A Premier Institute for Pre-Medical & Pre Engineering
SRI VIDYA ARADHANA ACADEMY
"Transforming Your DREAMS Into Reality...!"
PCMB PHYSICS CHEMISTRY MATHEMATICS BIOLOGY
NEET/JEE

Topic: Target JEE 2027

Mathematics **Revision Week 07** Chetan Sir

"Struggling is proof that you are learning something new, not that you are failing."

MONDAY 3RD AUGUST

1. Let $P_n = \alpha^n + \beta^n, n \in N$. If $P_{10} = 123, P_9 = 76, P_8 = 47$ and $P_1 = 1$, then the quadratic equation having roots $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is : **[JEE Main 2025]**

(A) $x^2 + x - 1 = 0$ (B) $x^2 - x + 1 = 0$
(C) $x^2 + x + 1 = 0$ (D) $x^2 - x - 1 = 0$

2. *If* $\sum_{r=0}^{10} \left(\frac{10^{r+1}-1}{10^r}\right).{}^{11}C_{r+1} = \frac{\alpha 11 - 11^{11}}{10^{10}}$, *then* α *is equal to* : **[JEE Main 2025]**

(A) 11 (B) 20 (C) 24 (D) 15

3. The remainder when $\left((64)^{(64)}\right)^{(64)}$ is divided by 7 is equal to **[JEE Main 2025]**

(A) 4 (B) 6 (C) 3 (D) 1

4. The number of sequences of ten terms, whose terms are either 0 or 1 or 2 , that contain exactly five 1 s and exactly three 2 s , is equal to : **[JEE Main 2025]**

(A) 360 (B) 2520 (C) 1820 (D) 45

5. Let x_1, x_2, x_3, x_4 be in a geometric progression. If $2, 7, 9, 5$ are subtracted respectively from x_1, x_2, x_3, x_4, then the resulting numbers are in an arithmetic progression. Then the value of $\frac{1}{24}(x_1 x_2 x_3 x_4)$ is: **[JEE Main 2025]**

(A) 18 (B) 216 (C) 36 (D) 72

6. Let $a_1, a_2, a_3, \ldots$. be a G.P. of increasing positive numbers. If $a_3 a_5 = 729$ and $a_2 + a_4 = \frac{111}{4}$, then $24(a_1 + a_2 + a_3)$ is equal to **[JEE Main 2025]**

(A) 128 (B) 129 (C) 131 (D) 130

7. If A and B are the points of intersection of the circle $x^2 + y^2 - 8x = 0$ and the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ and a point P moves on the line $2x - 3y + 4 = 0$, then the centroid of ΔPAB lies on the line : **[JEE Main 2025]**

(A) $x + 9y = 36$ (B) $9x - 9y = 32$
(C) $4x - 9y = 12$ (D) $6x - 9y = 20$

8. Let the distance between two parallel lines be 5 units and a point P lie between the lines at a unit distance from one of them. An equilateral triangle PQR is formed such that Q lies on one of the parallel lines, while R lies on the other. Then $(QR)^2$ is equal to **[JEE Main 2025]**

9. A circle C of radius 2 lies in the second quadrant and touches both the coordinate axes. Let r be the radius of a circle that has centre at the point $(2, 5)$ and intersects the circle C at exactly two points. If the set of all possible values of r is the interval (α, β), then $3\beta - 2\alpha$ is equal to : **[JEE Main 2025]**

(A) 10 (B) 12 (C) 14 (D) 15

10. Let the circle C touch the line $x - y + 1 = 0$, have the centre on the positive x-axis, and cut off a chord of length $\frac{4}{\sqrt{13}}$ along the line $-3x + 2y = 1$. Let H be the hyperbola $\frac{x^2}{\alpha^2} - \frac{y^2}{\beta^2} = 1$, whose one of the foci is the centre of C and the length of the transverse axis is the diameter of C. Then $2\alpha^2 + 3\beta^2$ is equal to **[JEE Main 2025]**

11. Let the equation $x(x+2)(12-k)=2$ have equal roots. Then the distance of the point $\left(k, \frac{k}{2}\right)$ from the line $3x+4y+5=0$ is **[JEE Main 2025]**

(A) 15 (B) 12 (C) $5\sqrt{3}$ (D) $15\sqrt{5}$

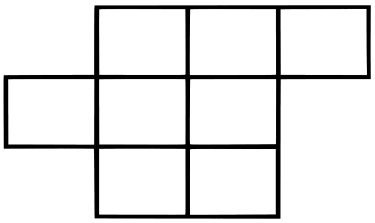
TUESDAY 4TH AUGUST

12. If the set of all $a \in \mathbf{R}-\{1\}$, for which the roots of the equation $(1-a)x^2+2(a-3)x+9=0$ are positive is $(-\infty,-\alpha]\cup[\beta,\gamma)$, then $2\alpha+\beta+\gamma$ is equal to . **[JEE Main 2025]**

13. The sum of all rational terms in the expansion of $(2+\sqrt{3})^8$ is : **[JEE Main 2025]**

(A) 16923 (B) 18817 (C) 3763 (D) 33845

14. The number of ways, in which the letters A, B, C, D, E can be placed in the 8 boxes of the figure below so that no row remains empty and at most one letter can be placed in a box, is : **[JEE Main 2025]**



(A) 5880 (B) 840 (C) 960 (D) 5760

15. If for $\theta \in \left[-\frac{\pi}{3}, 0\right]$, the points $(x,y)=\left(3\tan\left(\theta+\frac{\pi}{3}\right), 2\tan\left(\theta+\frac{\pi}{6}\right)\right)$ lie on $xy+\alpha x+\beta y+\gamma=0$, then $\alpha^2+\beta^2+\gamma^2$ is equal to : **[JEE Main 2025]**

(A) 75 (B) 96 (C) 80 (D) 72

16. The number of solutions of the equation $2x+3\tan x=\pi, x\in[-2\pi,2\pi]-\left\{\pm\frac{\pi}{2},\pm\frac{3\pi}{2}\right\}$ is: **[JEE Main 2025]**

(A) 4 (B) 5 (C) 3 (D) 6

17. The sum $1+3+11+25+45+71+\ldots$ upto 20 terms, is equal to **[JEE Main 2025]**

(A) 7240 (B) 8124 (C) 7130 (D) 6982

18. A rod of length eight units moves such that its ends A and B always lie on the lines $x-y+2=0$ and $y+2=0$, respectively. If the locus of the point P, that divides the rod AB internally in the ratio $2:1$ is $9\left(x^2+\alpha y^2+\beta xy+\gamma x+28y\right)-76=0$, then $\alpha-\beta-\gamma$ is equal to : **[JEE Main 2025]**

(A) 24 (B) 22 (C) 21 (D) 23

19. Let the lines $3x-4y-\alpha=0, 8x-11y-33=0$, and $2x-3y+\lambda=0$ be concurrent. If the image of the point $(1,2)$ in the line $2x-3y+\lambda=0$ is $\left(\frac{57}{13}, \frac{-40}{13}\right)$, then $|\alpha\lambda|$ is equal to **[JEE Main 2025]**

(A) 91 (B) 113 (C) 101 (D) 84

20. Let circle C be the image of $x^2+y^2-2x+4y-4=0$ in the line $2x-3y+5=0$ and A be the point on C such that OA is parallel to x-axis and A lies on the right hand side of the centre O of C. If $B(\alpha,\beta)$, with $\beta<4$, lies on C such that the length of the arc AB is $(1/6)^{\text{th}}$ of the perimeter of C, then $\beta-\sqrt{3}\alpha$ is equal to **[JEE Main 2025]**

(A) $4-\sqrt{3}$ (B) 3 (C) 4 (D) $3+\sqrt{3}$

21. Let $A=\begin{bmatrix}\cos\theta & 0 & -\sin\theta\\ 0 & 1 & 0\\ \sin\theta & 0 & \cos\theta\end{bmatrix}$. If for some $\theta\in(0,\pi)$, $A^2=A^T$, then the sum of the diagonal elements of the matrix $(A+I)^3+(A-I)^3-6A$ is equal to _____ . **[JEE Main 2025]**

22. Let $\left(1+x+x^2\right)^{10}=a_0+a_1x+a_2x^2+\ldots+a_{20}x^{20}$. If $(a_1+a_3+a_5+\ldots+a_{19})-11a_2=121k$, then k is equal to_____ . **[JEE Main 2025]**

WEDNESDAY 5TH AUGUST

23. Let the set of all values of $p \in \mathbb{R}$, for which both the roots of the equation $x^2 - (p+2)x + (2p+9) = 0$ are negative real numbers, be the interval $(\alpha, \beta]$. Then $\beta - 2\alpha$ is equal to **[JEE Main 2025]**

(A) 5 (B) 0 (C) 20 (D) 9

24. If $\sum_{r=1}^{9} \left(\frac{r+3}{2^r}\right) \cdot {}^9C_r = \alpha\left(\frac{3}{2}\right)^9 - \beta, \alpha, \beta \in \mathbb{N}$, then $(\alpha+\beta)^2$ is equal to **[JEE Main 2025]**

(A) 27 (B) 81 (C) 18 (D) 9

25. If $1^2 \cdot \left({}^{15}C_1\right) + 2^2 \cdot \left({}^{15}C_2\right) + 3^2 \cdot \left({}^{15}C_3\right) + \ldots + 15^2 \cdot \left({}^{15}C_{15}\right) = 2^m \cdot 3^n \cdot 5^k$, where $m, n, k \in \mathbf{N}$, then m + n + k is equal to : **[JEE Main 2025]**

(A) 20 (B) 19 (C) 18 (D) 21

26. From a group of 7 batsmen and 6 bowlers, 10 players are to be chosen for a team, which should include atleast 4 batsmen and atleast 4 bowlers. One batsmen and one bowler who are captain and vice-captain respectively of the team should be included. Then the total number of ways such a selection can be made, is **[JEE Main 2025]**

(A) 145 (B) 165 (C) 155 (D) 135

27. All five letter words are made using all the letters A, B, C, D, E and arranged as in an English dictionary with serial numbers. Let the word at serial number n be denoted by W_n. Let the probability $P(W_n)$ of choosing the word W_n satisfy $P(W_n) = 2P(W_{n-1}), n > 1$. **[JEE Main 2025]**

28. If the sum of the first 20 terms of the series $\frac{4\cdot1}{4+3\cdot1^2+1^4} + \frac{4\cdot2}{4+3\cdot2^2+2^4} + \frac{4\cdot3}{4+3\cdot3^2+3^4} + \frac{4\cdot4}{4+3\cdot4^2+4^4} + \ldots \cdot$ is $\frac{m}{n}$, where m and n are coprime, then m + n is equal to : **[JEE Main 2025]**

(A) 423 (B) 421 (C) 422 (D) 420

29. Let the points $\left(\frac{11}{2}, \alpha\right)$ lie on or inside the triangle with sides $x + y = 11, x + 2y = 16$ and $2x + 3y = 29$. Then the product of the smallest and the largest values of α is equal to : **[JEE Main 2025]**

(A) 22 (B) 33 (C) 55 (D) 44

30. Let a be the length of a side of a square OABC with O being the origin. Its side OA makes an acute angle α with the positive x-axis and the equations of its diagonals are $(\sqrt{3}+1)x + (\sqrt{3}-1)y = 0$ and $(\sqrt{3}-1)x - (\sqrt{3}+1)y + 8\sqrt{3} = 0$. Then $a2$ is equal to : **[JEE Main 2025]**

(A) 48 (B) 16 (C) 24 (D) 32

31. A line passing through the point $P(a, 0)$ makes an acute angle α with the positive x-axis. Let this line be rotated about the point P through an angle $\frac{\alpha}{2}$ in the clockwise direction. If in the new position, the slope of the line is $2 - \sqrt{3}$ and its distance from the origin is $\frac{1}{\sqrt{2}}$, then the value of $3a^2 \tan^2\alpha - 2\sqrt{3}$ is : **[JEE Main 2025]**

(A) 8 (B) 4 (C) 5 (D) 6

32. Let the equation of the circle, which touches x-axis at the point $(a, 0), a > 0$ and cuts off an intercept of length b on $y - axis$ be $x^2 + y^2 - \alpha x + \beta y + \gamma = 0$. If the circle lies below $x - axis$, then the ordered pair $(2a, b^2)$ is equal to **[JEE Main 2025]**

(A) $(\alpha, \beta^2 + 4\gamma)$ (B) $(\alpha, \beta^2 - 4\gamma)$
(C) $(\gamma, \beta^2 - 4\alpha)$ (D) $(\gamma, \beta^2 + 4\alpha)$

33. Line L_1 of slope 2 and line L_2 of slope $\frac{1}{2}$ intersect at the origin O . In the first quadrant, $P_1, P_2, \ldots, P_{12}$ are 12 points on line L_1 and $Q_1, Q_2, \ldots, Q_9$ are 9 points on line L_2. Then the total number of triangles, that can be formed having vertices at three of the 22 points $O, P_1, P_2, \ldots, P_{12}, Q_1, Q_2, \ldots, Q_9$, is: **[JEE Main 2025]**

(A) 1026 (B) 1188 (C) 1134 (D) 1080

THURSDAY 6TH AUGUST

34. Let α and β be the roots of $x^2 + \sqrt{3}x - 16 = 0$, and γ and δ be the roots of $x^2 + 3x - 1 = 0$. If $P_n = \alpha^n + \beta^n$ and $Q_n = \gamma^n + \delta^n$, then $\frac{P_{25} + \sqrt{3}P_{24}}{2P_{23}} + \frac{Q_{25} - Q_{23}}{Q_{24}}$ is equal to **[JEE Main 2025]**

(A) 4 (B) 3 (C) 5 (D) 7

35. For an integer $n \geq 2$, if the arithmetic mean of all coefficients in the binomial expansion of $(x+y)^{2n-3}$ is 16 , then the distance of the point P $(2n-1, n^2-4n)$ from the line $x+y=8$ is **[JEE Main 2025]**

(A) $\sqrt{2}$ (B) $2\sqrt{2}$ (C) $5\sqrt{2}$ (D) $3\sqrt{2}$

36. If the number of seven-digit numbers, such that the sum of their digits is even, is $m \cdot n \cdot 10^n; m, n \in \{1,2,3,\ldots,9\}$, then $m+n$ is equal to **[JEE Main 2025]**

37. If $10\sin^4\theta + 15\cos^4\theta = 6$, then the value of $\frac{27\,\text{cosec}^6\theta + 8\sec^6\theta}{16\sec^8\theta}$ is **[JEE Main 2025]**

(A) $\frac{2}{5}$ (B) $\frac{3}{5}$ (C) $\frac{1}{5}$ (D) $\frac{3}{4}$

38. Consider two sets A and B, each containing three numbers in A.P. Let the sum and the product of the elements of A be 36 and p respectively and the sum and the product of the elements of B be 36 and q respectively. Let d and D be the common differences of AP′s in A and B respectively such that $D = d+3, d > 0$. If $\frac{p+q}{p-q} = \frac{19}{5}$, then p − q is equal to **[JEE Main 2025]**

(A) 540 (B) 450 (C) 600 (D) 630

39. Let $A = \{1,6,11,16,\ldots\}$ and $B = \{9,16,23,30,\ldots\}$ be the sets consisting of the first 2025 terms of two arithmetic progressions. Then $n(A \cup B)$ is **[JEE Main 2025]**

(A) 3814 (B) 4003 (C) 4027 (D) 3761

40. If the orthocenter of the triangle formed by the lines y = x + 1, y = 4x - 8 and y = mx + c is at (3, -1), then m - c is : **[JEE Main 2025]**

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

41. Let the area of the triangle formed by a straight line L : $x + by + c = 0$ with co-ordinate axes be 48 square units. If the perpendicular drawn from the origin to the line L makes an angle of 45° with the positive x-axis, then the value of $b^2 + c^2$ is : **[JEE Main 2025]**

(A) 90 (B) 83 (C) 93 (D) 97

42. The absolute difference between the squares of the radii of the two circles passing through the point $(-9,4)$ and touching the lines $x+y=3$ and $x-y=3$, is equal to _____ . **[JEE Main 2025]**

43. Let C_1 be the circle in the third quadrant of radius 3 , that touches both coordinate axes. Let C_2 be the circle with centre $(1,3)$ that touches C_1 externally at the point (α,β). If $(\beta-\alpha)^2 = \frac{m}{n}$, $\gcd(m,n) = 1$, then $m+n$ is equal to **[JEE Main 2025]**

(A) 22 (B) 13 (C) 9 (D) 31

44. The sum $1 + \frac{1+3}{2!} + \frac{1+3+5}{3!} + \frac{1+3+5+7}{4!} + \ldots$ upto ∞ terms, is equal to **[JEE Main 2025]**

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

FRIDAY 7TH AUGUST

45. Consider the equation $x^2 + 4x - n = 0$, where $n \in [20,100]$ is a natural number. Then the number of all distinct values of n, for which the given equation has integral roots, is equal to **[JEE Main 2025]**

(A) 6 (B) 5 (C) 8 (D) 7

46. In the expansion of $\left(\sqrt[3]{2} + \frac{1}{\sqrt[3]{3}}\right)^n, n \in$ N, if the ratio of 15^{th} term from the beginning to the 15^{th} term from the end is $\frac{1}{6}$, then the value of ${}^nC_3$ is **[JEE Main 2025]**

(A) 4960 (B) 2300 (C) 1040 (D) 4060

47. Let m and n, (m < n), be two 2-digit numbers. Then the total numbers of pairs (m, n), such that $\gcd(m,n) = 6$, is _____ . **[JEE Main 2025]**

48. The number of solutions of the equation
$(4-\sqrt{3})\sin x - 2\sqrt{3}\cos^2 x = -\frac{4}{1+\sqrt{3}}, x \in \left[-2\pi, \frac{5\pi}{2}\right]$ is **[JEE Main 2025]**

(A) 4 (B) 3 (C) 6 (D) 5

49. $1+3+5^2+7+9^2+\ldots$ upto 40 terms is equal to **[JEE Main 2025]**

(A) 40870 (B) 41880 (C) 43890 (D) 33980

50. Let ABC be the triangle such that the equations of lines AB and AC be $3y-x=2$ and $x+y=2$, respectively, and the points B and C lie on x-axis. If P is the orthocentre of the triangle ABC , then the area of the triangle PBC is equal to **[JEE Main 2025]**

(A) 8 (B) 4 (C) 10 (D) 6

51. A line passes through the origin and makes equal angles with the positive coordinate axes. It intersects the lines $L_1: 2x+y+6=0$ and $L_2: 4x+2y-p=0, p>0$, at the points A and B , respectively. If $AB=\frac{9}{\sqrt{2}}$ and the foot of the perpendicular from the point A on the line L_2 is M, then $\frac{AM}{BM}$ is equal to **[JEE Main 2025]**

(A) 5 (B) 3 (C) 2 (D) 4

52. Let the three sides of a triangle are on the lines $4x-7y+10=0, x+y=5$ and $7x+4y=15$. Then the distance of its orthocentre from the orthocentre of the tringle formed by the lines $x=0, y=0$ and $x+y=1$ is **[JEE Main 2025]**

(A) $\sqrt{20}$ (B) 20 (C) $\sqrt{5}$ (D) 5

53. Let C be the circle $x^2+(y-1)^2=2$, E_1 and E_2 be two ellipses whose centres lie at the origin and major axes lie on x -axis and y -axis respectively. Let the straight line $x+y=3$ touch the curves C, E_1 and E_2 at $P\left(x_1, y_1\right), Q\left(x_2, y_2\right)$ and $R\left(x_3, y_3\right)$ respectively. Given that P is the mid point of the line segment QR and $PQ=\frac{2\sqrt{2}}{3}$, the value of $9\left(x_1y_1+x_2y_2+x_3y_3\right)$ is equal to **[JEE Main 2025]**

54. Let I be the identity matrix of order 3×3 and for the matrix $A=\begin{bmatrix}\lambda & 2 & 3\\ 4 & 5 & 6\\ 7 & -1 & 2\end{bmatrix}$, $|A|=-1$. Let B be the inverse of the matrix adj $\left(\text{Aadj}\left(A^2\right)\right)$. Then $|(\lambda \mathrm{B}+\mathrm{I})|$ is equal to **[JEE Main 2025]**

55. Consider the lines $x(3\lambda+1)+y(7\lambda+2)=17\lambda+5, \lambda$ being a parameter, all passing through a point P. One of these lines (say L) is farthest from the origin. If the distance of L from the point $(3,6)$ is d, then the value of d^2 is **[JEE Main 2025]**

(A) 10 (B) 20 (C) 15 (D) 30

56. If the four distinct points $(4,6),(-1,5),(0,0)$ and $(k,3k)$ lie on a circle of radius r, then $10k+r^2$ is equal to **[JEE Main 2025]**

(A) 34 (B) 32 (C) 35 (D) 33

ANSWER KEY

1. (A)	**2.** (B)	**3.** (D)	**4.** (B)	**5.** (B)	**6.** (B)	**7.** (D)	**8.** 28
9. (D)	**10.** 19	**11.** (A)	**12.** 7	**13.** (B)	**14.** (D)	**15.** (A)	**16.** (B)
17. (A)	**18.** (D)	**19.** (A)	**20.** (C)	**21.** 6	**22.** 239	**23.** (A)	**24.** (B)
25. (B)	**26.** (C)	**27.** 183	**28.** (B)	**29.** (B)	**30.** (A)	**31.** (B)	**32.** (B)
33. (C)	**34.** (C)	**35.** (D)	**36.** 14	**37.** (A)	**38.** (A)	**39.** (D)	**40.** (A)
41. (D)	**42.** 768	**43.** (A)	**44.** (B)	**45.** (A)	**46.** (B)	**47.** 64	**48.** (D)
49. (B)	**50.** (D)	**51.** (B)	**52.** (C)	**53.** 46	**54.** 38 OR -38	**55.** (B)	**56.** (C)

CONGRATULATIONS!

Milestone Reached!

You have successfully completed revisiting the **JEE Main PYQs** of years **2024** and **2025** for the chapters:

- Matrices and Determinants
- Quadratic Equations
- Sequences and Series
- Permutations and Combinations
- Binomial Theorem
- Trigonometric Ratios & Identities
- Trigonometric Equations
- Straight Lines
- Circles

Your consistent daily practice over these 7 weeks of Riyaaz has built a solid foundation. Keep this discipline alive as we move forward!

JEE Phodna Hai!