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 06** Chetan Sir

*"Don't practice until you get it right; practice until you cannot get it wrong."*

## MONDAY 27TH JULY

**1.** The product of all the rational roots of the equation $\left(x^2-9x+11\right)^2-(x-4)(x-5)=3$, is equal to **[JEE Main 2025]**

(A) 7 (B) 21 (C) 28 (D) 14

**2.** Suppose $A$ and $B$ are the coefficients of $30^{\text{th}}$ and $12^{\text{th}}$ terms respectively in the binomial expansion of $(1+x)^{2n-1}$. If 2 A = 5 B, then n is equal to: **[JEE Main 2025]**

(A) 20 (B) 19 (C) 22 (D) 21

**3.** If $\alpha=1+\sum\limits_{r=1}^{6}(-3)^{r-1}{}^{12}C_{2r-1}$, then the distance of the point $(12,\sqrt{3})$ from the line $\alpha x-\sqrt{3}y+1=0$ is **[JEE Main 2025]**

**4.** Number of functions $f:\{1,2,\ldots,100\}\to\{0,1\}$, that assign 1 to exactly one of the positive integers less than or equal to 98 , is equal to **[JEE Main 2025]**

**5.** Let $\langle a_n\rangle$ be a sequence such that $a_0=0, a_1=\frac{1}{2}$ and $2a_{n+2}=5a_{n+1}-3a_n, n=0,1,2,3,\ldots$. Then $\sum\limits_{k=1}^{100}a_k$ is equal to **[JEE Main 2025]**

(A) $3a_{100}+100$ (B) $3a_{100}-100$ (C) $3a_{99}-100$ (D) $3a_{99}+100$

**6.** If $\frac{1}{1^4}+\frac{1}{2^4}+\frac{1}{3^4}+\ldots\infty=\frac{\pi^4}{90}$, $\frac{1}{1^4}+\frac{1}{3^4}+\frac{1}{5^4}+\ldots\infty=\alpha$, $\frac{1}{2^4}+\frac{1}{4^4}+\frac{1}{6^4}+\ldots\infty=\beta$, then $\frac{\alpha}{\beta}$ is equal to : **[JEE Main 2025]**

(A) 23 (B) 14 (C) 18 (D) 15

**7.** If the line segment joining the points $(5,2)$ and $(2,a)$ subtends an angle $\frac{\pi}{4}$ at the origin, then the absolute value of the product of all possible values of $a$ is : **[JEE Main 2024]**

(A) 4 (B) 8 (C) 6 (D) 2

**8.** Let a ray of light passing through the point $(3,10)$ reflects on the line $2x+y=6$ and the reflected ray passes through the point $(7,2)$. If the equation of the incident ray is $ax+by+1=0$, then $a^2+b^2+3ab$ is equal to **[JEE Main 2024]**

**9.** Let the circles $C_1:(x-\alpha)^2+(y-\beta)^2=r_1^2$ and $C_2:(x-8)^2+\left(y-\frac{15}{2}\right)^2=r_2^2$ touch each other externally at the point $(6,6)$. If the point $(6,6)$ divides the line segment joining the centres of the circles $C_1$ and $C_2$ internally in the ratio 2 : 1, then $(\alpha+\beta)+4\left(r_1^2+r_2^2\right)$ equals **[JEE Main 2024]**

(A) 130 (B) 110 (C) 145 (D) 125

**10.** Let a circle C of radius 1 and closer to the origin be such that the lines passing through the point $(3,2)$ and parallel to the coordinate axes touch it. Then the shortest distance of the circle C from the point $(5,5)$ is : **[JEE Main 2024]**

(A) $4\sqrt{2}$ (B) 4 (C) 5 (D) $2\sqrt{2}$

## TUESDAY 28TH JULY

**11.** The number of real solution(s) of the equation $x^2+3x+2=\min\{|x-3|,|x+2|\}$ is : **[JEE Main 2025]**

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

**12.** The number of integral terms in the expansion of $\left(5^{\frac{1}{2}}+7^{\frac{1}{8}}\right)^{1016}$ is: **[JEE Main 2025]**

(A) 127 (B) 128 (C) 130 (D) 129

**13.** Group A consists of 7 boys and 3 girls, while group B consists of 6 boys and 5 girls. The number of ways, 4 boys and 4 girls can be invited for a picnic if 5 of them must be from group $A$ and the remaining 3 from group $B$, is equal to : **[JEE Main 2025]**

(A) 8925 (B) 9100 (C) 8575 (D) 8750

**14.** The value of $(\sin 70^\circ)\,(\cot 10^\circ \cot 70^\circ - 1)$ is **[JEE Main 2025]**

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

**15.** If $\theta \in [-2\pi, 2\pi]$, then the number of solutions of $2\sqrt{2}\cos^2\theta + (2-\sqrt{6})\cos\theta - \sqrt{3} = 0$, is equal to: **[JEE Main 2025]**

(A) 8 (B) 6 (C) 10 (D) 12

**16.** Let $a_n$ be the $n^{th}$ term of an A.P. If $S_n = a_1 + a_2 + a_3 + \ldots + a_n = 700$, $a_6 = 7$ and $S_7 = 7$, then $a_n$ is equal to : **[JEE Main 2025]**

(A) 65 (B) 56 (C) 70 (D) 64

**17.** If the orthocentre of the triangle formed by the lines $2x + 3y - 1 = 0, x + 2y - 1 = 0$ and $ax + by - 1 = 0$, is the centroid of another triangle, whose circumcentre and orthocentre respectively are $(3, 4)$ and $(-6, -8)$, then the value of $|a - b|$ is **[JEE Main 2024]**

**18.** The equations of two sides AB and AC of a triangle ABC are $4x + y = 14$ and $3x - 2y = 5$, respectively. The point $\left(2, -\frac{4}{3}\right)$ divides the third side BC internally in the ratio 2 : 1, the equation of the side BC is **[JEE Main 2024]**

(A) $x + 6y + 6 = 0$ (B) $x - 3y - 6 = 0$ (C) $x + 3y + 2 = 0$ (D) $x - 6y - 10 = 0$

**19.** Let the circle $C_1 : x^2 + y^2 - 2(x + y) + 1 = 0$ and $C_2$ be a circle having centre at $(-1, 0)$ and radius 2 . If the line of the common chord of $C_1$ and $C_2$ intersects the y-axis at the point P, then the square of the distance of P from the centre of $C_1$ is: **[JEE Main 2024]**

(A) 4 (B) 6 (C) 2 (D) 1

**20.** Let ABCD and AEFG be squares of side 4 and 2 units, respectively. The point E is on the line segment AB and the point F is on the diagonal AC. Then the radius r of the circle passing through the point F and touching the line segments BC and CD satisfies : **[JEE Main 2024]**

(A) $r = 1$ (B) $2r^2 - 4r + 1 = 0$ (C) $2r^2 - 8r + 7 = 0$ (D) $r^2 - 8r + 8 = 0$

## WEDNESDAY 29TH JULY

**21.** The sum, of the squares of all the roots of the equation $x^2 + |2x - 3| - 4 = 0$, is **[JEE Main 2025]**

(A) $6(2 - \sqrt{2})$ (B) $3(3 - \sqrt{2})$ (C) $3(2 - \sqrt{2})$ (D) $6(3 - \sqrt{2})$

**22.** The product of the last two digits of $(1919)^{1919}$ is **[JEE Main 2025]**

**23.** The largest n $\in$ **N** such that $3^n$ divides 50 ! is : **[JEE Main 2025]**

(A) 22 (B) 20 (C) 21 (D) 23

**24.** Let ${}^nC_{r-1} = 28, {}^nC_r = 56$ and ${}^nC_{r+1} = 70$. Let $A(4\cos t, 4\sin t), B(2\sin t, -2\cos t)$ and $C\left(3r - n, r^2 - n - 1\right)$ be the vertices of a triangle $ABC$, where $t$ is a parameter. If $(3x - 1)^2 + (3y)^2 = \alpha$, is the locus of the centroid of triangle ABC , then $\alpha$ equals **[JEE Main 2025]**

(A) 18 (B) 8 (C) 20 (D) 6

**25.** If the sum of the second, fourth and sixth terms of a G.P. of positive terms is 21 and the sum of its eighth, tenth and twelfth terms is 15309, then the sum of its first nine terms is : **[JEE Main 2025]**

(A) 757 (B) 755 (C) 750 (D) 760

**26.** Let two straight lines drawn from the origin O intersect the line $3x + 4y = 12$ at the points P and Q such that $\triangle OPQ$ is an isosceles triangle and $\angle POQ = 90^\circ$. If $l = OP^2 + PQ^2 + QO^2$, then the greatest integer less than or equal to $l$ is : **[JEE Main 2024]**

(A) 42 (B) 46 (C) 48 (D) 44

**27.** Let $A(-1,1)$ and $B(2,3)$ be two points and P be a variable point above the line AB such that the area of $\triangle PAB$ is 10. If the locus of P is $ax + by = 15$, then 5a + 2 b is : **[JEE Main 2024]**

(A) $-\frac{12}{5}$ (B) $-\frac{6}{5}$ (C) 6 (D) 4

**28.** If the locus of the point, whose distances from the point $(2,1)$ and $(1,3)$ are in the ratio 5 : 4, is $ax^2 + by^2 + cxy + dx + ey + 170 = 0$, then the value of $a^2 + 2b + 3c + 4d + e$ is equal to : **[JEE Main 2024]**

(A) 37 (B) $-27$ (C) 437 (D) 5

**29.** If $P(6,1)$ be the orthocentre of the triangle whose vertices are $A(5,-2)$, $B(8,3)$ and $C(h,k)$, then the point C lies on the circle : **[JEE Main 2024]**

(A) $x^2 + y^2 - 74 = 0$ (B) $x^2 + y^2 - 65 = 0$ (C) $x^2 + y^2 - 61 = 0$ (D) $x^2 + y^2 - 52 = 0$

**30.** Let $A$ be a matrix of order $3 \times 3$ and $|A| = 5$. If $|2\,\text{adj}(3A\,\text{adj}(2A))| = 2^\alpha \cdot 3^\beta \cdot 5^\gamma, \alpha, \beta, \gamma \in N$, then $\alpha + \beta + \gamma$ is equal to **[JEE Main 2025]**

(A) 26 (B) 27 (C) 25 (D) 28

## THURSDAY 30TH JULY

**31.** The sum of the squares of the roots of $|x-2|^2 + |x-2| - 2 = 0$ and the squares of the roots of $x^2 - 2|x-3| - 5 = 0$, is **[JEE Main 2025]**

(A) 24 (B) 26 (C) 36 (D) 30

**32.** The term independent of $x$ in the expansion of $\left(\frac{(x+1)}{\left(x^{2/3}+1-x^{1/3}\right)} - \frac{(x-1)}{\left(x-x^{1/2}\right)}\right)^{10}, x > 1$, is : **[JEE Main 2025]**

(A) 240 (B) 120 (C) 150 (D) 210

**33.** The number of different 5 digit numbers greater than 50000 that can be formed using the digits 0 , $1,2,3,4,5,6,7$, such that the sum of their first and last digits should not be more than 8 , is **[JEE Main 2025]**

(A) 5720 (B) 5719 (C) 4608 (D) 4607

**34.** Let the range of the function $f(x) = 6 + 16\cos x \cdot \cos\left(\frac{\pi}{3} - x\right) \cdot \cos\left(\frac{\pi}{3} + x\right) \cdot \sin 3x \cdot \cos 6x, x \in \mathbf{R}$ be $[\alpha, \beta]$. Then the distance of the point $(\alpha, \beta)$ from the line $3x + 4y + 12 = 0$ is : **[JEE Main 2025]**

(A) 11 (B) 10 (C) 8 (D) 9

**35.** Let $a_1, a_2, a_3, \ldots$ be in an A.P. such that $\sum_{k=1}^{12} a_{2k-1} = -\frac{72}{5}a_1, a_1 \neq 0$. If $\sum_{k=1}^{n} a_k = 0$, then $n$ is : **[JEE Main 2025]**

(A) 18 (B) 17 (C) 11 (D) 10

**36.** The number of terms of an A.P. is even; the sum of all the odd terms is 24 , the sum of all the even terms is 30 and the last term exceeds the first by $\frac{21}{2}$. Then the number of terms which are integers in the A.P. is : **[JEE Main 2025]**

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

**37.** Let a variable line of slope $m > 0$ passing through the point $(4,-9)$ intersect the coordinate axes at the points $A$ and $B$. The minimum value of the sum of the distances of $A$ and $B$ from the origin is **[JEE Main 2024]**

(A) 30 (B) 15 (C) 10 (D) 25

**38.** Let $\Delta ABC$ be a triangle formed by the lines 7x – 6y + 3 = 0, x + 2y – 31 = 0 and 9x – 2y – 19 = 0. Let the point (h, k) be the image of the centroid of $\Delta ABC$ in the line 3x + 6y – 53 = 0. Then h2 + k2 + hk is equal to : **[JEE Main 2025]**

(A) 47 (B) 37 (C) 40 (D) 36

**39.** A circle is inscribed in an equilateral triangle of side of length 12. If the area and perimeter of any square inscribed in this circle are $m$ and $n$, respectively, then $m + n^2$ is equal to **[JEE Main 2024]**

(A) 408 (B) 414 (C) 312 (D) 396

**40.** Let a circle C pass through the points (4, 2) and (0, 2), and its centre lie on 3x + 2y + 2 = 0. Then the length of the chord, of the circle C, whose mid-point is (1, 2), is: **[JEE Main 2025]**

(A) $4\sqrt{2}$ (B) $2\sqrt{2}$ (C) $2\sqrt{3}$ (D) $\sqrt{3}$

## FRIDAY 31ST JULY

**41.** The number of real roots of the equation $x|x-2|+3|x-3|+1=0$ is : **[JEE Main 2025]**

(A) 4 (B) 3 (C) 2 (D) 1

**42.** The sum of the series $2\times1\times{}^{20}C_4-3\times2\times{}^{20}C_5+4\times3\times{}^{20}C_6-5\times4\times{}^{20}C_7+\cdots\cdots+18\times17\times{}^{20}C_{20}$, is equal to **[JEE Main 2025]**

**43.** There are 12 points in a plane, no three of which are in the same straight line, except 5 points which are collinear. The number of triangles that can be formed with vertices at these points is **[JEE Main 2025]**

(A) 230 (B) 210 (C) 200 (D) 220

**44.** If $\theta\epsilon\left[-\frac{7\pi}{6},\frac{4\pi}{3}\right]$, then the number of solutions of $\sqrt{3}\,\mathrm{cosec}^2\theta-2(\sqrt{3}-1)\,\mathrm{cosec}\,\theta-4=0$, is equal to : **[JEE Main 2025]**

(A) 7 (B) 10 (C) 6 (D) 8

**45.** If the sum of the first 10 terms of the series $\frac{4\cdot1}{1+4\cdot1^4}+\frac{4\cdot2}{1+4\cdot2^4}+\frac{4\cdot3}{1+4\cdot3^4}+\ldots..$ is $\frac{m}{n}$, where $\gcd(m,n)=1$, then $m+n$ is equal to **[JEE Main 2025]**

**46.** Let the line $x + y = 1$ meet the axes of $x$ and $y$ at $A$ and $B$, respectively. A right angled triangle $AMN$ is inscribed in the triangle $OAB$, where $O$ is the origin and the points $M$ and $N$ lie on the lines $OB$ and $AB$, respectively. If the area of the triangle $AMN$ is $\frac{4}{9}$ of the area of the triangle $OAB$ and $AN : NB = \lambda : 1$, then the sum of all possible value(s) of $\lambda$ is: **[JEE Main 2025]**

(A) $\frac{1}{2}$ (B) $\frac{5}{2}$ (C) 2 (D) $\frac{13}{6}$

**47.** Let the triangle PQR be the image of the triangle with vertices $(1,3),(3,1)$ and $(2,4)$ in the line $x+2y=2$. If the centroid of $\triangle$PQR is the point $(\alpha,\beta)$, then $15(\alpha-\beta)$ is equal to : **[JEE Main 2025]**

(A) 21 (B) 19 (C) 22 (D) 24

**48.** Two equal sides of an isosceles triangle are along $-x+2y=4$ and $x+y=4$. If $m$ is the slope of its third side, then the sum, of all possible distinct values of $m$, is: **[JEE Main 2025]**

(A) $-2\sqrt{10}$ (B) 12 (C) -6 (D) 6

**49.** Let the line x+y=1 meet the circle $x^2+y^2=4$ at the points A and B. If the line perpendicular to AB and passing through the mid-point of the chord AB intersects the circle at C and D, then the area of the quadrilateral ABCD is equal to : **[JEE Main 2025]**

(A) $\sqrt{14}$ (B) $3\sqrt{7}$ (C) $2\sqrt{14}$ (D) $5\sqrt{7}$

**50.** Let the matrix $A=\begin{bmatrix}1&0&0\\1&0&1\\0&1&0\end{bmatrix}$ satisfy $A^n=A^{n-2}+A^2-I$ for $n\geqslant3$. Then the sum of all the elements of $A^{50}$ is : **[JEE Main 2025]**

(A) 44 (B) 39 (C) 52 (D) 53

## ANSWER KEY

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|---|---|---|---|---|---|---|---|
| **1.** (D) | **2.** (D) | **3.** 5 | **4.** 392 | **5.** (B) | **6.** (D) | **7.** (A) | **8.** 1 |
| **9.** (A) | **10.** (B) | **11.** (A) | **12.** (B) | **13.** (A) | **14.** (C) | **15.** (A) | **16.** (D) |
| **17.** 16 | **18.** (C) | **19.** (C) | **20.** (D) | **21.** (A) | **22.** 63 | **23.** (A) | **24.** (C) |
| **25.** (A) | **26.** (B) | **27.** (A) | **28.** (A) | **29.** (B) | **30.** (B) | **31.** (C) | **32.** (D) |
| **33.** (D) | **34.** (A) | **35.** (C) | **36.** (B) | **37.** (D) | **38.** (B) | **39.** (A) | **40.** (C) |
| **41.** (D) | **42.** 34 | **43.** (B) | **44.** (C) | **45.** 441 | **46.** (C) | **47.** (C) | **48.** (D) |
| **49.** (C) | **50.** (D) | | | | | | |