots$ is $\frac{5}{1024}$. Find the value of $n$.

View Text Solution

**26.** If the $3^{rd}, 8^{th}$ and $13^{th}$ terms of a G.P are $x, y, z$ respectively, then prove that $x, y, z$ are in G.p.`.

Watch Video Solution

**27.** Consider the G.P 3, 6, 12, ..... . Which term of this G.P is 96?

Watch Video Solution

**28.** Consider the G.P. $3, \frac{3}{2}, \frac{3}{4}, \ldots$

(i) Find the common ratio of the G.P.

(ii) How many terms of the above G.P. are needed to give the sum $\frac{3069}{512}$ ?.

View Text Solution

**29.** Find the sum of first 10 terms of a G.P whose $3^{rd}$ term is 12 and the $8^{th}$ term is 384.

Watch Video Solution

**30.** The sum of first three terms of a G.P. is $\frac{13}{12}$ and their product is – 1. Find the common ratio and the terms.

Watch Video Solution

**31.** The sum of the first three terms of a G.P. is 16 and the sum of the next three terms is 128.

(i) Determine the first term and common ratio.

(ii) Find also the sum of $n$ terms of the G.P.

Watch Video Solution

**32.** Find the sum of the sequence 7, 77, 777, 7777, ... to n terms.

Watch Video Solution

**33.** Find the sum of the following series up to n terms:

(i) $5 + 55 + 555 + \ldots\ldots$ (ii) $.6 + .66. + .666 + \ldots\ldots\ldots\ldots$

Watch Video Solution

**34.** If $a, b, c$ are in G.P and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$, prove that $x, y, z$ are in A.P.

Watch Video Solution

**35.** Insert three Geometric means between 1 and 256.

Watch Video Solution

**36.** If A.M and G.M between two positive numbers $a$ and $b$ are 10 and 8 respectively, find the numbers.

View Text Solution

**37.** Find the $20^{th}$ and $n^{th}$ terms of the G.P. $\frac{5}{2}, \frac{5}{2}, \frac{5}{8}, ....$

View Text Solution

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

View Text Solution

**39.** Evaluate $\sum_{k-1}^{11} \left(2 + 3^k\right)$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

**42.** Find the sum to n terms of the sequence, 8, 88, 888, 8888... .

Watch Video Solution

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

Watch Video Solution

**44.** Show that the products of the corresponding terms of the sequences a, ar, $ar^2, \ldots ar^{n-1}$ and A, AR, $\mathrm{AR}^{22}, \ldots \mathrm{AR}^{n-1}$ form a G.P, and find the common ratio.

Watch Video Solution

**45.** Find four numbers forming a geometric progression in which the third term is greater than the first term by 9, and the second term is

greater than the $4^{\text{th}}$ by 18.

Watch Video Solution

**46.** If the $p^{\text{th}}$, $q^{\text{th}}$ and $r^{\text{th}}$ terms of a G.P. are a, b and c, respectively. Prove that $a^{q-r}b^{r-p}c^{P-q} = 1$.

Watch Video Solution

**47.** If the first and the $n^{\text{th}}$ term of a G.P. are a and b, respectively, and if P is the product of n terms, prove that $P^2 = (ab)^n$.

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

**50.** Find the value of n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be the geometric mean between a and b.

Watch Video Solution

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

Watch Video Solution

**52.** The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of $2^{\text{nd}}$ hour, $4^{\text{th}}$ hour and $n^{\text{th}}$ hour ?

Watch Video Solution

**53.** If A.M. and G.M. of roots of a quadratic equation are 8 and 5, respectively, then obtain the quadratic equation.

Watch Video Solution

**54.** Find the $20^{th}$ term of the series $2 \times 4 + 4 \times 6 + 6 \times 8 + \ldots + n$ terms.

Watch Video Solution

**55.** Find the sum to n terms of each of the series in

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

Watch Video Solution

**56.** Find the sum to n terms of the series in whose $n^{th}$ terms is given by

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

Watch Video Solution

**57.** If the sum of three numbers in A.P., is 24 and their product is 440, find the numbers.

Watch Video Solution

**58.** Let sum of $n$, $2n$, $3n$, terms of an A.P are $S_1$, $S_2$, $S_3$ respectively. Prove that $S_3 = 3(S_2 - S_1)$.

Watch Video Solution

**59.** Find the sum of integers from 1 to 100 that are divisible by 2 or 5.

Watch Video Solution

**60.** Find the sum of all two digit numbers which when divided by 4, yields 1 as remainder.

Watch Video Solution

**61.** If f is a function satisfying f (x +y) = f(x) f(y) for all $x, y \in N$ such that $f(1) = 3$ and $\sum_{x=1}^{n} f(x) = 120$, find the value of n.

Watch Video Solution

**62.** The sum of some terms of G.P. is 315 whose first term and the common ratio are 5 and 2, respectively. Find the last term and the number of terms.

Watch Video Solution

**63.** The sum of three numbers in G.P. is 56. If we subtract 1, 7, 21 from these numbers in that order, we obtain an arithmetic progression. Find the numbers.

Watch Video Solution

**64.** The sum of the first four terms of an A.P. is 56. The sum of the last four terms is 112. If its first term is 11, then find the number of terms.

Watch Video Solution

**65.** If $\frac{a+bx}{a-bx}=\frac{b-cx}{b-cx}=\frac{c+dx}{c-dx}(x\neq 0)$ then show that a, b, c and d are in G.P.

Watch Video Solution

**66.** Let S be the sum, P the product and R the sum of reciprocals of n terms in a G.P. Prove that $P^2R^n=S^n$ .

Watch Video Solution

**67.** The$p^{th}$, $q^{th}$ and $r^{th}$ terms of an A.P. are a, b, c, respectively. Show that $(q-r)a+(r-p)b+(q-p)c=0$

Watch Video Solution

**68.** If a, b, c, d are in G.P, prove that $(a^n+b^n),(b^n+c^n),(c^n+d^n)$ are in G.P.

Watch Video Solution

**69.** Given tan A and tan B are the roots of $x^2 - ax + b = 0$. The value of $\sin^2(A + B)$ is

Watch Video Solution

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

Watch Video Solution

**71.** If a, b, c are in A.P., b, c, d are in G.P. and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ are in A.P. prove that a,c,e are in GP.

Watch Video Solution

**72.** Find the sum of the first n terms of the series: 3+ 7 +13 +21 +31 +.....

Watch Video Solution

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

Watch Video Solution

**74.** Find the sum of the following series up to n terms:

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

Watch Video Solution

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

Watch Video Solution

**76.** A farmer buys a used tractor for Rs 12000. He pays Rs 6000 cash and agrees to pay the balance in annual instalments of Rs 500 plus 12% interest on the unpaid amount. How much will the tractor cost him?

Watch Video Solution

**77.** Shamshad Ali buys a scootor for Rs 22000. He pays Rs 4000 cash and agrees to pay the balance in annual instalment of Rs 1000 plus $10\%$ interest on the unpaid amount. How much will the scootor cost him?

Watch Video Solution

**78.** A person writes a letter to four of his friends. He asks each one of them to copy the letter and mail to four different persons with instruction that they move the chain similarly. Assuming that the chain

is not broken and that it costs 50 paise to mail one letter. Find the amount spent on the postage when 8th set of letter is mailed.

Watch Video Solution

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

Watch Video Solution

**80.** A manufacturer reckons that the value of a machine, which costs him Rs. 15625,will depreciate each year by 20%. Find the estimated value at the end of 5 years.

Watch Video Solution

**81.** 150 workers were engaged to finish a piece of work in a certain number of days. Four workers dropped from the work on the second day. Four workers dropped on third day and so on. It took 8 more days to finish the work. Find the number of days in which the work was completed. [Let the no.of days to finish the work is 'r' then

$150x = \frac{x+8}{2}[2 \times 150 + (x+8-1)(-4)]$

Watch Video Solution

**82.** For an H.P. the $3^{rd}$ term and $14^{th}$ terms are respectively $\frac{6}{7}$ and $\frac{1}{3}$.

(i) Find the first term of H.P.

(ii) Hence find the $10^{th}$ terms of H.P.

Watch Video Solution

**83.** The A.M. between two numbers is 27 and H.M. is 12. Find G.M.

Watch Video Solution

**84.** Two A.M's $A_1$ and $A_2$, two G.M's $G_1$ and $G_2$ and two H.M's $H_1$ and $H_2$ are inserted between two numbers $a$ and $b$.

(i) Express $A_1 + A_2$ in terms of $a$ and $b$.

(ii) Express $G_1G_2$ in terms of $a$ and $b$.

(iii) Express $\frac{1}{H_1} + \frac{1}{H_2}1$ in terms of $a$ and $b$.

(iv) Show that $\frac{1}{H_1} + \frac{1}{h_2} = \frac{A_1 + A_2}{G_1G_2}$

Watch Video Solution

## Exercise

**1.** $a_1, a_2, a_3$ ..... Is an A.P. which of the following is true

A. 1. $a_1 + a_2 = a_2 + a_4$

B. 2. $a_2 + a_8 = a_4 + a_6$

C. 3. $a_2 = 2a_4$

D. 4. $a_1 < a_2 < a_3 \ldots\ldots\ldots\ldots$

**Answer: B**

Watch Video Solution

**2.** The sum to $n$ terms of the sequence $5, 11, 17, 23, \ldots\ldots$ is $320$ Then $n =$ .

A. 9

B. 10

C. 11

D. 12

**Answer: B**

Watch Video Solution

**3.** The $29^{th}$ term of an A.P is twice its $19^{th}$ term. Its $9^{th}$ term is equal to

A. $5^{th}$ term

B. $7^{th}$ term

C. $11^{th}$ term

D. Zero

**Answer: D**

Watch Video Solution

**4.** The sum to $n$ terms of a series is $\frac{n(n+1)(n+2)}{3}$. The $12^{th}$ terms is

A. 182

B. 122

C. 156

D. 1092

**Answer: D**

Watch Video Solution

**5.** the sum of the first $n$ terms of a sequence is $an^2 + bn$. Then the sum of the next $n$ terms is

A. $3an^2 + 2^{bn}$

B. $2an^2 + bn$

C. $3an^2 + bn$

D. $4an^2 + 2^{bn}$

**Answer: C**

Watch Video Solution

**6.** In a certain AP, 5times the $5^{th}$ term is equal to 8 times the $8^{th}$ term. Its $13^{th}$ term is

A. 0

B. $-1$

C. $-12$

D. $-13$

**Answer: A**

Watch Video Solution

**7.** The sum of the 9 AM's between $2\&24$ is

A. 99

B. 1289

C. 117

D. 143

**Answer: C**

Watch Video Solution

**8.** The difference between any two consecutive interior angles of a polygon is $5^\circ$ .If the smallest angle is $120^\circ$ , find the number of the sides of the polygon.

A. 5

B. 7

C. 9

D. 15

**Answer: C**

Watch Video Solution

**9.** The number of terms in the sequence $96, 48, 24, 12. \ldots \ldots \ldots \frac{3}{16}$ is

A. 9

B. 10

C. 16

D. 12

**Answer: B**

Watch Video Solution

**10.** the sum of the first six terms of a GP is 9 times the sum of the first three terms. The common ratio is

A. 3

B. $-3$

C. 4

D. 2

**Answer: D**

Watch Video Solution

**11.** In a GP of positive succeeding terms terms. The common ratio is

A. $\frac{\sqrt{5}+1}{2}$

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

C. $\frac{-\sqrt{5}-1}{2}$

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

**Answer: B**

Watch Video Solution

**12.** If $0 < x < 1$ and $y = x - x^2 + x^3 - x^4 + \ldots\ldots \infty$ then $y + y^2 + y^3 + \ldots\ldots\infty$ is equal to

A. $x$

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

C. $\frac{y}{1-y}$

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

**Answer: A**

Watch Video Solution

**13.** If the $4^{th}$ and $7^{th}$ terms of a GP are 16 and 128 respectively, then the $10^{th}$ terms is

A. 128

B. 512

C. 1024

D. 256

**Answer: C**

Watch Video Solution

**14.** The sum of the first two terms of a GP of positive terms is $\frac{5}{3}$ and the sum to infinity of the series is 3. the common ratio is

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

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

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

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

**Answer: B**

Watch Video Solution

**15.** If A be the AM and G be the GM of two real numbers, the numbers are

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

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

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

D. $\pm \sqrt{A^2 + G^2}$

**Answer: A**

Watch Video Solution

**16.** The AM and GM of two positive numbers are 15 and 9 respectively. The numbers are

A. 12, 18

B. 9, 21

C. 1, 81

D. 3, 27

**Answer: D**

Watch Video Solution

**17.** If G is the GM between $a$ and $b$ the $\frac{1}{G+a}+\frac{1}{G+b}=$

A. G

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

C. $G^2$

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

**Answer: B**

Watch Video Solution

**18.** If $|r| > 1, x = a + \frac{a}{r} + \frac{a}{r^2} + \ldots\ldots\ldots \infty$, $y = b - \frac{b}{r} + \frac{b}{r^2} - \ldots\ldots\ldots\infty$ and $z = c + \frac{c}{r^2} + \frac{c}{r^4} + \ldots\ldots\infty$, then the value of $\frac{xy}{z} =$

A. 1

B. $r$

C. $\frac{ab}{c}$

D. $\frac{c}{ab}$

**Answer: C**

Watch Video Solution

**19.** If the $p^{th}$ term if an A.P. is $q$ and the $q^{th}$ term of an A.P is $p$ then the $r^{th}$ term is

A. $q - p + r$

B. $p - q + r$

C. $p + q + r$

D. $p + q - r$

**Answer: D**

Watch Video Solution

**20.** The sum of the series `1^(2) + 3^(2) + 5^(2) + .....+n'

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

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

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

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

**Answer: B**

Watch Video Solution

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

A. $121\left(\sqrt{6}+\sqrt{2}\right.$

B. $243\left(\sqrt{3}+\sqrt{1}\right.$

C. $\frac{121}{\sqrt{3}-1}$

D. $243\left(\sqrt{3}-1\right)$

**Answer: A**

Watch Video Solution

**22.** If three positive real numbers $a$, $b$, $c$ are in A.P and $abc=4$, then the minimum possible value of $b$ is

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

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

C. $2^{\frac{1}{3}}$

D. $2^{\frac{5}{2}}$

**Answer: B**

Watch Video Solution

**23.** Sum to infininty of the series $1+\frac{4}{5}+\frac{7}{5^2}+\frac{10}{5^3}+\ldots\ldots$ is

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

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

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

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

**Answer: C**

Watch Video Solution

**24.** The sum of the series $2, 5, 8, 11, \ldots\ldots$ is $60100$, then $n$ is

A. 100

B. 200

C. 150

D. 250

**Answer: B**

Watch Video Solution

**25.** Let $a_n$ be the $n^{th}$ term of a G.P of positive integers. Let $\sum_{n=1}^{100} a_{2n} = \alpha$ and $\sum_{n=1}^{100} a_{2n+1} = \beta$ such that $\alpha \neq \beta$. Then the common ratio is

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

B. $\frac{\beta}{\alpha}$

C. $\left(\frac{\alpha}{\beta}\right)^{1/2}$

D. $\left(\frac{\beta}{\alpha}\right)^{1/2}$

**Answer: B**

Watch Video Solution

**26.** $\cos x = b$ for what $b$ do the roots of the equation form an A.P?

A. $-1$

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

C. $\frac{\sqrt{3}}{2}$

D. None of these

**Answer: A**

Watch Video Solution

**27.** Sum of all terms in in G.P is 5 times the sum of odd terms. The common ratio is

A. 2

B. 3

C. 4

D. 5

**Answer: C**

Watch Video Solution

**28.** Sum of $n$ terms of the serise $\sqrt{2}+\sqrt{8}+\sqrt{18}+\sqrt{32}+....$ is

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

B. $2n(n+1)$

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

D. 1

**Answer: C**

Watch Video Solution

**29.** The sum of series $1 + 2x + 3x^2 + 4x^3 + \ldots\ldots$ up to infinity when $x$ lies between $0$ and $1$ i.e., $0 < x < 1$ is

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

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

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

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

**Answer: D**

Watch Video Solution

**30.** If $\log_3^2, \log_3(2^x - 5)$ and $\log\left(2^x - \frac{7}{2}\right)$ are in A.P then the value is $x$ is

A. 2

B. 3

C. 4

D. 5

**Answer: B**

Watch Video Solution

**31.** If the sum of first $n$ positive integers is $\frac{1}{5}$ times the sum of their square then $n$ equals

A. 5

B. 6

C. 7

D. 8

**Answer: C**

Watch Video Solution

Watch Video Solution

**32.** The second term of an A.P is $(x - y)$ and fifth term is (x + y), then the first term is

A. $x - \frac{1}{3}y$

B. $x - \frac{2}{3}y$

C. $x - \frac{4}{3}y$

D. $x - \frac{5}{3}y$

**Answer: D**

Watch Video Solution

**33.** Three numbers are in G.P. if we double the middle term, we get an A.P. Then the common ratio of G.P equals

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

B. $3 \pm \sqrt{2}$

C. $3 \pm \sqrt{5}$

D. $5 \pm \sqrt{3}$

**Answer: A**

Watch Video Solution

**34.** Three non zero numbers $a, b, c$ are in A.P. Increasing $a$ by 1 or increasing $c$ by 2, the number become in G.P then $b$ equals

A. 10

B. 12

C. 14

D. 16

**Answer: B**

Watch Video Solution

Watch Video Solution

**35.** If $x > 0$ then the sum of the series $e^{-x} - e^{-2x} + e^{-3x} \ldots\ldots \infty$ is

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

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

C. $\frac{1}{1 + e^{-x}}$

D. $\frac{1}{1 + e^{x}}$

**Answer: D**

Watch Video Solution

**36.** The sum of the series $0.4 + 0.004 + 0.00004 + \infty$ is

A. $\frac{11}{25}$

B. $\frac{41}{100}$

C. $\frac{40}{99}$

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

**Answer: C**

Watch Video Solution

**37.** If $(1.05)^{50} = 11.658$ then $\sum_{n=1}^{49} (1.05)^n$ equals

A. 208.34

B. 212.12

C. 212.16

D. 213.16

**Answer: C**

Watch Video Solution

**38.** The product of $n$ positive numbers is 1, then their sum is a positive integer, that is

A. equal to 1

B. equal to $n + n^2$

C. divisible by $n$

D. never less than $n$

**Answer: D**

Watch Video Solution

**39.** If $x$, $y$, $z$ are in A.P then $e^{-x}$,$e^{-y}$and $e^{-z}$ are

A. A.P

B. G.P

C. H.P

D. no definite sequence

**Answer: B**

Watch Video Solution

**40.** If the sum of the first $n$ terms of a series be $5n^2 + 2n$, then its second term is

A. 6

B. 7

C. 8

D. 9

**Answer: A**

Watch Video Solution

**41.** If the sum of the first $n$ terms of a series be $5n^2 + 2n$, then its second term is

A. 16

B. 17

C. $\frac{27}{14}$

D. $\frac{50}{15}$

**Answer: B**

Watch Video Solution

**42.** If A.M and G.M of the roots of a quadratic equation in $x$ are $p$ and $q$ repectively then its equation is

A. $x^2 - 2px + q^2 = 0$

B. $x^2 + 2px + q^2 = 0$

C. $x^2 - px + q = 0$

D. $x^2 - 2px + q = 0$

**Answer: A**

Watch Video Solution

**43.** If the $10^{th}$term of G.P is 9 and $4^{th}$term is 4 then its $7^{th}$term is

A. 6

B. 36

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

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

**Answer: A**

Watch Video Solution

**44.** If $x > 1, y > 1, z > 1$ are in G.P then $\frac{1}{1+\log x}, \frac{1}{1+\log y}, \frac{1}{1+\log z}$ are in

A. A.P

B. H.P

C. G.P

D. None of these

**Answer: A**

Watch Video Solution

**45.** Suppose $a, b, c$ are in a.P and $a^2, b^2, c^2$ are in G.P. If $a < b < c$ and $a + b + c = \frac{3}{2}$ then the value of $a$ Is

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

B. $\frac{1}{2\sqrt{3}}$

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

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

**Answer: C**

Watch Video Solution

**46.** If the $7^{th}$ term of n A.P is 40. Then the sum of its first 13 terms is

A. 520

B. 53

C. 2080

D. 1040

**Answer: A**

Watch Video Solution

**47.** An infinite G.P has first 13 term as $a$ and sum 5 , then

A. $a < -10$

B. $-10 < a < 0$

C. $0 < a < 10$

D. $a > 10$

**Answer: C**

Watch Video Solution

**48.** If the sum of $p$ terms of an A.P is equal to sum of $q$ terms $(p \neq q)$ then the sum of $(p+q)$ terms is

A. 1

B. 2

C. 0

D. $-1$

**Answer: C**

Watch Video Solution

**49.** Three numbers from an increasing G.P. If the middle term is doubled the new number are in A.P. The common ratio of G.P will be

A. $2+\sqrt{3}$

B. $2\pm\sqrt{3}$

C. $3\sqrt{2}$

D. $3+\sqrt{2}$

**Answer: B**

Watch Video Solution

## Questions From Competitive Exams

**1.** The sum to $n$ terms of the series $\frac{1}{2}+\frac{3}{4}+\frac{7}{8}+\frac{15}{16}+\ldots\ldots$ is

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

B. 1

C. $n-1$

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

**Answer: A**

Watch Video Solution

**2.** $0.2+0.22+0.222+\ldots\ldots\ldots$ to $n$ terms =

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

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

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

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

**Answer: C**

Watch Video Solution

**3.** If $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ is the arithmetic mean between $a$ and $b$, then $n$ =

A. 2

B. $-2$

C. 0

D. 2

**Answer: C**

Watch Video Solution

**4.** If $(i)^2 = -1, (i)^2 + (i)^4 + (i)^6 + \ldots\ldots$ to $(2n+1)$ terms =

A. $-1$

B. 1

C. 0

D. 2

**Answer: A**

Watch Video Solution

**5.** If $S_n$ denotes the sum of $n$ terms of an A.P., $S_{n+3} - 3S_{n+2} + 3S_{n+1} - S_n =$

A. 3

B. 1

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

D. 0

**Answer:**

Watch Video Solution

**6.** The HM of 2 numbers is 4. Their AM is A and GM is G. If G satisfies $2A + G^2 = 27$, The numbers are

A. 6, 9

B. 9, 12

C. 3, 6

D. 4, 8

**Answer: C**

Watch Video Solution

**7.** The angle of triangle are in $30^\circ$. The greatest angle in radians is

A. 1. $\frac{7\pi}{12}$

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

C. 3. $\frac{5\pi}{6}$

D. 4. $\frac{\pi}{2}$

**Answer: D**

Watch Video Solution

**8.** How many terms of the geometric series $1 + 4 + 16 + 64 + \ldots\ldots\ldots$ will make the sum 5461?

A. 7

B. 8

C. 27

D. 28

**Answer: A**

Watch Video Solution

**9.** Find the value of n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be the geometric mean between a and b.

A. 0

B. 1

C. $-1$

D. 2

**Answer: A**

Watch Video Solution

**10.** The sum of the series $1 + 2.2 + 3.2^2 + 4.2^3 + 5.2^4 + \ldots\ldots\ldots + 100.2^{99}$ is

A. $99.2^{100}$

B. $100.2^{100}$

C. $99.2^{100} + 1$

D. $1000.2^{100}$

**Answer: C**

Watch Video Solution

**11.** If A, G, H denote respectively the AM, GM and HM between two unequal positive numbers, then

A. $A = G^2H$

B. $G^2 = AH$

C. $A^2 = G^2H$

D. $A = GH$

**Answer: B**

Watch Video Solution

**12.** Let $a, b, c$ be district real numbers. If $a, b, c$ are in G.P and $a + b + C = bx$, the $x \in$

A. a. $(0, \infty)$

B. b. $(-\infty, 0)$

C. c. $(-1, 3)$

D. d. $R - (-1, 3)$

**Answer: D**

Watch Video Solution

**13.** The numbers of terms of the A.P $3, 7, 11, 15, \ldots\ldots$ to be taken so that the sum is 406 is

A. 5

B. 10

C. 12

D. 14

**Answer: D**

Watch Video Solution

**14.** If the progression $3, 10, 17, \ldots\ldots$ and $63, 65, 67, \ldots\ldots$ are such that their $n^{th}$ terms are equal, that $n$ is equal to

A. 13

B. 15

C. 9

D. 8

**Answer: A**

Watch Video Solution

**15.** Which term of the geometric sequence $5, 2, \frac{4}{5}, \frac{8}{25} \ldots$ is $\frac{128}{15625}$ ?

A. 11

B. 10

C. 9

D. 4

**Answer: A**

Watch Video Solution

**16.** If $a, b$ and $c$ are respectively the $p^{th}$,$q^{th}$and $r^{th}$ terms of an A.P., then

$$\begin{vmatrix} a & p & 1 \\ b & q & 1 \\ c & r & 1 \end{vmatrix} =$$

A. 1

B. $-1$

C. 0

D. $pqr$

**Answer: C**

Watch Video Solution

**17.** The sum of infinite terms of the geometric progression $\frac{\sqrt{2}+1}{\sqrt{2}-1}$, $\frac{1}{2-\sqrt{2}}, \frac{1}{2}$..... Is

A. $\sqrt{2}\left(\sqrt{2}+1\right)^2$

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

C. $5\sqrt{2}$

D. $3\sqrt{2}+\sqrt{5}$

**Answer: A**

Watch Video Solution

**18.** The two geometric means between the numbers 1 and 64 are

A. 1 and 64

B. 4 and 16

C. 2 and 16

D. 8 and 16

**Answer: B**

Watch Video Solution

**19.** If $1+\frac{1+2}{2}+\frac{1+2+3}{3}+\ldots\ldots$ to $n$ 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. $n^2$

**Answer: A**

Watch Video Solution

**20.** If $a, b,$ and c` are in A.P., then which one of thew following is not true?

A. $\frac{k}{a}, \frac{k}{b}$ nad $\frac{k}{c}$ are in H.P.

B. $a+k, b+k$ and $c+k$ are in A.P.

C. $ka, kb,$ and $kc$ are in A.P.

D. $a^2, b^2$ and $c^2$ are in A.P.

**Answer: D**

Watch Video Solution

**21.** If are the $n$ Arithmetic means between $a$ and $b$, then $2\sum_{I-1}^{n} a_i =$

A. $ab$

B. $n(a+b)$

C. $nab$

D. $\frac{a+b}{n}$

**Answer: B**

Watch Video Solution

**22.** If the third term of a G.P is P. Then the Product of the first 5 terms of the G.P is

A. $p^3$

B. $p^2$

C. $p^{10}$

D. $p^5$

**Answer: D**

Watch Video Solution

**23.** The sum to $n$ terms of the series $\frac{4}{3}+\frac{10}{9}+\frac{28}{27}+\ldots\ldots$ is

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

B. $\frac{3^n(2n+1)-1}{2(3^n)}$

C. $\frac{3^n(n-1)}{2(3^n)}$

D. $\frac{3^n - 1}{2}$

**Answer: B**

Watch Video Solution

**24.** A long a road lie an odd number of stones placed at intervals of 10 meters. These stones have to be assembled around the middle stone. A person can carry only one stone ar a time. A man started the job with one of the end stones by carrying them in succession. In carrying all the stones, the man covered a total distance of 3 kilometers. Then the total number of stones is

A. 20

B. 25

C. 12

D. 24

**Answer: B**

Watch Video Solution

**25.** Suppose you are appointed to a post carrying a scale of pay of Rs. 800-50-1200-75-2100. The total pay that you would draw in a span of 6 years is (assume that there is no allowance).

A. a. 66660

B. b. 66000

C. c. 60000

D. d. 66600

**Answer: D**

Watch Video Solution

**26.** The quardritic equation in $x$ such that the arithmetic mean of its roots is 5 and geometric mean of the roots is 4, is given by

A. $x^2 + 20x + 16 = 0$

B. $x^2 - 10x + 16 = 0$

C. $x^2 + 10x + 16 = 0$

D. $x^2 - 10x - 16 = 0$

**Answer: B**

Watch Video Solution

**27.** If the sum of $n$ terms of the series $2^3 + 4^3 + 6^3 + \ldots\ldots\ldots$ is $3528$ then $n =$

A. 10

B. 6

C. 8

D. 9

**Answer: B**

Watch Video Solution

**28.** ..... term of the G.P. $3, 3\sqrt{3}, 9 \ldots\ldots$ is 2187

A. 15

B. 14

C. 13

D. 19

**Answer: C**

Watch Video Solution

**29.** A ball is dropped from a height of 48 meters and rebounds $\frac{2}{3}$ of the distance it falls. If it continues to fall and rebound in this way, the distance the ball travels before coming to rest is

A. a. 144 meters

B. b. 240 meters

C. c. 120 meters

D. d. 96 meters

**Answer: B**

Watch Video Solution

**30.** The sum of $15^2 + 16^2 + 17^2 + \ldots\ldots + 30^2 =$

A. 8840

B. 8440

C. 8540

D. 8450

**Answer: B**

Watch Video Solution

**31.** If $a_1, a_2, a_3, a_4, a_5$ and $a_6$ are six arithmetic means between 3 and 31, then $a_6 - a_5$ and $a_1 + a_6$ are respectively =

A. 5 and 34

B. 4 and 35

C. 4 and 34

D. 4 and 36

**Answer: C**

Watch Video Solution

**32.** The sum to $n$ terms of the series $1+(1+3)+(1+3+9)+(1+3+9+27)+\ldots\ldots$ is

A. $\frac{3(3^n-1)}{4}-1$

B. $\frac{3(3^n-1)-2n}{4}$

C. $\frac{3(3^n-1)-n}{4}$

D. $\frac{2n-3(3^n-n)}{4}$

**Answer: B**

View Text Solution

**33.** If $x, y, z$ are in A.P then $\frac{1}{\sqrt{x}+\sqrt{y}}, \frac{1}{\sqrt{z}+\sqrt{x}}, \frac{1}{\sqrt{y}+\sqrt{z}}$ are in

A. A.P

B. G.P

C. H.P

D. A.P and H.P

**Answer: A**

Watch Video Solution

**34.** The product of $(32)(32)^{1/6}(32)^{1/36}$ ..... To $\infty$ is

A. 16

B. 32

C. 64

D. 0

**Answer: C**

Watch Video Solution

**35.** If A.M and G.M of $x$ and $y$ are in the ratio $p:q$, then $x:y$ is

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

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

C. c. $p: q$

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

**Answer: B**

Watch Video Solution

**36.** The difference between any two consecutive interior angles of a polygon is $5^\circ$ .If the smallest angle is $120^\circ$ , find the number of the sides of the polygon.

A. 9

B. 10

C. 16

D. 5

**Answer: A**

Watch Video Solution

**37.** In an arithmetic progression, the $24^{th}$ term is 100. Then the sum of the first 47 terms of the arithmetic progression is

A. 2300

B. 2350

C. 2400

D. 4600

**Answer: D**

Watch Video Solution

**38.** If $a, b$ and $c$ are in geometric progression and the roots of the equation $ax^2 + 2bx + c = 0$ are $\alpha$ and $\beta$ and those of $cx^2 + 2bx + a = 0$ are $\gamma$ and $\delta$

A. $\alpha \neq \beta \neq \gamma \neq \delta$

B. $\alpha \neq \beta$ and $\gamma \neq \delta$

C. $a\alpha = a\beta$ and $c\gamma = c\delta$

D. $\alpha = \beta$ and $\gamma = \delta$

**Answer: C**

Watch Video Solution

**39.** If $a_1, a_2, \ldots\ldots\ldots, a_{50}$ are in G.P, then $\frac{a_1 - a_3 + a_5 - \ldots\ldots + a_{49}}{a_2 - a_4 + a_6 - \ldots\ldots + a_{50}} =$

A. 0

B. 1

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

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

**Answer: C**

Watch Video Solution

**40.** 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

A. 2

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

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

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

**Answer: D**

Watch Video Solution

**41.** If $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in A.P., then

A. $a, b, c$ are in A.P.

B. $c, a, b$ are in A.P.

C. $a^2, b^2, c^2$ are in A.P.

D. $a, b, c$ are in G.P.

**Answer: C**

Watch Video Solution

**42.** In an infinite geometric series the first term is $a$ and common ratio is $r$. If the sum of the series is 4 and the seond term is $\frac{3}{4}$, then $(a, r)$ is

A. $\left(\frac{4}{7}, \frac{3}{7}\right)$

B. $\left(2, \frac{3}{8}\right)$

C. $\left(\frac{3}{2}, \frac{1}{2}\right)$

D. $\left(3, \frac{1}{4}\right)$

**Answer: D**

Watch Video Solution

**43.** The sets $S_1, S_2, S_3, \ldots\ldots\ldots\ldots$ are given by $S_1 = \left\{\frac{2}{1}\right\}$, $S_2 = \left\{\frac{3}{2}, \frac{5}{2}\right\}$,$S_3 = \left\{\frac{4}{3}, \frac{7}{3}, \frac{10}{3}\right\}$,$S_4 = \left\{\frac{5}{4}, \frac{9}{4}, \frac{13}{4}, \frac{17}{4}\right\}$,..... .

Then the sum of the set $S_{25}$ is

A. 320

B. 322

C. 324

D. 325

**Answer: D**

Watch Video Solution

**44.** If $H_1, H_2$ are two harmonic means between two positive numbers $a$ and $b$, $(a \neq b)$, A and G are the arithmetic and geometric means 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

**45.** If the sum of $12^{th}$ and $22^{nd}$ terms of an A.P is 100, then the sum of the first 33 terms of the A.P is

A. 1700

B. 1650

C. 3300

D. 3400

**Answer: B**

Watch Video Solution

**46.** The coefficient of $x$ in the expansion of $(1+x)(1+2x)(1+3x)...(1+100x)$ is

A. 5050

B. 10100

C. 5151

D. 4950

**Answer: A**

Watch Video Solution

**47.** If $0 < \phi < \frac{\pi}{2}, x = \sum_{n=0}^{\infty} \cos^{2n}\phi, y\sum_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\phi \sin^{2n}\phi,$ then

A. $2y = x + z$

B. $2x = y + z$

C. $y = \frac{x + z}{xz}$

D. $y = \frac{2xz}{x + z}$

**Answer: D**

Watch Video Solution

**48.** The sum of the first $n$ terms of the series $\frac{1}{\sqrt{2}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{8}}+\frac{1}{\sqrt{8}+\sqrt{11}}+\ldots$ is

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

B. $\sqrt{3n+2}-\sqrt{2}$

C. $\sqrt{3n+2}+\sqrt{2}$

D. $\frac{1}{3}(\sqrt{2}-\sqrt{3n+2})$

**Answer: A**

Watch Video Solution

**49.** The H.M. of two numbers is 4. their A.M ia A and G.M. is G. If $2A+G^2=27$, then A is equal to

A. a. 9

B. b. $\frac{9}{2}$

C. c. 18

D. d. 27

**Answer: B**

Watch Video Solution

**50.** If $a, b, c$ are in G.P. and $x, y$ are the arithmetic mean 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**

Watch Video Solution

**51.** A student read common difference of are A.P. as $-3$ instead of 3 and obtained the sum of first 10 terms as -30. Then the actual sum of first 10 terms is equal to

A. a. 240

B. b. 120

C. c. 300

D. d. 180

**Answer: A**

Watch Video Solution

**52.** If $a_1, a_2 \ldots \ldots a_n = na_{n-1}$, for all positive integer $n \geq 2$, then $a_5$ is equal to

A. a. 125

B. b. 120

C. c. 100

D. d. 24

**Answer: B**

Watch Video Solution

**53.** If $a_1, a_2, \ldots\ldots, a_n$ are in A.P. with common differece $d \neq 0$, then $(\sin d)[\sec a_1 \sec a_2 + \sec a_2 \sec a_3 + \ldots. + \sec a_{n-1} \sec a_n]$ is equal to

A. a. $\cot a_n - \cot a_1$

B. b. $\cot a_1 - \cot a_n$

C. c. $\tan a_n - \tan a_1$

D. d. $\tan a_n - \tan a_{n-1}$

**Answer: D**

Watch Video Solution

**54.** Let $a$ be a positive number such that the arithmetic mean of $a$ and 2 exceeds their geometric mean by 1. Then the value of $a$

A. 3

B. 5

C. 9

D. 8

**Answer: D**

Watch Video Solution

**55.** If the sum to first $n$ terms of the A.P. $2, 4, 6, \ldots$ is 240, then the value of $n$ is

A. 14

B. 15

C. 16

D. 17

**Answer: B**

Watch Video Solution

**56.** The value of $\frac{1}{\sqrt{10}-\sqrt{9}}-\frac{1}{\sqrt{11}-\sqrt{10}}+\frac{1}{\sqrt{12}-\sqrt{11}}$ - .... - $\frac{1}{\sqrt{121}-\sqrt{120}}$ is equal to

A. a. $-10$

B. b. 11

C. c. 14

D. d. -8

**Answer: D**

Watch Video Solution

**57.** An A.P. consists of 23 terms. If the sum of the three terms Is the middle is 141 and the sum of the last three terms is 261, then the first is

A. 6

B. 5

C. 4

D. 3

**Answer: D**

Watch Video Solution

**58.** If $a_1, a_2, a_3, \ldots\ldots\ldots$, are in A.P. with common difference 5 and if $a_i a_j \neq -1$ for $i, j = 1, 2, \ldots., n,$ then $\tan^1\left(\frac{5}{1+a_1a_2}\right) + \tan^1\left(\frac{5}{1+a_2a_3}\right) + \ldots\ldots + \tan^{-1}\left(\frac{5}{1+a_{n-1}a_n}\right)$ is equal to

A. $\tan^{-1}\left(\frac{5}{1+a_n a_{n-1}}\right)$

B. $\tan^{-1}\left(\frac{5a_1}{1+a_n a_1}\right)$

C. $\tan^{-1}\left(\frac{5n-5}{1+a_n a_1}\right)$

D. $\tan^{-1}\left(\frac{5n-5}{1+a_1 a_{n+1}}\right)$

**Answer: C**

Watch Video Solution

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

A. 715

B. 702

C. 615

D. 602

**Answer: B**

Watch Video Solution

**60.** If the $9^{th}$ term of A.P. is zero, then the ratio of $29^{th}$ term to $19^{th}$ term is

A. $1:2$

B. $1:3$

C. $2:1$

D. $3:1$

**Answer: C**

Watch Video Solution

**61.** Let $S_1, S_2, \ldots\ldots S_{101}$ be consecutive terms of A.P. If $\frac{1}{S_1 S_2} + \frac{1}{S_2 S_3} + \ldots\ldots + \frac{1}{S_{100} S_{101}} = \frac{1}{6}$ and $S_1 + S_{101} = 50$, then $|S_1 - S_{101}|$ is equal to

A. 10

B. 20

C. 30

D. 40

**Answer: A**

Watch Video Solution

**62.** If $a_1, a_2, a_3, \ldots\ldots, a_n$ are in A.P. and $a_1 = 0$, then the value of $\left(\frac{a_3}{a_2} + \frac{a_4}{a_3} + \ldots. + \frac{a_n}{a_{n-1}}\right) - a_2\left(\frac{1}{a_2} + \frac{1}{a_3} + \ldots. + \frac{1}{a_{n-2}}\right)$ is equal to

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

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

C. $(n-2)$

D. $n-1$

**Answer: A**

Watch Video Solution

**63.** The value of $1^2 - 2^2 + 3^2 - 4^2 + \ldots\ldots + 11^2$ is equal to

A. 55

B. 66

C. 77

D. 88

**Answer: B**

Watch Video Solution

**64.** Let $s_n$ denote the sum of first $n$ terms of an A.P. and $S_{2n} = 3S_n$. If $S_{3n} = kS_n$ then the value of $k$ is equal to

A. 4

B. 5

C. 6

D. 7

**Answer: C**

Watch Video Solution

**65.** The first four terms of an A.P. are $a, 9, 3a - b, 3a + b$. The $2011^{th}$ term of the A.P. is

A. 2015

B. 4025

C. 5030

D. 6035

**Answer: D**

Watch Video Solution

**66.** If $\log_e 5, \log_e(5^x - 1)$ and $\log_e\left(5^x - \frac{11}{5}\right)$ are in A.P., then the values of $x$ are

A. $\log_5 4$ and $\log_5 3$

B. $\log_3 4$ and $\log_4 3$

C. $\log_3 4$ and $\log_3 5$

D. $\log_5 6$ and $\log_5 7$

**Answer: A**

Watch Video Solution

**67.** The sum to $n$ terms of the series $\frac{4}{3}+\frac{10}{9}+\frac{28}{27}+\ldots\ldots$ is

A. $n+\frac{1}{2}\left(1+3^{-n}\right)$

B. $n-\frac{1}{2}\left(1+3^{-n}\right)$

C. $n+\frac{1}{2}\left(2+3^{-n}\right)$

D. $n+\frac{1}{2}\left(2-3^{-n}\right)$

**Answer: D**

Watch Video Solution

**68.** If $\sum_{k=1}^{n} k(k+1)(k-1)=pn^4+qn^3+tn^2+sn$ where $p, q, t$ and $s$ are constants, then the value of $s$ is equal to

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

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

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

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

**Answer: B**

Watch Video Solution

**69.** In an A.P., the first term is 2 and the sum of first five terms is 5. Then the $31th$ term is

A. 13

B. 17

C. $-13$

D. $\frac{27}{2}$

**Answer: C**

Watch Video Solution

**70.** If $a, b, c, d$ are in G.P., then $(a+b+c+d)^2$ is equal to

A. $(a+b)^2+(c+d)^2+2(b+c)^2$

B. $(a+b)^2+(c+d)^2+2(a+c)^2$

C. $(a+b)^2+(c+d)^2+2(b+d)^2$

D. $(a+b)^2+(c+d)^2+(b+c)^2$

**Answer: A**

Watch Video Solution

**71.** The sum of first $n$ terms of the series $1+(1+x)y+\left(1+x+x^2\right)y^2+\left(1+x+x^2+x^3\right)y^3+\ldots\ldots\ldots$ is

A. $\left(\frac{1}{1-x}\right)\left[\frac{1-y^n}{1-y}-y\left(\frac{1-x^ny^n}{1-xy}\right)\right]$

B. $\left(\frac{1}{1-x}\right)\left[\frac{1-y^n}{1-y^2}-x\left(\frac{1-x^ny^n}{1-xy}\right)\right]$

C. $\left(\frac{1}{1-x}\right)\left[\frac{1-y^n}{1-y}-x^2\left(\frac{1-x^n y^n}{1-xy}\right)\right]$

D. $\left(\frac{1}{1-x}\right)\left[\frac{1-y^n}{1-y}-2x\left(\frac{1-x^n y^n}{1-xy}\right)\right]$

**Answer: D**

Watch Video Solution

**72.** If $3^{rd}$, $7^{th}$ and $12^{th}$ terms of A.P. are three consecutive terms of a G.P., then the common ratio of G.P is

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

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

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

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

**Answer: A**

Watch Video Solution

**73.** If $a_1 = 4$ and $a_{n+1} = a_n + 4n$ for $n \geq 1$, then the value of $a_{100}$ is

A. 19804

B. 18904

C. 18894

D. 19904

**Answer: A**

Watch Video Solution

**74.** If the first term of a G.P. is 729 and its $7^{th}$ term is 64, then the sum of first seven terms is

A. 2187

B. 2059

C. 1458

D. 2123

**Answer: B**

Watch Video Solution

**75.** Let $a_1, a_2, a_3, a_4$ be in A.P. If $a_1 + a_4 = 10$ and $a_2 a_3 = 24$, them the least term of them is

A. 1

B. 2

C. 3

D. 4

**Answer: B**

Watch Video Solution

**76.** The $100^{th}$ term of the sequence $1, 2, 2, 3, 3, 3, 4, 4, 4, 4, \ldots\ldots$ is

A. 12

B. 13

C. 14

D. 15

**Answer: C**

Watch Video Solution

**77.** Let $S_n$ denote the sum of first $n$ terms of an A.P. If $S_4 = -34$, $S_3 = -60$ and $S_6 = -93$, then the common difference and the first term of the A.P. are respectively.

A. $-7, 2$

B. $7, -4$

C. $7, -2$

D. $-7, -2$

**Answer: A**

Watch Video Solution

**78.** An A.P. has the property that the sum of first ten terms is half the sum of next ten terms. If the second term is 13, then the common difference is

A. 3

B. 2

C. 5

D. 4

**Answer: B**

Watch Video Solution

**79.** The sum of the series $\sum_{n=8}^{17} \frac{1}{(n+2)(n+3)}$ is equal to

A. $\frac{1}{17}$

B. $\frac{1}{18}$

C. $\frac{1}{19}$

D. $\frac{1}{20}$

**Answer: D**

Watch Video Solution

**80.** If two positive numbers are in the ratio $3+2\sqrt{2}:3-2\sqrt{2}$, then the ratio between their A.M. and G.M. is

A. $6:1$

B. $3:2$

C. $2:1$

D. $3:1$

**Answer: D**

Watch Video Solution

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

A. 1020

B. 1200

C. 716

D. 2720

**Answer: A**

Watch Video Solution

**82.** If the second and fifth terms of a G.P. are 24 and 3 respectively, then the sum of first six terms is

A. 181

B. $\frac{181}{2}$

C. 189

D. $\frac{189}{2}$

**Answer: D**

Watch Video Solution

**83.** If the sum of first 75 terms of an A.P. is 2625, then the $38^{th}$ term of the A.P. is

A. 39

B. 37

C. 36

D. 35

**Answer: D**

Watch Video Solution

**84.** If $-5, k, -1$ are in A.P., then the value of $k$ is equal to

A. $-5$

B. $-3$

C. $-1$

D. 3

**Answer: B**

Watch Video Solution

**85.** Let $T_n$ denote the number of triangles which can be formed by using the vertices of a regular polygon of $n$ sides. If $T_{n+1} - T_n = 36$, then $n$ is equal to

A. 2

B. 5

C. 9

D. 8

**Answer: D**

Watch Video Solution

**86.** if $1, \log_9\left(3^{1-x}+2\right), \log_3[4.3^x - 1]$ are in A.P. then $x$ equals

A. $\log_3 4$

B. $1 - \log_3 4$

C. $1 - \log_4 3$

D. $\log_4 3$

**Answer: C**

Watch Video Solution

**87.** $1^3 - 2^3 + 3^3 + 4^3 + .... + 9^3 =$

A. 425

B. $-425$

C. 475

D. $-475$

**Answer: A**

Watch Video Solution

**88.** Sum of infinite number of terms in GP is 20 and sum of their square is 100. The common ratio of GP is

A. 5

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

C. $\frac{8}{5}$

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

**Answer: B**

Watch Video Solution

**89.** The value of $2^{\frac{1}{4}}, 4^{\frac{1}{8}}, 8^{\frac{1}{16}} \ldots\ldots\infty$ is

A. 1

B. 2

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

D. 4

**Answer: B**

Watch Video Solution

**90.** Fifth term of a GP is 2, then the product of 1ts 9 terms is

A. 256

B. 512

C. 1024

D. None of these

**Answer: B**

Watch Video Solution

**91.** If the system of linear equations $x + 2ay + az = 0$, $x + 3by + bz = 0$,$x + 4cy + cz = 0$ has a non-zero solution, then $a, b, c$

A. are in G.P

B. are in H.P

C. satisfy $a + 2b + 3c = 0$

D. are in A.P

**Answer: B**

Watch Video Solution

**92.** Let $f(x)$ be a polynomial function of second degree. If $f(1) = f(-1)$ and $a, b. c$ are in A.P., then $f'(a), f'(b), f'(c)$ are in

A. G.P.

B. H.P.

C. Arithmetic-Geometric Progression

D. A.P.

**Answer: D**

Watch Video Solution

**93.** The sum of the series $\frac{1}{1.2} - \frac{1}{2.3} + \frac{1}{3.4} \ldots$ upto $\infty$ is equal to

A. $\log_e 2 - 1$

B. $\log_e 2$

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

D. $2 \log_e 2$

**Answer: C**

Watch Video Solution

**94.** If $x_1, x_2, x(3)$as well as $y_1, y_2, y_3$ are in geometric progression with the same common ratio,then the points (x_(1),y_(1)),(x_(2),y_(2)), (x_(3),y_(3))`

A. lie on an ellipse

B. lie on a circle

C. are vertices of a triangle

D. lie on a stright line

**Answer: D**

Watch Video Solution

**95.** Let $T$, be the $r^{th}$ term of an A.P. whose first term is $a$ and common difference is $d$ If for some positive integers $m, n, m \neq n, T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$, then $a - d$ equals

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

B. 1

C. 0

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

**Answer: C**

Watch Video Solution

**96.** The sum of first $n$ terms of the series $1_2+2.2^2+3^2+2.4^2+5^2+2.6^2+\ldots\ldots$ is $\frac{n(n+1)^2}{4}$ when $n$ is even. When $n$ odd the sum is

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

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

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

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

**Answer: B**

Watch Video Solution

**97.** The sum of series $\frac{1}{2}! + \frac{1}{4}! + \frac{1}{6}! + \ldots\ldots\ldots$ is

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

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

C. $\frac{e^2-1}{2}$

D. $\frac{e^2-1}{e}$

**Answer: A**

Watch Video Solution

**98.** If the coefficients of $r^{th}$, $(r+1)^{th}$ and $(r+2)^{th}$ terms in the binomial expansion of $(1+y)^m$ are in A.P., then $m$ and $r$ satisfy the

equation

A. 1. $m^2 - m(4r-1) + 4r^2 + 2 = 0$

B. 2. $m^2 - m(4r+1) + 4r^2 - 2 = 0$

C. 3. $m^2 - m(4r+1) + 4r^2 + 2 = 0$

D. 4. $m^2 - m(4r-1) + 4r^2 - 2 = 0$

**Answer: B**

Watch Video Solution

**99.** If $0 < \phi < \frac{\pi}{2}, x = \sum_{n=0}^{\infty} \cos^{2n}\phi, y \sum_{n=0}^{\infty} \sin^{2n}\phi$ and $z = \sum_{n=0}^{\infty} \cos^{2n}\phi \sin^{2n}\phi,$ then

A. HP

B. Arithmetric - Geometric progression

C. AP

D. GP

**Answer: A**

Watch Video Solution

**100.** If $a_1, a_2, a_3, \ldots\ldots\ldots, a_n \ldots\ldots$ are in G.P., then the determinant $\Delta =$

$$\begin{vmatrix} \log a_n & \log a_{n+1} & \log_{n+2} \\ \log a_{n+3} & \log a_{n+4} & \log_{n+5} \\ \log a_{n+6} & \log a_{n+7} & \log_{n+8} \end{vmatrix}$$ is equal to

A. 0

B. 1

C. 2

D. 4

**Answer: A**

Watch Video Solution

**101.** Let $a_1, a_2, a_3, \ldots\ldots\ldots$ be terms of an A.P. if $\frac{a_1 + a_2 + \ldots\ldots a_p}{a_1 + a_2 + \ldots\ldots a_q} = \frac{p^2}{q^2}, p \neq q$, then $\frac{a_6}{a_{21}}$ equals

A. $\frac{41}{11}$

B. $\frac{7}{2}$

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

D. $\frac{11}{41}$

**Answer: D**

Watch Video Solution

**102.** If $a_1, a_2, \ldots\ldots A_n$ are in H.P., then the expression $a_1a_2 + a_2a_3 + \ldots\ldots + a_{n-1}a_n$ is equal to

A. $n(a_1 - a_n)$

B. $(n-1)(a_1 - a_n)$

C. $na_1, a_n$

D. $(n-1)a_1a_n$

**Answer: D**

Watch Video Solution

**103.** The sum of the series $\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \ldots\ldots\ldots$ upto infinity is

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

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

C. $e^{-2}$

D. $e^{-1}$

**Answer: D**

Watch Video Solution

**104.** 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. $\frac{1}{2}\left(\sqrt{5}-1\right)$

C. $\frac{1}{2}\left(1-\sqrt{5}\right)$

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

**Answer: B**

Watch Video Solution

**105.** 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 (1) $4$ (2) $12$ (3) 12 (4) 4

A. 4

B. $-4$

C. $-12$

D. 12

**Answer: C**