

JEE MAIN CONIC SECTIONS — HYPERBOLA: STANDARD EQUATION, ECCENTRICITY, ASYMPTOTES — PYQS

Max. Marks: 68
Questions: 17

Section A (MCQ) — 12 questions

- Q.1** 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.2** 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) $\frac{8}{7}$

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- Q.3** 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) $\frac{17}{2}$

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- Q.4** 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

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- Q.5** 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 $(\frac{1}{2}, -\frac{1}{2})$. 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) $\frac{9}{2}$

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- Q.6** 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

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- Q.7** 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

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- Q.8** 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) $\frac{9}{5}$

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- Q.9** 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

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- Q.10** 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

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- Q.11** 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

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- Q.12** 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

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Section B (Numerical) — 5 questions

- Q.13** 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]

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- Q.14** 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 $a^2 b^2 = \alpha \sqrt{2} - \beta$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is _____.

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

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- Q.15** 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.16** 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]

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- Q.17** 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



ANSWER KEY**Section A (MCQ) — 12 questions**

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	4	3	2	3	1	1	3	4	1	4
Ques.	12										
Ans.	4										

Section B (Numerical) — 5 questions

Ques.	13	14	15	16	17		
Ans.	8	1944	189	120	141		