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MATHEMATICS · JEE MAIN

Ellipse

Previous Year Questions with answers

123 questions · **112** papers · **2004–2026** · newest paper first

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What is in this PDF: every Ellipse question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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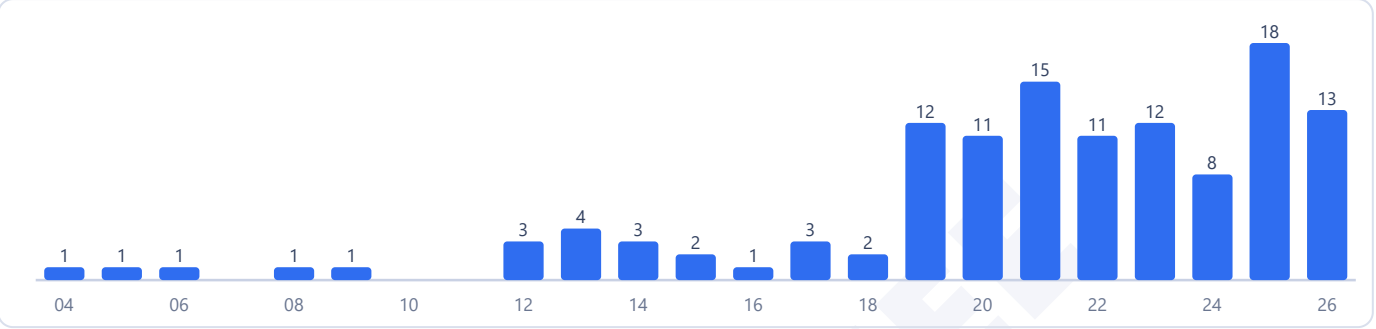
Chapter at a glance

2.2%	123	90 of 162	105 / 18
of Mathematics questions, 2019–2026	questions, 2004–2026	papers asked it, 2019–2026	MCQ / numerical, 2004–2026

Trend. Steady: 0.7 questions per paper in 2024–2026 against 0.6 in 2019–2023.

Questions per year



Counts are the questions we hold: 123 in 112 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2004–2026)

Standard Forms	67
Tangents, Normals & Chords	56

How often it comes up

Ellipse provides coordinate geometry problems on central conics under Unit 10: Coordinate Geometry in the Class 11 curriculum, placing it at rank 22 among the 29 chapters in the subject. Between 2019 and 2026, 100 questions were catalogued from this chapter across 162 papers, representing 2.2 percent of all mathematics questions. It appeared in 90 of those 162 papers and has been tested every single year since 2019. Over the recent 2024 to 2026 examination cycles, it contributed 39 questions across 58 papers, averaging 0.7 questions per paper and capturing a 2.5 percent subject share. Comparing the earlier 2002 to 2018 share of 1.8 percent with the 2024 to 2026 level shows that its long-term share is up, while comparing 2019 to 2026 with 2024 to 2026 shows it is about the same. Across the complete historical record from 2004 to 2026 across 200 papers, 123 questions appeared in 112 papers, including 18 numerical answer questions between 2019 and 2026.

The annual numbers for 2024, 2025, and 2026 stood at 8, 18, and 13 questions respectively, demonstrating steady modern engagement.

Examiners frequently formulate ellipse problems in conjunction with circles or auxiliary lines. Typical questions involve focal properties, eccentricities, equations of chords and tangents, and locus equations of geometric centroids or chord midpoints.

Most-asked topics

Questions in this chapter divide between two primary subject headings:

1. **Standard Forms (53 questions, 2019-2026; 67 total, last asked 2026)** The dominant classification in the chapter. Covers equations of horizontal and vertical ellipses, major and minor axis lengths, eccentricity relations linking a and b, focus and directrix coordinates, latus rectum length, focal radii properties where SP plus S'P equals 2a, and parametric coordinates using eccentric angle theta.

2. **Tangents, Normals & Chords (47 questions, 2019-2026; 56 total, last asked 2026)** Involves conditions of tangency where c squared equals a squared m squared plus b squared, point-form tangents using T equals zero,

equations of chords joining points with specified eccentric angles, chords with given midpoints using T equals S1, and auxiliary circle intersections.

What the questions look like

Examiners test ellipse concepts through regular geometric configurations:

- **Tangency Condition and Focal Distances**: A line with unknown slope touches an ellipse in the first quadrant, requiring students to determine the point of contact and calculate its distance to the nearer focus.
- **Chord Subtending Angle at the Centre**: A chord lying along a known line cuts the ellipse at two points, and candidates determine the angle subtended by the chord at the origin or the area of the resulting central triangle.
- **Dual Horizontal and Vertical Ellipses**: Comparing two related ellipses where one has its major axis along the horizontal axis and the other along the vertical axis, using shared eccentricity or latus rectum relations to locate foci.
- **Focal Distance Relations and Locus**: Enforcing constraints on the sum or ratio of distances from a point on the curve to the two foci to deduce coordinate values or trace a new locus curve.

How to practise it

Efficient mastery of the ellipse depends on mastering eccentricity relations and parametric forms:

- **Check axis orientation first**: Before applying standard formulas, identify whether a is greater than b or b is greater than a. For a vertical ellipse where b exceeds a, the foci lie at (0, plus or minus be), the directrices are horizontal, and the eccentricity identity swaps roles to a squared equals b squared multiplied by one minus e squared.
- **Exploit the focal radius identity**: Remember that for any point P on an ellipse, the sum of its distances to the two foci is always equal to the major axis length 2a. This property frequently shortcuts algebraic distance calculations in geometric triangle problems.
- **Use the condition of tangency**: For the standard ellipse x squared over a squared plus y squared over b squared equals one, a line y equals mx plus c is tangent if and only if c squared equals a squared m squared plus b squared. This provides a direct path to finding common tangents with parabolas or circles.
- **Employ the eccentric angle formulation**: Use the parametric coordinates (a cos theta, b sin theta) when dealing with chords, auxiliary circles, or maximum inscribed rectangle areas. The chord joining eccentric angles alpha and beta has a clean cosine-based linear equation.

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Q1 JEE Main 2026 · 8 Apr · Shift 2 MCQ

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 $\mathbf{R}$. If the set of all possible values of a is $\mathbf{R}-[\alpha,\beta]$, then $\alpha^2+\beta^2$ is equal to :

(A) 28

(B) 40

(C) 61

(D) 24

Answer: (B) 40 · Official NTA final key

Q2 JEE Main 2026 · 6 Apr · Shift 2 MCQ

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

(A) $9y^2=8x\,(1-x)$

(B) $3y^2=4x\,(1-x)$

(C) $9y^2=8x\,(x-1)$

(D) $3y^2=4x\,(x-1)$

Answer: (A) $9y^2=8x\,(1-x)$ · Official NTA final key

Q3 JEE Main 2026 · 5 Apr · Shift 1 MCQ

Let a focus of the ellipse $\mathrm{E}:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ be $\mathrm{S}(4,0)$ and its eccentricity be $\frac{4}{5}$. If the point $\mathrm{P}(3,\alpha)$ lies on E and O is the origin, then the area of ΔPOS is equal to:

(A) 12/5

(B) 14/5

(C) 24/5

(D) 48/5

Answer: (C) 24/5 · Official NTA final key

Q4 JEE Main 2026 · 4 Apr · Shift 1 Numerical

Consider the parabola $\mathrm{P}: y^2=4kx$ and the ellipse $\mathrm{E}:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. 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 _____.

Numerical value type: the answer is a number.

Answer: 3. · Official NTA final key

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Q5 JEE Main 2026 · 2 Apr · Shift 1 MCQ

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 :

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

(B) $2\sqrt{5}$

(C) $\frac{7\sqrt{5}}{3}$

(D) $\frac{8\sqrt{5}}{3}$

Answer: (D) $\frac{8\sqrt{5}}{3}$ · Official NTA final key

Q6 JEE Main 2026 · 2 Apr · Shift 2 Numerical

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 _____.

Numerical value type: the answer is a number.

Answer: 18. · Official NTA final key

Q7 JEE Main 2026 · 28 Jan · Shift 2 MCQ

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 :

(A) $\frac{16}{\sqrt{3}}$

(B) 6

(C) $4\sqrt{3}$

(D) $6\sqrt{3}$

Answer: (B) 6 · Official NTA final key

Q8 JEE Main 2026 · 24 Jan · Shift 1 MCQ

Let each of the two ellipses $\mathrm{E}_1:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, $(a>b)$ and $\mathrm{E}_2:\frac{x^2}{\mathrm{A}^2}+\frac{y^2}{\mathrm{B}^2}=1$, $(\mathrm{A}<\mathrm{B})$ 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

(A) $\frac{16}{5}$

(B) $\frac{96}{5}$

(C) $\frac{8}{5}$

(D) $\frac{32}{5}$

Answer: (D) $\frac{32}{5}$ · Official NTA final key

Q9 JEE Main 2026 · 24 Jan · Shift 2 MCQ

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

(A) 276
(B) 516
(C) 256
(D) 496

Answer: (D) 496 · Official NTA final key

Q10 JEE Main 2026 · 24 Jan · Shift 2 Numerical

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 _____.

Numerical value type: the answer is a number.

Answer: 9. · Official NTA final key

Q11 JEE Main 2026 · 23 Jan · Shift 1 MCQ

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 :

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

Answer: (C) $\frac{\pi}{2}+\tan^{-1}\left(\frac{1}{4}\right)$ · Official NTA final key

Q12 JEE Main 2026 · 22 Jan · Shift 2 MCQ

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

(A) 17
(B) 13
(C) 15
(D) 11

Answer: (B) 13 · Official NTA final key

Q13 JEE Main 2026 · 21 Jan · Shift 2 MCQ

If the line $\alpha x + 4y = \sqrt{7}$, where $\alpha \in \mathbf{R}$, 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 :

(A) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{5}}$

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

(C) $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{5}}$

(D) $\frac{1}{\sqrt{3}} - \frac{1}{2\sqrt{11}}$

Answer: (B) $\frac{1}{\sqrt{3}} + \frac{1}{2\sqrt{7}}$ · Official NTA final key

Q14 JEE Main 2025 · 8 Apr · Shift 2 MCQ

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

(A) 68

(B) 78

(C) 70

(D) 74

Answer: (C) 70 · Key from source paper

Q15 JEE Main 2025 · 7 Apr · Shift 2 MCQ

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 $f(t) = t^2 + t + \frac{11}{12}, t \in \mathbf{R}$, then $a^2 + b^2$ is equal to :

(A) 126

(B) 115

(C) 125

(D) 120

Answer: (A) 126 · Key from source paper

Q16 JEE Main 2025 · 7 Apr · Shift 2 MCQ

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 :

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(A) $\frac{\sqrt{7}}{4}$
(B) $\frac{4}{5}$
(C) $\frac{\sqrt{3}}{2}$
(D) $\frac{3}{5}$

Answer: (D) $\frac{3}{5}$ · Key from source paper

Q17 JEE Main 2025 · 4 Apr · Shift 1 MCQ

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

(A) $\frac{6}{5}$
(B) $\frac{10}{3}$
(C) $\frac{18}{5}$
(D) $\frac{50}{3}$

Answer: (C) $\frac{18}{5}$ · Key from source paper

Q18 JEE Main 2025 · 4 Apr · Shift 1 Numerical

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 $9\left(x_1y_1 + x_2y_2 + x_3y_3\right)$ is equal to _____

Numerical value type: the answer is a number.

Answer: 46. · Key from source paper

Q19 JEE Main 2025 · 4 Apr · Shift 2 MCQ

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 :

(A) 24
(B) 20
(C) 48
(D) 36

Answer: (A) 24 · Key from source paper

Q20 JEE Main 2025 · 4 Apr · Shift 2 MCQ

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 :

(A) 26
(B) 12
(C) $\frac{13}{2}$
(D) 13

Answer: (D) 13 · Key from source paper

Q21 JEE Main 2025 · 3 Apr · Shift 1 MCQ

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 $(PA) \cdot (PB)$ is maximum. Then $5\left(PA^2 + PB^2\right)$ is equal to :

(A) 338
(B) 218
(C) 377
(D) 290

Answer: (A) 338 · Key from source paper

Q22 JEE Main 2025 · 3 Apr · Shift 2 MCQ

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 $(\pm 2, 0)$. 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 :

(A) $6(3 + \sqrt{2})$
(B) $6(2 + \sqrt{3})$
(C) $8(3 + \sqrt{2})$
(D) $8(2 + \sqrt{3})$

Answer: (D) $8(2 + \sqrt{3})$ · Key from source paper

Q23 JEE Main 2025 · 2 Apr · Shift 1 MCQ

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 :

(A) $3(6 + \sqrt{2})$
(B) 27
(C) $3(1 + \sqrt{2})$
(D) 9

Answer: (B) 27 · Key from source paper

Q24 JEE Main 2025 · 2 Apr · Shift 2 MCQ

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 :

(A) $\frac{3}{\sqrt{19}}$
(B) $\frac{4}{\sqrt{17}}$
(C) $\frac{\sqrt{5}}{7}$
(D) $\frac{\sqrt{3}}{16}$

Answer: (B) $\frac{4}{\sqrt{17}}$ · Key from source paper

Q25 JEE Main 2025 · 29 Jan · Shift 1 MCQ

Let the ellipse $\mathrm{E}_1 : \frac{x^2}{\mathrm{a}^2} + \frac{y^2}{\mathrm{b}^2} = 1$, a > b and $\mathrm{E}_2 : \frac{x^2}{\mathrm{A}^2} + \frac{y^2}{\mathrm{B}^2} = 1$, 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 :

(A) $\frac{12\sqrt{6}}{5}$
(B) $6\sqrt{6}$
(C) $\frac{18\sqrt{6}}{5}$
(D) $\frac{24\sqrt{6}}{5}$

Answer: (D) $\frac{24\sqrt{6}}{5}$ · Key from source paper

Q26 JEE Main 2025 · 29 Jan · Shift 2 MCQ

If $\alpha x + \beta y = 109$ 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 $\alpha + \beta$ is equal to :

(A) 58
(B) 46
(C) 37
(D) 72

Answer: (A) 58 · Key from source paper

Q27 JEE Main 2025 · 28 Jan · Shift 1 Numerical

Let $\mathrm{E}_1 : \frac{x^2}{9} + \frac{y^2}{4} = 1$ 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 _____ .

Numerical value type: the answer is a number.

Answer: 54. · Key from source paper

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Q28 JEE Main 2025 · 28 Jan · Shift 2 MCQ

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 :

(A) 20

(B) 22

(C) 18

(D) 26

Answer: (B) 22 · Key from source paper

Q29 JEE Main 2025 · 24 Jan · Shift 1 MCQ

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

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

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

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

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

Answer: (B) $\frac{3-2\sqrt{2}}{2\sqrt{3}}$ · Key from source paper

Q30 JEE Main 2025 · 24 Jan · Shift 2 MCQ

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

(A) $48x+25y=169$

(B) $5x+16y=31$

(C) $25x+101y=176$

(D) $4x+122y=134$

Answer: (A) $48x+25y=169$ · Key from source paper

Q31 JEE Main 2025 · 23 Jan · Shift 2 MCQ

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 :

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

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

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

(D) $\sqrt{15}$

Answer: (C) $\frac{2}{3}\sqrt{15}$ · Key from source paper

Q32 JEE Main 2024 · 9 Apr · Shift 1 MCQ

Let $f(x)=x^2+9, g(x)=\frac{x}{x-9}$ and $\mathrm{a}=f \circ g(10), \mathrm{b}=g \circ f(3)$. If e and l denote the eccentricity and the length of the latus rectum of the ellipse $\frac{x^2}{a}+\frac{y^2}{b}=1$, then $8 \mathrm{e}^2+l^2$ is equal to.

(A) 8
(B) 16
(C) 6
(D) 12

Answer: (A) 8 · Key from source paper

Q33 JEE Main 2024 · 5 Apr · Shift 1 MCQ

Let the line $2x+3y-\mathrm{k}=0, \mathrm{k}>0$, intersect the x-axis and y-axis at the points A and B, respectively. If the equation of the circle having the line segment AB as a diameter is $x^2+y^2-3x-2y=0$ and the length of the latus rectum of the ellipse $x^2+9y^2=k^2$ is $\frac{m}{n}$, where m and n are coprime, then 2 m + n is equal to

(A) 11
(B) 10
(C) 12
(D) 13

Answer: (A) 11 · Key from source paper

Q34 JEE Main 2024 · 1 Feb · Shift 2 MCQ

Let P be a point on the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$. Let the line passing through P and parallel to y - axis meet the circle $x^2+y^2=9$ at point Q such that P and Q are on the same side of the x - axis. Then, the eccentricity of the locus of the point R on PQ such that $PR : RQ = 4 : 3$ as P moves on the ellipse, is:

(A) $\frac{11}{19}$
(B) $\frac{13}{21}$
(C) $\frac{\sqrt{139}}{23}$
(D) $\frac{\sqrt{13}}{7}$

Answer: (D) $\frac{\sqrt{13}}{7}$ · Key from source paper

Q35 JEE Main 2024 · 30 Jan · Shift 1 MCQ

If the length of the minor axis of ellipse is equal to half of the distance between the foci, then the eccentricity of the ellipse is :

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

Answer: (D) $\frac{2}{\sqrt{5}}$ · Key from source paper

Q36 JEE Main 2024 · 30 Jan · Shift 2 MCQ

Let $A(\alpha, 0)$ and $B(0, \beta)$ be the points on the line $5x + 7y = 50$. Let the point P divide the line segment AB internally in the ratio $7 : 3$. Let $3x - 25 = 0$ be a directrix of the ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the corresponding focus be S. If from S, the perpendicular on the x - axis passes through P, then the length of the latus rectum of E is equal to

(A) $\frac{25}{3}$
(B) $\frac{32}{9}$
(C) $\frac{25}{9}$
(D) $\frac{32}{5}$

Answer: (D) $\frac{32}{5}$ · Key from source paper

Q37 JEE Main 2024 · 29 Jan · Shift 1 Numerical

If the points of intersection of two distinct conics $x^2 + y^2 = 4b$ and $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ lie on the curve $y^2 = 3x^2$, then $3\sqrt{3}$ times the area of the rectangle formed by the intersection points is _____.

Numerical value type: the answer is a number.

Answer: 432. · Key from source paper

Q38 JEE Main 2024 · 27 Jan · Shift 1 MCQ

The length of the chord of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, whose mid point is $\left(1, \frac{2}{5}\right)$, is equal to:

(A) $\frac{\sqrt{1691}}{5}$
(B) $\frac{\sqrt{2009}}{5}$
(C) $\frac{\sqrt{1741}}{5}$
(D) $\frac{\sqrt{1541}}{5}$

Answer: (A) $\frac{\sqrt{1691}}{5}$ · Key from source paper

Q39 JEE Main 2024 · 27 Jan · Shift 2 MCQ

Let e_1 be the eccentricity of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ and e_2 be the eccentricity of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $a > b$, which passes through the foci of the hyperbola. If $e_1 e_2 = 1$, then the length of the chord of the ellipse parallel to the x-axis and passing through $(0, 2)$ is :

(A) $4\sqrt{5}$
(B) $\frac{8\sqrt{5}}{3}$
(C) $\frac{10\sqrt{5}}{3}$
(D) $3\sqrt{5}$

Answer: (C) $\frac{10\sqrt{5}}{3}$ · Key from source paper

Q40 JEE Main 2023 · 15 Apr · Shift 1 Numerical

Let an ellipse with centre $(1, 0)$ and latus rectum of length $\frac{1}{2}$ have its major axis along x-axis. If its minor axis subtends an angle 60° at the foci, then the square of the sum of the lengths of its minor and major axes is equal to _____.

Numerical value type: the answer is a number.

Answer: 9. · Key from source paper

Q41 JEE Main 2023 · 12 Apr · Shift 1 MCQ

Let $P\left(\frac{2\sqrt{3}}{\sqrt{7}}, \frac{6}{\sqrt{7}}\right)$, Q, R and S be four points on the ellipse $9x^2 + 4y^2 = 36$. Let PQ and RS be mutually perpendicular and pass through the origin. If $\frac{1}{(PQ)^2} + \frac{1}{(RS)^2} = \frac{p}{q}$, where p and q are coprime, then $p + q$ is equal to

(A) 147
(B) 143
(C) 137
(D) 157

Answer: (D) 157 · Key from source paper

Q42 JEE Main 2023 · 11 Apr · Shift 1 MCQ

Consider ellipses $E_k : kx^2 + k^2y^2 = 1$, $k = 1, 2, \ldots, 20$. Let C_k be the circle which touches the four chords joining the end points (one on minor axis and another on major axis) of the ellipse E_k. If r_k is the radius of the circle C_k, then the value of $\sum_{k=1}^{20} \frac{1}{r_k^2}$ is

(A) 3080
(B) 2870
(C) 3210
(D) 3320

Answer: (A) 3080 · Key from source paper

Q43 JEE Main 2023 · 11 Apr · Shift 2 MCQ

If the radius of the largest circle with centre $(2,\ 0)$ inscribed in the ellipse $x^2 + 4y^2 = 36$ is r, then $12\,r^2$ is equal to

(A) 115
(B) 92
(C) 69
(D) 72

Answer: (B) 92 · Key from source paper

Q44 JEE Main 2023 · 10 Apr · Shift 2 MCQ

Let a circle of radius 4 be concentric to the ellipse $15x^2 + 19y^2 = 285$. Then the common tangents are inclined to the minor axis of the ellipse at the angle

(A) $\frac{\pi}{3}$
(B) $\frac{\pi}{4}$
(C) $\frac{\pi}{6}$
(D) $\frac{\pi}{12}$

Answer: (A) $\frac{\pi}{3}$ · Key from source paper

Q45 JEE Main 2023 · 6 Apr · Shift 2 Numerical

Let the eccentricity of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is reciprocal to that of the hyperbola $2x^2 - 2y^2 = 1$. If the ellipse intersects the hyperbola at right angles, then square of length of the latus-rectum of the ellipse is _____ .

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q46 JEE Main 2023 · 6 Apr · Shift 2 MCQ

In a group of 100 persons 75 speak English and 40 speak Hindi. Each person speaks at least one of the two languages. If the number of persons who speak only English is α and the number of persons who speaks only Hindi is β, then the eccentricity of the ellipse $25(\beta^2x^2 + \alpha^2y^2) = \alpha^2\beta^2$ is

(A) $\frac{\sqrt{119}}{12}$
(B) $\frac{\sqrt{117}}{12}$
(C) $\frac{3\sqrt{15}}{12}$
(D) $\frac{\sqrt{129}}{12}$

Answer: (A) $\frac{\sqrt{119}}{12}$ · Key from source paper

Q47 JEE Main 2023 · 1 Feb · Shift 2 Numerical

The line $x = 8$ is the directrix of the ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with the corresponding focus $(2, 0)$. If the tangent to E at the point P in the first quadrant passes through the point $(0, 4\sqrt{3})$ and intersects the x-axis at Q, then $(3PQ)^2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 39. · Key from source paper

Q48 JEE Main 2023 · 31 Jan · Shift 1 MCQ

If the maximum distance of normal to the ellipse $\frac{x^2}{4}+\frac{y^2}{b^2}=1$, $b<2$, from the origin is 1 , then the eccentricity of the ellipse is:

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

Answer: (B) $\frac{\sqrt{3}}{2}$ · Key from source paper

Q49 JEE Main 2023 · 29 Jan · Shift 2 MCQ

If the tangent at a point P on the parabola $y^2=3x$ is parallel to the line $x+2y=1$ and the tangents at the points Q and R on the ellipse $\frac{x^2}{4}+\frac{y^2}{1}=1$ are perpendicular to the line $x-y=2$, then the area of the triangle PQR is:

(A) $\frac{9}{\sqrt{5}}$
(B) $5\sqrt{3}$
(C) $\frac{3}{2}\sqrt{5}$
(D) $3\sqrt{5}$

Answer: (D) $3\sqrt{5}$ · Key from source paper

Q50 JEE Main 2023 · 24 Jan · Shift 1 Numerical

Let a tangent to the curve $9x^2+16y^2=144$ intersect the coordinate axes at the points A and B. Then, the minimum length of the line segment AB is _____

Numerical value type: the answer is a number.

Answer: 7. · Key from source paper

Q51 JEE Main 2023 · 24 Jan · Shift 1 Numerical

Let C be the largest circle centred at 2, 0 and inscribed in the ellipse $\frac{x^2}{36}+\frac{y^2}{16}=1$. If 1, α lies on C, then $10\alpha^2$ is equal to _____

Numerical value type: the answer is a number.

Answer: 118. · Key from source paper

Q52 JEE Main 2022 · 29 Jul · Shift 2 Numerical

Let
$S = x, y \in \mathbb{N} \times \mathbb{N} : 9x - 3^2 + 16y - 4^2 \leq 144$
and $T = x, y \in \mathbb{R} \times \mathbb{R} : x - 7^2 + y - 4^2 \leq 36$
The $nS \cap T$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 27. · Key from source paper

Q53 JEE Main 2022 · 28 Jul · Shift 1 Numerical

For the hyperbola $H : x^2 - y^2 = 1$ and the ellipse $E : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b > 0$, let the
(1) eccentricity of E be reciprocal of the eccentricity of H, and
(2) the line $y = \sqrt{\frac{5}{2}}x + K$ be a common tangent of E and H.
Then $4a^2 + b^2$ is equal to

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q54 JEE Main 2022 · 28 Jul · Shift 2 Numerical

Let the tangents at the points P and Q on the ellipse $\frac{x^2}{2} + \frac{y^2}{4} = 1$ meet at the point $R\left(\sqrt{2}, 2\sqrt{2} - 2\right)$. If S is the focus of the ellipse on its negative major axis, then $SP^2 + SQ^2$ is equal to

Numerical value type: the answer is a number.

Answer: 13. · Key from source paper

Q55 JEE Main 2022 · 27 Jul · Shift 1 Numerical

If the length of the latus rectum of the ellipse $x^2 + 4y^2 + 2x + 8y - \lambda = 0$ is 4, and l is the length of its major axis, then $\lambda + l$ is equal to _____ .

Numerical value type: the answer is a number.

Answer: 75. · Key from source paper

Q56 JEE Main 2022 · 26 Jul · Shift 2 MCQ

The acute angle between the pair of tangents drawn to the ellipse $2x^2 + 3y^2 = 5$ from the point $1, 3$ is

(A) $\tan^{-1}\frac{16}{7\sqrt{5}}$
(B) $\tan^{-1}\frac{24}{7\sqrt{5}}$
(C) $\tan^{-1}\frac{32}{7\sqrt{5}}$
(D) $\tan^{-1}\frac{3+8\sqrt{5}}{35}$

Answer: (B) $\tan^{-1}\frac{24}{7\sqrt{5}}$ · Key from source paper

Q57 JEE Main 2022 · 25 Jul · Shift 2 MCQ

If the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets the line $\frac{x}{7}+\frac{y}{2\sqrt{6}}=1$ on the x-axis and the line $\frac{x}{7}-\frac{y}{2\sqrt{6}}=1$ on the y-axis, then the eccentricity of the ellipse is

(A) $\frac{5}{7}$

(B) $\frac{2\sqrt{6}}{7}$

(C) $\frac{3}{7}$

(D) $\frac{2\sqrt{5}}{7}$

Answer: (A) $\frac{5}{7}$ · Key from source paper

Q58 JEE Main 2022 · 27 Jun · Shift 1 MCQ

Let the eccentricity of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,\ a>b$, be $\frac{1}{4}$. If this ellipse passes through the point $\left(-4\sqrt{\frac{2}{5}},3\right)$, then a^2+b^2 is equal to

(A) 29

(B) 31

(C) 32

(D) 34

Answer: (B) 31 · Key from source paper

Q59 JEE Main 2022 · 26 Jun · Shift 2 MCQ

If m is the slope of a common tangent to the curves $\frac{x^2}{16}+\frac{y^2}{9}=1$ and $x^2+y^2=12$, then $12\mathrm{m}^2$ is equal to

(A) 6

(B) 9

(C) 10

(D) 12

Answer: (B) 9 · Key from source paper

Q60 JEE Main 2022 · 26 Jun · Shift 2 MCQ

The locus of the mid-point of the line segment joining the point $(4,3)$ and the points on the ellipse $x^2+2y^2=4$ is an ellipse with eccentricity

(A) $\frac{\sqrt{3}}{2}$

(B) $\frac{1}{2\sqrt{2}}$

(C) $\frac{1}{\sqrt{2}}$

(D) $\frac{1}{2}$

Answer: (C) $\frac{1}{\sqrt{2}}$ · Key from source paper

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Q61 JEE Main 2022 · 25 Jun · Shift 2 MCQ

The line $y = x + 1$ meets the ellipse $\frac{x^2}{4} + \frac{y^2}{2} = 1$ at two points P and Q. If r is the radius of the circle with PQ as diameter then $3r^2$ is equal to

(A) 20

(B) 12

(C) 11

(D) 8

Answer: (A) 20 · Key from source paper

Q62 JEE Main 2022 · 24 Jun · Shift 2 MCQ

Let the maximum area of the triangle that can be inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{4} = 1$, $a > 2$, having one of its vertices at one end of the major axis of the ellipse and one of its sides parallel to the y-axis, be $6\sqrt{3}$. Then the eccentricity of the ellipse is:

(A) $\frac{\sqrt{3}}{2}$

(B) $\frac{1}{2}$

(C) $\frac{1}{\sqrt{2}}$

(D) $\frac{\sqrt{3}}{4}$

Answer: (A) $\frac{\sqrt{3}}{2}$ · Key from source paper

Q63 JEE Main 2021 · 31 Aug · Shift 1 MCQ

The line $12x\ \cos\theta + 5y\ \sin\theta = 60$ is tangent to which of the following curves ?

(A) $x^2 + y^2 = 30$

(B) $144x^2 + 25y^2 = 3600$

(C) $x^2 + y^2 = 169$

(D) $25x^2 + 12y^2 = 3600$

Answer: (B) $144x^2 + 25y^2 = 3600$ · Key from source paper

Q64 JEE Main 2021 · 31 Aug · Shift 2 MCQ

The locus of mid-points of the line segments joining $-3, -5$ and the points on the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is :

(A) $36x^2 + 16y^2 + 90x + 56y + 145 = 0$

(B) $36x^2 + 16y^2 + 108x + 80y + 145 = 0$

(C) $9x^2 + 4y^2 + 18x + 8y + 145 = 0$

(D) $36x^2 + 16y^2 + 72x + 32y + 145 = 0$

Answer: (B) $36x^2 + 16y^2 + 108x + 80y + 145 = 0$ · Key from source paper

EdLoop JEE

Q65 JEE Main 2021 · 27 Aug · Shift 1 Numerical

If the minimum area of the triangle formed by a tangent to the ellipse $\frac{x^2}{b^2}+\frac{y^2}{4a^2}=1$ and the co-ordinate axis is kab, then k is equal to _____.

Numerical value type: the answer is a number.

Answer: 2. · Key from source paper

Q66 JEE Main 2021 · 26 Aug · Shift 1 MCQ

On the ellipse $\frac{x^2}{8}+\frac{y^2}{4}=1$, let P be a point in the second quadrant such that the tangent at P to the ellipse is perpendicular to the line $x+2y=0$. Let S and S′ be the foci of the ellipse and e be its eccentricity. If A is the area of the triangle SPS′, then the value of $\left(5-e^2\right)\cdot A$ is

(A) 12
(B) 6
(C) 14
(D) 24

Answer: (B) 6 · Key from source paper

Q67 JEE Main 2021 · 27 Jul · Shift 1 MCQ

A ray of light through $(2,1)$ is reflected at a point P on the $y-$ axis and then passes through the point $(5,3)$. If this reflected ray is the directrix of an ellipse with eccentricity $\frac{1}{3}$ and the distance of the nearer focus from this directrix is $\frac{8}{\sqrt{53}}$, then the equation of the other directrix can be:

(A) $11x+7y+8=0$ or $11x+7y-15=0$
(B) $11x-7y-8=0$ or $11x+7y+15=0$
(C) $2x-7y+29=0$ or $2x-7y-7=0$
(D) $2x-7y-39=0$ or $2x-7y-7=0$

Answer: (C) $2x-7y+29=0$ or $2x-7y-7=0$ · Key from source paper

Q68 JEE Main 2021 · 27 Jul · Shift 2 Numerical

Let E be an ellipse whose axes are parallel to the co-ordinates axes, having its centre at $(3,-4)$, one focus at $(4,-4)$ and one vertex at $(5,-4)$. If $mx-y=4$, $m>0$ is a tangent to the ellipse E, then the value of $5m^2$ is equal to _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q69 JEE Main 2021 · 25 Jul · Shift 1 MCQ

Let an ellipse $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, $a^2>b^2$, passes through $\sqrt{\frac{3}{2}},1$ and has eccentricity $\frac{1}{\sqrt{3}}$. If a circle, centered at focus $F(\alpha,0)$, $\alpha>0$, of E and radius $\frac{2}{\sqrt{3}}$, intersects E at two points P and Q, then PQ^2 is

equal to :

(A) $\frac{8}{3}$
(B) $\frac{4}{3}$
(C) $\frac{16}{3}$
(D) 3

Answer: (C) $\frac{16}{3}$ · Key from source paper

Q70 JEE Main 2021 · 25 Jul · Shift 2 MCQ

If a tangent to the ellipse $x^2 + 4y^2 = 4$ meets the tangents at the extremities of its major axis at B and C, then the circle with BC as diameter passes through the point.

(A) $(\sqrt{3}, 0)$
(B) $(\sqrt{2}, 0)$
(C) $(1, 1)$
(D) $(-1, 1)$

Answer: (A) $(\sqrt{3}, 0)$ · Key from source paper

Q71 JEE Main 2021 · 22 Jul · Shift 1 MCQ

Let $E_1 : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $a > b$. Let E_2 be another ellipse such that it touches the end points of major axis of E_1 and the foci of E_2 are the end points of minor axis of E_1. If E_1 and E_2 have same eccentricities, then its value is:

(A) $\frac{-1+\sqrt{5}}{2}$
(B) $\frac{-1+\sqrt{8}}{2}$
(C) $\frac{-1+\sqrt{3}}{2}$
(D) $\frac{-1+\sqrt{6}}{2}$

Answer: (A) $\frac{-1+\sqrt{5}}{2}$ · Key from source paper

Q72 JEE Main 2021 · 18 Mar · Shift 2 MCQ

Let $S_1 : x^2 + y^2 = 9$ and $S_2 : (x-2)^2 + y^2 = 1$.
Then the locus of center of a variable circle S which touches S_1 internally and S_2 externally always passes through the points :

(A) $(0, \pm\sqrt{3})$
(B) $\left(\frac{1}{2}, \pm\frac{\sqrt{5}}{2}\right)$
(C) $(2, \pm\frac{3}{2})$
(D) $(1, \pm 2)$

Answer: (C) $(2, \pm\frac{3}{2})$ · Key from source paper

Q73 JEE Main 2021 · 18 Mar · Shift 2 MCQ

Let a tangent be drawn to the ellipse $\frac{x^2}{27}+y^2=1$ at $\left(3\sqrt{3}\cos\theta,\sin\theta\right)$ where $\theta\in\left(0,\frac{\pi}{2}\right)$. Then the value of θ such that the sum of intercepts on axes made by this tangent is minimum is equal to :

(A) $\frac{\pi}{8}$
(B) $\frac{\pi}{4}$
(C) $\frac{\pi}{6}$
(D) $\frac{\pi}{3}$

Answer: (C) $\frac{\pi}{6}$ · Key from source paper

Q74 JEE Main 2021 · 17 Mar · Shift 2 MCQ

Let L be a tangent line to the parabola $y^2=4x-20$ at $(6,2)$. If L is also a tangent to the ellipse $\frac{x^2}{2}+\frac{y^2}{b}=1$, then the value of b is equal to :

(A) 11
(B) 14
(C) 16
(D) 20

Answer: (B) 14 · Key from source paper

Q75 JEE Main 2021 · 16 Mar · Shift 2 MCQ

If the points of intersection of the ellipse $\frac{x^2}{16}+\frac{y^2}{b^2}=1$ and the circle $x^2+y^2=4b$, $b>4$ lie on the curve $y^2=3x^2$, then b is equal to :

(A) 12
(B) 5
(C) 6
(D) 10

Answer: (A) 12 · Key from source paper

Q76 JEE Main 2021 · 26 Feb · Shift 2 Numerical

Let L be a common tangent line to the curves $4x^2+9y^2=36$ and $(2x)^2+(2y)^2=31$. Then the square of slope of the line L is _____.

Numerical value type: the answer is a number.

Answer: 3. · Key from source paper

Q77 JEE Main 2021 · 24 Feb · Shift 2 MCQ

For which of the following curves, the line $x+\sqrt{3}y=2\sqrt{3}$ is the tangent at the point $\left(\frac{3\sqrt{3}}{2},\frac{1}{2}\right)$?

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(A) $2x^2 - 18y^2 = 9$
(B) $y^2 = \frac{1}{6\sqrt{3}}x$
(C) $x^2 + 9y^2 = 9$
(D) $x^2 + y^2 = 7$

Answer: (C) $x^2 + 9y^2 = 9$ · Key from source paper

Q78 JEE Main 2020 · 6 Sep · Shift 1 MCQ

Which of the following points lies on the locus of the foot of perpendicular drawn upon any tangent to the ellipse, $\frac{x^2}{4} + \frac{y^2}{2} = 1$ from any of its foci?

(A) $(-2, \sqrt{3})$
(B) $(-1, \sqrt{2})$
(C) $(-1, \sqrt{3})$
(D) $(1, 2)$

Answer: (C) $(-1, \sqrt{3})$ · Key from source paper

Q79 JEE Main 2020 · 6 Sep · Shift 2 MCQ

If the normal at an end of latus rectum of an ellipse passes through an extremity of the minor axis, then the eccentricity e of the ellipse satisfies :

(A) $e^4 + 2e^2 - 1 = 0$
(B) $e^2 + e - 1 = 0$
(C) $e^4 + e^2 - 1 = 0$
(D) $e^2 + 2e - 1 = 0$

Answer: (C) $e^4 + e^2 - 1 = 0$ · Key from source paper

Q80 JEE Main 2020 · 5 Sep · Shift 1 MCQ

If the co-ordinates of two points A and B are $(\sqrt{7}, 0)$ and $(-\sqrt{7}, 0)$ respectively and P is any point on the conic, $9x^2 + 16y^2 = 144$, then $PA + PB$ is equal to :

(A) 16
(B) 8
(C) 6
(D) 9

Answer: (B) 8 · Key from source paper

Q81 JEE Main 2020 · 5 Sep · Shift 1 MCQ

If the point P on the curve $4x^2 + 5y^2 = 20$ is farthest from the point $Q(0, -4)$, then PQ^2 is equal to

(A) 36
(B) 48
(C) 21
(D) 29

Answer: (A) 36 · Key from source paper

Q82 JEE Main 2020 · 4 Sep · Shift 1 MCQ

Let $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ be a given ellipse, length of whose latus rectum is 10. If its eccentricity is the maximum value of the function, $\phi(t)=\frac{5}{12}+t-t^2$, then a^2+b^2 is equal to :

(A) 145
(B) 116
(C) 126
(D) 135

Answer: (C) 126 · Key from source paper

Q83 JEE Main 2020 · 4 Sep · Shift 2 MCQ

Let $x=4$ be a directrix to an ellipse whose centre is at the origin and its eccentricity is $\frac{1}{2}$. If $P(1,\beta),\beta>0$ is a point on this ellipse, then the equation of the normal to it at P is

(A) $4x-3y=2$
(B) $8x-2y=5$
(C) $7x-4y=1$
(D) $4x-2y=1$

Answer: (D) $4x-2y=1$ · Key from source paper

Q84 JEE Main 2020 · 9 Jan · Shift 1 MCQ

If e_1 and e_2 are the eccentricities of the ellipse $\frac{x^2}{18}+\frac{y^2}{4}=1$ and the hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ respectively and (e_1,e_2) is a point on the ellipse $15x^2+3y^2=k$, then the value of k is equal to

(A) 16
(B) 17
(C) 15
(D) 14

Answer: (A) 16 · Key from source paper

Q85 JEE Main 2020 · 9 Jan · Shift 2 MCQ

The length of the minor axis (along y-axis) of an ellipse in the standard form is $\frac{4}{\sqrt{3}}$. If this ellipse touches the line $x+6y=8$ then its eccentricity is:

(A) $\frac{1}{2}\sqrt{\frac{11}{3}}$
(B) $\sqrt{\frac{5}{6}}$
(C) $\frac{1}{2}\sqrt{\frac{5}{3}}$
(D) $\frac{1}{3}\sqrt{\frac{11}{3}}$

Answer: (A) $\frac{1}{2}\sqrt{\frac{11}{3}}$ · Key from source paper

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Q86 JEE Main 2020 · 8 Jan · Shift 1 MCQ

Let the line $y = mx$ and the ellipse $2x^2 + y^2 = 1$ intersect at a point P in the first quadrant. If the normal to this ellipse at P meets the co-ordinate axes at $\left(-\frac{1}{3\sqrt{2}}, 0\right)$ and $(0, \beta)$, then β is equal to

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

Answer: (D) $\frac{\sqrt{2}}{3}$ · Key from source paper

Q87 JEE Main 2020 · 7 Jan · Shift 1 MCQ

If the distance between the foci of an ellipse is 6 and the distance between its directrix is 12, then the length of its latus rectum is

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

Answer: (B) $3\sqrt{2}$ · Key from source paper

Q88 JEE Main 2020 · 7 Jan · Shift 2 MCQ

If $3x + 4y = 12\sqrt{2}$ is a tangent o the ellipse $\frac{x^2}{a^2} + \frac{y^2}{9} = 1$ for some $a \in R$, then the distance between the foci of the ellipse is

(A) $2\sqrt{7}$
(B) 4
(C) $2\sqrt{5}$
(D) $2\sqrt{2}$

Answer: (A) $2\sqrt{7}$ · Key from source paper

Q89 JEE Main 2019 · 12 Apr · Shift 1 MCQ

If the normal to the ellipse $3x^2 + 4y^2 = 12$ at a point P on it is parallel to the line, $2x + y = 4$ and the tangent to the ellipse at P passes through $Q\ (4, 4)$ then PQ is equal to:

(A) $\frac{\sqrt{61}}{2}$
(B) $\frac{5\sqrt{5}}{2}$
(C) $\frac{\sqrt{157}}{2}$
(D) $\frac{\sqrt{221}}{2}$

Answer: (B) $\frac{5\sqrt{5}}{2}$ · Key from source paper

Q90 JEE Main 2019 · 12 Apr · Shift 2 MCQ

An ellipse, with foci at $(0, 2)$ and $(0, -2)$ and minor axis of length 4 , passes through which of the following points?

(A) $(1,\ 2\sqrt{2})$
(B) $(2,\ \sqrt{2})$
(C) $(\sqrt{2},\ 2)$
(D) $(2,\ 2\sqrt{2})$

Answer: (C) $(\sqrt{2},\ 2)$ · Key from source paper

Q91 JEE Main 2019 · 10 Apr · Shift 1 MCQ

If the line $x - 2y = 12$ is a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at the point $\left(3, -\frac{9}{2}\right)$, then the length of the latus rectum of the ellipse is

(A) 5 units
(B) $12\sqrt{2}$ units
(C) 9 units
(D) $8\sqrt{3}$ units

Answer: (C) 9 units · Key from source paper

Q92 JEE Main 2019 · 10 Apr · Shift 2 MCQ

The tangent and normal to the ellipse $3x^2 + 5y^2 = 32$ at the point $P2,\ 2$ meet the x-axis at Q and R, respectively. Then the area (in sq. units) of the triangle PQR is:

(A) $\frac{68}{15}$
(B) $\frac{16}{3}$
(C) $\frac{14}{3}$
(D) $\frac{34}{15}$

Answer: (A) $\frac{68}{15}$ · Key from source paper

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Q93 JEE Main 2019 · 9 Apr · Shift 2 MCQ

If the tangent to the parabola $y^2 = x$ at a point (α, β), $(\beta > 0)$ is also a tangent to the ellipse, $x^2 + 2y^2 = 1$ then α is equal to:

(A) $\sqrt{2} - 1$
(B) $2\sqrt{2} + 1$
(C) $\sqrt{2} + 1$
(D) $2\sqrt{2} - 1$

Answer: (C) $\sqrt{2} + 1$ · Key from source paper

Q94 JEE Main 2019 · 8 Apr · Shift 1 MCQ

Let $O0, 0$ and $A0, 1$ be two fixed points. Then, the locus of a point P such that the perimeter of ΔAOP is 4 is

(A) $8x^2 + 9y^2 - 9y = 18$
(B) $9x^2 - 8y^2 + 8y = 16$
(C) $8x^2 - 9y^2 + 9y = 18$
(D) $9x^2 + 8y^2 - 8y = 16$

Answer: (D) $9x^2 + 8y^2 - 8y = 16$ · Key from source paper

Q95 JEE Main 2019 · 8 Apr · Shift 1 MCQ

If the tangents on the ellipse $4x^2 + y^2 = 8$ at the points 1, 2 and (a, b) are perpendicular to each other, then a^2 is equal to

(A) $\frac{2}{17}$
(B) $\frac{4}{17}$
(C) $\frac{64}{17}$
(D) $\frac{128}{17}$

Answer: (A) $\frac{2}{17}$ · Key from source paper

Q96 JEE Main 2019 · 8 Apr · Shift 2 MCQ

In an ellipse, with centre at the origin, if the difference of the lengths of major axis and minor axis is 10 and one of the foci is at $0, 5\sqrt{3}$, then the length of its latus rectum is:

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(A) 6
(B) 10
(C) 8
(D) 5

Answer: (D) 5 · Key from source paper

Q97 JEE Main 2019 · 12 Jan · Shift 2 MCQ

Let S and S' be the foci of an ellipse and B be any one of the extremities of its minor axis. If $\Delta S'BS$ is a right angled triangle with right angle at B and area $(\Delta S'BS) = 8$ sq. units, then the length of a latus rectum of the ellipse is :

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

Answer: (C) 4 · Key from source paper

Q98 JEE Main 2019 · 11 Jan · Shift 1 MCQ

If tangents are drawn to the ellipse $x^2 + 2y^2 = 2$ at all points on the ellipse other than its four vertices then the mid points of the tangents intercepted between the coordinate axes lie on the curve :

(A) $\frac{1}{4x^2} + \frac{1}{2y^2} = 1$
(B) $\frac{x^2}{4} + \frac{y^2}{2} = 1$
(C) $\frac{1}{2x^2} + \frac{1}{4y^2} = 1$
(D) $\frac{x^2}{2} + \frac{y^2}{4} = 1$

Answer: (C) $\frac{1}{2x^2} + \frac{1}{4y^2} = 1$ · Key from source paper

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Q99 JEE Main 2019 · 11 Jan · Shift 2 MCQ

Let the length of the latus rectum of an ellipse with its major axis along x -axis and centre at the origin, be 8 . If the distance between the foci of this ellipse is equal to the length of its minor axis, then which one of the following points lies on it?

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

Answer: (B) $(4\sqrt{3}, 2\sqrt{2})$ · Key from source paper

Q100 JEE Main 2019 · 10 Jan · Shift 2 MCQ

Let $S = \left\{(x, y) \in R^2 : \frac{y^2}{1+r} - \frac{x^2}{1-r} = 1\right\}$, where $r \neq \pm 1$. Then S represents:

(A) An ellipse whose eccentricity is $\frac{1}{\sqrt{r+1}}$, when $r > 1$.

(B) A hyperbola whose eccentricity is $\frac{2}{\sqrt{r+1}}$, when $0 < r < 1$.

(C) An ellipse whose eccentricity is $\sqrt{\frac{2}{r+1}}$, when $r > 1$

(D) A hyperbola whose eccentricity is $\frac{2}{\sqrt{1-r}}$, when $0 < r < 1$

Answer: (C) An ellipse whose eccentricity is $\sqrt{\frac{2}{r+1}}$, when $r > 1$ · Key from source paper

Q101 JEE Main 2018 · 16 Apr · Online MCQ

If the length of the latus rectum of an ellipse is 4 units and the distance between a focus and its nearest vertex on the major axis is $\frac{3}{2}$ units, then its eccentricity is

(A) $\frac{2}{3}$

(B) $\frac{1}{2}$

(C) $\frac{1}{9}$

(D) $\frac{1}{3}$

Answer: (D) $\frac{1}{3}$ · Key from source paper

Q102 JEE Main 2018 · 15 Apr · Shift 1 MCQ

If β is one of the angles between the normals to the ellipse, $x^2 + 3y^2 = 9$ at the points $(3\cos\theta, \sqrt{3}\sin\theta)$ and $(-3\sin\theta, \sqrt{3}\cos\theta)$; $\theta \in (0, \frac{\pi}{2})$; then $\frac{2\cot\beta}{\sin 2\theta}$ is equal to

(A) $\sqrt{2}$

(B) $\frac{2}{\sqrt{3}}$

(C) $\frac{1}{\sqrt{3}}$

(D) $\frac{\sqrt{3}}{4}$

Answer: (B) $\frac{2}{\sqrt{3}}$ · Key from source paper

Q103 JEE Main 2017 · 9 Apr · Online MCQ

The eccentricity of an ellipse having centre at the origin, axes along the co-ordinate axes and passing through the points $(4, -1)$ and $(-2, 2)$ is

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

Answer: (A) $\frac{\sqrt{3}}{2}$ · Key from source paper

Q104 JEE Main 2017 · 8 Apr · Online MCQ

Consider an ellipse, whose center is at the origin and its major axis is along the x-axis. If its eccentricity is $\frac{3}{5}$ and the distance between its foci is 6, then the area (in sq. units) of the quadrilateral inscribed in the ellipse, with the vertices as the vertices of the ellipse, is:

(A) 32
(B) 80
(C) 40
(D) 8

Answer: (C) 40 · Key from source paper

Q105 JEE Main 2017 · 2 Apr · Offline MCQ

The eccentricity of an ellipse whose centre is at the origin is $\frac{1}{2}$. If one of its directrices is $x = -4$, then the equation of the normal to it at $\left(1, \frac{3}{2}\right)$ is:

(A) $2y - x = 2$
(B) $4x - 2y = 1$
(C) $4x + 2y = 7$
(D) $x + 2y = 4$

Answer: (B) $4x - 2y = 1$ · Key from source paper

Q106 JEE Main 2016 · 9 Apr · Online MCQ

If the tangent at a point on the ellipse $\frac{x^2}{27} + \frac{y^2}{3} = 1$ meets the coordinate axes at A and B, and O is the origin, then the minimum area (in sq. units) of the triangle OAB is

(A) $3\sqrt{3}$
(B) $\frac{9}{2}$
(C) 9
(D) $9\sqrt{3}$

Answer: (C) 9 · Key from source paper

Q107 JEE Main 2015 · 11 Apr · Online MCQ

If the distance between the foci of an ellipse is half the length of its latus rectum, then the eccentricity of the ellipse is:

(A) $\frac{1}{2}$
(B) $\sqrt{2}-1$
(C) $\frac{\sqrt{2}-1}{2}$
(D) $\frac{2\sqrt{2}-1}{2}$

Answer: (B) $\sqrt{2}-1$ · Key from source paper

Q108 JEE Main 2015 · 4 Apr · Offline MCQ

The area (in sq. units) of the quadrilateral formed by the tangents at the end points of the latus ractum (sic) to the ellipse $\frac{x^2}{9}+\frac{y^2}{5}=1$, is

(A) 27
(B) $\frac{27}{4}$
(C) 18
(D) $\frac{27}{2}$

Answer: (A) 27 · Key from source paper

Q109 JEE Main 2014 · 12 Apr · Online MCQ

The minimum area of a triangle formed by any tangent to the ellipse $\frac{x^2}{16}+\frac{y^2}{81}=1$ and the co-ordinate axes is:

(A) 12
(B) 18
(C) 26
(D) 36

Answer: (D) 36 · Key from source paper

Q110 JEE Main 2014 · 9 Apr · Online MCQ

If OB is the semi-minor axis of an ellipse, F_1 and F_2 are its focii and the angle between F_1B and F_2B is a right angle, then the square of the eccentricity of the ellipse is

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

Answer: (C) $\frac{1}{2}$ · Key from source paper

Q111 JEE Main 2014 · 6 Apr · Offline MCQ

The locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it is

(A) $(x^2 + y^2)^2 = 6x^2 + 2y^2$
(B) $(x^2 + y^2)^2 = 6x^2 - 2y^2$
(C) $(x^2 - y^2)^2 = 6x^2 + 2y^2$
(D) $(x^2 - y^2)^2 = 6x^2 - 2y^2$

Answer: (A) $(x^2 + y^2)^2 = 6x^2 + 2y^2$ · Key from source paper

Q112 JEE Main 2013 · 25 Apr · Online MCQ

A point on the ellipse, $4x^2 + 9y^2 = 36$, where the normal is parallel to the line, $4x - 2y - 5 = 0$, is :

(A) $\left(\frac{9}{5}, \frac{8}{5}\right)$
(B) $\left(\frac{8}{5}, -\frac{9}{5}\right)$
(C) $\left(-\frac{9}{5}, \frac{8}{5}\right)$
(D) $\left(\frac{8}{5}, \frac{9}{5}\right)$

Answer: (A) $\left(\frac{9}{5}, \frac{8}{5}\right)$ · Checked by our team

Q113 JEE Main 2013 · 22 Apr · Online MCQ

Let the equations of two ellipses be
$E_1 : \frac{x^2}{3} + \frac{y^2}{2} = 1$ and $E_2 : \frac{x^2}{16} + \frac{y^2}{b^2} = 1$,
If the product of their eccentricities is $\frac{1}{2}$, then the length of the minor axis of ellipse E_2 is :

(A) 8
(B) 9
(C) 4
(D) 2

Answer: (C) 4 · Key from source paper

Q114 JEE Main 2013 · 9 Apr · Online MCQ

Equation of the line passing through the points of intersection of the parabola $x^2 = 8y$ and the ellipse $\frac{x^2}{3} + y^2 = 1$ is :

(A) $y - 3 = 0$
(B) $y + 3 = 0$
(C) $3y + 1 = 0$
(D) $3y - 1 = 0$

Answer: (D) $3y - 1 = 0$ · Key from source paper

EdLoop JEE

Q115 JEE Main 2013 · 9 Apr · Online · MCQ

If a and c are positive real numbers and the ellipse $\frac{x^2}{4c^2}+\frac{y^2}{c^2}=1$ has four distinct points ir common with the circle $x^2+y^2=9a^2$, then

(A) $9ac-9a^2-2c^2<0$
(B) $6ac+9a^2-2c^2<0$
(C) $9ac-9a^2-2c^2>0$
(D) $6ac+9a^2-2c^2>0$

Answer: (C) $9ac-9a^2-2c^2>0$ · Key from source paper

Q116 AIEEE 2012 · 26 May · Online · MCQ

The normal at $\left(2,\frac{3}{2}\right)$ to the ellipse, $\frac{x^2}{16}+\frac{y^2}{3}=1$ touches a parabola, whose equation is

(A) $y^2=-104x$
(B) $y^2=14x$
(C) $y^2=26x$
(D) $y^2=-14x$

Answer: (A) $y^2=-104x$ · Key from source paper

Q117 AIEEE 2012 · 12 May · Online · MCQ

If P_1 and P_2 are two points on the ellipse $\frac{x^2}{4}+y^2=1$ at which the tangents are parallel to the chord joining the points $(0,1)$ and $(2,0)$, then the distance between P_1 and P_2 is

(A) $2\sqrt{2}$
(B) $\sqrt{5}$
(C) $2\sqrt{3}$
(D) $\sqrt{10}$

Answer: (D) $\sqrt{10}$ · Key from source paper

Q118 AIEEE 2012 · Offline · MCQ

An ellipse is drawn by taking a diameter of the circle $(x-1)^2+y^2=1$ as its semiminor axis and a diameter of the circle $x^2+(y-2)^2=4$ as its semi-major axis. If the centre of the ellipse is the origin and its axes are the coordinate axes, then the equation of the ellipse is

(A) $4x^2+y^2=4$
(B) $x^2+4y^2=8$
(C) $4x^2+y^2=8$
(D) $x^2+4y^2=16$

Answer: (D) $x^2+4y^2=16$ · Key from source paper

EdLoop JEE

Q119 AIEEE 2009 MCQ

The ellipse $x^2 + 4y^2 = 4$ is inscribed in a rectangle aligned with the coordinate axes, which in turn in inscribed in another ellipse that passes through the point $(4, 0)$. Then the equation of the ellipse is

(A) $x^2 + 16y^2 = 16$
(B) $x^2 + 12y^2 = 16$
(C) $4x^2 + 48y^2 = 48$
(D) $4x^2 + 64y^2 = 48$

Answer: (B) $x^2 + 12y^2 = 16$ · Key from source paper

Q120 AIEEE 2008 MCQ

A focus of an ellipse is at the origin. The directrix is the line $x = 4$ and the eccentricity is $1/2$. Then the length of the semi-major axis is

(A) $\frac{8}{3}$
(B) $\frac{2}{3}$
(C) $\frac{4}{3}$
(D) $\frac{5}{3}$

Answer: (A) $\frac{8}{3}$ · Key from source paper

Q121 AIEEE 2006 MCQ

In an ellipse, the distance between its foci is 6 and minor axis is 8. Then its eccentricity is

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

Answer: (A) $\frac{3}{5}$ · Key from source paper

Q122 AIEEE 2005 MCQ

An ellipse has OB as semi minor axis, F and F′ its focii and the angle FBF' is a right angle. Then the eccentricity of the ellipse is

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

Answer: (A) $\frac{1}{\sqrt{2}}$ · Key from source paper

Q123 AIEEE 2004 MCQ

The eccentricity of an ellipse, with its centre at the origin, is $\frac{1}{2}$. If one of the directrices is $x = 4$, then the equation of the ellipse is

(A) $3x^2 + 4y^2 = 1$

(B) $3x^2 + 4y^2 = 12$

(C) $4x^2 + 3y^2 = 12$

(D) $4x^2 + 3y^2 = 1$

Answer: (B) $3x^2 + 4y^2 = 12$ · Key from source paper

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