

MATHS

BOOKS - KC SINHA MATHS (HINGLISH)

PROGRESSIONS (AP GP) - FOR COMPETITION

Solved Examples

1. If x,y, and z are positive real numbers different from 1 and $x^{18}=y^{21}=z^{28}$ show that $3,3\log_y x,3\log_z y,7\log_x z$ are in A.P.

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2. Four different integers form an increasing A. P One of these numbers is equal to the sum of the squares of the other three numbers. Then The smallest number is



3. If the sum of first p terms of an A.P. is equal to the sum of the first q terms, then find the sum of the first (p + q) terms.

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4. The ratio of the sums of n terms of two Aps is (3n - 13): (5n + 21).

Find the ratio of the 24th terms of the two progressions.

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5. If the sum of m terms of an A. P is equal to these that n terms and also to the sum of the next p terms, prove $(m+n)\left(\frac{1}{m}-\frac{1}{p}\right) = (m+p)\left(\frac{1}{m}-\frac{1}{n}\right)$

6. If $s_1, s_2, s_3, \ldots s_{2n}$ are the sums of infinite geometric series whose first terms are respectively 1,2,3,...2n and common ratio are respectively $\frac{1}{2}, \frac{1}{3}, \ldots , \frac{1}{2n+1}$ find the value of $s_1^2 + s_2^2 + \ldots + s_{2n-1}^2$

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7. How many geometric progressions are possible containing 27, 8 and 12

as three of its/their terms

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8. The natural number a for which $\sum_{k=1,n} f(a+k) = 16(2^n - 1)$ where the function f satisfies the relation f(x + y) = f(x). f(y) for all natural numbers x,y and further f(1) = 2 is:- A) 2 B) 3 C) 1 D) none of these

9. IF S_1, S_2, S_3 denote the sum n(>1) terms of three sequences in A.P., whose first terms are unity and common differences are in H.P.prove that $n=rac{2S_3S_1-S_1S_2-S_2S_3}{S_1-2S_2+S_3}$ Watch Video Solution 10. lf $x_1, x_2, x_3, \ldots, x_n$ are in H.P. that prove $x_1x_2 + x_2x_3 + x_3x_4 + \ldots + x_{n-1}x_n = (n-1)x_1x_n$ Watch Video Solution

11. If pth, qth , rth and sth terms of an AP are in GP then show that (p-q),

(q-r), (r-s) are also in GP



12. 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

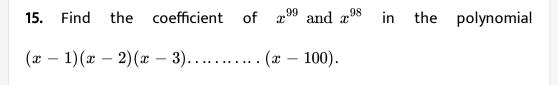


13. If y - z, 2(y - a), y - x are in H.P. prove that x - a, y - a, z - a are in G.P.

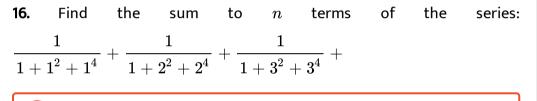
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14. A sequence $a_1, a_2, a_3, .., a_n$ of real numbers is such that $a_1 = 0, |a_2| = |a_1 + 1|, |a_3| = |a_2 + 1|, > , |a_n| = |a_{n-1} + 1|.$ Prove that the arithmetic mean $\frac{a_1 + a_2 + \dots + a_n}{n}$ of these numbers cannot be les then - 1/2.







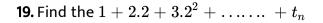


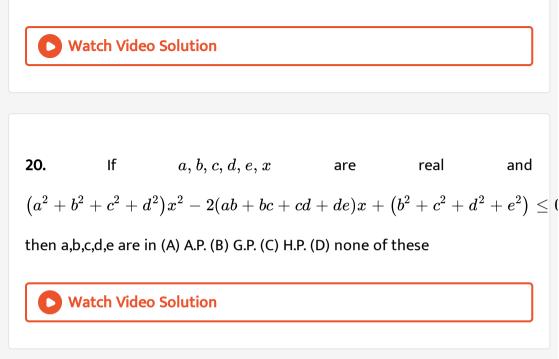
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17. Find the sum to n terms of the series : $5+11+19+29+41^\circ$



18. 1 + 3 + 7 + 15 + 31 + ... +to n terms





21. If S_n denote the sum of first n terms of an A.P. whose first term is $aandS_{nx}/S_x$ is independent of x, $thenS_p=\ p^3$ b. p^2a c. pa^2 d. a^3

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22. If rational numbers a,b,c be th pth, qth, rth terms respectively of an A.P. then roots of the equation $a(q-r)x^2 + b(r-p)x + c(p-q) = 0$

are necessarily (A) imaginary (B) rational (C) irrational (D) real and equal



23. If $(r)_n$, denotes the number rrr...(ndigits), where r=1,2,3,...,9

and
$$a = (6)_n, b = (8)_n, c = (4)_{2n}$$
, then

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24. If a_1, a_2, a_3 are in G.P. having common ratio r such that $\sum_{k=1}^n a_{2k-1} = \sum_{k=1}^n a_{2k+2} \neq 0$ then number of possible value of r is (A) 1

(B) 2 (C) 3 (D) none of these

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25. If a_1, a_2, a_3, a_4 are in H.P. then $\frac{1}{a_1a_4}\sum_{r=1}^3 a_r a_{r+1}$ is a root of (A) $x^2 - 2x - 15 = 0$ (B) $x^2 + 2x + 15 = 0$ (C) $x^2 + 2x - 15 = 0$ (D) $x^2 - 2x + 15 = 0$ 26. If a and b are digits between 0 and 9 the the rational number represented by 0 . *ababab* is (A) $\frac{10a+b}{99}$ (B) $\frac{9+b}{90}$ (C) $\frac{a+b}{99}$ (D) $\frac{(99ab+10a+b)}{990}$

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27. If $rac{l+mx}{l-mx}=rac{m+nx}{m-nx}=rac{n+px}{n-px}, x
eq 0$. Then the number l,m,n and

p are in (A) A.P. (B) G.P. (C) H.P. (D) none of these

28. If
$$a_1, a_2, a_3, \ldots, a_n$$
 are in H.P. and $f(k) = \sum_{r=1}^n a_r - a_k$ then $\frac{f(1)}{a_1}, \frac{f(2)}{a_3}, \ldots, \frac{f(n)}{a_n}$ are (A) A.P. (B) G.P. (C) H.P. (D) none of these Watch Video Solution

29. If
$$x = \sum_{n=0}^{\infty} a^n$$
, $y = \sum_{n=0}^{\infty} b^n$, $z = \sum_{n=0}^{\infty} c^n$ where a, b, c are in A.P and $|a| < 1$, $|b < 1$, $|c| < 1$, then x, y, z are in **Watch Video Solution**

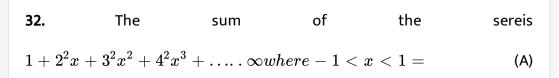
30. If $a+b+c=3 \, ext{ and } \, a>0, b>0, c>0$ then the greatest value of

$$a^2b^3c^2=$$
 (A) $\left(3^2
ight)\left(2^3
ight)\left(7^2
ight)$ (B) $rac{3^{10}2^4}{7^7}$ (C) $rac{3^72^5}{7^2}$ (D) $rac{3^72^4}{7^7}$

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31.

$$rac{1^4}{1.3} + rac{2^4}{3.5} + rac{3^4}{5.7} + + rac{n^4}{(2n-1)(2n+1)} = rac{nig(4n^2+6n+5ig)}{48} + rac{16}{16}$$



$$rac{1+x}{\left(\left(1-x
ight)
ight) ^{3}}$$
 (B) $rac{x}{\left(1+x
ight) ^{3}}$ (C) $rac{1-x^{2}}{\left(1+x
ight) ^{3}}$ (D) none of these

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33. For a positive integer n let $a(n) = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{(2^n) - 1}$. Then $a(100) \le 100$ b. a(100) > 100 c. $a(200) \le 100$ d. $a(200) \le 100$

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$$\textbf{34. Let } \Delta(x) = \begin{vmatrix} x+a & x+b & x+a-c \\ x+b & x+c & x-1 \\ x+c & x+d & x-b+d \end{vmatrix} \text{ and } \int_0^2 \Delta(x) dx = -16,$$

where a, b, c, d are in A.P. then the common difference (i) 1 (ii)2 (iii)3 (iv)4

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35. If a, b, c are in A.P and a^2, b^2, c^2 are in H.P then

36. Sum of n terms of the series
$$\frac{1}{1.2.3.4.} + \frac{1}{2.3.4.5} + \frac{1}{3.4.5.6} + \dots$$



37. If
$$a_n=\int_0^\pi rac{\sin(2n-1)x}{\sin x}dx, then a_1a_2a_3$$
 are in (A) A.P. (B) G.P. (C) H.P.

(D) none of these

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38. Find the sum of series $\left(3^3=2^3
ight)+\left(5^3=4^3
ight)+\left(7^3=6^3
ight)+$ to n

terms



39. The three digit number whose digits are in G.P. and the digits of the number obtained from it by subtracting 400 form an A.P. is equal to.

40. The value of x for which the numbers
$$\log_3 2, \log_3(2^x - 5)$$
 and $\log_3\left(2^x - \frac{7}{2}\right)$ are in A.P.=

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Exercise

1. If $a_1, a_2, a_3, \ldots, a_n$ are in A.P, where $a_i > 0$ for all i show that

 $rac{1}{\sqrt{a_1}+\sqrt{a_2}}+rac{1}{\sqrt{a_2}+\sqrt{a_3}}+\dots\dots+rac{1}{\sqrt{a_{n-1}}+\sqrt{a_n}}=rac{n-1}{\sqrt{a_1}+\sqrt{a_n}}$

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2. If $a_1, a_2, a_3, \ldots, a_n$ are in A.P. whose common difference is d,

show tht
$$\sum_{2}^{n}rac{ anu^{-1}d}{1+a_{n-1}a_{n}}= anu^{-1}igg(rac{a_{n}-a_{1}}{1+a_{n}a_{n}}igg)$$

3. If $a_1, a_2, a_3, \ldots a_n, a_{n+1}, \ldots$ be A.P. whose common difference is d and $S_1 = a_1 + a_2 + \ldots + a_n, S_2 = a_{n+1} + \ldots + a_{2n}, S_3 = a_{2n+1}$ etc show that $S_1, S_2, S_3, S_4, \ldots$ are in A.P. whose common difference is n^2d .

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4. If $\log 2$, $\log(2^x - 1)$ and $\log 2\log(2^x + 3)$ are in A.P., write the value of

 $x \cdot$



5. If
$$I_n = \int_0^{\pi} \frac{1 - \cos 2nx}{1 - \cos 2x} dx$$
 or $\int_0^{\pi} \frac{\sin^2 nx}{\sin^2 x} dx$, show that $I_1, I_2, I_3, \dots, \dots$ are inA.P.

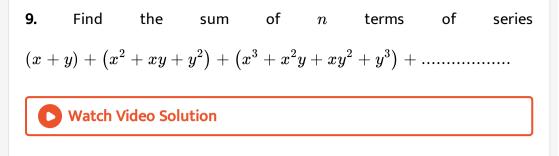
6. A cashier has to count a bundle of Rs. 12,000 one rupee notes. He counts at the rate of Rs. 150 per minute for an hour, at the end of which he begins to count at the rate of Rs. 2 less every minute then he did the previous minute. Find how long he will take to finish his task and explain the double answer.

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7. If a, b, c, d and p are different real numbers such that $(a^2+b^2+c^2)p^2-2(ab+bc+cd)p+(b^2+c^2+d^2)\leq 0$, then show that a, b, c and d are in G.P.

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8. If $\log_x a, a^{\frac{x}{2}}$ and $\log_b x$ are in G.P. then find x.



10. Prove that in a sequence of numbers 49,4489,444889,4448889 in which every number is made by inserting 48-48 in the middle of previous as indicated, each number is the square of an integer.

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11. Solve the following equations for x and y:

$$\log_{10} x + \log_{10} (x)^{\frac{1}{2}} + \log_{10} (x)^{\frac{1}{4}} + \dots = y$$

$$\frac{1+3+5+\dots+(2y-1)}{4+7+10+\dots+(3y+1)} = \frac{20}{7\log_{10} x}$$

12. Find the values of $x\in(-\pi,\pi)$ which satisfy the equation $8^{1+|\cos x|+|\cos^2 x|+|\cos^{2x|+}}=4^3$

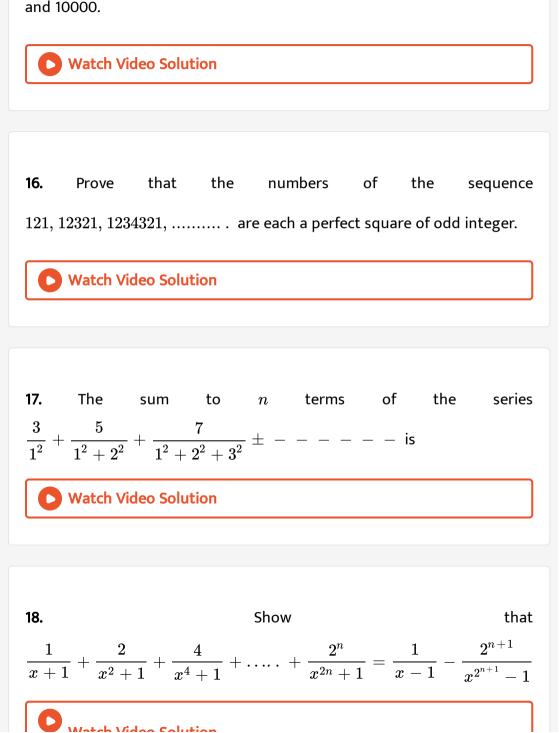
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13. The sum oif the first ten terms of an A.P. is equal to 155, and the sum of the first two terms of a G.P. is 9. Find these progressionsif the first term of the A.P. equals the common ratio of the G.P. and the 1st term of G.P. equals the common difference of A.P.

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14. If an A.P. and a G.P. have the same 1st and 2nd terms then show that every other term of the A.P. will be less than the corresponding term of G.P. all the terms being positive.

15. Find the sum of all the numbers of the form n^3 which lie between 100



19. The sum of n terms of the series $5/1.2.1/3+7/2.3.1/3^2+9/3.4.1/3^3+11/4.5.1/3^4+..is(A)1+1/2^(n-1).1/3^n(B)$

1+1/(n+1).1/3^n(C)1-1/(n+1).1/3^n(D)1+1/2n-1.1/3^n`

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20. If
$$x+y+z=a$$
 , show that $\left(rac{1}{x}+rac{1}{y}+rac{1}{z}
ight)^{-1}\geq rac{9}{a}$

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21. If x and y are positive real numbers and m, n are any positive integers, then $\frac{x^n y^m}{(1+x^{2n})(1+y^{2m})} < \frac{1}{4}$

22. If the arthmetic mean of $(b-c)^2$, $(c-a)^2$ and $(a-b)^2$ is the same as that of $(b+c-2a)^2$, $(c+a-2b)^2$ and $(a+b-2c)^2$ show that a=b=c.

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23. If pth, qth, rth terms of an AP are in GP whose common ratio is k, then the root of equation $(q-r)x^+(r-p)x + (p-q) = 0$ other than unity is

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24. If n be the number of sequence a, b, c, d, e satisfying the conditions

(i) a,b,c,d,e are in A.P and G.P. both,(ii) c= 3,7 then n =

25. If a,b,c are non zero real numbers such that $3(a^2 + b^2 + c^2 + 1) = 2(a + b + c + ab + bc + ca)$ then a,b,c are in (A) A.P. only (B) G.P. only (C) A.P., G.P., and H.P. (D) A.P. and G.P.both

26. If a, b, c, d are distinct integers in A. P. Such that $d=a^2+b^2+c^2$,

then a + b + c + d is

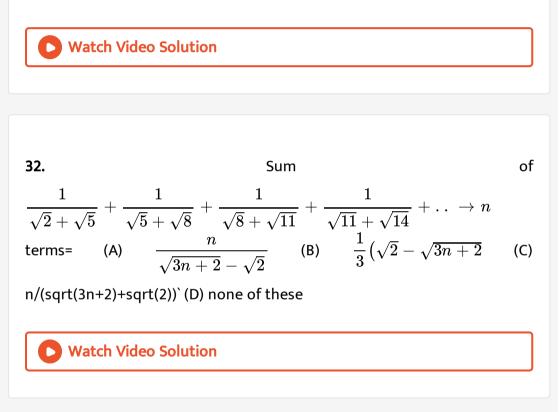
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27. If $a_n = \int_0^\pi rac{\sin(2n-1)x}{\sin x} dx$. Then the number a_1, a_2, a_3 Are in

(A) A.P (B) G.P (C) H.P (D) none of these

28. If a, b, c, d, e are in H.P., then $rac{a}{b+c+d+e}, rac{b}{a+c+d+e}, rac{c}{a+b+d+e}, rac{d}{a+b+c+e}, rac{e}{a+b+c+e}$ are in (A) A.P. (B) G.P. (C) H.P. (D) none of these Watch Video Solution **29.** If a,b,c are proper fractiion are in H.P. and $x\sum_{n=1}^{\infty}a^{n},y=\sum_{n=1}^{\infty}b^{n},z=\sum_{n=1}^{\infty}c^{n}$ then x,y,z are in (A) A.P. (B) G.P. (C) H.P. (D) none of these Watch Video Solution **30.** If $S_1, S_2, S_3, \ldots, S_n$ denote the sum of 1,2,3.....n terms of an A.P. having first term a $\operatorname{and} \frac{S_{kx}}{S_{x}}$ is independent of x then $S_1 + S_2 + S_3 + \ldots + S_n =$ (A) $rac{n(n+1)(2n+1)a}{6}$ (B) $\hat{}~(n+2)C_3a$ (C) $\hat{}~(n+1)C_3a$ (D) none of these

31. If a,b,c,d are rational and are in G.P. then the rooots of equation $(a-c)^2 x^2 + (b-c)^2 x + (b-x)^2 - (a-d)^2 = \text{ are necessarily (A)}$ imaginary (B) irrational (C) rational (D) real and equal



33. If a,b,c are p^{th} , q^{th} and r^{th} term of an AP and GP both, then the product of the roots of equation $a^bb^cc^ax^2 - abcx + a^cb^cc^a = 0$ is equal to :

34. If a,b,c, be the pth, qth and rth terms respectivley of a G.P., then the equation $a^q b^r c^p x^2 + pqrx + a^r b^{-p} c^q = 0$ has (A) both roots zero (B) at least one root zero (C) no root zero (D) both roots unilty



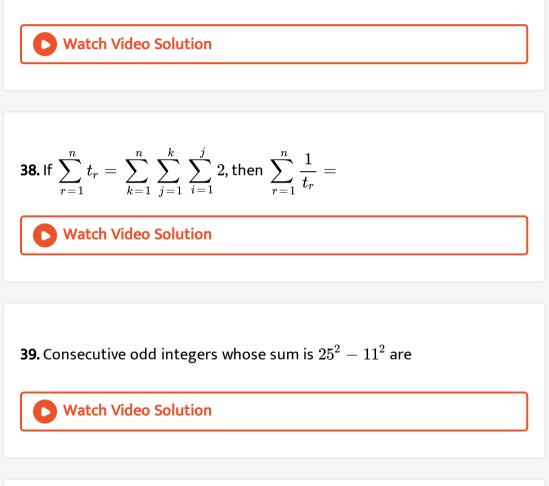
$$a = 1111(55 digits), b = 1 + 10 + 1 = {}^2 + + 10^4, c = 1 + 10^5 + 10^{10} + 10^{10}$$

then a = b + c b. a = bc c. b = ac d. c = ab

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36. If a,b,c,d, x are real and the roots of equation $(a^2 + b^2 + c^2)x^2 - 2(ab + bc + cd)x + (b^2 + c^2 + d^2) = 0$ are real
and equal then a,b,c,d are in (A) A.P (B) G.P. (C) H.P. (D) none of these

37. If an A.P., a G.P. and a H.P. have the same first term and same (2n + 1)th term and their $(n + 1)^n$ terms are a,b,c respectively, then the radius of the circle. $x^2 + y^2 + 2bx + 2ky + ac = 0$ is



40. If a,b,c,d are distinct positive then $rac{a^n}{b^n} > rac{c^n}{d^n}$ for all arepsilon N if a,b,c,d

are in (A) A.P. (B) G.P. (C) H.P. (D) none of these

41. If
$$a = \sum_{r=1}^{\infty} \left(\frac{1}{r}\right)^2$$
, $b = \sum_{r=1}^{\infty} \frac{1}{\left(2r-1\right)^2}$, $then \frac{a}{b} =$ (A) $\frac{5}{4}$ (B) $\frac{4}{5}$ (C) $\frac{3}{4}$

(D) none of these

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42. If
$$\sum n^2 = 2870, then \sum n^3 = \,$$
 (A) 44100 (B) 48400 (C) 52900 (D)

none of these

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43. If 9A. M. 's and 9H. M's be inserted between 2 and 3 and A be any

A. M. and H be the corresponding H. M., then H(5-A)

44. If
$$a-b, ax-by, ax^2-by^2a, b
eq 0$$
 are in G.P., then $x, y \frac{ax-by}{a-b}$

are in (A) A.P. only (B) G.P.only (C) A.P., G.P. (D) A.P., and G.P and H.P



45. If the square of differences of three numbers be in A.P., then their differences re in (A) A.P. (B) G.P. (C) H.P. (D) none of these

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46. 1,3,9 can be terms of (A) an A.P. out not of a G.P (B) G.P. but not of an

A.P. (C) A.P. and G.P both (D) neither A.P nor G.P

47. If
$$t_r = 2^{\frac{r}{3}} + 2^{-\frac{r}{3}}$$
, $then \sum_{r=1}^{100} t_r^3 - 3 \sum_{r=1}^{100} t_r + 1 =$ (A) $\frac{2^{101} + 1}{2^{100}}$ (B) $\frac{2^{101} - 1}{2^{100}}$ (C) $\frac{2^{201} + 1}{2^{100}}$ (D) none of these

48. If a,b,c be the sum of n term of three A. P's whose first terms are unity and common differences are in H.P., then $n=(A) \frac{2ac+ab+bc}{a+c-ab}$ (B) $\frac{2ac-ab-bc}{a+c-ab}$ (C) $\frac{2ac-ab-bc}{a+c-ab}$ (D) $\frac{2ac-ab+bc}{a+c-ab}$

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49. If a,b,c in G.P. x,y be the A.M.\'s between a,b and b,c respectively then

$$\left(rac{a}{x}+rac{c}{y}
ight)\!\left(rac{b}{x}+rac{b}{y}
ight)=$$
 (A) 2 (B) -4 (C) 4 (D) none of these

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50. If positive numbers a, b, c are in H.P., then equation $x^2 - kx + 2b^{101} - a^{101} - c^{101} = 0 (k \in R)$ has both roots positive both roots negative one positive and one negative root both roots imaginary

51.
$$\sum_{n=1}^{\infty} \left(\tan^{-1} \left(\frac{4n}{n^4 - 2n^2 + 2} \right) \right) \text{ is equal to (A) } \tan^{-1}(2) + \tan^{-1}(3)$$

(B) $4 \tan^{-1}(1)$ (C) $\frac{\pi}{2}$ (D) $\sec^{-1}(-\sqrt{2})$

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$$b_i = 1 - a_i, na = \sum_{i=1}^n a_i, nb = \sum_{i=1}^n b_i, then \sum_{i=1}^n a_i, b_i + \sum_{i=1}^n \left(a_i - a
ight)^2 =$$

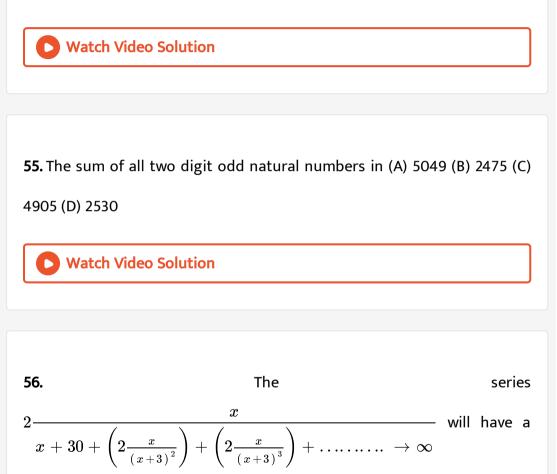
If

ab b. nab c. (n+1)ab d. nab

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53. If the sum of the series $\sum_{n=0}^{\infty}r^n, |r|<1 iss,\,\,$ then find the sum of the series $\sum_{n=0}^{\infty}r^{2n}$.

54. Four numbers are such that the first three are in.A.P while the last three are in G.P. If the first number is 6 and common ratio of G.P. is $\frac{1}{2}$ the the number are (A) 6,8,4,2 (B) 6,10,14,7 (C) 6,9,12,6 (D) 6,4,2,1



definite sum when (A) -1 < x < 3 (B) 0 < x < 1 (C) x = 0 (D) none of

these

57. if
$$\displaystyle rac{a^{n+1}+b^{n+1}}{a^n+b^n}$$
 harmonic mean of $a\&b$ then n is



58. The nth term of the series $2\frac{1}{2} + 1\frac{7}{3} + 1\frac{1}{9} + \frac{20}{23} + \dots Is(A)$

 $20/(5n+3)(B)20/(5n-3)(C)20(5n+3)(D)20/(5n^2+3)$

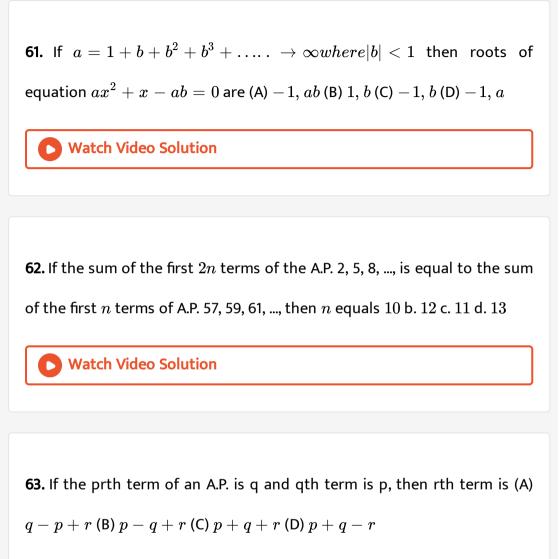


59. Let a_1, a_2, \ldots, a_{10} be in A.P. and h_1, h_2, \ldots, h_{10} be in H.P. If

 $a_1=h_1=2 \,\,\, {
m and} \,\,\, a_{10}=h_{10}=3, then a_4 h_7$ is (A) 2 (B) 3 (C) 5 (D) 6

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60. If a,b,c,d are positive real number with a+b+c+d=2 ,then M=(a+b)(c+d) satisfies the inequality



64. If the numbers p,q,r are in A.P. then $m^{7p}, m^{7q}, m^{7r}(m > 0)$ are in (A)

A.P. (B) G.P. (C) H.P. (D) none of these



65. $1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2)$, +.....upto 22nd term is (A) 22368

(B) 23276 (C) 22376 (D) none of these

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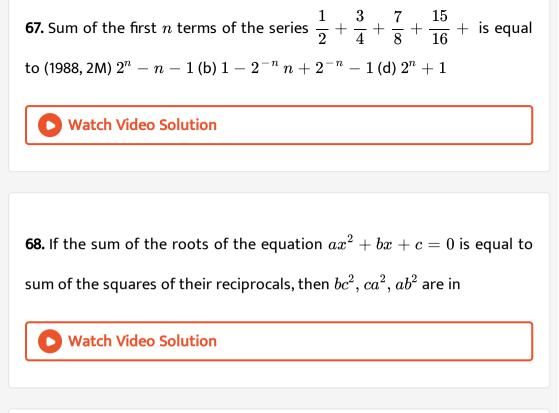
66. If $1^2 + 2^2 + 3^2 + n^2 = 1015$ then the value of n is equal to

(A) 13

(B) 14

(C) 15

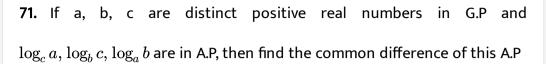
(D) none of these

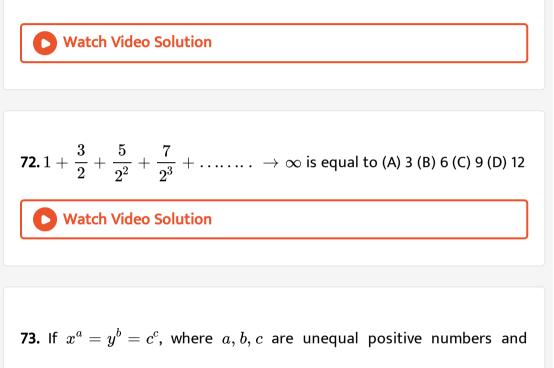


69. The third term of a geometric progression is 4. The production of the

first five terms is 4^3 b. 4^5 c. 4^4 d. none of these

70. If A_1, A_2 be two A.M. and G_1, G_2 be two G.K.s between aandb then $\frac{A_1 + A_2}{G_1G_2}$ is equal to $\frac{a+b}{2ab}$ b. $\frac{2ab}{a+b}$ c. $\frac{a+b}{ab}$ d. $\frac{a+b}{\sqrt{ab}}$





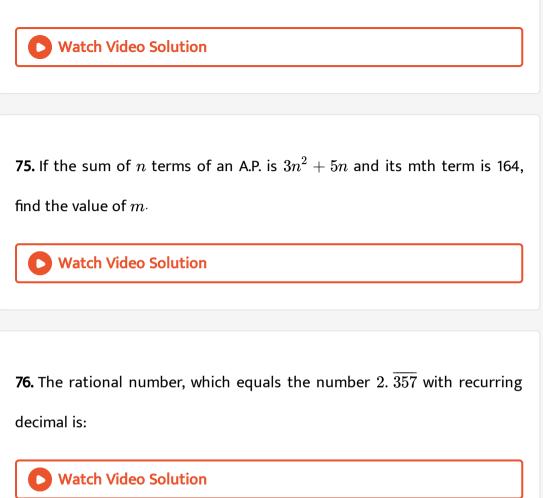
x,y,z are in GP, then a^3+c^3 is :

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74. If G_1 and G_2 are two geometric means and A the asrithmetic mean

inserted between two numbers, then the value of $rac{G_1^2}{G_2}+rac{G_2^2}{G_1}$ is (A) $rac{A}{2}$ (B)

A (C) 2A (D) none of these



77. If $x\in\{1,2,3,...,9\}$ and $f_n(x)=xxx....x$ (n digits) , then $f_n^2(3)+f_n(2)$

78. Let
$$S_n = \sum_{r=0}^{\infty} \frac{1}{n^r}$$
 and $\sum_{n=1}^k (n-1)S_n = 5050 then k =$ (A) 50 (B) 505

(C) 100 (D) 55



79. If
$$\sum_{n=1}^{k} \left[\frac{1}{3} + \frac{n}{90} \right] = 21$$
 where [x] dentes the integeral part of x, then

k= (A) 84 (B) 80 (C) 85 (D) none of these

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80. Let $f \colon R o R$ such that f(x) is continuous and attains only rational

value at all real x and f(3)=4. If a_1, a_2, a_3, a_4, a_5 are in H.P. then

$$\sum_{r=1}^4 a_r a_{r+1} = (A)f(3).\ a_1 a_5$$
 (B) $f(3).\ a_4 a_5$ (C) $f(3).\ a_1 a_2$ (D) $f(2).\ a_1 a_3$

81. The roots of equation $x^2 + 2(a - 3)x + 9 = 0$ lie between -6 and 1 and 2, $h_1, h_2, \ldots, h_{20}[a]$ are in H.P., where [a] denotes the integeral part of a and 2, $a_1, a_2, \ldots a_{20}$ [a] are in A.P. then $a_3h_{18} =$ (A) 6 (B) 12 (C) 3 (D) none of these

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82. If three successive terms of as G.P. with commonratio r>1 form the sides of a triangle and [r] denotes the integral part of x the [r] + [-r] = (A) 0 (B) 1 (C) -1 (D) none of these

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83. I $a_n = \int_0^{rac{\pi}{2}} rac{1-\cos 2nx}{1-\cos 2x} dx then a_1, a_2, a_3, \ldots, a_n$ are in (A) A.P.

only (B) G.P.only (C) H.P. only (D) A.P., G.P. and H.P.

84. If a_1, a_2, a_3, \dots are in H.P. and

$$f(k) = \sum_{r=1}^n a_r - a_k, therac{a_1}{f(1)}, rac{a_2}{f(2)}, rac{a_3}{f(3)}, \dots, rac{a_n}{f(n)}$$
 are in (A)

A.P. (B) G.P (C) H.P. (D) none of these

85. If the sides of a triangle are in G.P., and its largest angle is twice the smallest, then the common ratio r satisfies the inequality `0

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86. The sum of n terms of the series

$$\frac{5}{1.2} \frac{.1}{3} + \frac{7}{2.3} \frac{.1}{3^2} + \frac{9}{3.4} \frac{.1}{3^3} + \frac{11}{4.5} \frac{.1}{3^4} + \dots \text{ is } (A) \quad 1 + \frac{1}{2^{n-1}} \frac{.1}{3^n} (B)$$

$$1 + \frac{1}{n+1} \frac{.1}{3^n} (C) \quad 1 - \frac{1}{n+1} \frac{.1}{3^n} (D) \quad 1 + \frac{1}{2}n - \frac{1.1}{3^n}$$

87. If
$$\frac{b+c}{a+d} = \frac{bc}{ad} = 3\left(\frac{b-c}{a-d}\right)$$
 then a,b,c,d are in (A) H.P. (B) G.P. (C)

A.P. (D) none of these

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88. If
$$\log\left(\frac{2b}{3c}\right)$$
, $\log\left(\frac{4c}{9a}\right)$ and $\log\left(\frac{8a}{27b}\right)$ are in A.P. where a, b, c and

are in G.P. then a,b,c are the length of sides of (A) a scelene triangle (B) anisocsceles tirangel (C) an equilateral triangle (D) none of these

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89. If S_r denotes the sum of r terms of an A.P. and $\frac{S_a}{a^2} = \frac{S_b}{b^2} = c$. Then

$$S_c=\$$
 (A) c^3 (B) ${c\over a}b$ (C) abc (D) $a+b+c$,

90. If S_p denotes the sum of the series $1 + r^p + r^{2p} + \to \infty ands_p$ the sum of the series $1 - r^{2p}r^{3p} + \to \infty$, |r| < 1, $thenS_p + s_p$ in term of S_{2p} is $2S_{2p}$ b. 0 c. $\frac{1}{2}S_{2p}$ d. $-\frac{1}{2}S_{2p}$

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91. If a, bandc are in AP, then the straight line ax + by + c = 0 will always pass through a fixed point whose coordinates are_____

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92. The value of $10^3 + 11^3 + 12^3 + \ldots + 100^3$ is equal to (A)

25500475 (B) 25500000 (C) 25000000 (D) none of these



93. If $a_n =$ the digit at units palce in the number o $1! + 2! + 3! + \dots n!$ for $n \ge 4$ the a_4, a_5, a_6, \dots are in (A) A.P. only (B) G.P. only (C) A.P. and G.P. only (D) A.P., G.P. and H.P.

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94. Let a,b,c be positive real numers such that
$$bx^2 + \left(\sqrt{\left(\left(a+c\right)^2 + 4b^2\right)}x + (a+c), = 0, \forall x \in R, then a,b,c are in the constant of the set of$$

(A) G.P. (B) A.P. (C) H.P. (D) none of these

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95. The coefficient of x^{49} in the product $(x-1)(x-3)(x+99)is-99^2$

b. 1 c. -2500 d. none of these

96. if
$$a, a_1, a_2, a_3, \dots, a_{2n}, b$$
 are in A . P . and $a, g_1, g_2, \dots, g_{2n}, b$
are in G . P . and h is H . M . of a, b then
 $\frac{a_1 + a_{2n}}{g_1 \cdot g_{2n}} + \frac{a_2 + a_{2n-1}}{g_2 \cdot g_{2n-1}} + \dots + \frac{a_n + a_{n+1}}{g_n \cdot g_{n+1}}$ is equal
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97. Let α be the A.M. and $\beta\text{, }\gamma$ be two G.M.\'s between two positive numbes

then the value of $rac{eta^3+\gamma^3}{lphaeta\gamma}$ is (A) 1 (B) 2 (C) 0 (D) 3

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98. If the sum of n positive number is 2n, then the product of these numbers is (A) $\leq 2^n$ (B) $\geq 2^n$ (C) divisible by 2^n (D) none of these

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

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100. Sum of the first n terms of an A.P. having positive terms is given by $S_n = (1 + 2T_n)(1 - T_n)(whereT_n \text{ is the nth term of the series})$. The value of T_2^2 is (A) $\frac{\sqrt{2} + 1}{2\sqrt{2}}$ (B) $\frac{\sqrt{2} - 1}{2\sqrt{2}}$ (C) $\frac{1}{2\sqrt{2}}$ (D) none of these

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101. Let a be the A.M. and b,c bet wo G.M\'s between two positive numbers. Then $b^3 + c^3$ is equal to (A) abc (B) 2abc (C) 3abc (D) 4abc

102. If a > 0, b > 0, c > 0 and the minimum value of $a^2(b+c) + b^2(c+a) + c^2(a+b)$ is kabc, then k is (A) 1 (B) 3 (C) 6 (D) 4 Watch Video Solution

103. If
$$(2+x)(2+x^2)(2+x^3)\dots(2+x^{100}) = \sum_{r=0}^n k_r x^r,$$
 then

n= (A) 2550 (B) 5050 (C) 2^8 (D) none of these

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104. Let S_1, S_2 , be squares such that for each $n \ge 1$, the length of a side of S_n equals the length of a diagonal of S_{n+1} . If the length of a side of $S_1is10cm$, then for which of the following value of n is the area of S_n less than 1 sq. cm? a. 5 b. 7 c. 9 d. 10



105. The next term of the G.P. $x, x^2+2, andx^3+10$ is $rac{729}{16}$ b. 6 c. 0 d. 54



106. If $\ ^nC_4, ^nC_5$ and nC_6 are in A.P. then the value of n will be (A) 14 (B) 11 (C) 7 (D) 8

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107.

 $a, b, care \in G. P.$ and x, ybetheAM's between a, b and $b, crespectively the <math>rac{1}{a} + rac{1}{b} = rac{x+y}{6}(B)ax + cy = b$ (C) $rac{a}{x} + rac{c}{y} = 2$ (D) $rac{1}{x} + rac{1}{y} = rac{2}{b}$

If

108. If
$$a_n = \int_0^\pi \frac{\sin(2n-1)x}{\sin x} dx$$
. Then the number a_1, a_2, a_3 Are in (A) A.P (B) G.P (C) H.P (D) none of these

109. If the first two terms of a progression are $\log_2 256$ and $\log_3 81$ respectively, then which of the following stastement (s) is (are) true: (A) if the third term is $2\log_{61}$ the the terms are in A.P. (B) if the third term is $\log_2 8$, the the terms are in A.P. (C) if the third term is $\log_4 16$ the the terms are in G.P. (D) if the third term is $\frac{2}{3}\log_2 16$ the the terms are in H.P.

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110. If first and $(2n - 1)^t h$ terms of an AP, GP. and HP. are equal and their nth terms are a, b, c respectively, then (a) a=b=c (b)a+c=b (c) a>b>c and $ac - b^2 = 0$ (d) none of these

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111. The complex numbrs x and y such that x, x+2y, 2x+y are n A.P. and $(y+1)^2, xy+5, (x+1)^2$ are in G.P. are (A) x=3, y=1 (B)

$$x = -1 + 2\sqrt{2}i, y = \frac{1}{3}(-1 + 2\sqrt{2}i)$$
(C)

$$x = \sqrt{2} + i, y = 3\sqrt{5} - \sqrt{2}i$$
(D) 'x=-1(1+2sqrt(2)i), y= - 1/3 (1+2sqrt(2)i)
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112. The values of x for which $\frac{1}{1 + \sqrt{x}}, \frac{1}{1 - x}, \frac{1}{1 - \sqrt{x}}$ are in A.P. lie in the interval (A) $(0, \infty)$ (B) $(1, \infty)$ (C) $(0, 1)$ (D) none of these
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113. If pth, qth, rth terms of an A.P. are in G.P. then common ratio of ths

G.P. is (A)
$$rac{q-r}{p-q}$$
 (B) $rac{q-s}{p-r}$ (C) $rac{r-s}{q-r}$ (D) $rac{q}{p}$

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114. If A_1, A_2 be two A.M.\'s G_1, G_2 be the two G.M.\'s and H_1, H_2 be the two H.M.\'s between a and b then (A) $\frac{A_1 + A_2}{G_1 G_2} = \frac{a + b}{ab}$ (B) $\frac{H_1 + H_2}{H_1 H_2} = \frac{a + b}{a} b$ (C) $\frac{G_1 G_2}{H_1 H_2} = \frac{A_1 + A_2}{H_1 + H_2} (D) \frac{A_1 + A_2}{H_1 H_2} = \frac{a + b}{a - b}$

115. If
$$f(n) = 1^2 + 2.2^2 + 3^2 + 2.4^2 + 5.6^2 + 2.6^2 + ... + n$$
 terms ,then

(A)
$$f(n)=rac{n(n+1)^2}{2}$$
, if n is even (B)

$$f(n) = rac{n^2 (n+2)^2}{2}$$
, if $niseven(C)$ f(n)= (n^2(n+1))/2

$$, \hspace{1.5cm} ext{if} \hspace{1.5cm} nisodd(D)f(n) = rac{n(n+3)^2}{2} ext{ if n is odd}$$

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116. 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 =

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117. The G.M. of two positive numbers is 6. Their arithmetic mean A and harmonic mean H satisfy the equation 90A + 5H = 918, then A may be

equal to (A) $\frac{5}{2}$ (B) 10 (C) 5 (D) $\frac{1}{5}$

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118. Let $a_1, a_2, a_3, \ldots, a_n$ be positive numbers in G.P. For each n let A_n, G_n, H_n be respectively the arithmetic mean geometric mean and harmonic mean of a_1, a_2, \ldots, a_n On the basis of above information answer the following question: A_k, G_k, H_k are in (A) A.P. (B) G.P. (C) H.P. (D) none of these

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119. Let a_1, a_2, \ldots be positive real numbers in geometric progression. For each n, let A_nG_n, H_n , be respectively the arithmetic mean, geometric mean & harmonic mean of a_1, a_2, \ldots, a_n . Find an expression ,for the geometric mean of G_1, G_2, \ldots, G_n in terms of $A_1, A_2, \ldots, A_n, H_1, H_2, \ldots, H_n$. 120. Let S_n denote the sum of first n terms of a G.P. whose first term and common ratio are a and r respectively. On the basis of above information answer the following question: $S_1 + S_2 + S_2 + \ldots + S_n =$ (A) $\frac{na}{1-r} - \frac{ar(1-n)}{(1-r)^{20}}$ (B) $\frac{na}{1-r} - \frac{ar(1+n)}{(1+r)^{20}}$ (C) $\frac{na}{1-r} - \frac{a(1-n)}{(1-r)^{20}}$ (D) none of these

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121. Let S_n denote the sum of first n terms of a G.P. whose first term and common ratio are a and r respectively. On the basis of above information answer the following question: The sum of product of first n terms of the G.P. taken two at a time in (A) $\frac{r+1}{r}S_nS_{n-1}$ (B) $\frac{r}{r+1}S_n^2$ (C) $\frac{r}{r+1}S_nS_{n-1}$ (D) none of these

122. If sum of n terms of a sequende is S_n then its nth term $t_n=S_n-S_{n-1}.$ This relation is vale for all n>-1 provided $S_0=0.$ But if $S_{
eq} 0$, then the relation is valid ony for $n\geq 2$ and in hat cast t_1 can be obtained by the relation $t_1 = S_1$. Also if nth term of a sequence $t_1=S_n-S_{n-1}$ then sum of n term of the sequence can be obtained by putting n=1,2,3, . n and adding them. Thus $\sum_{n=1}^{n}t_n=S_n-S_0.$ if $S_0=0, then \sum_{n=1}^{n}t_n=S_n.$ On the basis of above information answer the following questions: If the sum of n terms of a sequence is $10n^2 + 7n$ then the sequence is (A) an A.P. having common difference 20 (B) an A.P. having common difference 7 (C) an A.P. having common difference 27 (D) not an A.P.

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123. If sum of n terms of a sequence is S_n then its nth term $t_n = S_n - S_{n-1}$. This relation is valid for all n > -1 provided $S_0 = 0$. But if $S_1 = 0$, then the relation is valid only for $n \ge 2$ and in hat cast t_1 can be obtained by the relation $t_1 = S_1$. Also if nth term of a sequence $t_1 = S_n - S_{n-1}$ then sum of n term of the sequence can be obtained by putting n = 1, 2, 3, .n and adding them. Thus $\sum_{n=1}^{n} t_n = S_n - S_0$. if $S_0 = 0, then \sum_{n=1}^{n} t_n = S_n$. On the basis of above information answer the following questions: If the sum of n terms of a sequence is $10n^2 + 7n$ then the sequence is (A) an A.P. having common difference 20 (B) an A.P. having common difference 7 (C) an A.P. having common difference 27 (D) not an A.P.

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124. If sum of n terms of a sequende is S_n then its nth term $t_n = S_n - S_{n-1}$. This relation is vale for all n > -1 provided $S_0 = 0$. But if $S_{\neq} 0$, then the relation is valid ony for $n \ge 2$ and in hat cast t_1 can be obtained by the relation $t_1 = S_1$. Also if nth term of a sequence $t_1 = S_n - S_{n-1}$ then sum of n term of the sequence can be obtained by putting n = 1, 2, 3, .n and adding them. Thus $\sum_{n=1}^n t_n = S_n - S_0$. If $S_0 = 0$, then $\sum_{n=1}^n t_n = S_n$. On the basis of above information answer the following questions: If nth term of a sequence is $\frac{n}{1+n^2+n^4}$ then

the sum of its first n terms is (A)
$$\frac{n^2 + n}{1 + n + n^2}$$
 (B) $\frac{n^2 - n}{1 + n + n^2}$ (C)
 $\frac{n^2 + n}{1 - n + n^2}$ (D) $\frac{n^2 + n}{2(1 + n + n^2)}$
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125. If a,b,c are positive real numbers then $(1 + a)^7(1 + b)^7(1 + c)^7$ (A)
 $< 7^7 a^4 b^4 c^4$ (B) $\le 7^7 a^4 b^4 c^4$ (C) $> 7^7 a^4 b^4 c^4$ (D) none of these

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126. If $x\in R$, the numbers $5^{1+x}+5^{1-x}, rac{a}{2}, 25^x+25^{-x}$ form an A.P.

then a must lie in the interval

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

128. Sum of infinite terms of series 3+5. $\frac{1}{4}+7$. $\frac{1}{4^2}+...$ is

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129. The largest term common to the sequences $1, 11, 21, 31, \rightarrow 100$ terms and $31, 36, 41, 46, \rightarrow 100$ terms is 381 b. 471 c. 281 d. none of these

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130. Assertion: $\left[\left(1+\frac{1}{10000}\right)^{10000}\right] = 2$ where [.] is the greatest integer function. Reason: $2 < \left(1+\frac{1}{n}\right)^n < 2.5$ for all n εN (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.



131. Assertion: If n is odd then the sum of n terms of the series $1^2+2 imes 2^2+3^2+2 imes 4^2+5^2+2 imes 6^2+7^2+\ldots is{n^2(n+1)\over 2}.$ If n is of the the terms series. then sum of n even $1^2+2 imes 2^2+3^2+2 imes 4^2+5^2+2 imes 6^2+\dots$, is $rac{n(n+1)^2}{2}$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.



132. Assertion: one root of equation $(a - d)^2 x^2 - [(b - c)^2](c - a)^2 x - (d - b)^2 = 0$ is necessarily 1. Reason: $(a - d)^2 = (b - c)^2 + (c - a)^2 + (d - b)^2$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

133. Assertion: x,y,z are in A.P., Reason: sum of an infinite G.P. having first term a and common ratio r is $\frac{a}{1-r}where - 1 < r < 1$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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134. Assertion: x - a, y - a, z - a are in G.P., Reason: If a,b,c are in H.P. then $a - \frac{b}{2}$, $b - \frac{b}{2}$, $c - \frac{b}{2}$ are in G.P. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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135. Assertion: $I_1, I_2, I_3,$ are in A.P. Reason: $I_{n+2} + I_n - 2I_{n+1} = 0$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

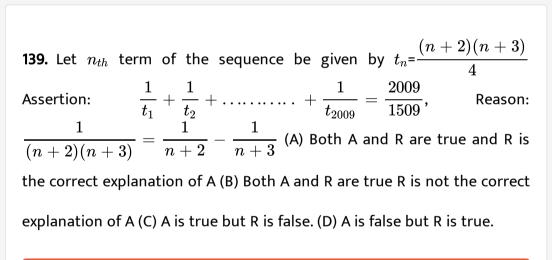


136. Assetion: a_1, a_2, a_3, \ldots an are not in G.P. Reason: $a_{n+1} = a_n$ (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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137. Assertion: a^2 , b^2 , c^2 are in A.P., Reason: $\frac{1}{b+c}$, $\frac{1}{c+a}$, $\frac{1}{a+b}$ are in A.P. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

138. Assertion: $\frac{S_1}{S_2} = \frac{n}{n+1}$, Reason: Numbers of odd termsof A.P. is (n+1) and numbers of even terms is n. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.



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140. The real numbers x_1, x_2, x_3 satisfying the equation $x^3 - x^2 + bx + \gamma = 0$ ar ein A.P. Find the intervals in which $eta and \gamma$ lie.

141. Let x be the arithmetic mean and y, z be the two geometric means

between any two positive numbers, then $rac{y^3+z^3}{xyz}=$ \cdot (1997C, 2M)

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142. If $\cos(x-y)$, $\cos x$ and $\cos(x+y)$ are in H.P., are in H.P., then $\cos x \cdot \sec \left(\frac{y}{2} \right)$ =

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143. Let pandq be the roots of the equation $x^2 - 2x + A = 0$ and let

rands be the roots of the equation $x^2 - 18x + B = 0$. If `p

144. Let T_r be the rth term of an A.P., for r = 1, 2, 3, If for some positive integers m, n, we have $T_m = \frac{1}{n} and T_n = \frac{1}{m}$, $then T_{mn}$ equals $\frac{1}{mn}$ b. $\frac{1}{m} + \frac{1}{n}$ c. 1 d. 0

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145. If
$$x > 1, y > 1, z > 1$$
 are in G.P. then $\frac{1}{1 + Inx}, \frac{1}{1 + Iny}, \frac{1}{1 + Inz}$ are in (A) A.P. (B) H.P. (C) G.P. (D) none of these

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146. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G.P. with the same common ratio, then the points $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) (A) lie on a straight line (B) lie on a parabola (C) lie on a circle (D) are vertices of a triangle

147. The harmonic mean of the roots of the equation $(5+\sqrt{2})x^2 - (4+\sqrt{5})x + 8 + 2\sqrt{5} = 0$ is 2 b. 4 c. 6 d. 8

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148. Let a_1, a_2, \ldots, a_{10} be in A.P. and h_1, h_2, \ldots, h_{10} be in H.P. If

 $a_1 = h_1 = 2 \, ext{ and } \, a_{10} = h_{10} = 3, then a_4 h_7$ is (A) 2 (B) 3 (C) 5 (D) 6

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149. Let S_1, S_2 , be squares such that for each $n \ge 1$, the length of a side of S_n equals the length of a diagonal of S_{n+1} . If the length of a side of $S_1is10cm$, then for which of the following value of n is the area of S_n less than 1 sq. cm? a. 5 b. 7 c. 9 d. 10



150. If a, b, c, d are positive real umbers such that a = b + c + d = 2, then M = (a + b)(c + d) satisfies the relation $0 \le M \le 1.1 \le M \le 2.2 \le M \le 3.3 \le M \le 4$

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151. Consider an infinite geometric series with first term a and common ratio r. If its sum is 4 and the second term is 3/4, then $a = \frac{4}{7}$, $r = \frac{3}{7}$ b. $a = 2, r = \frac{3}{8}$ c. $a = \frac{3}{2}, r = \frac{1}{2}$ d. $a = 3, r = \frac{1}{4}$

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152. The fourth power of common difference of an arithmetic progression with integer entries is added to the product of any four consecutive terms of it. Prove that the resulting sum is the square of an integer.



153. Let $\alpha and\beta$ be the roots of $x^2 - x + p = 0$ and $\gamma and\delta$ be the root of $x^2 - 4x + q = 0$. If α , β , and γ , δ are in G.P., then the integral values of pandq, respectively, are -2, -32 b. -2, 3 c. -6, 3 d. -6, -32



154. If the sum of the first 2n terms of the A.P. 2, 5, 8, ..., is equal to the sum of the first n terms of A.P. 57, 59, 61, ..., then n equals 10 b. 12 c. 11 d. 13

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155. Let the positive numebrs a,b,c,d be in A.P. Then *abc*, *abd*, *acd*, *bcd* re

(A) not in A.P., G.P., H.P. (B) in A.P. (C) in G.P. (D) in H.P.



156. Let a_1, a_2, \ldots be positive real numbers in geometric progression. For each n, let A_nG_n, H_n , be respectively the arithmetic mean, geometric mean & harmonic mean of a_1, a_2, \ldots, a_n . Find an expression ,for the geometric mean of G_1, G_2, \ldots, G_n in terms of $A_1, A_2, \ldots, A_n, H_1, H_2, \ldots, H_n$.



157. If

$$\sin^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} - \dots \right) + \cos^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \dots \right) = \frac{\pi}{2}$$

for $0 < |x| < \sqrt{2}$ then $x =$
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158. If $a - 1, a_2, a_n$ are positive real numbers whose product is a fixed number c, then the minimum value of $a_1 + a_2 + a_{n-1} + 2a_n$ is $a_{n-1} + 2a_n$ is b. $(n+1)c^{1/n} 2nc^{1/n} (n+1)(2c)^{1/n}$ **159.** Suppose a,b,c are in A.P and a^2, b^2, c^2 are in G.P If `a

160. Let a, b be positive real numbers. If aA_1, A_2, b be are in arithmetic progression a, G_1, G_2, b are in geometric progression, and a, H_1, H_2, b

are in harmonic progression, show that
$$\frac{G_1G_2}{H_1H_2} = \frac{A_1 + A_2}{H_1 + H_2} = \frac{(2a+b)(a+2b)}{9ab}$$

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161. If
$$lpha\in \Big(0,rac{\pi}{2}\Big), then\sqrt{x^2+x}+rac{ an^2lpha}{\sqrt{x^2+x}}$$
 is always greater than or

equal to $2 \tan \alpha \ 1 \ 2 \sec^2 \alpha$

162. If a, b, c are in A.P. and a^2, b^2, c^2 are in H.P., then prove that either a = b = c or $a, b, c = \frac{c}{2}$ form a G.P.

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163. An infinite G.P has first term x and sum 5 then x belongs



164. If a,b,c, are positive real numbers, then prove that (2004, 4M) $\{(1+a)(1+b)(1+c)\}^7>7^7a^4b^4c^4$

165. In the quadratic
$$ax^2 + bx + c = 0, D = b^2 - 4ac$$
 and $\alpha + \beta, \alpha^2 + \beta^2, \alpha^3 + \beta^3$, are in

G.P , where lpha,eta are the roots of $ax^2+bx+c,\,$ then (a) $\Delta
eq 0$ (b)

$$b\Delta=0$$
 (c) cDelta = 0 (d) Delta = 0`

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166.

$$A_n = \left(rac{3}{4}
ight) - \left(rac{3}{4}
ight)^2 + \left(rac{3}{4}
ight)^3 + \ldots + (\,-1)^{n-1} igg(rac{3}{4}igg)^n \, \, ext{and} \, \, B_n = 1 -$$

. find the least odd natural numbers n_0 , so that $B_n > A_n A$ for all $n \ge n_0$

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167. Let V_r denote the sum of the first' ' terms of an arithmetic progression (A.P.) whose first term is'r and the common difference is (2r-1). Let $T_r = V_{r+1} - V_r - 2$ and $Q_r = T_{r+1} - T_r$ for $r = 1, 2, \ldots$. The sum $V_1 + V_2 + \ldots + V_n$ is

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Let

168. Let V_r denote the sum of the first r terms of an arithmetic progression (AP) whose first term is r and the common difference is (2r - 1). Let $T_r = V_{r+1} - V_r - 2$ and $Q_r = T_{r+1} - T_r$ for $r = 1, 2 T_r$ is always (A) an odd number (B) an even number (C) a prime number (D) a composite num,ber

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169. Let V_r denote the sum of the first r terms of an arithmetic progression (AP) whose first term is r and the common difference is (2r-1). Let $T_r = V_{r+1} - V_r - 2$ and $Q_r = T_{r+1} - T_r$ for r = 1, 2Which one of the following is a correct statement? (A) $Q_1, Q_2, Q_3, \ldots, \ldots$, are in A.P. with common difference 5 (B) $Q_1, Q_2, Q_3, \ldots, \ldots$, are in A.P. with common difference 6 (C) $Q_1, Q_2, Q_3, \ldots, \ldots$, are in A.P. with common difference 11 (D) $Q_1 = Q_2 = Q_3$

170. Let A_1, G_1, H_1 denote the arithmetic, geometric and harmonic means respectively, of two distinct positive numbers. For n > 2, let A_{n-1}, G_{n-1} and H_{n-1} has arithmetic, geometric and harmonic means as A_n, G_N, H_N , respectively.

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171. Let A_1, G_1, H_1 denote the arithmetic, geometric and harmonic means respectively, of two distinct positive numbers. For n > 2, let A_{n-1}, G_{n-1} and H_{n-1} has arithmetic, geometric and harmonic means as A_n, G_N, H_N , respectively.

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172. Let A_1, G_1, H_1 denote the arithmetic, geometric and harmonic means respectively, of two distinct positive numbers. For n > 2, let A_{n-1}, G_{n-1} and H_{n-1} has arithmetic, geometric and harmonic means as A_n, G_N, H_N , respectively. **173.** Assertion: The numbers b_1 , b_2 , b_3 , b_4 are neither in A.P. nor in G.P. Reason: The numbers b_1 , b_2 , b_3 , b_3 are in H.P. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true R is not te correct explanation of A (C) A is true but R is false. (D) A is false but R is true.

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174. If the sum of first *n* terms of an AP is cn^2 , then the sum of squares of these *n* terms is (2009) $\frac{n(4n^2-1)c^2}{6}$ (b) $\frac{n(4n^2+1)c^2}{3}$ $\frac{n(4n^2-1)c^2}{3}$ (d) $\frac{n(4n^2+1)c^2}{6}$ Watch Video Solution