# NDA 2 2024

LIVE

# MATHS

## SEQUENCE & SERIES

CLASS 2


NAVJYOTI SIR

Crack
EXAMS

# 13 June 2024 Live Classes Schedule

| | | |
|---|---|---|
| 8:00AM | 13 JUNE 2024 DAILY CURRENT AFFAIRS | RUBY MA'AM |

## SSB INTERVIEW LIVE CLASSES

| | | |
|---|---|---|
| 9:00AM | OVERVIEW OF GTO | ANURADHA MA'AM |

## AFCAT 2 2024 LIVE CLASSES

| | | |
|---|---|---|
| 4:00PM | MATHS - TRIGONOMETRY - CLASS 3 | NAVJYOTI SIR |
| 5:30PM | ENGLISH - CLOZE TEST - CLASS 2 | ANURADHA MA'AM |

## NDA 2 2024 LIVE CLASSES

| | | |
|---|---|---|
| 11:30AM | GK - INDIAN GEOGRAPHY - CLASS 2 | RUBY MA'AM |
| 2:30PM | GS - CHEMISTRY - CLASS 4 | SHIVANGI MA'AM |
| 5:30PM | ENGLISH - CLOZE TEST - CLASS 2 | ANURADHA MA'AM |
| 6:30PM | MATHS - SEQUENCE & SERIES - CLASS 2 | NAVJYOTI SIR |

## CDS 2 2024 LIVE CLASSES

| | | |
|---|---|---|
| 11:30AM | GK - INDIAN GEOGRAPHY - CLASS 2 | RUBY MA'AM |
| 2:30PM | GS - CHEMISTRY - CLASS 4 | SHIVANGI MA'AM |
| 4:00PM | MATHS - TRIGONOMETRY - CLASS 3 | NAVJYOTI SIR |
| 5:30PM | ENGLISH - CLOZE TEST - CLASS 2 | ANURADHA MA'AM |



# WHAT WILL WE STUDY ?

- Harmonic Progression
- Harmonic Mean (HM)
- Relation between AM, GM and HM
- Practice MCQs

# HARMONIC PROGRESSION

$2 \quad 5 \quad 8 \quad 11 \quad 14$ — AP

(reciprocal)

$\frac{1}{2} \quad \frac{1}{5} \quad \frac{1}{8} \quad \frac{1}{11} \quad \frac{1}{14}$ } Harmonic progression

reciprocal

$\frac{1}{5} - \frac{1}{2}$ } $\frac{1}{8} - \frac{1}{5}$ (common differences)

$a_1, a_2, a_3 \cdots a_n$ are in AP

then, $\frac{1}{a_1}, \frac{1}{a_2}, \frac{1}{a_3} \cdots \frac{1}{a_n}$ are in HP.

$a, \quad a+d, \quad a+2d$ —— in AP,

$$\frac{1}{a} \quad \frac{1}{a+d} \quad \frac{1}{a+2d} \quad \cdots\cdots \quad \frac{1}{a+(n-1)d}$$

$$T_n = \frac{1}{a+(n-1)d}$$

# HARMONIC MEAN

$a, b \longrightarrow HM = \dfrac{2}{\frac{1}{a} + \frac{1}{b}}$

$AM = \dfrac{a+b}{2}$

$\dfrac{1}{HM} = \dfrac{\frac{1}{a} + \frac{1}{b}}{2}$

$= HM = \dfrac{2ab}{a+b}$

$a_1, a_2 \cdots a_n \longrightarrow \dfrac{n}{\frac{1}{a_1} + \frac{1}{a_2} + \frac{1}{a_3} + \cdots \frac{1}{a_n}} = HM$

# RELATION BETWEEN AM, GM AND HM

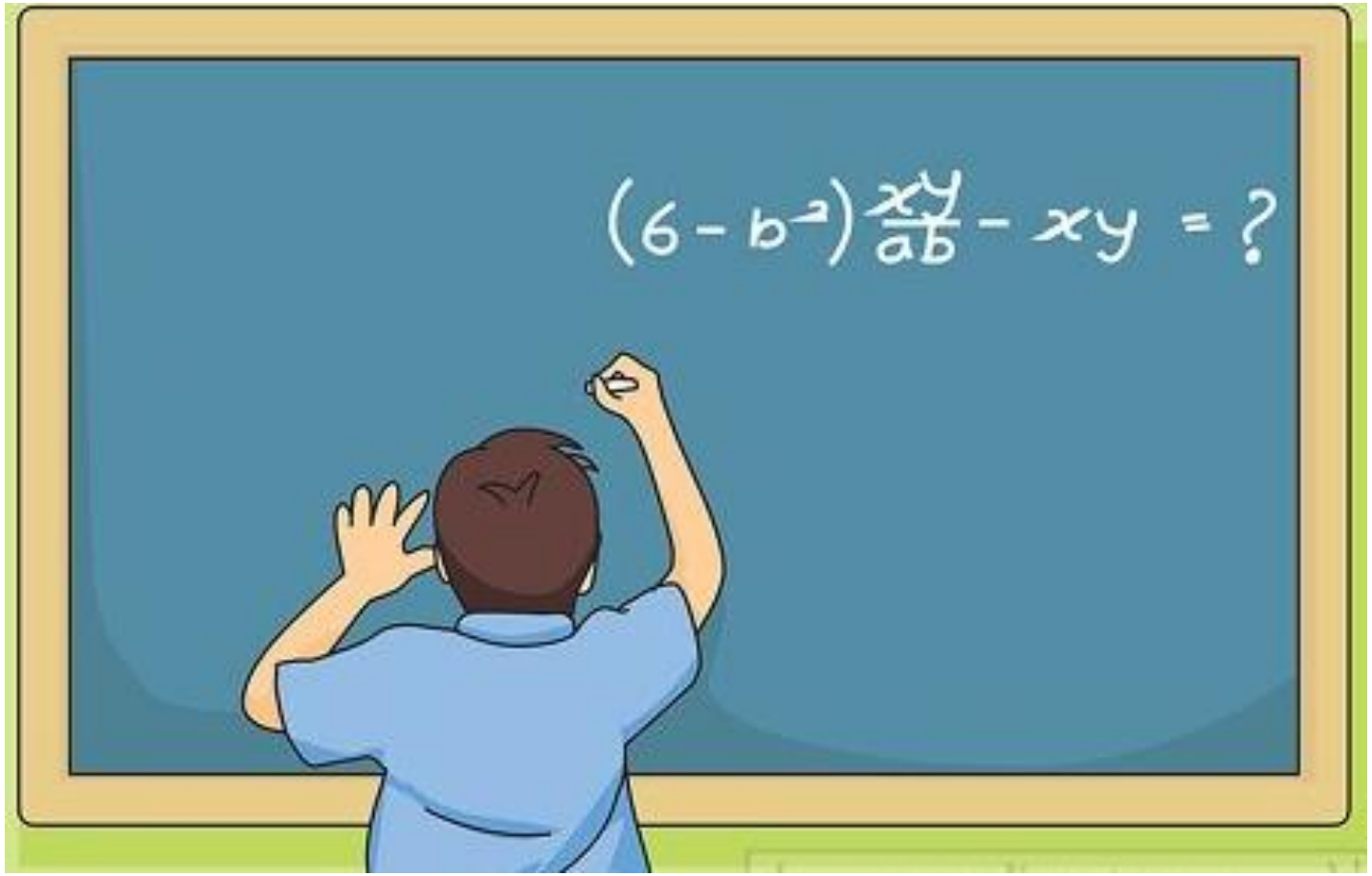
for 2 nos, a & b,

$$AM = \frac{a+b}{2} \; ; \; GM = \sqrt{ab} \; ; \; HM = \frac{2}{\frac{1}{a}+\frac{1}{b}} = \frac{2ab}{a+b}$$

$$GM^2 = AM \times HM$$

$$AM \geq GM \geq HM$$

# PRACTISE TIME !



**Q)** The third term of a geometric progression is 4. The product of the first five terms is

(a) $4^3$ (b) $4^5$ (c) $4^4$ (d) none of these

$ar^2 = 4$

$a(ar)(ar^2)(ar^3)(ar^4)$

$= a^5 r^{1+2+3+4}$

$= a^5 r^{10} = (ar^2)^5$

$= (4)^5$

**Q)** The third term of a geometric progression is 4. The product of the first five terms is

(a) $4^3$ (b) $4^5$ (c) $4^4$ (d) none of these

**Ans: (b)**

SSBCrack EXAMS

**Q)** Sum of the first $n$ terms of the series

$\frac{1}{2}+\frac{3}{4}+\frac{7}{8}+\frac{15}{16}+\ldots\ldots\ldots\ldots$ is equal to

(a) $2^n - n - 1$ (b) $1-2^{-n}$

(c) $n + 2^{-n} - 1$ (d) $2^n + 1.$

$\left(1-\frac{1}{2}\right)+\left(1-\frac{1}{4}\right)+\left(1-\frac{1}{8}\right)+\left(1-\frac{1}{16}\right)+\ldots$ $n$ terms

$(1+1+\ldots n \text{ times}) - \left(\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\ldots n \text{ terms}\right)$

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

$= 2^{-n} + n - 1$ ✓

$\because \frac{a(1-r^n)}{1-r}$

(OR) For first 3 terms,

$\frac{1}{2}+\frac{3}{4}+\frac{7}{8} = \frac{4+6+7}{8} = \frac{17}{8}$

Check with options, $n=3$

(a) $2^3 - 3 - 1 = 8 - 4 = 4$ — (X)

(b) $1 - 2^{-3} = 1 - \frac{1}{8} = \frac{7}{8}$ — (X)

(c) $3 + \frac{1}{8} - 1 = 2 + \frac{1}{8} = \frac{17}{8}$ ✓

(d) $2^3 + 1 = 9$ — (X)

**Q)** Sum of the first $n$ terms of the series

$\frac{1}{2}+\frac{3}{4}+\frac{7}{8}+\frac{15}{16}+\ldots\ldots\ldots\ldots$ is equal to

(a) $2^n - n - 1$

(b) $1 - 2^{-n}$

(c) $n + 2^{-n} - 1$

(d) $2^n + 1.$

**Ans: (c)**

**Q)** If $ln(a+c), ln(a-c), ln(a-2b+c)$ are in A.P., then

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

(c) $a, b, c$ are in G.P. (d) $a, b, c$ are in H.P.

$$2\ln(a-c) = \ln(a+c) + \ln(a-2b+c)$$

$$\ln(a-c)^2 = \ln\left((a+c)(a-2b+c)\right)$$

$$(a-c)^2 = (a+c)(a-2b+c)$$

$$a^2 - 2ac + c^2 = a^2 - 2ab + ac + ac - 2bc + c^2$$

$$-4ac = -2ab - 2bc$$

$$2ac = ab + bc$$

$$2ac = b(a+c)$$

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

$\Rightarrow$ a, b, c are in HP.

$$\ln(a^m) = m\ln a$$

$$\ln(a) + \ln(b) = \ln(a \cdot b)$$

**Q)** If $ln(a+c), ln(a-c), ln(a-2b+c)$ are in A.P., then

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

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

(c) $a, b, c$ are in G.P.

(d) $a, b, c$ are in H.P.

**Ans: (d)**

**Q)** 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) $a = \frac{4}{7}, r = \frac{3}{7}$

(b) $a = 2, r = \frac{3}{8}$

(c) $a = \frac{3}{2}, r = \frac{1}{2}$

(d) $a = 3, r = \frac{1}{4}$

$S_\infty = \frac{a}{1-r} = 4$

$ar = \frac{3}{4}$ — (2)

$a = 4 - 4r$ — (1)

**Q)** 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) $a = \frac{4}{7}, r = \frac{3}{7}$

(b) $a = 2, r = \frac{3}{8}$

(c) $a = \frac{3}{2}, r = \frac{1}{2}$

(d) $a = 3, r = \frac{1}{4}$

**Ans: (d)**

**Q)** 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 the A.P. 57, 59, 61, …, then $n$ equals

(a) 10 (b) 12 (c) 11 (d) 13

**AP$_1$**

2, 5, 8, ... $2n$ terms

$$S_{2n} = \frac{2n}{2}\left(2\times 2 + (2n-1)3\right)$$

$$= n(4 + 6n - 3)$$

$$S_{2n} = 6n^2 + n$$

**AP$_2$**

57, 59, 61 ... $n$ terms

$$S'_n = \frac{n}{2}\left(2\times 57 + (n-1)2\right)$$

$$= 57n + n^2 - n$$

$$= n^2 + 56n$$

$$S_{2n} = S'_n$$

$$6n^2 + n = n^2 + 56n$$

$$5n^2 - 55n = 0$$

$$5n(n-11) = 0$$

$n = 0$ ; $n = 11$

($n = 0$ rejected)

**Q)** 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 the A.P. 57, 59, 61, …, then $n$ equals

(a) 10 (b) 12 (c) 11 (d) 13

**Ans: (c)**

SSBCrack EXAMS

**Q)** If a, b, c are in geometric progression and a, 2b, 3c are in arithmetic progression, then what is the common ratio r such that $0 < r < 1$ ?

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$

(c) $\frac{1}{4}$ (d) $\frac{1}{8}$

$r = \frac{b}{a}$ or $\frac{c}{b}$

$b^2 = ac$

$2(2b) = a + 3c$

$4b = a + 3c$

$a = 4b - 3c$

$b^2 = (4b - 3c)(c)$

$b^2 = 4bc - 3c^2$

$b^2 - 4bc + 3c^2 = 0$

$b^2 - (4c)b + 3c^2 = 0$

$b = \frac{4c \pm \sqrt{16c^2 - 4 \times 1 \times 3c^2}}{2}$

$b = \frac{4c \pm \sqrt{4c^2}}{2}$

$b = \frac{4c \pm 2c}{2}$

$\left(b = \frac{6c}{2}\right)$ $\left(b = \frac{2c}{2}\right)$

$\frac{b}{c} = 3$ $\left(\frac{b}{c} = 1\right.$

$r_b = 1/3$ $r_b = 1$

**Q)** If a, b, c are in geometric progression and a, 2b, 3c are in arithmetic progression, then what is the common ratio r such that $0 < r < 1$ ?

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$

(c) $\frac{1}{4}$ (d) $\frac{1}{8}$

**Ans: (a)**

**Q)** For an AP with first term u and common difference v, the $p^{th}$ term is 15 uv more than the $q^{th}$ term. Which one of the following is correct ?

(a) $p = q + 15\,v$ (b) $p = q + 15\,u$

(c) $p = q + 14\,v$ (d) $p = q + 14\,u$

$u + (p-1)v = 15uv + u + (q-1)v$

$pv - v - qv + v = 15uv$

$v(p-q) = 15uv$

$p - q = 15u$

$p = q + 15u$

**Q)** For an AP with first term u and common difference v, the $p^{th}$ term is 15 uv more than the $q^{th}$ term. Which one of the following is correct ?

(a) $p = q + 15\,v$ (b) $p = q + 15\,u$

(c) $p = q + 14\,v$ (d) $p = q + 14\,u$

**Ans: (b)**

**Q)** What is the sum of the first 50 terms of the series

$(1 \times 3) + (3 \times 5) + (5 \times 7) + \ldots . ?$

(a) 1,71,650 (b) 26,600

(c) 26,650 (d) 26,900

$(1\times3) + (3\times5) + (5\times7) + \cdots$

$n=1 \quad n=2 \quad n=3$

$(2n-1)(2n+1)$ → General term

$= 4n^2 - 1 = a_n$

$$S_n = \sum a_n = \sum_{n=1}^{50} (4n^2-1) = \sum_{n=1}^{50} 4n^2 - \sum_{n=1}^{50} 1$$

$$= 4\sum_{n=1}^{50} n^2 - (1+1+1 \ldots 50 \text{ times})$$

$$= \frac{4(n)(n+1)(2n+1)}{6} - (1\times50)$$

$$= \frac{4\times50\times51\times101}{6} - 50$$

**Q)** What is the sum of the first 50 terms of the series

$(1 \times 3) + (3 \times 5) + (5 \times 7) + \ldots . ?$

(a) 1,71,650
(b) 26,600
(c) 26,650
(d) 26,900

**Ans: (a)**

**Q)** What is the value of $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \ldots\ldots \infty$ ?

(a) 9 (b) 3

(c) $9^{1/3}$ (d) 1

$$9^{\frac{1}{3}+\frac{1}{9}+\frac{1}{27}+\cdots\infty} = 9^{1/2} = \sqrt{9} = 3$$

As $\frac{1}{3}, \frac{1}{9}, \frac{1}{27} \cdots \infty$ is infinite GP with $r = \frac{1}{3}$

$$S_\infty = \frac{a}{1-r} = \frac{1/3}{1-1/3} = \frac{1/3}{2/3} = \frac{1}{2}$$

**Q)** What is the value of $9^{1/3} . 9^{1/19} . 9^{1/27} \ldots\ldots \infty$ ?

(a) 9
(b) 3
(c) $9^{1/3}$
(d) 1

**Ans: (b)**

**Q)** After paying 30 out of 40 installments of a debt of Rs. 3600, one third of the debt is unpaid. If the installments are forming an arithmetic series, then what is the first instalment?

(a) Rs 50
(b) Rs 51
(c) Rs 105
(d) Rs 110

$S_{40} = 3600$

$S_{40} - S_{30} = \frac{1}{3}(3600)$

$S_{40} - S_{30} = 1200$

$2400 = S_{30}$

$15(2a + (30-1)d) = 2400$

$30a + 29 \times 15d = 2400$

$20(2a + (39)d) = 3600$

$40a + 20 \times 39d = 3600$

**Q)** After paying 30 out of 40 installments of a debt of Rs. 3600, one third of the debt is unpaid. If the installments are forming an arithmetic series, then what is the first instalment?

(a) Rs 50
(b) Rs 51
(c) Rs 105
(d) Rs 110

**Ans: (b)**

SSBCrack EXAMS

**Q)** If the sum of '$n$' terms of an arithmetic progression is $n^2 - 2n$, then what is the $n^{th}$ term?

(a) $3n - n^2$ (b) $2n - 3$

(c) $2n + 3$ (d) $2n - 5$

$S_n = n^2 - 2n$ $\quad a_n = ?$

$S_1 = 1^2 - 2\times1 = -1 = a$ = first term

$S_2 = 2^2 - 2\times2 = 0 = a_1 + a_2$

$S_3 = 3^2 - 2\times3 = 3$

$= a + (a+d)$

$= 2a + d = 0$

$-2 + d = 0 \Rightarrow d = 2$ ✓

$-1$, $1$

$a$, $a+d$

$a = -1$ ; $d = 2$

$a_n = a + (n-1)d$

$= -1 + (n-1)2$

$= 2n - 3$

— OR —

$a_n = S_{n+1} - S_n$ | $S_n - S_{n-1}$

**Q)** If the sum of '$n$' terms of an arithmetic progression is $n^2 - 2n$, then what is the $n^{th}$ term?

(a) $3n - n^2$ (b) $2n - 3$

(c) $2n + 3$ (d) $2n - 5$

**Ans: (b)**

**Q)** What is sum to the 100 terms of the series
$9+99+999+\ldots?$

(a) $\frac{10}{9}\left(10^{100}-1\right)-100$ (b) $\frac{10}{9}\left(10^{99}-1\right)-100$

(c) $100\,(100^{10}-1)$ (d) $\frac{9}{100}\left(10^{100}-1\right)$

$(10-1)+(10^2-1)+(10^3-1)+\ldots$ (100 terms)

$(10+10^2+10^3+\ldots$ (100 terms)$)-(100)$

**Q)** What is sum to the 100 terms of the series
$9+99+999+\ldots?$

(a) $\frac{10}{9}\left(10^{100}-1\right)-100$ (b) $\frac{10}{9}\left(10^{99}-1\right)-100$

(c) $100\,(100^{10}-1)$ (d) $\frac{9}{100}\left(10^{100}-1\right)$

**Ans: (a)**

[ 2024 (I) ]

If $a$, $b$ and $c$ $(a > 0, c > 0)$ are in GP, then consider the following in respect of the equation $ax^2 + bx + c = 0$ :

1. The equation has imaginary roots.
2. The ratio of the roots of the equation is $1 : \omega$ where $\omega$ is a cube root of unity.
3. The product of roots of the equation is $\left(\frac{b^2}{a^2}\right)$.

Which of the statements given above are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

$ax^2 + bx + c = 0$ → (Discriminant < 0)

$b^2 = ac$

$(b)^2 - 4ac < 0$

$ac - 4ac < 0$

$-3ac < 0$

if $a > 0, c > 0 \Rightarrow ac > 0$

$ax^2 + bx + c = 0$

$b^2 = ac$

$D = -3ac$

$$x = \frac{-b \pm \sqrt{-3ac}}{2a}$$

$$x = \frac{-b \pm \sqrt{-3b^2}}{2a} = \frac{-b \pm b\sqrt{-3}}{2a}$$

$$\frac{-b + b\sqrt{-3}}{2a} = \frac{-b}{2a}\left(1 + \sqrt{-3}\right) \quad (\alpha)$$

$(\sqrt{3}i)$

$$\frac{-b - b\sqrt{-3}}{2a} = \frac{-b}{2a}\left(1 - \sqrt{-3}\right) \quad (\beta)$$

$\sqrt{3}i)$

$\alpha = \frac{-b}{a}(\omega)$

$\beta = \frac{-b}{a}(\omega^2)$

$\frac{\alpha}{\beta} = \frac{1}{\omega} = 1 : \omega$

$\omega = \frac{-1 + \sqrt{3}i}{2}$ | $\omega^2 = \frac{-1 - \sqrt{3}i}{2}$

$\alpha\beta = \frac{b^2}{a^2}(\omega \cdot \omega^2)$

$= \frac{b^2}{a^2}(\omega^3) = \frac{b^2}{a^2}$ ✓

[ 2024 (I) ]

If $a$, $b$ and $c$ $(a > 0, c > 0)$ are in GP, then consider the following in respect of the equation $ax^2 + bx + c = 0$ :

1. The equation has imaginary roots.
2. The ratio of the roots of the equation is $1 : \omega$ where $\omega$ is a cube root of unity.
3. The product of roots of the equation is $\left(\frac{b^2}{a^2}\right)$.

Which of the statements given above are correct ?

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

**Ans: (d)**

If $a$, $b$, $c$ are in AP; $b$, $c$, $d$ are in GP; $c$, $d$, $e$ are in HP, then which of the following is/are correct ?

1. $a$, $c$ and $e$ are in GP

2. $\frac{1}{a}, \frac{1}{c}, \frac{1}{e}$ are in GP

Select the correct answer using the code given below :

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

. If $a$, $b$, $c$ are in AP; $b$, $c$, $d$ are in GP; $c$, $d$, $e$ are in HP, then which of the following is/are correct ?

1. $a$, $c$ and $e$ are in GP

2. $\frac{1}{a}, \frac{1}{c}, \frac{1}{e}$ are in GP

Select the correct answer using the code given below :

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

**Ans: (c)**

**Q)** If the sum of the first two terms and the sum of the first four terms of a geometric progression with positive common ratio are 8 and 80 respectively, then what is the 6th term?

(a) 88
(b) 243
(c) 486
(d) 1458

**Q)** If the sum of the first two terms and the sum of the first four terms of a geometric progression with positive common ratio are 8 and 80 respectively, then what is the 6th term?

(a) 88
(b) 243
(c) 486
(d) 1458

**Ans: (c)**

Q) If $x^2, y^2, z^2$ are in AP, then $y+z, z+x, x+y$ are in

(a) AP
(b) HP
(c) GP
(d) None of these

**Q)** If $x^2, y^2, z^2$ are in AP, then $y+z, z+x, x+y$ are in

(a) AP
(b) HP
(c) GP
(d) None of these

**Ans: (a)**

**Q)** What is the value of $1 - 2 + 3 - 4 + 5 - ..... + 101$?

(a) 51 (b) 55

(c) 110 (d) 111

Q) What is the value of $1 - 2 + 3 - 4 + 5 - \ldots\ldots + 101$?

(a) 51
(b) 55
(c) 110
(d) 111

**Ans: (a)**

**Q)** If $b_1, b_2, b_3$ are three consecutive terms of an arithmetic progression with common difference $d > 0$, then what is the value of d for which $b_3^2 = b_2 b_3 + b_1 d + 2$?

(a) $\frac{1}{2}$ (b) 0

(c) 1 (d) 2

**Q)** If $b_1, b_2, b_3$ are three consecutive terms of an arithmetic progression with common difference $d > 0$, then what is the value of d for which $b_3^2 = b_2 b_3 + b_1 d + 2$?

(a) $\frac{1}{2}$

(b) 0

(c) 1

(d) 2

**Ans: (c)**

**Q)** If 1, x, y, z, 16 are in geometric progression, then what is the value of $x + y + z$ ?

(a) 8 (b) 12

(c) 14 (d) 16

**Q)** If 1, x, y, z, 16 are in geometric progression, then what is the value of $x + y + z$ ?

(a) 8 (b) 12

(c) 14 (d) 16

**Ans: (c)**

**Q)** Which one of the following is correct?

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

(a) AP
(b) HP
(c) GP
(d) None of these

**Q)** Which one of the following is correct?

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

(a) AP
(b) HP
(c) GP
(d) None of these

**Ans: (b)**

**Q)** If $A, B$ and $C$ are in AP and $b : c = \sqrt{3} : \sqrt{2}$, then what is the value of sin C?

(a) 1

(b) $\frac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{2}}$

**Q)** If $A, B$ and $C$ are in AP and $b : c = \sqrt{3} : \sqrt{2}$, then what is the value of sin C?

(a) 1

(b) $\frac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

(d) $\frac{1}{\sqrt{2}}$

**Ans: (d)**

**Q)** If the AM and GM between two number are in the ratio $m : n$, then what is the ratio between the two numbers?

(a) $\dfrac{m+\sqrt{m^2-n^2}}{m-\sqrt{m^2-n^2}}$

(b) $\dfrac{m+n}{m-n}$

(c) $\dfrac{m^2-n^2}{m^2+n^2}$

(d) $\dfrac{m^2+n^2-mn}{m^2+n^2+mn}$

**Q)** If the AM and GM between two number are in the ratio $m : n$, then what is the ratio between the two numbers?

(a) $\dfrac{m+\sqrt{m^2-n^2}}{m-\sqrt{m^2-n^2}}$

(b) $\dfrac{m+n}{m-n}$

(c) $\dfrac{m^2-n^2}{m^2+n^2}$

(d) $\dfrac{m^2+n^2-mn}{m^2+n^2+mn}$

**Ans: (a)**

**Q)** The arithmetic mean of two numbers exceeds their geometric mean by 2 and the geometric mean exceeds their harmonic mean by 1.6. What are the two numbers?

(a) 16, 4
(b) 81, 9
(c) 256, 16
(d) 625, 25

**Q)** The arithmetic mean of two numbers exceeds their geometric mean by 2 and the geometric mean exceeds their harmonic mean by 1.6. What are the two numbers?

(a) 16, 4
(b) 81, 9
(c) 256, 16
(d) 625, 25

**Ans: (a)**

**Q)** What is the sum of $\sqrt{3}+\frac{1}{\sqrt{3}}+\frac{1}{3\sqrt{3}}+.....?$

(a) $\frac{\sqrt{3}}{2}$

(b) $\frac{3\sqrt{3}}{2}$

(c) $\frac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

**Q)** What is the sum of $\sqrt{3}+\frac{1}{\sqrt{3}}+\frac{1}{3\sqrt{3}}+.....?$

(a) $\frac{\sqrt{3}}{2}$

(b) $\frac{3\sqrt{3}}{2}$

(c) $\frac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

**Ans: (b)**

**Q)** Which one of the following options is correct?

(a) $\sin^2 30°, \sin^2 45°, \sin^2 60°$ are in GP

(b) $\cos^2 30°, \cos^2 45°, \cos^2 60°$ are in GP

(c) $\cot^2 30°, \cot^2 45°, \cot^2 60°$ are in GP

(d) $\tan^2 30°, \tan^2 45°, \tan^2 60°$ are in GP

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**Ans: (d)**

Q) What is the 10th common term between the series $2+6+10+....$ and $1+6+11+....$ ?

(a) 180 (b) 186

(c) 196 (d) 206

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Ans: (b)

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

(a) 12 (b) 18

(c) 24 (d) 27

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**Ans: (b)**

**Q)** Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \ldots$ is the first negative term?

(a) 27th
(b) 28th
(c) 29th
(d) No such term exists

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**Ans: (b)**

**Q)** If the sequence $\{S_n\}$ is a geometric progression and $S_2 S_{11} = S_p S_8$, then what is the value of p?

(a) 1 (b) 3

(c) 5 (d) cannot be determined

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**Ans: (c)**

**DIRECTIONS** : *For the next two (02) Questions that follow:*

The sum of first 10 terms and 20 terms of an AP are 120 and 440 respectively.

**Q)**What is its first term?

(a) 2 (b) 3

(c) 4 (d) 5

**Q)** What is its first term?

(a) 2 (b) 3

(c) 4 (d) 5

**Ans: (b)**

**Q)** What is the common difference?

(a) 1 (b) 2

(c) 3 (d) 4

**Q)** What is the common difference?

(a) 1 (b) 2

(c) 3 (d) 4

**Ans: (b)**

**Q)** What is the geometric mean of the sequence 1, 2, 4, 8, ... $2^n$ ?

(a) $2^{n/2}$

(b) $2^{(n+1)/2}$

(c) $2^{(n+1)} - 1$

(d) $2^{(n-1)}$

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**Ans: (a)**

**Q)** The harmonic mean H of two numbers is 4 and the arithmetic mean A and geometric mean G satisfy the equation $2A + G^2 = 27$. The two numbers are

(a) 6, 3
(b) 9, 5
(c) 12, 7
(d) 3, 1

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(a) 6, 3 (b) 9, 5

(c) 12, 7 (d) 3, 1

**Ans: (a)**

# Summary

- Harmonic Progression
- Harmonic Mean (HM)
- Relation between AM, GM and HM
- PRACTISE MCQs

# NDA 2 2024

LIVE

# MATHS

## MATRICES & DETERMINANTS

CLASS 1


NAVJYOTI SIR

Crack
EXAMS