

# NDA 2 2024

LIVE

# MATHS

## REVISION

CLASS 8

SSBCrack  
EXAMS



NAVJYOTI SIR





## 14 August 2024 Live Classes Schedule

8:00AM	14 AUGUST 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	14 AUGUST 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

### SSB INTERVIEW LIVE CLASSES

9:00AM	OVERVIEW OF GPE & PRACTICE	ANURADHA MA'AM
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### NDA 2 2024 LIVE CLASSES

11:00AM	GK - GEOGRAPHY REVISION - CLASS 2	RUBY MA'AM
✓ 1:00PM	MATHS REVISION - CLASS 8	NAVJYOTI SIR
2:00PM	CHEMISTRY REVISION - CLASS 1	SHIVANGI MA'AM
5:30PM	ENGLISH - REVISION - CLASS 4	ANURADHA MA'AM

### CDS 2 2024 LIVE CLASSES

11:00AM	GK - GEOGRAPHY REVISION - CLASS 2	RUBY MA'AM
2:00PM	CHEMISTRY REVISION - CLASS 1	SHIVANGI MA'AM
3:00PM	MATHS REVISION - CLASS 8	NAVJYOTI SIR
5:30PM	ENGLISH - REVISION - CLASS 4	ANURADHA MA'AM

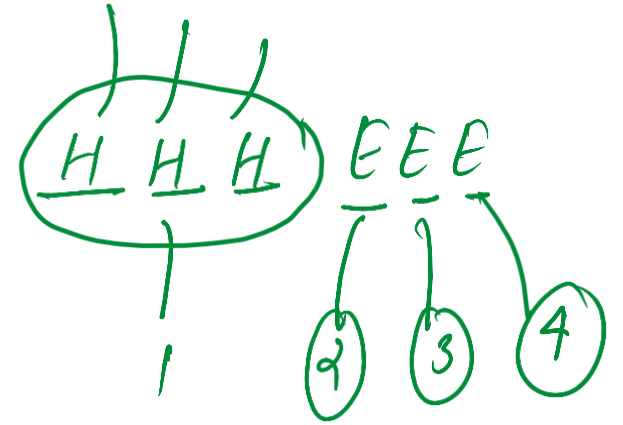


# REVISION TOPICS :

- **Sequence and Series**
- **Permutations and Combinations**

Q) In how many ways can 3 books on Hindi and 3 books on English be arranged in a row on a shelf, so that not all the Hindi books are together?

- (a) 144                      (b) 360  
 (c) 576                      (d) 720



$$\text{Total arrangements} = 6! = 6 \times 5 \times 4 \times 3 \times 2 = \underline{720}$$

$$3 \text{ Hindi books together} = 3! \times 3! = 24 \times 6 = \underline{144}$$

$$\text{No Hindi books together} = 720 - 144 = \underline{576}$$

**Q)** In how many ways can 3 books on Hindi and 3 books on English be arranged in a row on a shelf, so that not all the Hindi books are together?

(a) 144

(b) 360

(c) 576

(d) 720

**Ans: (c)**

Q) If  $P(32, 6) = kC(32, 6)$ , then what is the value of  $k$ ?

(a) 6

(b) 32

(c) 120

(d) 720

$${}_{32}P_6 = k \times {}_{32}C_6$$

$$k = \frac{r!}{1} = \frac{6!}{1} = \underline{720}$$

$${}^n P_r = \frac{n!}{(n-r)!}$$

$${}^n C_r = \frac{n!}{(n-r)! r!}$$

$${}^n P_r = r! \times {}^n C_r$$



**Q)** If  $P(32, 6) = kC(32, 6)$ , then what is the value of  $k$ ?

(a) 6

(b) 32

(c) 120

(d) 720

**Ans: (d)**

Q) What is the value of  $r$ , if  $P(5, r) = P(6, r-1)$ ?

- (a) 9 ✓  
 (c) 4 ✓

- (b) 5 ✓  
 (d) 2 ✓

$${}^5P_r = {}^6P_{r-1}$$

$$(7-r)(6-r) = 6$$

$r$  cannot be greater than 5.

$$\frac{5!}{(5-r)!} = \frac{6!}{(6-r+1)!}$$

$$\frac{1}{1} = \frac{6}{(7-r)(6-r)}$$

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



**Q)** What is the value of  $r$ , if  $P(5, r) = P(6, r - 1)$ ?

(a) 9

(b) 5

(c) 4

(d) 2

**Ans: (c)**



Q) What is the total number of combination of  $n$  different things taken 1, 2, 3, .....,  $n$  at a time?

(a)  $2^{n+1}$

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

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

(d)  $2^n - 1$

**Ans: (d)**

Q) 5 books are to be chosen from a lot of 10 books. If  $m$  is the number of ways of choice when one specified book is always included and  $n$  is the number of ways of choice when a specified book is always excluded, then which one of the following is correct?

(a)  $m > n$

(b)  $m = n$

(c)  $m = n - 1$

(d)  $m = n - 2$

(10)  $\rightarrow$  (5)

$$m = \binom{9}{4} = \binom{9}{5} = n$$

equal

$$\left. \begin{array}{l} \\ \\ \end{array} \right\} \binom{n}{r} = \binom{n}{n-r}$$

Q) 5 books are to be chosen from a lot of 10 books. If  $m$  is the number of ways of choice when one specified book is always included and  $n$  is the number of ways of choice when a specified book is always excluded, then which one of the following is correct?

- (a)  $m > n$                       (b)  $m = n$   
(c)  $m = n - 1$                   (d)  $m = n - 2$

**Ans: (b)**

Q) A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is

- (a) 346      (b) 140      (c) 196      (d) 280

(min.)

4 out of 5 questions —  ${}^5C_4 \times {}^8C_6 = 5 \times \frac{8 \times 7}{2} = 140$

5 out of 5 questions —  ${}^5C_5 \times {}^8C_5 = \frac{1 \times 8 \times 7 \times 6}{3 \times 2} = 56$

**196**

**Q)** A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is

- (a) 346      (b) 140      (c) 196      (d) 280

**Ans: (c)**



Q) How many 3-digit numbers, each less than 600, can be formed from  $\{1, 2, 3, 4, 7, 9\}$  if repetition of digits is allowed?

- (a) 216      (b) 180  
(c) 144      (d) 120

④   ⑥   ⑥

$$4 \times 6 \times 6 = 24 \times 6 \\ = \underline{144}$$



Q) How many different words can be formed by taking four letters out of the letters of the word 'AGAIN' if each word has to start with A ?

- (a) 6  
(c) 24  
(b) 12  
(d) None of the above

A \_ \_ \_ \_

G A I N

$$4! = 24$$



Q) The number of ways of distributing 8 identical balls in 3 distinct boxes so that none of the boxes is empty is

- (a)  ${}^8C_3$     (b) 21    (c)  $3^8$     (d) 5



A hand-drawn cloud shape containing the mathematical expression  $n-1 C_{r-1}$ .

at least one

$${}^{8-1}C_{3-1} = {}^7C_2 = \frac{7 \times 6}{2} = 21$$

Q) The number of ways of distributing 8 identical balls in 3 distinct boxes so that none of the boxes is empty is

- (a)  ${}^8C_3$       (b) 21      (c)  $3^8$       (d) 5

**Ans: (b)**

Q) What is the number of ways of arranging the letters of the word 'BANANA' so that no two N's appear together?

(a) 40

(b) 60

(c) 80

(d) 100



Q) What is the number of ways of arranging the letters of the word 'BANANA' so that no two N's appear together?

(a) 40

(b) 60

(c) 80

(d) 100

**Ans: (a)**

**Q)** What is  $C(47, 4) + C(51, 3) + C(50, 3) + C(49, 3) + C(48, 3) + C(47, 3)$  equal to?

(a)  $C(47, 4)$

(b)  $C(52, 5)$

(c)  $C(52, 4)$

(d)  $C(47, 5)$

Q) What is  $C(47, 4) + C(51, 3) + C(50, 3) + C(49, 3) + C(48, 3) + C(47, 3)$  equal to?

- (a)  $C(47, 4)$                       (b)  $C(52, 5)$   
(c)  $C(52, 4)$                       (d)  $C(47, 5)$

**Ans: (c)**

**Q)** A team of 8 players is to be chosen from a group of 12 players. Out of the eight players one is to be elected as captain and another vice-captain. In how many ways can this be done?

(a) 27720

(b) 13860

(c) 6930

(d) 495

**Q)** A team of 8 players is to be chosen from a group of 12 players. Out of the eight players one is to be elected as captain and another vice-captain. In how many ways can this be done?

- (a) 27720                      (b) 13860  
(c) 6930                        (d) 495

**Ans: (a)**

Q) If  $C(20, n + 2) = C(20, n - 2)$ , then  
what is  $n$  equal to

(a) 8

(b) 10

(c) 12

(d) 16

Q) If  $C(20, n + 2) = C(20, n - 2)$ , then  
what is  $n$  equal to

- |        |        |
|--------|--------|
| (a) 8  | (b) 10 |
| (c) 12 | (d) 16 |

**Ans: (b)**



**Q)**How many words can be formed from the letters of the word 'ARTICLE', if vowels always comes at the odd places?

(a) 60

(b) 576

(c)  $\frac{7!}{3!}$

(d) 120

Q) How many words can be formed from the letters of the word 'ARTICLE', if vowels always comes at the odd places?

(a) 60

(b) 576

(c)  $\frac{7!}{3!}$

(d) 120

**Ans: (b)**

Q) From 6 programmers and 4 typists, an office wants to recruit 5 people. What is the number of ways this can be done so as to recruit at least one typist?

(a) 209

(b) 210

(c) 246

(d) 242

Q) From 6 programmers and 4 typists, an office wants to recruit 5 people. What is the number of ways this can be done so as to recruit at least one typist?

- (a) 209                      (b) 210  
(c) 246                      (d) 242

**Ans: (c)**

Q) The number of ways in which 6 men and 5 women can dine at a round table if no two women are to sit together is given by

- (a)  $7! \times 5!$  (b)  $6! \times 5!$  (c)  $30!$  (d)  $5! \times 4!$

Q) The number of ways in which 6 men and 5 women can dine at a round table if no two women are to sit together is given by

- (a)  $7! \times 5!$  (b)  $6! \times 5!$  (c)  $30!$  (d)  $5! \times 4!$

**Ans: (b)**

**Q)** A five digit number divisible by 3 is to be formed using the digits, 0, 1, 2, 3, 4 and 5 without repetition. What is the total number of ways in which this can be done?

- (a) 216      (b) 240      (c) 600      (d) 3125

**Q)** A five digit number divisible by 3 is to be formed using the digits, 0, 1, 2, 3, 4 and 5 without repetition. What is the total number of ways in which this can be done?

- (a) 216      (b) 240      (c) 600      (d) 3125

**Ans: (a)**



**Q)** How many 4-letter words (with or without meaning) containing two vowels can be constructed using only the letters (without repetition) of the word 'LUCKNOW'?

(a) 240

(b) 200

(c) 150

(d) 120

**Q)** How many 4-letter words (with or without meaning) containing two vowels can be constructed using only the letters (without repetition) of the word 'LUCKNOW'?

- (a) 240                      (b) 200  
(c) 150                      (d) 120

**Ans: (a)**

**Q)**In a football championship, a total of 153 matches was played. Every two teams played one match with each other. What is the total number of teams which took part in the championship?

(a) 17

(b) 18

(c) 19

(d) 21



# SEQUENCES AND SERIES

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

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

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

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

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

(d)  $2^n + 1$

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

$$= n - 1 + 2^{-n}$$

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

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

$$\left. \begin{array}{l} a = \frac{1}{2} \\ r = \frac{1}{2} \end{array} \right\}$$

For  $r < 1$ ,

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

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

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

(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.

$a+c, a-c, a-2b+c$  are in GP,

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

$$\cancel{a^2} - 2ac + \cancel{c^2} = \cancel{a^2} - 2ab + ac + ca - 2bc + \cancel{c^2}$$

$$-2ac = -2ab + 2ac - 2bc$$

$$2ac = ab + bc$$

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

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



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

$$ar = \frac{3}{4}$$

$$(4 - 4r)(r) = \frac{3}{4}$$

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

$$4 = \frac{a}{1-r} \Rightarrow a = \underline{4 - 4r}$$

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

$$\frac{\cancel{2n}}{2} (2 \times 2 + (2n-1)3) = \frac{\cancel{n}}{2} (2 \times 57 + (n-1)2)$$

$$2(4 + 6n - 3) = 114 + 2n - 2$$

$$12n + 2 = 2n + 112$$

$$\underline{10n = 110} \quad \Rightarrow \quad \textcircled{n = 11}$$

Q) If the sum of the first  $2n$  terms of the A.P.  $2, 5, 8, \dots$ , is equal to the sum of the first  $n$  terms of the A.P.  $57, 59, 61, \dots$ , then  $n$  equals

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

**Ans: (c)**

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)  $\frac{1}{2}$

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

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

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

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

$$a \text{ — } a$$

$$4r = 1 + 3r^2$$

$$b \text{ — } ar$$

$$3r^2 - 4r + 1 = 0$$

$$c \text{ — } ar^2$$

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$$r = \frac{1}{3}$$


---

**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  $p^{\text{th}}$  term is  $15uv$  more than the  $q^{\text{th}}$  term. Which one of the following is correct ?

(a)  $p = q + 15v$

(b)  $p = q + 15u$

(c)  $p = q + 14v$

(d)  $p = q + 14u$

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

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

$$p = 15u + q$$



**Q)** For an AP with first term  $u$  and common difference  $v$ , the  $p^{\text{th}}$  term is  $15 uv$  more than the  $q^{\text{th}}$  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

$$(1 \times 3) + (3 \times 5) + (5 \times 7) + \dots ?$$

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

$(2n-1)(2n+1)$  } General term

$$4n^2 - 1$$

$$S_n = \sum (4n^2 - 1)$$

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

Put  $n = 50$

$$\frac{4 \times 50 \times 51 \times 101}{6} - 50$$

$$100 \times 17 \times 101 - 50$$

$$\begin{array}{r} 170000 \\ + 1700 \\ \hline 171700 \\ - 50 \\ \hline 171650 \end{array}$$

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

$$(1 \times 3) + (3 \times 5) + (5 \times 7) + \dots ?$$

(a) 1,71,650

(b) 26,600

(c) 26,650

(d) 26,900

**Ans: (a)**

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

$$\frac{40}{2} (2a + (40-1)d) = 3600 \Rightarrow \underline{180 = 2a + 39d}$$

$$\frac{2}{3} \text{ of } 3600 \text{ is paid} = \frac{30}{2} (2a + (30-1)d)$$

$$\frac{2400}{15} = \underline{160 = 2a + 29d}$$

$$2a + 39d = 180$$

$$- \quad 2a + 29d = 160$$

---


$$10d = 20$$

$$\underline{d = 2}$$

$$\underline{a = 51}$$

**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  $n^{\text{th}}$  term?

(a)  $3n - n^2$

(b)  $2n - 3$

(c)  $2n + 3$

(d)  $2n - 5$

$$S_n = n^2 - 2n$$

$$S_{n-1} = (n-1)^2 - 2(n-1)$$

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

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

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

- (a)  $3n - n^2$                       (b)  $2n - 3$   
(c)  $2n + 3$                         (d)  $2n - 5$

**Ans: (b)**

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

$$\underline{2y^2 = x^2 + z^2}$$



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

(a) 51

(b) 55

(c) 110

(d) 111

$$\begin{aligned} & \left( \underbrace{1 + 3 + 5 + \dots + 101} \right) - 2 \left( \underbrace{1 + 2 + 3 + \dots + 50} \right) \\ & \quad \frac{(51)^2 - 2(50)(51)}{2} \end{aligned}$$

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

(a) 51

(b) 55

(c) 110

(d) 111

**Ans: (a)**

**REVISION  
TOPICS :  
(16/08/24)**

- **Matrices and Determinants**

# NDA 2 2024

LIVE

# MATHS

## REVISION

CLASS 9

SSBCrack  
EXAMS



NAVJYOTI SIR

