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JEE MAIN CONIC SECTIONS — PYQS

Max. Marks: 440 **Questions:** 110

Section A (MCQ) — 88 questions

Q.1 Let O be the vertex of the parabola $y^2 = 4x$ and its chords OP and OQ are perpendicular to each other. If the locus of the mid-point of the line segment PQ is a conic C, then the length of its latus rectum is :

[JEE Main 2026 (Online) 8th April Evening Shift]

(1) 1 (2) 2 (3) 4 (4) 8

Scan or tap for the full solution

Q.2 Let $\frac{x^2}{f(a^2+7a+3)}+\frac{y^2}{f(3a+15)}=1$ represent an ellipse with major axis along y-axis, where f is a strictly decreasing positive function on R. If the set of all possible values of a is R–[α, β], then $\alpha^2+\beta^2$ is equal to : [JEE Main 2026 (Online) 8th April Evening Shift]

(1) 28 (2) 40 (3) 61 (4) 24

Scan or tap for the full solution

Q.3 Let one root of the quadratic equation in x :

$(k^2-15k+27)x^2+9(k-1)x+18=0$

be twice the other. Then the length of the latus rectum of the parabola $y^2 = 6kx$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

(1) 4 (2) 6 (3) 8 (4) 12

Scan or tap for the full solution

Q.4 If the eccentricity e of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, passing through $(6,4\sqrt{3})$, satisfies $15(e^2+1)=34e$, then the length of the latus rectum of the hyperbola $\frac{x^2}{b^2}-\frac{y^2}{2(a^2+1)}=1$ is :

[JEE Main 2026 (Online) 6th April Morning Shift]

(1) 10 (2) 20 (3) 25 (4) 30

Scan or tap for the full solution

Q.5 Let chord PQ of length $3\sqrt{13}$ of the parabola $y^2 = 12x$ be such that the ordinates of points P and Q are in the ratio 1:2. If the chord PQ subtends an angle α at the focus of the parabola, then $\sin\alpha$ is equal to :

[JEE Main 2026 (Online) 6th April Morning Shift]

(1) $\frac{3}{5}$ (2) $\frac{4}{5}$ (3) $\frac{5}{13}$ (4) $\frac{12}{13}$

Scan or tap for the full solution

Q.6 Let C be a circle having centre in the first quadrant and touching the x-axis at a distance of 3 units from the origin. If the circle C has an intercept of length $6\sqrt{3}$ on y-axis, then the length of the chord of the circle C on the line x − y = 3 is :

[JEE Main 2026 (Online) 6th April Evening Shift]

(1) 8 (2) 6 (3) $6\sqrt{2}$ (4) $8\sqrt{2}$

Scan or tap for the full solution

Q.7 The eccentricity of an ellipse E with centre at the origin O is $\frac{\sqrt{3}}{2}$ and its directrices are $x=\pm\frac{4\sqrt{6}}{3}$.

Let $H:\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ be a hyperbola whose eccentricity is equal to the length of semi-major axis of E, and whose length of latus rectum is equal to the length of minor axis of E. Then the distance between the foci of H is :

[JEE Main 2026 (Online) 6th April Evening Shift]

(1) $\frac{4\sqrt{2}}{\sqrt{7}}$ (2) $\frac{4\sqrt{2}}{7}$ (3) $\frac{4}{\sqrt{7}}$ (4) $\frac{8}{7}$

Scan or tap for the full solution

Q.8 Let x = 9 be a directrix of an ellipse E, whose centre is at the origin and eccentricity is $\frac{1}{3}$. Let P(α, 0), α > 0, be a focus of E and AB be a chord passing through P. Then the locus of the mid point of AB is :

[JEE Main 2026 (Online) 6th April Evening Shift]

(1) $9y^2 = 8x(1 - x)$ (2) $3y^2 = 4x(1 - x)$

(3) $9y^2 = 8x(x–1)$ (4) $3y^2 = 4x(x–1)$

Scan or tap for the full solution

Q.9 Let a focus of the ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ be S(4, 0) and its eccentricity be $\frac{4}{5}$. If the point P(3, α) lies on E and O is the origin, then the area of ΔPOS is equal to: [JEE Main 2026 (Online) 5th April Morning Shift]

(1) $\frac{12}{5}$ (2) $\frac{14}{5}$ (3) $\frac{24}{5}$ (4) $\frac{48}{5}$

Scan or tap for the full solution

Q.10 Let P be a moving point on the circle $x^2 + y^2 - 6x - 8y + 21 = 0$. Then, the maximum distance of P from the vertex of the parabola $x^2 + 6x + y + 13 = 0$ is equal to:

[JEE Main 2026 (Online) 5th April Morning Shift]

(1) 8 (2) 10 (3) 12 (4) 9

Scan or tap for the full solution

Q.11 Let the point P be the vertex of the parabola $y = x^2 - 6x + 12$. If a line passing through the point P intersects the circle $x^2 + y^2 - 2x - 4y + 3 = 0$ at the points R and S, then the maximum value of $(PR + PS)^2$ is :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) 10 (2) 20 (3) 25 (4) 5

Scan or tap for the full solution

Q.12 Let the directrix of the parabola $P: y^2 = 8x$, cut x-axis at the point A. Let $B(\alpha, \beta)$, $\alpha > 1$, be a point on P such that the slope of AB is 3/5. If BC is a focal chord of P, then six times the area of ΔABC is :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) 80 (2) 160 (3) 174 (4) 192

Scan or tap for the full solution

Q.13 Let the eccentricity e of a hyperbola satisfy the equation $6e^2 - 11e + 3 = 0$. If the foci of the hyperbola are (3, 5) and (3, − 4), then the length of its latus rectum is :

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) $\frac{11}{3}$ (2) $\frac{17}{3}$ (3) $\frac{15}{2}$ (4) $\frac{17}{2}$

Scan or tap for the full solution

Q.14 Suppose that two chords, drawn from the point (1, 2) on the circle $x^2 + y^2 + x - 3y = 0$ are bisected by the y-axis. If the other ends of these chords are R and S, and the mid point of the line segment RS is (α, β), then $6(\alpha + \beta)$ is equal to :

[JEE Main 2026 (Online) 4th April Morning Shift]

(1) 1 (2) 3 (3) 4 (4) 6

Scan or tap for the full solution

Q.15 Let $P(3\cos\alpha, 2\sin\alpha)$, $\alpha \neq 0$, be a point on the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$, Q be a point on the circle $x^2 + y^2 - 14x - 14y + 82 = 0$ and R be a point on the line $x + y = 5$ such that the centroid of the triangle PQR is $\left(2 + \cos\alpha, 3 + \frac{2}{3}\sin\alpha\right)$. Then the sum of the ordinates of all possible points R is :

[JEE Main 2026 (Online) 4th April Evening Shift]

(1) 6 (2) 2 (3) 4 (4) 8

Scan or tap for the full solution

Q.16 Let $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be a hyperbola such that the distance between its foci is 6 and the distance between its directrices is $\frac{8}{3}$. If the line $x = \alpha$ intersects the hyperbola H at the points A and B such that the area of the triangle AOB is $4\sqrt{15}$, where O is the origin, then α^2 equals

[JEE Main 2026 (Online) 4th April Evening Shift]

(1) 12 (2) 16 (3) 24 (4) 25

Scan or tap for the full solution

Q.17 Let an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $a < b$, pass through the point (4, 3) and have eccentricity $\frac{\sqrt{5}}{3}$. Then the length of its latus rectum is :

[JEE Main 2026 (Online) 2nd April Morning Shift]

(1) $\frac{4\sqrt{5}}{3}$ (2) $2\sqrt{5}$ (3) $\frac{7\sqrt{5}}{3}$ (4) $\frac{8\sqrt{5}}{3}$

Scan or tap for the full solution

Q.18 Let a circle pass through the origin and its centre be the point of intersection of two mutually perpendicular lines $x + (k-1)y + 3 = 0$ and $2x + k^2y - 4 = 0$. If the line $x - y + 2 = 0$ intersects the circle at the points A and B, then $(AB)^2$ is equal to :

[JEE Main 2026 (Online) 2nd April Evening Shift]

(1) 10 (2) 27 (3) 18 (4) 34

Scan or tap for the full solution

Q.19 Let O be the origin, and P and Q be two points on the rectangular hyperbola $xy = 12$ such that the midpoint of the line segment PQ is $\left(\frac{1}{2}, -\frac{1}{2}\right)$. Then the area of the triangle OPQ equals :

[JEE Main 2026 (Online) 2nd April Evening Shift]

(1) $\frac{3}{2}$ (2) $\frac{5}{2}$ (3) $\frac{7}{2}$ (4) $\frac{9}{2}$

Scan or tap for the full solution

Q.20 Let the parabola $y = x^2 + px + q$ passing through the point $(1, -1)$ be such that the distance between its vertex and the x-axis is minimum. Then the value of $p^2 + q^2$ is :

[JEE Main 2026 (Online) 2nd April Evening Shift]

(1) 2 (2) 4 (3) 5 (4) 8

Scan or tap for the full solution

Q.21 Let $y = x$ be the equation of a chord of the circle C_1 (in the closed half-plane $x \geq 0$) of diameter 10 passing through the origin. Let C_2 be another circle described on the given chord as its diameter. If the equation of the chord of the circle C_2, which passes through the point (2, 3) and is farthest from the center of C_2, is $x + ay + b = 0$, then $a - b$ is equal to

[JEE Main 2026 (Online) 28th January Morning Shift]

(1) −6 (2) 10 (3) 6 (4) −2

Scan or tap for the full solution

Q.22 Let the circle $x^2 + y^2 = 4$ intersect x-axis at the points $A(a, 0)$, $a > 0$ and $B(b, 0)$. Let $P(2\cos\alpha, 2\sin\alpha)$, $0 < \alpha < \frac{\pi}{2}$ and $Q(2\cos\beta, 2\sin\beta)$ be two points such that $(\alpha - \beta) = \frac{\pi}{2}$. Then the point of intersection of AQ and BP lies on :

[JEE Main 2026 (Online) 28th January Evening Shift]

(1) $x^2 + y^2 - 4x - 4 = 0$

(2) $x^2 + y^2 - 4x - 4y = 0$

(3) $x^2 + y^2 - 4x - 4y - 4 = 0$

(4) $x^2 + y^2 - 4y - 4 = 0$

Scan or tap for the full solution

Q.23 An ellipse has its center at $(1, -2)$, one focus at $(3, -2)$ and one vertex at $(5, -2)$. Then the length of its latus rectum is :

[JEE Main 2026 (Online) 28th January Evening Shift]

(1) 6 (2) $6\sqrt{3}$ (3) $\frac{16}{\sqrt{3}}$ (4) $4\sqrt{3}$

Scan or tap for the full solution

Q.24 Let A be the focus of the parabola $y^2 = 8x$. Let the line $y = mx + c$ intersect the parabola at two distinct points B and C. If the centroid of the triangle ABC is $\left(\frac{7}{3}, \frac{4}{3}\right)$, then $(BC)^2$ is equal to :

[JEE Main 2026 (Online) 28th January Evening Shift]

(1) 89 (2) 80 (3) 32 (4) 41

Scan or tap for the full solution

Q.25 Let the ellipse $E: \frac{x^2}{144} + \frac{y^2}{169} = 1$ and the hyperbola $H: \frac{x^2}{16} - \frac{y^2}{\lambda^2} = -1$ have the same foci. If e and L respectively denote the eccentricity and the length of the latus rectum of H, then the value of $24(e + L)$ is :

[JEE Main 2026 (Online) 28th January Evening Shift]

(1) 296 (2) 126 (3) 67 (4) 148

Scan or tap for the full solution

Q.26 Let a circle of radius 4 pass through the origin O, the points $A(-\sqrt{3}a, 0)$ and $B(0, -\sqrt{2}b)$, where a and b are real parameters and $ab \neq 0$. Then the locus of the centroid of $\triangle OAB$ is a circle of radius

[JEE Main 2026 (Online) 24th January Morning Shift]

(1) $\frac{7}{3}$ (2) $\frac{11}{3}$ (3) $\frac{5}{3}$ (4) $\frac{8}{3}$

Scan or tap for the full solution

Q.27 Let each of the two ellipses $E_1: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $(a > b)$ and $E_2: \frac{x^2}{A^2} + \frac{y^2}{B^2} = 1$, $(A < B)$ have eccentricity $\frac{4}{5}$. Let the lengths of the latus recta of E_1 and E_2 be l_1 and l_2, respectively, such that $2l_1^2 = 9l_2$. If the distance between the foci of E_1 is 8, then the distance between the foci of E_2 is

[JEE Main 2026 (Online) 24th January Morning Shift]

(1) $\frac{96}{5}$ (2) $\frac{8}{5}$ (3) $\frac{16}{5}$ (4) $\frac{32}{5}$

Scan or tap for the full solution

Q.28 Let the image of parabola $x^2 = 4y$, in the line $x - y = 1$ be $(y + a)^2 = b(x - c)$, $a, b, c \in N$. Then $a + b + c$ is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) 12 (2) 8 (3) 6 (4) 4

Scan or tap for the full solution

Q.29 Let the length of the latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $(a > b)$, be 30. If its eccentricity is the maximum value of the function $f(t) = -\frac{3}{4} + 2t - t^2$, then $(a^2 + b^2)$ is equal to

[JEE Main 2026 (Online) 24th January Evening Shift]

(1) 276 (2) 516 (3) 256 (4) 496

Scan or tap for the full solution

Q.30 Let the domain of the function $f(x)=\log_3\log_5\log_7(9x-x^2-13)$ be the interval (m, n). Let the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ have eccentricity $\frac{n}{3}$ and the length of the latus rectum $\frac{8m}{3}$. Then b^2-a^2 is equal to :

[JEE Main 2026 (Online) 23rd January Morning Shift]

(1) 7 (2) 9 (3) 11 (4) 5

Scan or tap for the full solution

Q.31 Let the line $y-x=1$ intersect the ellipse $\frac{x^2}{2}+\frac{y^2}{1}=1$ at the points A and B. Then the angle made by the line segment AB at the center of the ellipse is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

(1) $\pi-\tan^{-1}\left(\frac{1}{4}\right)$ (2) $\frac{\pi}{2}+\tan^{-1}\left(\frac{1}{4}\right)$

(3) $\frac{\pi}{2}+2\tan^{-1}\left(\frac{1}{4}\right)$ (4) $\frac{\pi}{2}-\tan^{-1}\left(\frac{1}{4}\right)$

Scan or tap for the full solution

Q.32 Let PQ be a chord of the hyperbola $\frac{x^2}{4}-\frac{y^2}{b^2}=1$, perpendicular to the x-axis such that OPQ is an equilateral triangle, O being the centre of the hyperbola. If the eccentricity of the hyperbola is $\sqrt{3}$, then the area of the triangle OPQ is

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) $2\sqrt{3}$ (2) $\frac{11}{5}$ (3) $\frac{8\sqrt{3}}{5}$ (4) $\frac{9}{5}$

Scan or tap for the full solution

Q.33 If the points of intersection of the ellipses $x^2+2y^2-6x-12y+23=0$ and $4x^2+2y^2-20x-12y+35=0$ lie on a circle of radius r and centre (a, b), then the value of $ab+18r^2$ is :

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 53 (2) 52 (3) 55 (4) 51

Scan or tap for the full solution

Q.34 An equilateral triangle OAB is inscribed in the parabola $y^2=4x$ with the vertex O at the vertex of the parabola. Then the minimum distance of the circle having AB as a diameter from the origin is

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) $2(8-3\sqrt{3})$ (2) $4(6+\sqrt{3})$

(3) $4(3-\sqrt{3})$ (4) $2(3+\sqrt{3})$

Scan or tap for the full solution

Q.35 If the line $\alpha x+2y=1$, where $\alpha\in R$, does not meet the hyperbola $x^2-9y^2=9$, then a possible value of α is : [JEE Main 2026 (Online) 22nd January Morning Shift]

(1) 0.6 (2) 0.7 (3) 0.8 (4) 0.5

Scan or tap for the full solution

Q.36 Let the set of all values of r, for which the circles $(x+1)^2+(y+4)^2=r^2$ and $x^2+y^2-4x-2y-4=0$ intersect at two distinct points be the interval (α, β). Then $\alpha\beta$ is equal to

[JEE Main 2026 (Online) 22nd January Morning Shift]

(1) 21 (2) 24 (3) 20 (4) 25

Scan or tap for the full solution

Q.37 If the chord joining the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ on the parabola $y^2=12x$ subtends a right angle at the vertex of the parabola, then $x_1x_2-y_1y_2$ is equal to

[JEE Main 2026 (Online) 22nd January Morning Shift]

(1) 280 (2) 288 (3) 292 (4) 284

Scan or tap for the full solution

Q.38 Let the locus of the mid-point of the chord through the origin O of the parabola $y^2=4x$ be the curve S. Let P be any point on S. Then the locus of the point, which internally divides OP in the ratio 3 : 1, is :

[JEE Main 2026 (Online) 22nd January Evening Shift]

(1) $2x^2=3y$ (2) $2y^2=3x$

(3) $3y^2=2x$ (4) $3x^2=2y$

Scan or tap for the full solution

Q.39 Let S and S′ be the foci of the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ and $P(\alpha, \beta)$ be a point on the ellipse in the first quadrant. If $(SP)^2+(S'P)^2-SP\cdot S'P=37$, then $\alpha^2+\beta^2$ is equal to :

[JEE Main 2026 (Online) 22nd January Evening Shift]

(1) 13 (2) 15 (3) 11 (4) 17

Scan or tap for the full solution

Q.40 Let $P(10, 2\sqrt{15})$ be a point on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, whose foci are S and S'. If the length of its latus rectum is 8, then the square of the area of $\Delta PSS'$ is equal to :

[JEE Main 2026 (Online) 22nd January Evening Shift]

(1) 4200 (2) 1462 (3) 900 (4) 2700

Scan or tap for the full solution

Q.41 Let PQ and MN be two straight lines touching the circle $x^2 + y^2 - 4x - 6y - 3 = 0$ at the points A and B respectively. Let O be the centre of the circle and $\angle AOB = \pi/3$. Then the locus of the point of intersection of the lines PQ and MN is :

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $x^2 + y^2 - 18x - 12y - 25 = 0$
(2) $x^2 + y^2 - 12x - 18y - 25 = 0$
(3) $3(x^2 + y^2) - 12x - 18y - 25 = 0$
(4) $3(x^2 + y^2) - 18x - 12y + 25 = 0$

Scan or tap for the full solution

Q.42 Let the foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{36} + \frac{y^2}{16} = 1$. If the eccentricity of the hyperbola is 5, then the length of its latus rectum is :

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $\frac{96}{\sqrt{5}}$ (2) $24\sqrt{5}$
(3) 12 (4) 16

Scan or tap for the full solution

Q.43 Let O be the vertex of the parabola $x^2 = 4y$ and Q be any point on it. Let the locus of the point P, which divides the line segment OQ internally in the ratio 2:3 be the conic C. Then the equation of the chord of C, which is bisected at the point (1, 2), is :

[JEE Main 2026 (Online) 21st January Morning Shift]

(1) $5x - 4y + 3 = 0$ (2) $x - 2y + 3 = 0$
(3) $4x - 5y + 6 = 0$ (4) $5x - y - 3 = 0$

Scan or tap for the full solution

Q.44 If the line $\alpha x + 4y = \sqrt{7}$, where $\alpha \in R$, touches the ellipse $3x^2 + 4y^2 = 1$ at the point P in the first quadrant, then one of the focal distances of P is :

[JEE Main 2026 (Online) 21st January Evening Shift]

(1) $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{11}}$ (2) $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{5}}$
(3) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{5}}$ (4) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{7}}$

Scan or tap for the full solution

Q.45 Let $y^2 = 12x$ be the parabola with its vertex at O. Let P be a point on the parabola and A be a point on the x-axis such that $\angle OPA = 90°$. Then the locus of the centroid of such triangles OPA is:

[JEE Main 2026 (Online) 21st January Evening Shift]

(1) $y^2 - 4x + 8 = 0$ (2) $y^2 - 2x + 8 = 0$
(3) $y^2 - 9x + 6 = 0$ (4) $y^2 - 6x + 4 = 0$

Scan or tap for the full solution

Q.46 Let one end of a focal chord of the parabola $y^2 = 16x$ be (16, 16). If $P(\alpha, \beta)$ divides this focal chord internally in the ratio 5:2, then the minimum value of $\alpha + \beta$ is equal to:

[JEE Main 2026 (Online) 21st January Evening Shift]

(1) 5 (2) 7 (3) 22 (4) 16

Scan or tap for the full solution

Q.47 Let the ellipse $3x^2 + py^2 = 4$ pass through the centre C of the circle $x^2 + y^2 - 2x - 4y - 11 = 0$ of radius r. Let f_1, f_2 be the focal distances of the point C on the ellipse. Then $6f_1f_2 - r$ is equal to

[JEE Main 2025 (Online) 8th April Evening Shift]

(1) 78 (2) 68 (3) 70 (4) 74

Scan or tap for the full solution

Q.48 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 (Online) 7th April Morning Shift]

(1) 22 (2) 13 (3) 9 (4) 31

Scan or tap for the full solution

Q.49 Let P be the parabola, whose focus is (−2, 1) and directrix is $2x + y + 2 = 0$. Then the sum of the ordinates of the points on P, whose abscissa is −2, is

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) $\frac{5}{2}$ (2) $\frac{3}{2}$ (3) $\frac{3}{4}$ (4) $\frac{1}{4}$

Scan or tap for the full solution

Q.50 Let the length of a latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ be 10. If its eccentricity is the minimum value of the function $f(t) = t^2 + t + \frac{11}{12}$, $t \in R$, then $a^2 + b^2$ is equal to :

[JEE Main 2025 (Online) 7th April Evening Shift]

(1) 115 (2) 120 (3) 125 (4) 126

Scan or tap for the full solution

Q.51 Let e_1 and e_2 be the eccentricities of the ellipse $\frac{x^2}{b^2} + \frac{y^2}{25} = 1$ and the hyperbola $\frac{x^2}{16} - \frac{y^2}{b^2} = 1$, respectively. If $b < 5$ and $e_1e_2 = 1$, then the eccentricity of the ellipse having its axes along the coordinate axes and passing through all four foci (two of the ellipse and two of the hyperbola) is :

[JEE Main 2025 (Online) 7th April Evening Shift]

(1) $\frac{4}{5}$ (2) $\frac{3}{5}$ (3) $\frac{\sqrt{7}}{4}$ (4) $\frac{\sqrt{3}}{2}$

Scan or tap for the full solution

Q.52 Let p be the number of all triangles that can be formed by joining the vertices of a regular polygon P of n sides and q be the number of all quadrilaterals that can be formed by joining the vertices of P. If p + q = 126, then the eccentricity of the ellipse $\frac{x^2}{16}+\frac{y^2}{n}=1$ is :

[JEE Main 2025 (Online) 7th April Evening Shift]

(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$ (3) $\frac{\sqrt{7}}{4}$ (4) $\frac{3}{4}$

Scan or tap for the full solution

Q.53 The length of the latus-rectum of the ellipse, whose foci are (2, 5) and (2, − 3) and eccentricity is $\frac{4}{5}$, is

[JEE Main 2025 (Online) 4th April Morning Shift]

(1) $\frac{50}{3}$ (2) $\frac{18}{5}$ (3) $\frac{6}{5}$ (4) $\frac{10}{3}$

Scan or tap for the full solution

Q.54 Let the sum of the focal distances of the point P(4, 3) on the hyperbola $H:\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ be $8\sqrt{\frac{5}{3}}$. If for H, the length of the latus rectum is l and the product of the focal distances of the point P is m, then $9l^2 + 6m$ is equal to :

[JEE Main 2025 (Online) 4th April Evening Shift]

(1) 187 (2) 184 (3) 186 (4) 185

Scan or tap for the full solution

Q.55 Let for two distinct values of p the lines y = x + p touch the ellipse $E:\frac{x^2}{4^2}+\frac{y^2}{3^2}=1$ at the points A and B. Let the line y = x intersect E at the points C and D. Then the area of the quadrilateral ABCD is equal to : [JEE Main 2025 (Online) 4th April Evening Shift]

(1) 48 (2) 20 (3) 24 (4) 36

Scan or tap for the full solution

Q.56 The centre of a circle C is at the centre of the ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, a > b. Let C pass through the foci F_1 and F_2 of E such that the circle C and the ellipse E intersect at four points. Let P be one of these four points. If the area of the triangle PF_1F_2 is 30 and the length of the major axis of E is 17, then the distance between the foci of E is :

[JEE Main 2025 (Online) 4th April Evening Shift]

(1) 12 (2) 26 (3) 13 (4) $\frac{13}{2}$

Scan or tap for the full solution

Q.57 The axis of a parabola is the line y = x and its vertex and focus are in the first quadrant at distances $\sqrt{2}$ and $2\sqrt{2}$ units from the origin, respectively. If the point (1, k) lies on the parabola, then a possible value of k is :

[JEE Main 2025 (Online) 4th April Evening Shift]

(1) 8 (2) 3 (3) 9 (4) 4

Scan or tap for the full solution

Q.58 The radius of the smallest circle which touches the parabolas $y = x^2 + 2$ and $x = y^2 + 2$ is

[JEE Main 2025 (Online) 3rd April Morning Shift]

(1) $\frac{7\sqrt{2}}{16}$ (2) $\frac{7\sqrt{2}}{8}$ (3) $\frac{7\sqrt{2}}{2}$ (4) $\frac{7\sqrt{2}}{4}$

Scan or tap for the full solution

Q.59 A line passing through the point $P(\sqrt{5}, \sqrt{5})$ intersects the ellipse $\frac{x^2}{36}+\frac{y^2}{25}=1$ at A and B such that (PA)·(PB) is maximum. Then $5(PA^2+PB^2)$ is equal to :

[JEE Main 2025 (Online) 3rd April Morning Shift]

(1) 290 (2) 377 (3) 338 (4) 218

Scan or tap for the full solution

Q.60 Let C be the circle of minimum area enclosing the ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ with eccentricity $\frac{1}{2}$ and foci (± 2, 0). Let PQR be a variable triangle, whose vertex P is on the circle C and the side QR of length 2a is parallel to the major axis of E and contains the point of intersection of E with the negative y-axis. Then the maximum area of the triangle PQR is :

[JEE Main 2025 (Online) 3rd April Evening Shift]

(1) $8(3+\sqrt{2})$ (2) $8(2+\sqrt{3})$

(3) $6(3+\sqrt{2})$ (4) $6(2+\sqrt{3})$

Scan or tap for the full solution

Q.61 The shortest distance between the curves $y^2 = 8x$ and $x^2 + y^2 + 12y + 35 = 0$ is:

[JEE Main 2025 (Online) 3rd April Evening Shift]

(1) $2\sqrt{3}-1$ (2) $2\sqrt{2}-1$

(3) $3\sqrt{2}-1$ (4) $\sqrt{2}$

Scan or tap for the full solution

Q.62 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 (Online) 3rd April Evening Shift]

(1) 34 (2) 32 (3) 35 (4) 33

Scan or tap for the full solution

Q.63 If S and S′ are the foci of the ellipse $\frac{x^2}{18}+\frac{y^2}{9}=1$ and P be a point on the ellipse, then $\min(SP\cdot S'P)+\max(SP\cdot S'P)$ is equal to :

[JEE Main 2025 (Online) 2nd April Morning Shift]

(1) $3(6+\sqrt{2})$ (2) $3(1+\sqrt{2})$

(3) 27 (4) 9

Scan or tap for the full solution

Q.64 Let the focal chord PQ of the parabola $y^2 = 4x$ make an angle of 60° with the positive x axis, where P lies in the first quadrant. If the circle, whose one diameter is PS, S being the focus of the parabola, touches the y-axis at the point (0, α), then $5\alpha^2$ is equal to:

[JEE Main 2025 (Online) 2nd April Morning Shift]

(1) 15 (2) 25 (3) 20 (4) 30

Scan or tap for the full solution

Q.65 Let one focus of the hyperbola $H:\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ be at $(\sqrt{10},0)$ and the corresponding directrix be $x=\frac{9}{\sqrt{10}}$. If e and l respectively are the eccentricity and the length of the latus rectum of H, then $9(e^2 + l)$ is equal to :

[JEE Main 2025 (Online) 2nd April Morning Shift]

(1) 12 (2) 14 (3) 15 (4) 16

Scan or tap for the full solution

Q.66 Let the point P of the focal chord PQ of the parabola $y^2 = 16x$ be (1, − 4). If the focus of the parabola divides the chord PQ in the ratio m:n, $\gcd(m,n)=1$, then $m^2 + n^2$ is equal to :

[JEE Main 2025 (Online) 2nd April Evening Shift]

(1) 17 (2) 37 (3) 10 (4) 26

Scan or tap for the full solution

Q.67 If the length of the minor axis of an ellipse is equal to one fourth of the distance between the foci, then the eccentricity of the ellipse is :

[JEE Main 2025 (Online) 2nd April Evening Shift]

(1) $\frac{3}{\sqrt{19}}$ (2) $\frac{\sqrt{3}}{16}$ (3) $\frac{4}{\sqrt{17}}$ (4) $\frac{\sqrt{5}}{7}$

Scan or tap for the full solution

Q.68 Let the ellipse $E_1:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, a > b and $E_2:\frac{x^2}{A^2}+\frac{y^2}{B^2}=1$, A < B have same eccentricity $\frac{1}{\sqrt{3}}$. Let the product of their lengths of latus rectums be $\frac{32}{\sqrt{3}}$ and the distance between the foci of E_1 be 4. If E_1 and E_2 meet at A, B, C and D, then the area of the quadrilateral ABCD equals :

[JEE Main 2025 (Online) 29th January Morning Shift]

(1) $\frac{24\sqrt{6}}{5}$ (2) $\frac{18\sqrt{6}}{5}$

(3) $6\sqrt{6}$ (4) $\frac{12\sqrt{6}}{5}$

Scan or tap for the full solution

Q.69 Two parabolas have the same focus (4, 3) and their directrices are the x-axis and the y-axis, respectively. If these parabolas intersect at the points A and B, then $(AB)^2$ is equal to :

[JEE Main 2025 (Online) 29th January Morning Shift]

(1) 384 (2) 392 (3) 96 (4) 192

Scan or tap for the full solution

Q.70 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 (Online) 29th January Morning Shift]

(1) $\sqrt{14}$ (2) $3\sqrt{7}$

(3) $2\sqrt{14}$ (4) $5\sqrt{7}$

Scan or tap for the full solution

Q.71 If αx + βy = 109 is the equation of the chord of the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$, whose mid point is $\left(\frac{5}{2},\frac{1}{2}\right)$. then α + β is equal to :

[JEE Main 2025 (Online) 29th January Evening Shift]

(1) 37 (2) 46 (3) 72 (4) 58

Scan or tap for the full solution

Q.72 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 (Online) 29th January Evening Shift]

(1) $4\sqrt{2}$ (2) $2\sqrt{2}$ (3) $2\sqrt{3}$ (4) $\sqrt{3}$

Scan or tap for the full solution

Q.73 Let ABCD be a trapezium whose vertices lie on the parabola $y^2 = 4x$. Let the sides AD and BC of the trapezium be parallel to y-axis. If the diagonal AC is of length $\frac{25}{4}$ and it passes through the point (1, 0), then the area of ABCD is

[JEE Main 2025 (Online) 28th January Morning Shift]

(1) $\frac{75}{8}$ (2) $\frac{125}{8}$ (3) $\frac{25}{2}$ (4) $\frac{75}{4}$

Scan or tap for the full solution

Q.74 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 (Online) 28th January Morning Shift]

(1) $(\alpha, \beta^2 + 4\gamma)$ (2) $(\alpha, \beta^2 - 4\gamma)$

(3) $(\gamma, \beta^2 - 4\alpha)$ (4) $(\gamma, \beta^2 + 4\alpha)$

Scan or tap for the full solution

Q.75 If the midpoint of a chord of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is $(\sqrt{2}, 4/3)$, and the length of the chord is $\frac{2\sqrt{\alpha}}{3}$, then α is:

[JEE Main 2025 (Online) 28th January Evening Shift]

(1) 26 (2) 18 (3) 22 (4) 20

Scan or tap for the full solution

Q.76 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 (Online) 28th January Evening Shift]

(1) x + 9y = 36 (2) 9x − 9y = 32

(3) 4x − 9y = 12 (4) 6x − 9y = 20

Scan or tap for the full solution

Q.77 Let the product of the focal distances of the point $\left(\sqrt{3}, \frac{1}{2}\right)$ on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, (a > b), be $\frac{7}{4}$. Then the absolute difference of the eccentricities of two such ellipses is

[JEE Main 2025 (Online) 24th January Morning Shift]

(1) $\frac{1-2\sqrt{2}}{\sqrt{3}}$ (2) $\frac{1-\sqrt{3}}{\sqrt{2}}$

(3) $\frac{3-2\sqrt{2}}{2\sqrt{3}}$ (4) $\frac{3-2\sqrt{2}}{3\sqrt{2}}$

Scan or tap for the full solution

Q.78 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(α, β), with β < 4, lies on C such that the length of the arc AB is $(1/6)^{th}$ of the perimeter of C, then $\beta - \sqrt{3}\alpha$ is equal to

[JEE Main 2025 (Online) 24th January Morning Shift]

(1) $4 - \sqrt{3}$ (2) 3

(3) 4 (4) $3 + \sqrt{3}$

Scan or tap for the full solution

Q.79 If the equation of the parabola with vertex $V\left(\frac{3}{2}, 3\right)$ and the directrix x + 2y = 0 is
$\alpha x^2 + \beta y^2 - \gamma xy - 30x - 60y + 225 = 0$,
then α + β + γ is equal to :

[JEE Main 2025 (Online) 24th January Evening Shift]

(1) 6 (2) 8 (3) 7 (4) 9

Scan or tap for the full solution

Q.80 The equation of the chord, of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, whose mid-point is (3,1) is :

[JEE Main 2025 (Online) 24th January Evening Shift]

(1) 5x + 16y = 31 (2) 48x + 25y = 169

(3) 4x + 122y = 134 (4) 25x + 101y = 176

Scan or tap for the full solution

Q.81 If the line 3x–2y + 12 = 0 intersects the parabola $4y = 3x^2$ at the points A and B, then at the vertex of the parabola, the line segment AB subtends an angle equal to

[JEE Main 2025 (Online) 23rd January Morning Shift]

(1) $\frac{\pi}{2} - \tan^{-1}\left(\frac{3}{2}\right)$ (2) $\tan^{-1}\left(\frac{9}{7}\right)$

(3) $\tan^{-1}\left(\frac{11}{9}\right)$ (4) $\tan^{-1}\left(\frac{4}{5}\right)$

Scan or tap for the full solution

Q.82 The length of the chord of the ellipse $\frac{x^2}{4}+\frac{y^2}{2}=1$, whose mid-point is $\left(1,\frac{1}{2}\right)$, is :

[JEE Main 2025 (Online) 23rd January Evening Shift]

(1) $\frac{2}{3}\sqrt{15}$ (2) $\frac{1}{3}\sqrt{15}$

(3) $\sqrt{15}$ (4) $\frac{5}{3}\sqrt{15}$

Scan or tap for the full solution

Q.83 Let the shortest distance from (a,0), a > 0, to the parabola $y^2 = 4x$ be 4. Then the equation of the circle passing through the point (a,0) and the focus of the parabola, and having its centre on the axis of the parabola is :

[JEE Main 2025 (Online) 23rd January Evening Shift]

(1) $x^2 + y^2 - 8x + 7 = 0$ (2) $x^2 + y^2 - 6x + 5 = 0$

(3) $x^2 + y^2 - 4x + 3 = 0$ (4) $x^2 + y^2 - 10x + 9 = 0$

Scan or tap for the full solution

Q.84 Let the foci of a hyperbola be (1,14) and (1, − 12). If it passes through the point (1,6), then the length of its latus-rectum is :

[JEE Main 2025 (Online) 22nd January Morning Shift]

(1) $\frac{25}{6}$ (2) $\frac{144}{5}$ (3) $\frac{288}{5}$ (4) $\frac{24}{5}$

Scan or tap for the full solution

Q.85 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 3β–2α is equal to :

[JEE Main 2025 (Online) 22nd January Morning Shift]

(1) 10 (2) 12 (3) 14 (4) 15

Scan or tap for the full solution

Q.86 Let the parabola $y = x^2 + px - 3$, meet the coordinate axes at the points P, Q and R. If the circle C with centre at (−1, − 1) passes through the points P, Q and R, then the area of $\triangle PQR$ is :

[JEE Main 2025 (Online) 22nd January Morning Shift]

(1) 4 (2) 6 (3) 5 (4) 7

Scan or tap for the full solution

Q.87 Let $P(4, 4\sqrt{3})$ be a point on the parabola $y^2 = 4ax$ and PQ be a focal chord of the parabola. If M and N are the foot of perpendiculars drawn from P and Q respectively on the directrix of the parabola, then the area of the quadrilateral PQMN is equal to :

[JEE Main 2025 (Online) 22nd January Evening Shift]

(1) $\frac{34\sqrt{3}}{3}$ (2) $\frac{343\sqrt{3}}{8}$

(3) $17\sqrt{3}$ (4) $\frac{263\sqrt{3}}{8}$

Scan or tap for the full solution

Q.88 Let $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, a > b and $H:\frac{x^2}{A^2}-\frac{y^2}{B^2}=1$. Let the distance between the foci of E and the foci of H be $2\sqrt{3}$. If a − A = 2, and the ratio of the eccentricities of E and H is $\frac{1}{3}$, then the sum of the lengths of their latus rectums is equal to :

[JEE Main 2025 (Online) 22nd January Evening Shift]

(1) 10 (2) 7 (3) 9 (4) 8

Scan or tap for the full solution

Section B (Numerical) — 22 questions

Q.89 Consider the circle $C: x^2 + y^2 - 6x - 8y - 11 = 0$. Let a variable chord AB of the circle C subtend a right angle at the origin. If the locus of the foot of the perpendicular drawn from the origin on the chord AB is the circle $x^2 + y^2 - \alpha x - \beta y - \gamma = 0$, then α + β + 2γ is equal to _____.

[JEE Main 2026 (Online) 8th April Evening Shift]

Scan or tap for the full solution

Q.90 Let the centre of the circle $x^2 + y^2 + 2gx + 2fy + 25 = 0$ be in the first quadrant and lie on the line 2x − y = 4. Let the area of an equilateral triangle inscribed in the circle be $27\sqrt{3}$. Then the square of the length of the chord of the circle on the line x = 1 is _____.

[JEE Main 2026 (Online) 6th April Morning Shift]

Scan or tap for the full solution

Q.91 Let the line x − y = 4 intersect the circle $C: (x-4)^2 + (y+3)^2 = 9$ at the points Q and R. If P(α, β) is a point on C such that PQ = PR, then $(6\alpha + 8\beta)^2$ is equal to _____.

[JEE Main 2026 (Online) 6th April Evening Shift]

Scan or tap for the full solution

Q.92 Consider the parabola $P: y^2 = 4kx$ and the ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. Let the line segment joining the points of intersection of P and E, be their latus rectums. If the eccentricity of E is e, then $e^2+2\sqrt{2}$ is equal to _____.

[JEE Main 2026 (Online) 4th April Morning Shift]

Scan or tap for the full solution

Q.93 Let A, B and C be the vertices of a variable right angled triangle inscribed in the parabola $y^2 = 16x$. Let the vertex B containing the right angle be (4, 8) and the locus of the centroid of $\triangle$ ABC be a conic C_0. Then three times the length of latus rectum of C_0 is _____.

[JEE Main 2026 (Online) 4th April Evening Shift]

Scan or tap for the full solution

Q.94 Let a circle C have its centre in the first quadrant, intersect the coordinate axes at exactly three points and cut off equal intercepts from the coordinate axes. If the length of the chord of C on the line $x + y = 1$ is $\sqrt{14}$, then the square of the radius of C is _____.

[JEE Main 2026 (Online) 2nd April Morning Shift]

Scan or tap for the full solution

Q.95 Let A be the point (3, 0) and circles with variable diameter AB touch the circle $x^2 + y^2 = 36$ internally. Let the curve C be the locus of the point B. If the eccentricity of C is e, then $72e^2$ is equal to _____.

[JEE Main 2026 (Online) 2nd April Evening Shift]

Scan or tap for the full solution

Q.96 For some $\theta \in \left(0, \frac{\pi}{2}\right)$, let the eccentricity and the length of the latus rectum of the hyperbola $x^2 - y^2\sec^2\theta = 8$ be e_1 and l_1, respectively, and let the eccentricity and the length of the latus rectum of the ellipse $x^2\sec^2\theta + y^2 = 6$ be e_2 and l_2, respectively. If $e_1^2 = e_2^2(\sec^2\theta + 1)$, then $\left(\frac{l_1 l_2}{e_1 e_2}\right)\tan^2\theta$ is equal to _____.

[JEE Main 2026 (Online) 28th January Morning Shift]

Scan or tap for the full solution

Q.97 Let (h, k) lie on the circle $C: x^2 + y^2 = 4$ and the point (2h + 1, 3k + 2) lie on an ellipse with eccentricity e. Then the value of $\frac{5}{e^2}$ is equal to _____.

[JEE Main 2026 (Online) 24th January Evening Shift]

Scan or tap for the full solution

Q.98 Let r be the radius of the circle, which touches x-axis at point (a, 0), a < 0 and the parabola $y^2 = 9x$ at the point (4, 6). Then r is equal to _____.

[JEE Main 2025 (Online) 8th April Evening Shift]

Scan or tap for the full solution

Q.99 Consider the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ having one of its foci at P(−3, 0). If the latus rectum through its other focus subtends a right angle at P and $a^2b^2 = \alpha\sqrt{2} - \beta$, $\alpha, \beta \in N$, then $\alpha + \beta$ is _____.

[JEE Main 2025 (Online) 7th April Morning Shift]

Scan or tap for the full solution

Q.100 Let the lengths of the transverse and conjugate axes of a hyperbola in standard form be 2a and 2b, respectively, and one focus and the corresponding directrix of this hyperbola be (−5, 0) and 5x + 9 = 0, respectively. If the product of the focal distances of a point $(\alpha, 2\sqrt{5})$ on the hyperbola is p, then 4p is equal to _____.

[JEE Main 2025 (Online) 7th April Evening Shift]

Scan or tap for the full solution

Q.101 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 $P(x_1, y_1)$, $Q(x_2, y_2)$ and $R(x_3, y_3)$ respectively. Given that P is the mid point of the line segment QR and $PQ = \frac{2\sqrt{2}}{3}$, the value of $9(x_1y_1 + x_2y_2 + x_3y_3)$ is equal to _____.

[JEE Main 2025 (Online) 4th April Morning Shift]

Scan or tap for the full solution

Q.102 Let the product of the focal distances of the point $P(4, 2\sqrt{3})$ on the hyperbola $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ be 32. Let the length of the conjugate axis of H be p and the length of its latus rectum be q. Then $p^2 + q^2$ is equal to _____

[JEE Main 2025 (Online) 3rd April Morning Shift]

Scan or tap for the full solution

Q.103 If the equation of the hyperbola with foci (4, 2) and (8, 2) is $3x^2 - y^2 - \alpha x + \beta y + \gamma = 0$, then $\alpha + \beta + \gamma$ is equal to _____.

[JEE Main 2025 (Online) 3rd April Evening Shift]

Scan or tap for the full solution

Q.104 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 (Online) 2nd April Morning Shift]

Scan or tap for the full solution

Q.105 Let $y^2 = 12x$ be the parabola and S be its focus. Let PQ be a focal chord of the parabola such that $(SP)(SQ) = \frac{147}{4}$. Let C be the circle described taking PQ as a diameter. If the equation of a circle C is $64x^2 + 64y^2 - \alpha x - 64\sqrt{3}\,y = \beta$, then β − α is equal to _____.

[JEE Main 2025 (Online) 29th January Evening Shift]

Scan or tap for the full solution

Q.106 Let $E_1 : \frac{x^2}{9} + \frac{y^2}{4} = 1$ be an ellipse. Ellipses E_i's are constructed such that their centres and eccentricities are same as that of E_1, and the length of minor axis of E_i is the length of major axis of E_{i+1} $(i \geq 1)$. If A_i is the area of the ellipse E_i, then $\frac{5}{\pi}\left(\sum_{i=1}^{\infty} A_i\right)$, is equal to _____.

[JEE Main 2025 (Online) 28th January Morning Shift]

Scan or tap for the full solution

Q.107 Let A and B be the two points of intersection of the line y + 5 = 0 and the mirror image of the parabola $y^2 = 4x$ with respect to the line x + y + 4 = 0. If d denotes the distance between A and B, and a denotes the area of $\triangle SAB$, where S is the focus of the parabola $y^2 = 4x$, then the value of (a + d) is _____.

[JEE Main 2025 (Online) 28th January Evening Shift]

Scan or tap for the full solution

Q.108 Let $H_1 : \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $H_2 : -\frac{x^2}{A^2} + \frac{y^2}{B^2} = 1$ be two hyperbolas having length of latus rectums $15\sqrt{2}$ and $12\sqrt{5}$ respectively. Let their eccentricities be $e_1 = \sqrt{\frac{5}{2}}$ and e_2 respectively. If the product of the lengths of their transverse axes is $100\sqrt{10}$, then $25e_2^2$ is equal to _____ .

[JEE Main 2025 (Online) 24th January Evening Shift]

Scan or tap for the full solution

Q.109 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 (Online) 23rd January Morning Shift]

Scan or tap for the full solution

Q.110 The focus of the parabola $y^2 = 4x + 16$ is the centre of the circle C of radius 5. If the values of λ, for which C passes through the point of intersection of the lines 3x − y = 0 and x + λy = 4, are λ_1 and λ_2, $\lambda_1 < \lambda_2$, then $12\lambda_1 + 29\lambda_2$ is equal to _____.

[JEE Main 2025 (Online) 23rd January Evening Shift]

Scan or tap for the full solution

ANSWER KEY

Section A (MCQ) — 88 questions

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**2**	**2**	**4**	**1**	**1**	**3**	**4**	**1**	**3**	**3**	**2**
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	**2**	**3**	**2**	**4**	**2**	**4**	**3**	**3**	**2**	**4**	**4**
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	**1**	**2**	**1**	**4**	**4**	**3**	**4**	**1**	**2**	**3**	**3**
Ques.	34	35	36	37	38	39	40	41	42	43	44
Ans.	**3**	**3**	**4**	**2**	**2**	**1**	**4**	**3**	**1**	**1**	**4**
Ques.	45	46	47	48	49	50	51	52	53	54	55
Ans.	**2**	**2**	**3**	**1**	**2**	**4**	**2**	**1**	**2**	**4**	**3**
Ques.	56	57	58	59	60	61	62	63	64	65	66
Ans.	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**3**	**1**	**4**	**1**
Ques.	67	68	69	70	71	72	73	74	75	76	77
Ans.	**3**	**1**	**4**	**3**	**4**	**3**	**4**	**2**	**3**	**4**	**3**
Ques.	78	79	80	81	82	83	84	85	86	87	88
Ans.	**3**	**4**	**2**	**2**	**1**	**2**	**3**	**4**	**2**	**2**	**4**

Section B (Numerical) — 22 questions

Ques.	89	90	91	92	93	94	95
Ans.	**18**	**80**	**18**	**3**	**16**	**8**	**18**
Ques.	96	97	98	99	100	101	102
Ans.	**8**	**9**	**30**	**1944**	**189**	**46**	**120**
Ques.	103	104	105	106	107	108	109
Ans.	**141**	**768**	**1328**	**54**	**14**	**55**	**19**
Ques.	110						
Ans.	**15**						