



A Premier Institute for Pre-Medical & Pre Engineering

**VIDYA
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NEET/JEE

Topic: Target JEE 2027

Mathematics

Revision Week - 02

Chetan Sir

Monday 15th June

Q1. JEE Main 2024

Let $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ and $B = I + \text{adj}(A) + (\text{adj } A)^2 + \dots + (\text{adj } A)^{10}$.

Then, the sum of all the elements of the matrix B is:

- (A) -110 (B) 22 (C) -124 (D) -88

Q2. JEE Main 2024

In an increasing geometric progression of positive terms, the sum of the second and sixth terms is $\frac{70}{3}$ and the product of the third and fifth terms is 49. Then the sum of the 4th, 6th and 8th terms is equal to:

- (A) 78 (B) 96 (C) 91 (D) 84

Q3. JEE Main 2024

The number of ways five alphabets can be chosen from the alphabets of the word MATHEMATICS, where the chosen alphabets are not necessarily distinct, is equal to:

- (A) 179 (B) 177 (C) 175 (D) 181

Q4. JEE Main 2024

If the value of $\frac{3 \cos 36^\circ + 5 \sin 18^\circ}{5 \cos 36^\circ - 3 \sin 18^\circ}$ is $\frac{a\sqrt{5}-b}{c}$, where a, b, c are natural numbers and $\text{gcd}(a, c) = 1$, then $a + b + c$ is equal to:

- (A) 54 (B) 52 (C) 50 (D) 40

Q5. JEE Main 2024

If the system of equations $x + 4y - z = \lambda$, $7x + 9y + \mu z = -3$, $5x + y + 2z = -1$ has infinitely many solutions, then $(2\mu + 3\lambda)$ is equal to:

- (A) -2 (B) 2 (C) 3 (D) -3

Q6. JEE Main 2024

If the term independent of x in the expansion of $(\sqrt{a}x^2 + \frac{1}{2x^3})^{10}$ is 105, then a^2 is equal to:

- (A) 6 (B) 4 (C) 2 (D) 9

Q7. JEE Main 2024

For $x \geq 0$, the least value of K , for which $4^{1+x} + 4^{1-x}, \frac{K}{2}, 16^x + 16^{-x}$ are three consecutive terms of an A.P., is equal to:

- (A) 10 (B) 4
(C) 8 (D) 16

Q8. JEE Main 2024

An arithmetic progression is written in the following way

$$\begin{array}{ccccccc} & & & 2 & & & \\ & & 5 & & 8 & & \\ & 11 & & 14 & & 17 & \\ 20 & & 23 & & 26 & & 29 \\ \hline & & & & & & \end{array}$$

The sum of all the terms of the 10th row is _____.

Q9. JEE Main 2024

If $\alpha \neq a, \beta \neq b, \gamma \neq c$ and $\begin{vmatrix} \alpha & b & c \\ a & \beta & c \\ a & b & \gamma \end{vmatrix} = 0$, then $\frac{a}{\alpha-a} + \frac{b}{\beta-b} + \frac{c}{\gamma-c}$ is equal to:

- (A) 2 (B) 3
(C) 1 (D) 0

Q10. JEE Main 2024

Consider the matrix $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

Given below are two statements:

Statement I: $f(-x)$ is the inverse of the matrix $f(x)$.

Statement II: $f(x)f(y) = f(x+y)$.

In the light of the above statements, choose the correct answer from the options given below:

- (A) Statement I is false but Statement II is true
(B) Both Statement I and Statement II are false
(C) Both Statement I and Statement II are true
(D) Statement I is true but Statement II is false

Tuesday 16th June

Q11. JEE Main 2024

Let the set $S = \{2, 4, 8, 16, \dots, 512\}$ be partitioned into 3 sets A, B, C with equal number of elements such that $A \cup B \cup C = S$ and $A \cap B = B \cap C = A \cap C = \phi$. The maximum number of such possible partitions of S is equal to:

- (A) 1640 (B) 1520
(C) 1710 (D) 1680

Q12. JEE Main 2024

The values of m, n , for which the system of equations

$$x + y + z = 4,$$

$$2x + 5y + 5z = 17,$$

$$x + 2y + mz = n$$

has infinitely many solutions, satisfy the equation :

(A) $m^2 + n^2 - m - n = 46$ (B) $m^2 + n^2 + mn = 68$

(C) $m^2 + n^2 - mn = 39$ (D) $m^2 + n^2 + m + n = 64$

Q13. JEE Main 2024

If the constant term in the expansion of $\left(\frac{\sqrt{3}}{x} + \frac{2x}{\sqrt[3]{5}}\right)^{12}$, $x \neq 0$, is $\alpha \times 2^8 \times \sqrt[5]{3}$, then 25α is equal to :

(A) 724 (B) 742 (C) 693 (D) 639

Q14. JEE Main 2024

The number of real solutions of the equation $x|x+5| + 2|x+7| - 2 = 0$ is _____.

Q15. JEE Main 2024

If $1 + \frac{\sqrt{3}-\sqrt{2}}{2\sqrt{3}} + \frac{5-2\sqrt{6}}{18} + \frac{9\sqrt{3}-11\sqrt{2}}{36\sqrt{3}} + \frac{49-20\sqrt{6}}{180} + \dots$ upto $\infty = 2 + \left(\sqrt{\frac{b}{a}} + 1\right) \log_e\left(\frac{a}{b}\right)$, where a and b are integers with $\gcd(a, b) = 1$, then $11a + 18b$ is equal to _____.

Q16. JEE Main 2024

Let $\alpha\beta \neq 0$ and $A = \begin{bmatrix} \beta & \alpha & 3 \\ \alpha & \alpha & \beta \\ -\beta & \alpha & 2\alpha \end{bmatrix}$. If $B =$

$\begin{bmatrix} 3\alpha & -9 & 3\alpha \\ -\alpha & 7 & -2\alpha \\ -2\alpha & 5 & -2\beta \end{bmatrix}$ is the matrix of cofactors of the elements

of A , then $\det(AB)$ is equal to :

(A) 64 (B) 343 (C) 125 (D) 216

Q17. JEE Main 2024

Let $S = \{\sin^2 2\theta : (\sin^4 \theta + \cos^4 \theta)x^2 + (\sin 2\theta)x + (\sin^6 \theta + \cos^6 \theta) = 0 \text{ has real roots}\}$. If α and β be the smallest and largest elements of the set S , respectively, then $3((\alpha - 2)^2 + (\beta - 1)^2)$ equals _____.

Q18. JEE Main 2024

60 words can be made using all the letters of the word BHBJO, with or without meaning. If these words are written as in a dictionary, then the 50th word is:

(A) OBBJH (B) HBBJO (C) OBBHJ (D) JBBOH

Q19. JEE Main 2024

Number of integral terms in the expansion of $\left\{7^{\left(\frac{1}{2}\right)} + 11^{\left(\frac{1}{3}\right)}\right\}$

Q20. JEE Main 2024

Let ABC be an equilateral triangle. A new triangle is formed by joining the middle points of all sides of the triangle ABC and the same process is repeated infinitely many times. If P is the sum of perimeters and Q is be the sum of areas of all the triangles formed in this process, then :

(A) $P^2 = 72\sqrt{3}Q$

(B) $P^2 = 36\sqrt{3}Q$

(C) $P = 36\sqrt{3}Q^2$

(D) $P^2 = 6\sqrt{3}Q$

Wednesday 17th June**Q21. JEE Main 2024**

If A is a square matrix of order 3 such that $\det(A) = 3$ and $\det(\text{adj}(-4\text{adj}(-3\text{adj}(3\text{adj}((2A)^{-1})))))) = 2^m 3^n$, then $m + 2n$ is equal to :

(A) 2 (B) 4 (C) 3 (D) 6

Q22. JEE Main 2024

A software company sets up m number of computer systems to finish an assignment in 17 days. If 4 computer systems crashed on the start of the second day, 4 more computer systems crashed on the start of the third day and so on, then it took 8 more days to finish the assignment. The value of m is equal to:

(A) 125 (B) 160 (C) 150 (D) 180

Q23. JEE Main 2024

Let a be the sum of all coefficients in the expansion of $(1 - 2x + 2x^2)^{2023} (3 - 4x^2 + 2x^3)^{2024}$ and $b = \lim_{x \rightarrow 0} \left(\frac{\int_0^x \frac{\log(1+t)}{t^2} dt}{x^2}\right)$. If the equation $cx^2 + dx + e = 0$ and $2bx^2 + ax + 4 = 0$ have a common root, where $c, d, e \in \mathbb{R}$, then $d : c : e$ equals

(A) 2 : 1 : 4 (B) 1 : 1 : 4 (C) 1 : 2 : 4 (D) 4 : 1 : 4

Q24. JEE Main 2024

If all the words with or without meaning made using all the letters of the word "NAGPUR" are arranged as in a dictionary, then the word at 315th position in this arrangement is :

(A) NRAPUG (B) NRAGUP
(C) NRAPGU (D) NRAGPU

Q25. JEE Main 2024

If $\tan A = \frac{1}{\sqrt{x(x^2+x+1)}}$, $\tan B = \frac{\sqrt{x}}{\sqrt{x^2+x+1}}$ and $\tan C = (x^{-3} + x^{-2} + x^{-1})^{1/2}$, $0 < A, B, C < \frac{\pi}{2}$, then $A + B$ is equal to :

(A) C (B) $\pi - C$ (C) $2\pi - C$ (D) $\frac{\pi}{2} - C$

Q26. JEE Main 2024

Consider the system of linear equations $x + y + z = 4\mu$, $x + 2y + 2\lambda z = 10\mu$, $x + 3y + 4\lambda^2 z = \mu^2 + 15$ where $\lambda, \mu \in \mathbb{R}$. Which one of the following statements is NOT correct ?

(A) The system has unique solution if $\lambda \neq \frac{1}{2}$ and $\mu \neq 1, 15$
(B) The system has infinite number of solutions if $\lambda = \frac{1}{2}$ and $\mu = 15$
(C) The system is consistent if $\lambda \neq \frac{1}{2}$
(D) The system is inconsistent if $\lambda = \frac{1}{2}$ and $\mu \neq 1$

Q27. JEE Main 2024

If $S(x) = (1+x) + 2(1+x)^2 + 3(1+x)^3 + \dots + 60(1+x)^{60}$, $x \neq 0$, and $(60)^2 S(60) = a(b)^b + b$, where $a, b \in \mathbb{N}$, then $(a+b)$ equal to _____.

Q28. JEE Main 2024

Let $A = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$, $B = [B_1, B_2, B_3]$, where B_1, B_2, B_3 are column matrices, and

$$AB_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, AB_2 = \begin{bmatrix} 2 \\ 3 \\ 0 \end{bmatrix}, AB_3 = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \text{ If } \alpha = |B|$$

and β is the sum of all the diagonal elements of B , then $\alpha^3 + \beta^3$ is equal to _____.

Q29. JEE Main 2024

Let $\lambda, \mu \in \mathbf{R}$. If the system of equations

$$3x + 5y + \lambda z = 3$$

$$7x + 11y - 9z = 2$$

$$97x + 155y - 189z = \mu$$

has infinitely many solutions, then $\mu + 2\lambda$ is equal to :

- (A) 24 (B) 25 (C) 27 (D) 22

Q30. JEE Main 2024

If the system of linear equations

$$x - 2y + z = -4$$

$$2x + \alpha y + 3z = 5$$

$$3x - y + \beta z = 3$$

has infinitely many solutions, then $12\alpha + 13\beta$ is equal to

- (A) 60 (B) 54 (C) 64 (D) 58

Thursday 18th June**Q31. JEE Main 2024**

Let S_n denote the sum of first n terms of an arithmetic progression. If $S_{20} = 790$ and $S_{10} = 145$, then $S_{15} - S_5$ is :

- (A) 405 (B) 390 (C) 410 (D) 395

Q32. JEE Main 2024

In the expansion of $(1+x)(1-x^2)\left(1+\frac{3}{x}+\frac{3}{x^2}+\frac{1}{x^3}\right)^5$, $x \neq 0$, the sum of the coefficients of x^3 and x^{-13} is equal to _____.

Q33. JEE Main 2024

Let $0 \leq r \leq n$. If ${}^{n+1}C_{r+1} : {}^nC_r : {}^{n-1}C_{r-1} = 55 : 35 : 21$, then $2n + 5r$ is equal to :

- (A) 62 (B) 60 (C) 55 (D) 50

Q34. JEE Main 2024

Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \alpha & \beta \\ 0 & \beta & \alpha \end{bmatrix}$ and $|2A|^3 = 2^{21}$ where $\alpha, \beta \in \mathbf{Z}$, Then a value of α is

- (A) 9 (B) 17
(C) 3 (D) 5

Q35. JEE Main 2024

The number of solutions of $\sin^2 x + (2 + 2x - x^2) \sin x - 3(x-1)^2 = 0$, where $-\pi \leq x \leq \pi$, is _____.

Q36. JEE Main 2024

Let $\alpha = 1^2 + 4^2 + 8^2 + 13^2 + 19^2 + 26^2 + \dots$ upto 10 terms and $\beta = \sum_{n=1}^{10} n^4$. If $4\alpha - \beta = 55k + 40$, then k is equal to _____.

Q37. JEE Main 2024

Let S be the set of positive integral values of a for which $\frac{ax^2+2(a+1)x+9a+4}{x^2-8x+32} < 0, \forall x \in \mathbf{R}$. Then, the number of elements in S is :

- (A) 0 (B) ∞ (C) 3 (D) 1

Q38. JEE Main 2024

If $\frac{{}^{11}C_1}{2} + \frac{{}^{11}C_2}{3} + \dots + \frac{{}^{11}C_{10}}{10} = \frac{n}{m}$ with $\gcd(n, m) = 1$, then $n + m$ is equal to _____.

Q39. JEE Main 2024

Let A be a square matrix such that $AA^T = I$. Then $\frac{1}{2}A[(A+A^T)^2 + (A-A^T)^2]$ is equal to

- (A) $A^2 + A^T$ (B) $A^3 + I$
(C) $A^3 + A^T$ (D) $A^2 + I$

Q40. JEE Main 2024

In an A.P., the sixth term $a_6 = 2$. If the product $a_1 a_4 a_5$ is the greatest, then the common difference of the A.P. is equal to

- (A) $\frac{2}{3}$ (B) $\frac{5}{8}$ (C) $\frac{3}{2}$ (D) $\frac{8}{5}$

Friday 19th June**Q41. JEE Main 2024**

The total number of words (with or without meaning) that can be formed out of the letters of the word 'DISTRIBUTION' taken four at a time, is equal to _____.

Q42. JEE Main 2024

For $0 < c < b < a$, let $(a+b-2c)x^2 + (b+c-2a)x + (c+a-2b) = 0$ and $\alpha \neq 1$ be one of its root. Then, among the two statements

(I) If $\alpha \in (-1, 0)$, then b cannot be the geometric mean of a and c

(II) If $\alpha \in (0, 1)$, then b may be the geometric mean of a and c

- (A) only (II) is true (B) Both (I) and (II) are true
(C) only (I) is true (D) Neither (I) nor (II) is true

Q43. JEE Main 2024

If $A = \begin{bmatrix} \sqrt{2} & 1 \\ -1 & \sqrt{2} \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$, $C = ABA^T$ and $X = A^T C^2 A$, then $\det X$ is equal to :

- (A) 243 (B) 729 (C) 27 (D) 891

Q44. JEE Main 2024

The sum of the series $\frac{1}{1-3 \cdot 1^2+1^4} + \frac{2}{1-3 \cdot 2^2+2^4} + \frac{3}{1-3 \cdot 3^2+3^4} + \dots$ up to 10 -terms is

- (A) $\frac{45}{109}$ (B) $-\frac{55}{109}$ (C) $\frac{55}{109}$ (D) $-\frac{45}{109}$

Q45. JEE Main 2024

If the Coefficient of x^{30} in the expansion of $(1 + \frac{1}{x})^6 (1 + x^2)^7 (1 - x^3)^8$; $x \neq 0$ is α , then $|\alpha|$ equals _____.

Q46. JEE Main 2024

Let $S = \{x \in \mathbf{R} : (\sqrt{3} + \sqrt{2})^x + (\sqrt{3} - \sqrt{2})^x = 10\}$. Then the number of elements in S is :

- (A) 4 (B) 0 (C) 2 (D) 1

Q47. JEE Main 2024

All the letters of the word "GTWENTY" are written in all possible ways with or without meaning and these words are written as in a dictionary. The serial number of the word "GTWENTY" is _____.

Q48. JEE Main 2024

Let the set of all $a \in \mathbf{R}$ such that the equation $\cos 2x + a \sin x = 2a - 7$ has a solution be $[p, q]$ and $r = \tan 9^\circ - \tan 27^\circ - \frac{1}{\cot 63^\circ} + \tan 81^\circ$, then pqr is equal to _____.

Q49. JEE Main 2024

If in a G.P. of 64 terms, the sum of all the terms is 7 times the sum of the odd terms of the G.P, then the common ratio of the G.P. is equal to

- (A) 7 (B) 6 (C) 5 (D) 4

Q50. JEE Main 2024

The number of distinct real roots of the equation $|x + 1||x + 3| - 4|x + 2| + 5 = 0$, is _____

Saturday 20th June

Q51. JEE Main 2024

${}^{n-1}C_r = (k^2 - 8) {}^nC_{r+1}$ if and only if :

- (A) $2\sqrt{2} < k < 2\sqrt{3}$ (B) $2\sqrt{2} < k \leq 3$
(C) $2\sqrt{3} < k < 3\sqrt{3}$ (D) $2\sqrt{3} < k \leq 3\sqrt{2}$

Q52. JEE Main 2024

If $2 \sin^3 x + \sin 2x \cos x + 4 \sin x - 4 = 0$ has exactly 3 solutions in the interval $[0, \frac{n\pi}{2}]$, $n \in \mathbf{N}$, then the roots of the equation $x^2 + nx + (n - 3) = 0$ belong to :

- (A) $(0, \infty)$ (B) $\mathbf{Z}$
(C) $(-\frac{\sqrt{17}}{2}, \frac{\sqrt{17}}{2})$ (D) $(-\infty, 0)$

Q53. JEE Main 2024

If n is the number of ways five different employees can sit into four indistinguishable offices where any office may have any number of persons including zero, then n is equal to :

- (A) 47 (B) 53 (C) 51 (D) 43

Q54. JEE Main 2024

Let α, β be the roots of the equation $x^2 + 2\sqrt{2}x - 1 = 0$. The quadratic equation, whose roots are $\alpha^4 + \beta^4$ and $\frac{1}{10}(\alpha^6 + \beta^6)$, is:

- (A) $x^2 - 180x + 9506 = 0$ (B) $x^2 - 195x + 9506 = 0$
(C) $x^2 - 190x + 9466 = 0$ (D) $x^2 - 195x + 9466 = 0$

Q55. JEE Main 2024

Let 3, a, b, c be in A.P. and 3, a - 1, b + 1, c + 9 be in G.P. Then, the arithmetic mean of a, b and c is :

- (A) -4 (B) -1 (C) 13 (D) 11

Q56. JEE Main 2024

If A denotes the sum of all the coefficients in the expansion of $(1 - 3x + 10x^2)^n$ and B denotes the sum of all the coefficients in the expansion of $(1 + x^2)^n$, then :

- (A) $B = A^3$ (B) $3A = B$ (C) $A = 3B$ (D) $A = B^3$

Q57. JEE Main 2024

Let 3, 7, 11, 15, ..., 403 and 2, 5, 8, 11, ..., 404 be two arithmetic progressions. Then the sum, of the common terms in them, is equal to _____.

Q58. JEE Main 2024

Let α, β be roots of $x^2 + \sqrt{2}x - 8 = 0$. If $U_n = \alpha^n + \beta^n$, then $\frac{U_{10} + \sqrt{2}U_9}{2U_8}$ is equal to _____.

Q59. JEE Main 2024

Let $\alpha, \beta \in \mathbf{N}$ be roots of the equation $x^2 - 70x + \lambda = 0$, where $\frac{\lambda}{2}, \frac{\lambda}{3} \notin \mathbf{N}$. If λ assumes the minimum possible value, then $\frac{(\sqrt{\alpha-1} + \sqrt{\beta-1})(\lambda+35)}{|\alpha-\beta|}$ is equal to :

Q60. JEE Main 2024

If the system of equations

$$2x + 7y + \lambda z = 3$$

$$3x + 2y + 5z = 4$$

$$x + \mu y + 32z = -1$$

has infinitely many solutions, then $(\lambda - \mu)$ is equal to _____ :

ANSWER KEY

1. D	2. C	3. A	4. B	5. D	6. B	7. A	8. 1505	9. D	10. C
11. D	12. C	13. C	14. 3	15. 76	16. D	17. 4	18. A	19. 138	20. B
21. B	22. C	23. B	24. C	25. A	26. D	27. 3660	28. 28	29. B	30. D
31. D	32. 118	33. D	34. D	35. 2	36. 353	37. A	38. 2041	39. C	40. D
41. 3734	42. B	43. B	44. B	45. 678	46. C	47. 553	48. 48	49. B	50. 2
51. B	52. D	53. C	54. B	55. D	56. D	57. 6699	58. 4	59. 60	60. 38