18 Nov 2024 Live Classes Schedule

| 8:00AM | 18 NOVEMBER 2024 DAILY CURRENT AFFAIRS | RUBY MA'AM |
| 9:00AM | 18 NOVEMBER 2024 DAILY DEFENCE UPDATES | DIVYANSHU SIR |

NDA 1 2025 LIVE CLASSES

11:30AM	GK - ECONOMICS - CLASS 1	RUBY MA'AM
1:00PM	GS - CHEMISTRY MCQ - CLASS 9	SHIVANGI MA'AM
5:30PM	MATHS - SEQUENCE & SERIES - CLASS 4	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

11:30AM	GK - ECONOMICS - CLASS 1	RUBY MA'AM
1:00PM	GS - CHEMISTRY MCQ - CLASS 9	SHIVANGI MA'AM
7:00PM	MATHS - MENSURATION 3D - CLASS 4	NAVJYOTI SIR

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EXAMS

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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

$$\frac{2}{3}(3600) = \frac{30}{2}\left(2a + (30-1)d\right)$$

$$2400 = 15\left(2a + 29d\right)$$

$$2a + 29d = 160 \quad —— \text{①}$$

$$2a + 39d = 180 \quad —— \text{②}$$

$$\overline{\qquad\qquad\qquad\qquad}$$

$$10d = 20 \Rightarrow \boxed{d = 2}$$

$$3600 = \frac{40}{2}\left(2a + (40-1)d\right)$$

$$2a + 58 = 160$$

$$2a = 102 \Rightarrow \boxed{a = 51}$$

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)

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

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

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

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

$$= \left[(n^2 - 2n)\right] - \left[(n-1)^2 - 2(n-1)\right]$$

$$= 2n - 3$$

(OR)

$$S_1 = 1^2 - 2 \times 1 = -1 = a_1$$

$$n = 1$$

(a) $3(1) - (1)^2 = 2$

(b) $2(1) - 3 = -1$ ✓

Q) If the sum of 'n' terms of an arithmetic progression is $n^2 - 2n$, then what is the nth 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) $\dfrac{10}{9}\left(10^{100} - 1\right) - 100$ (b) $\dfrac{10}{9}\left(10^{99} - 1\right) - 100$

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

$$\left(10^1 - 1\right) + \left(10^2 - 1\right) + \left(10^3 - 1\right) + \ldots$$

$$\left(10^1 + 10^2 + 10^3 + \ldots \cdot 10^{100}\right) + \left[(-1) + (-1) + (-1) + \ldots (100 \text{ times})\right]$$

$$\underbrace{}_{GP}$$

$$\dfrac{10\left((10)^{100} - 1\right)}{10 - 1} + (-1) \times 100 = \dfrac{10\left(10^{100} - 1\right)}{9} - 100$$

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

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

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

Ans: (a)

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

$$8\left(1+r^2\right) = 80$$

$$1+r^2 = 10$$

$$r^2 = 9$$

$$r = \pm 3$$

$$a + ar = 8 \implies a(1+r) = 8$$

But as r is positive,

$$a + ar + ar^2 + ar^3 = 80$$

$$8 + ar^2(1+r) = 80$$

$$8 + r^2\left[a(1+r)\right] = 80$$

$$\boxed{r = 3}$$

$$8 + r^2(8) = 80$$

$$a(1+r) = 8$$

$$a(4) = 8 \quad \left(As \ r = 3\right)$$

$$\underline{a = 2}$$

$$6^{th} \ term \Rightarrow a_6 = ar^5 = (2)(3)^5$$

$$= 2 \times 243$$

$$= 486$$

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

$2y^2 = x^2 + z^2$

$$\frac{2}{x+z} = \frac{1}{y+z} + \frac{1}{x+y}$$

$$\frac{2}{x+z} = \frac{x + 2y + z}{(y+z)(x+y)}$$

a, b, c are in HP,

$$\left(\frac{2}{b} = \frac{1}{a} + \frac{1}{c} \right)$$

$2yx + 2y^2 + 2zx + 2zy = x^2 + 2xy + zx + zx + 2yz + z^2$

$2y^2 = x^2 + z^2 \Rightarrow x^2, y^2$ and z^2 are in AP $\checkmark$

$$y+z, \quad z+x, \quad x+y$$

(a) $\quad 2(z+x) = y+z+x+y$

$$2z + 2x = 2y + z + x$$

$$2y = x+z \implies x, y, z \text{ are in AP.} \quad \underline{\qquad} \times$$

(b) $\quad (z+x)^2 = (y+z)(x+y)$

$$z^2 + 2xz + x^2 = yx + y^2 + zx + zy$$

$$x^2 + z^2 = y^2 + xy + yz - xz \quad \underline{\qquad\qquad} \times$$

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: (b)

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

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

$$\left(1 + 3 + 5 + 7 \ldots \underline{101} \right) - 2\left(1 + 2 + 3 + 4 + \ldots 50 \right)$$

Sum of odd numbers from 1 to $\underline{n} = n^2$ $n = \dfrac{\text{Last odd number} + 1}{2}$

$$(51)^2 - \cancel{2} \times \dfrac{50 (51)}{\cancel{2}} = (51)^2 - 50 \times 51$$

$$= 51 \left(51 - 50 \right) = \boxed{51}$$

Q) What is the value of

$1 - 2 + 3 - 4 + 5 - \dots + 101?$

(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) $\dfrac{1}{2}$

(b) 0

(c) 1

(d) 2

$b_1 = a - d$

$b_2 = a$

$b_3 = a + d$

$(a+d)^2 = a(a+d) + (a-d)d + 2$

$a^2 + 2ad + d^2 = a^2 + ad + ad - d^2 + 2$

$2d^2 = 2 \implies d^2 = 1 \implies d = \pm 1$

As $d > 0 \implies \boxed{d = 1}$

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) $\dfrac{1}{2}$

(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

$\{1, x, y, z, 16\}$

$a = 1$

$ar^4 = 16$

$r^4 = 16$

$\{r = \pm 2\}$

$r = 2$

$1, 2, 4, 8, 16$

$x \quad y \quad z =$

$x + y + z = \boxed{14}$

$r = -2$

$1, -2, 4, -8, 16$

$(-2) + 4 + (-8)$

$= \boxed{-6}$

(not available in options)

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

(a) AP

(b) HP

(c) GP

(d) None of these

$$\dfrac{(a-b+c)}{} \left[\dfrac{1}{a(b-c)} + \dfrac{1}{c(b-a)} \right] = 0$$

$$\left(\dfrac{1}{b-c} - \dfrac{1}{a} \right) + \left(\dfrac{1}{b-a} - \dfrac{1}{c} \right) = 0$$

$$\dfrac{cb-ca+ab-ac}{ac(b-c)(b-a)} = 0$$

$$\dfrac{a-(b-c)}{a(b-c)} + \dfrac{c-(b-a)}{c(b-a)} = 0$$

$$2ac = ab + bc$$

$$2ac = ab + bc$$

$$\frac{2ac}{abc} = \frac{ab + bc}{abc}$$

$$\frac{2}{b} = \frac{1}{c} + \frac{1}{a}$$

$$\Rightarrow \quad a, b \text{ and } c \text{ are in HP,}$$

Q) Which one of the following is correct?

If $\dfrac{1}{b-c} + \dfrac{1}{b-a} = \dfrac{1}{a} + \dfrac{1}{c}$, 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) $\dfrac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

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

$2B = A + C$

$A + B + C = 180°$

$2B + B = 180° \Rightarrow \boxed{B = 60°}$

$\dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

$\dfrac{b}{c} = \dfrac{\sin B}{\sin C}$

$\dfrac{\sqrt{3}}{\sqrt{2}} = \dfrac{\sin 60°}{\sin C}$

$\sin C = \dfrac{\sqrt{3}}{2} \times \dfrac{\sqrt{2}}{\sqrt{3}}$

$\sin C = \dfrac{1}{\sqrt{2}}$

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) $\dfrac{1}{\sqrt{3}}$

(c) $\sqrt{3}$

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

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

$$\dfrac{\dfrac{a+b}{2}}{\sqrt{ab}} = \dfrac{m}{n}$$

$$\dfrac{a+b}{2\sqrt{ab}} = \dfrac{m}{n}$$

$$\dfrac{(a+b)^2}{4ab} = \dfrac{m^2}{n^2}$$

$$\frac{a}{b} = \frac{c}{d}$$

$$\frac{a+b}{b} = \frac{c+d}{d} \quad \Bigg| \quad \frac{a-b}{b} = \frac{c-d}{d}$$

$$\frac{a+b}{a-b} = \frac{c+d}{c-d} \Bigg) \quad c-D \ (\text{compmendo} - \text{dividendo})$$

$$\frac{(a+b)^2}{4ab} = \frac{m^2}{n^2} \quad\text{---} \quad ①$$

$$\frac{(a+b)^2 - 4ab}{4ab} = \frac{m^2 - n^2}{n^2} \quad \Rightarrow \quad \frac{(a-b)^2}{4ab} = \frac{m^2 - n^2}{n^2} \quad\text{---} \quad ②$$

$$① \div ②, \quad \frac{(a+b)^2}{(a-b)^2} = \frac{m^2}{m^2 - n^2}$$

$$\frac{(a+b)^2}{(a-b)^2} = \frac{m^2}{m^2-n^2}$$

$$\frac{a+b}{a-b} = \pm \frac{m}{\sqrt{m^2-n^2}}$$

$$\frac{(a+b)+(a-b)}{(a+b)-(a-b)} = \frac{\pm m + \sqrt{m^2-n^2}}{\pm m - \sqrt{m^2-n^2}}$$

$$\frac{2a}{2b} = \frac{a}{b}$$

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

$$\frac{a+b}{2} = \sqrt{ab} + 2$$

$$\sqrt{ab} = \frac{2ab}{a+b} + 1.6$$

(a) ✓

(b) ✗

(c) ✗

(d) ✗

} putting options and checking

$$\frac{\cancel{2} \times 64}{\cancel{20}^{10}} = 6.4 + 1.6 = \boxed{8}$$

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 $\sqrt{3} + \dfrac{1}{\sqrt{3}} + \dfrac{1}{3\sqrt{3}} + \ldots$?

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

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

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

(d) $\sqrt{3}$

infinite GP series,

$a = \sqrt{3}$ $\qquad$ $r = \left(\dfrac{1}{3}\right) (r < 1)$

$r = \dfrac{\frac{1}{\sqrt{3}}}{\sqrt{3}} = \dfrac{1}{3}$ $\qquad$ $\dfrac{\frac{1}{3\sqrt{3}}}{\frac{1}{\sqrt{3}}} = \dfrac{1}{3}$

$S_\infty = \dfrac{a}{1-r}$

$= \dfrac{\sqrt{3}}{1-\frac{1}{3}} = \dfrac{3\sqrt{3}}{2}$

Q) What is the sum of $\sqrt{3} + \dfrac{1}{\sqrt{3}} + \dfrac{1}{3\sqrt{3}} + \ldots$?

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

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

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

(d) $\sqrt{3}$

Ans: (b)

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

(a) AP

(b) GP

(c) HP

(d) None of these

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

(a) AP

(b) GP

(c) HP

(d) None of these

Ans: (c)

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

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

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

$a = 2 ; d = 4$

$2 \quad ⑥ \quad 10 \quad 14 \quad 18 \quad 22 \quad ㉖$

$1 \quad ⑥ \quad 11 \quad 16 \quad 21 \quad ㉖ \quad 31$

$a = 1 ; d = 5$

LCM = common diff.
of the common series
$= 4 \times 5 = ⓴$

$6, 26,$

$a = 6 \qquad d = 20$

$a_{10} = a + 9d = ⑴⑻⑹$

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

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

$$AM > GM > HM$$

$$GM = \sqrt{AM \times HM}$$

$$GM = \sqrt{27 \times 12} = \sqrt{3 \times 9 \times 3 \times 4} = 3 \times 3 \times 2$$

$$= \boxed{18}$$

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

Ans: (b)

Q) Which term of the sequence 20, $19\frac{1}{4}$, $18\frac{1}{2}$, $17\frac{3}{4}$,... is the

first negative term?

(a) 27th (b) 28th

(c) 29th (d) No such term exists

$$a_n = 0$$

$$a + (n-1)d = 0$$

$$20 + (n-1)\frac{-3}{4} = 0$$

$$\left(a = 20 \; ; \; d = \frac{-3}{4}\right)$$

$$20 - \frac{3}{4}n + \frac{3}{4} = 0$$

$$n = \frac{83}{4} \times \frac{4}{3} = 27.\overline{}$$

$$\left(\text{next} = 28^{th} \text{ term}\right)$$

$$\left(\text{round off}\right)$$

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

(a)   27th

(b)   28th

(c)   29th

(d)   No such term exists

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

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

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 number of diagonals which can be drawn by joining the angular points of a polygon of 100 sides?
(a)   4850
(b)   4950
(c)   5000
(d)   10000

Q) What is the number of diagonals which can be drawn by joining the angular points of a polygon of 100 sides?

(a) 4850

(b) 4950

(c) 5000

(d) 10000

Ans: (a)

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

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

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

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

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

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

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

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

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

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

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

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

Ans: (a)