

Ques No.	Question
1 - 8499	<p>Portion of asymptote of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (between centre and the tangent at vertex) in the first quadrant is cut by the line $y + \lambda(x - a) = 0$ (lambda is a parameter) then</p> <p>(A) $\lambda \in R$ (B) $\lambda \in (0, \infty)$ (C) $\lambda \in (-\infty, 0)$ (D) $\lambda \in R - \{0\}$</p> <p> Watch Free Video Solution on Doubtnut</p>
2 - 11694	<p>The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is : (A) $\frac{4}{3}$ (B) $\frac{4}{\sqrt{3}}$ (C) $\frac{2}{\sqrt{3}}$ (D) $\sqrt{3}$</p> <p> Watch Free Video Solution on Doubtnut</p>
3 - 15901	

A hyperbola passes through the point P $(\sqrt{2}, \sqrt{3})$ and has foci at $(\pm 2, 0)$. Then the tangent to this hyperbola at P also passes through the point (A) $(\sqrt{3}, \sqrt{2})$ (B) $(-\sqrt{2}, -\sqrt{3})$ (C) $(3\sqrt{2}, 2\sqrt{3})$ (D) $(2\sqrt{2}, 3\sqrt{3})$

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What is the equation of the hyperbola having latus rectum

and eccentricity 8 and $\frac{3}{\sqrt{5}}$ respectively? (A)

4 - 16105 $\frac{x^2}{25} - \frac{y^2}{20} = 1$ (B) $\frac{x^2}{40} - \frac{y^2}{20} = 1$ (C) $\frac{x^2}{40} - \frac{y^2}{30} = 1$ (D)

$$\frac{x^2}{30} - \frac{y^2}{25} = 1$$

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If any point on a hyperbola has the coordinates

($5 \tan \phi, 4 \sec \phi$) then the eccentricity of the hyperbola is:

5 - 29727

(A) $\frac{5}{4}$ (B) $\frac{\sqrt{41}}{5}$ (C) $\frac{25}{16}$ (D) $\frac{\sqrt{41}}{4}$

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Locus of feet of perpendiculars drawn from either foci on a variable tangent to hyperbola $16y^2 - 9x^2 = 1$ is (A)

$$x^2 + y^2 = 9 \text{ (B)} \quad x^2 + y^2 = \frac{1}{9} \text{ (C)} \quad x^2 + y^2 = \frac{7}{144} \text{ (D)}$$

$$x^2 + y^2 = \frac{1}{16}$$



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The locus of the midde points of chords of hyperbola

$$3x^2 - 2y^2 + 4x - 6y = 0 \text{ parallel to } y = 2x \text{ is (A)}$$

$$3x - 4y = 4 \text{ (B)} \quad 3x - 4y = 5 \text{ (C)} \quad 4x - 4y = 3 \text{ (D)}$$

$$3x - 4y = 2$$



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If the normal to the given hyperbola at the point $\left(ct, \frac{c}{t}\right)$ meets the curve again at $\left(ct', \frac{c}{t'}\right)$, then (A) $t^3 t' = 1$ (B) $t^3 t' = -1$ (C) $t t' = 1$ (D) $t t' = -1$

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The angle between the lines joining origin to the points of intersection of the line $\sqrt{3}x + y = 2$ and the curve $y^2 - x^2 = 4$ is (A) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$ (B) $\frac{\pi}{6}$ (C) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$ (D) $\frac{\pi}{2}$

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The asymptote of the hyperbola $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ form with λ as tangent to the hyperbola triangle whose area is $a^2 \tan \lambda$ in magnitude then its eccentricity is: (A) $\sec \lambda$ (B) $\cos e c \lambda$ (C) $\sec^2(\lambda)$ (D) $\cos e c^2(\lambda)$

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The number of possible tangents which can be drawn to the curve $4x^2 - 9y^2 = 36$, which are perpendicular to the straight line $5x + 2y - 10 = 0$, is (A) 0 (B) 1 (C) 2 (D) 4

11 - 41175

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If $ax + by = 1$ is tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$,

then $a^2 - b^2$ is equal to (A) $\frac{1}{a^2 e^2}$ (B) $a^2 e^2$ (C) $b^2 e^2$ (D)

12 - 41180

none of these

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If the line $2x + \sqrt{6}y = 2$ touches the hyperbola

$x^2 - 2y^2 = 4$, then the point of contact is (A) $(-2, \sqrt{6})$

13 - 41184

(B) $(-5, 2\sqrt{6})$ (C) $\left(\frac{1}{2}, \frac{1}{\sqrt{6}}\right)$ (D) $(4, -\sqrt{6})$

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The point of intersection of tangents drawn to the hyperbola

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at the points where it is intersected by the

line $lx + my + n = 0$, is (A) $\left(\frac{-a^2l}{n}, \frac{b^2m}{n} \right)$ (B)

(C) $\left(\frac{-a^2l}{m}, \frac{b^2n}{m} \right)$ (D) $\left(\frac{a^2l}{m}, \frac{-b^2n}{m} \right)$

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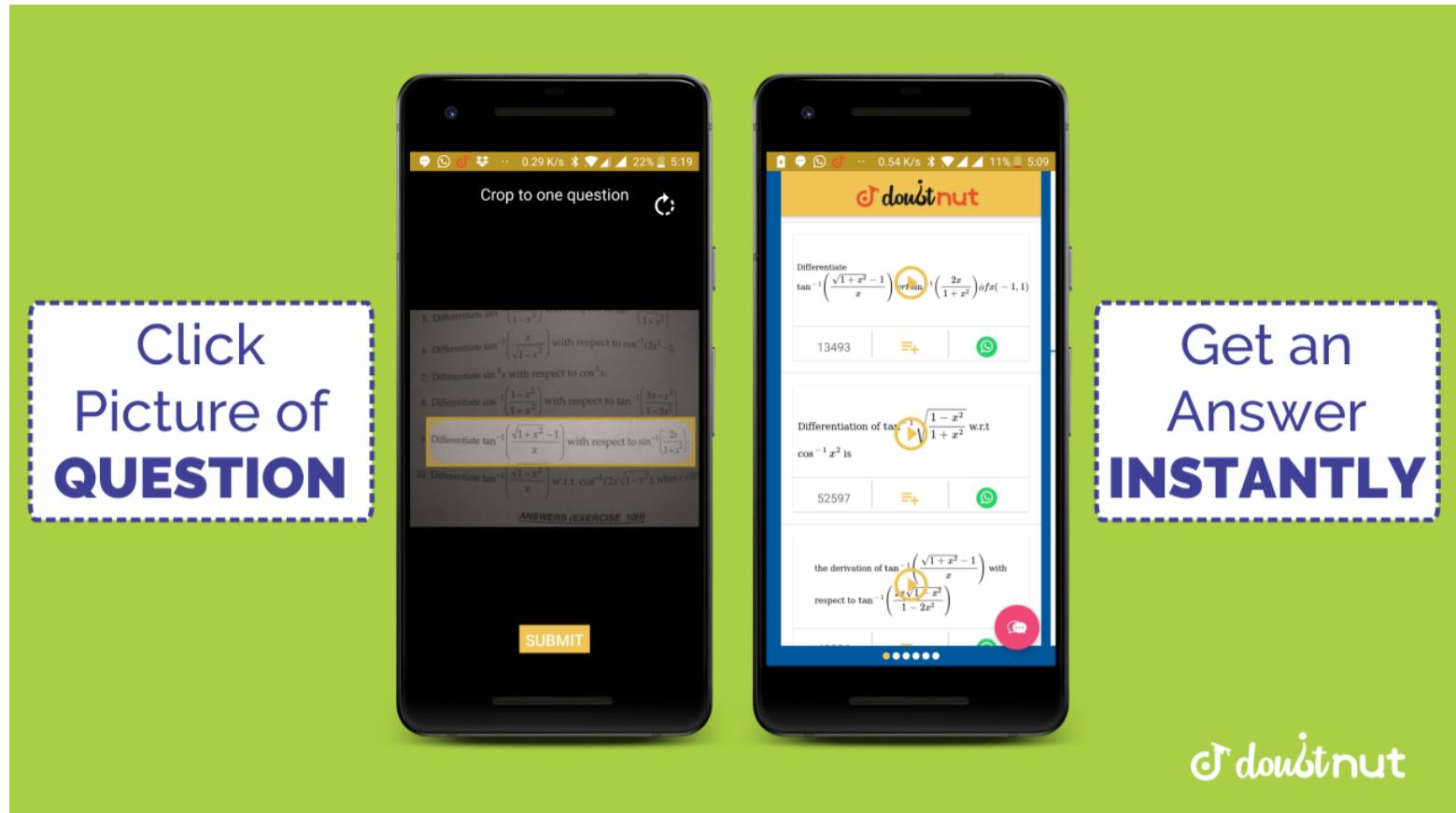
The equation to the chord joining two points (x_1, y_1) and

(x_2, y_2) on the rectangular hyperbola $xy = c^2$ is: (A)

15 - 44186 (B) $\frac{x}{x_1 - x_2} + \frac{y}{y_1 - y_2} = 1$

(C) $\frac{x}{y_1 + y_2} + \frac{y}{x_1 + x_2} = 1$ (D)
 $\frac{x}{y_1 - y_2} + \frac{y}{x_1 - x_2} = 1$

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Consider a branch of the hyperbola

$x^2 - 2y^2 - 2\sqrt{2}x - 4\sqrt{2}y - 6 = 0$ with vertex at the

point A. Let B be one of the end points of its latus rectum. If

16 - 55251

C is the focus of the hyperbola nearest to the point A, then

the area of the triangle ABC is (A) $1 - \sqrt{\frac{2}{3}}$ (B) $\sqrt{\frac{3}{2}} - 1$

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

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17 - 55324

The range of a for which a circle will pass through the points

of intersection of the hyperbola $x^2 - y^2 = a^2$ and the

- parabola $y = x^2$ is (A) $(-3, -2)$ (B) $[-1, 1]$ (C) $(2, 4)$
(D) $(4, 6)$

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- If the common tangents of hyperbola $\frac{x^2}{4} - \frac{y^2}{1} = \lambda$ and
the parabola $y^2 = 4x$ cuts the coordinate axis at A and B,
then locus of midpoint of AB is (A) $y^2 = -2x$ (B)
 $2y^2 = -x$ (C) $x^2 - y^2 = 2$ (D) $y^2 = x$

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The equation

$$\left| \sqrt{(x-2)^2 + (y-1)^2} - \sqrt{(x+2)^2 + y^2} \right| = c \text{ will}$$

- represent a hyperbola if (A) $c \in (0, 6)$ (B) $c \in (0, 5)$ (C)
 $c \in (0, \sqrt{17})$ (D) $c \in (0, \sqrt{19})$

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Let $P(x, y)$ is a variable point such that

$$\left| \sqrt{(x - 1)^2 + (y - 2)^2} - \sqrt{(x - 5)^2 + (y - 5)^2} \right| = 3$$

, which represents hyperbola. The eccentricity e' of the

corresponding conjugate hyperbola is (A) $\frac{5}{3}$ (B) $\frac{4}{3}$ (C) $\frac{5}{4}$

(D) $\frac{3}{\sqrt{7}}$

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The equation of the tangent to the hyperbola $\frac{x^2}{4} - \frac{y^2}{3} = 1$

, parallel to the line $y = x + 2$, is (A) $y = -x + 1$ (B)

21 - 79240

(C) $y = x + 7$ (D) $y = -x - 1$

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22 - 79254

The locus a point $P(\alpha, \beta)$ moving under the condition that

the line $y = \alpha x + \beta$ is a tangent to the hyperbola

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is (A) a parabola (B) an ellipse (C) a hyperbola (D) a circle

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A tangent drawn to hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at $P\left(\frac{\pi}{6}\right)$

forms a triangle of area $3a^2$ square units, with the coordinate

23 - 79273

axes, then the square of its eccentricity is (A) 15 (B) 24 (C)

17 (D) 14

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Let any double ordinate PNP^1 of the hyperbol

$$\frac{x^2}{9} - \frac{y^2}{4} = 1$$
 be produced both sides to meet the

asymptotes in Q and Q', then $PQ \cdot P'Q$ is equal to (A) 9 (B)

4 (C) 5 (D) 13

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The product of the perpendicular from two foci on any

25 - 98877
tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is (A) a^2 (B)
 $\left(\frac{b}{a}\right)^2$ (C) $\left(\frac{a}{b}\right)^2$ (D) b^2

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If tangents of slope 1 can be drawn to the hyperbola

26 - 98880
 $\frac{x^2}{2} - \frac{y^2}{1} = 1$ from any point $(2t, t^2)$ then (A) $t = \pm \sqrt{2}$

+1 (B) $t = 2$ (C) $t = 2 + \sqrt{2}$ (D) none of these

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If the intercepts made by tangent, normal to a rectangular

$x^2 - y^2 = a^2$ with x-axis are a_1, a_2 and with y-axis are

b_1, b_2 then $a_1, a_2 + b_1 b_2 =$ (A) 0 (B) 1 (C) -1 (D) a^2



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If the line $px + gy = r$ intersects the ellipse $x^2 + 4y^2 = 4$

in points, whose eccentric angles differ by $\frac{\pi}{3}$, then r^2 is

28 - 123798

equal to (A) $\frac{3}{4}(4p^2 + q^2)$ (B) $\frac{4}{3}(4p^2 + q^2)$ (C)
 $\frac{2}{3}(4p^2 + q^2)$ (D) $\frac{3}{4}(p^2 + 4q^2)$



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The locus of the point (h, k) from which the tangent can be

drawn to the different branches of the hyperbola

29 - 150099

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is (A) $\frac{k^2}{b^2} - \frac{h^2}{a^2} < 0$ (B) $\frac{k^2}{b^2} - \frac{h^2}{a^2} > 0$
(C) $\frac{k^2}{b^2} - \frac{h^2}{a^2} = 0$ (D) none of these



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Locus of the middle point of the chords of the hyperbola

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ Which passes through a fixed point (α, β) is

30 - 192878

hyperbola whose centre is (A) (α, β) (B) $(2\alpha, 2\beta)$ (C)

$\left(\frac{\alpha}{2}, \frac{\beta}{2} \right)$ (D) none

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If e and e' are the eccentricities of the hyperbola

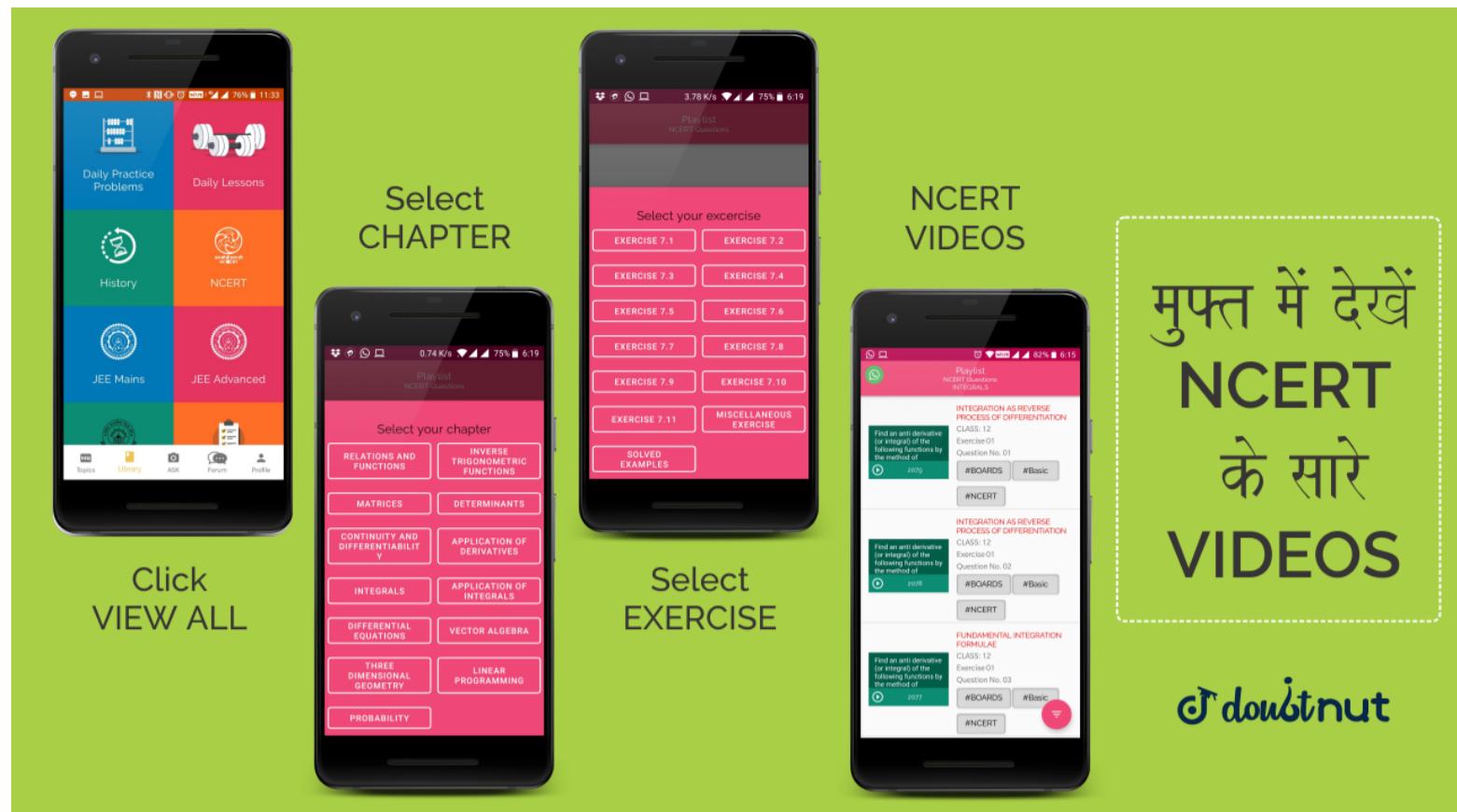
$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$, then the point

31 - 194584

$\left(\frac{1}{e}, \frac{1}{e'} \right)$ lies on the circle (A) $x^2 + y^2 = 1$ (B)

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

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The product of perpendicular drawn from any point on

$$\frac{x^2}{9} - \frac{y^2}{16} = 1 \text{ upon its asymptote is } (A) \frac{125}{144} \text{ (B) } \frac{144}{25} \text{ (C)}$$

32 - 194607

$$\frac{25}{144} \text{ (D) } \frac{144}{125}$$

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The number of points from where a pair of

perpendicular tangents can be drawn to the hyperbola,

33 - 194631

$$x^2 \sec^2 \alpha - y^2 \cos e c^2 \alpha = 1, \alpha \in \left(0, \frac{\pi}{4}\right), \text{ is } (A) 0 \text{ (B) } 1$$

(C) 2 (D) infinite

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34 - 240154

If from $(1, \beta)$ two tangents are drawn on exactly one branch

of a hyperbola $\frac{x^2}{4} - \frac{y^2}{1} = 1$, then value of β should be

- (A) $\left[-\frac{1}{2}, 1 \right]$ (B) $\left(-\frac{1}{2}, \frac{1}{2} \right)$ (C) $(-1, 1)$ (D)
 $\left(-\frac{3}{4}, \frac{3}{4} \right)$



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The locus of the foot of the perpendicular from the centre of

the hyperbola $xy = c^2$ on a variable tangent is (A)

35 - 315659

$$(x^2 - y^2) = 4c^2xy \text{ (B)} \quad (x^2 + y^2)^2 = 2c^2xy \text{ (C)}$$

$$(x^2 + y^2) = 4c^2xy \text{ (D)} \quad (x^2 + y^2)^2 = 4c^2xy$$



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36 - 1121109

The number of real points are which the line $3y - 2x = 14$

cuts the hyperbola $\frac{(x-1)^2}{9} + \frac{(y-2)^2}{4} = 5$ is (A) 1 (B)

2 (C) 3 (D) 4



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37 - 1322803

The sum and product of the slopes of the tangents to the hyperbola $\frac{x^2}{4} - \frac{y^2}{2} = 1$ drawn from the point $(3, - 2)$ are (A) $-\frac{12}{5}, \frac{6}{5}$ (B) $\frac{12}{5}, \frac{6}{5}$ (C) $\frac{11}{4}, \frac{7}{5}$ (D) $-\frac{12}{5}, \frac{8}{5}$

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The equation of the normal at the positive end of the latus rectum of the hyperbola $x^2 - 3y^2 = 144$ is (A) $\sqrt{3}x + 2y = 32$ (B) $\sqrt{3}x - 3y = 48$ (C) $3x + \sqrt{3}y = 48$ (D) $3x - \sqrt{3}y = 48$

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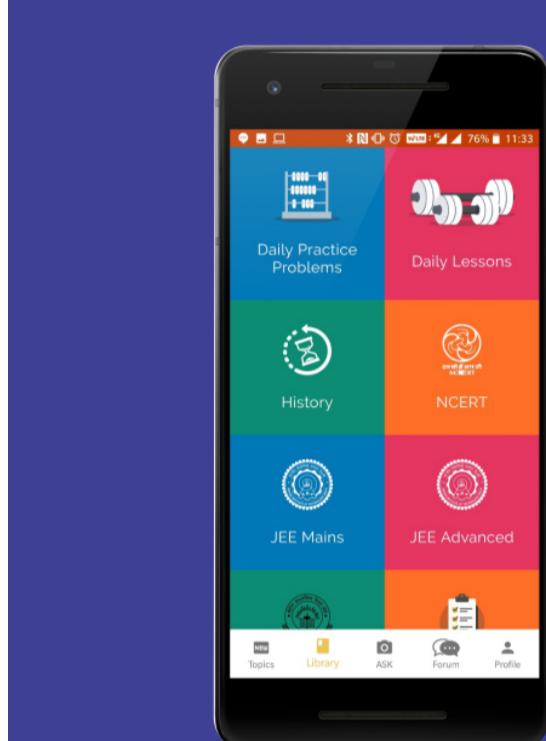
39 - 1449248

The equation of the hyperbola whose centre is $(6, 2)$ one focus is $(4, 2)$ and of eccentricity 2 is (A) $3(x - 6)^2 - (y - 2)^2 = 3$ (B) $(x - 6)^2 - 3(y - 2)^2 = 1$ (C)

$$(x - 6)^2 - 2(y - 2)^2 = 1 \text{ (D)}$$

$$2(x - 6)^2 - (y - 2)^2 = 1$$

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The circle drawn on the line segment joining the foci of the

hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ as diameter cuts the asymptotes

40 - 1613058

- at (A) (a, a) (B) (b, a) (C) $(\pm b, \pm a)$ (D) $(\pm a, \pm b)$

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If $\left(a, \frac{1}{a}\right)$ and $\left(b, \frac{1}{b}\right)$ be the extremities of a chord on the hyperbola $xy = 1$, then line perpendicular to this chord will

be equally inclined to the coordinate axes for (A) $a^2 = b^2$ (B)

$a^2 b^2 = 1$ (C) $(a + b)^2 = 1$ (D) none of these

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'e' is the eccentricity of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and θ

is the angle between its asymptotes . The value of $\sin\left(\frac{\theta}{2}\right)$

is (A) $\frac{\sqrt{e^2 - 1}}{e}$ (B) $\frac{e}{\sqrt{e^2 - 1}}$ (C) $\sqrt{\frac{e^2 + 1}{e^2 - 1}}$ (D)

$$\sqrt{\frac{e^2 - 1}{e^2 + 1}}$$

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The coordinates of a point on the rectangular hyperbola

$xy = c^2$ normal at which passes through the centre of the

43 - 3384515

hyperbola are (A) (c, c) (B) $(c, -c)$ (C) $(c\sqrt{2}, c\sqrt{2})$ (D)

$$\left(2c, \frac{c}{2}\right)$$

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For a hyperbola whose centre is $(1, 2)$ and the asymptotes are parallel to the line $x + y = 0$ and $x + 2y = 1$, the equation of the hyperbola passing through $(3, 5)$ is (A)

$(x + y - 5)(x + 2y - 3) = 30$ (B)

$(x + y - 3)(x + 2y - 5) = 40$ (C)

$(x + y + 3)(x + 2y + 5) = 195$ (D) none of these

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If the product of the perpendicular distances from any point

on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ eccentricity $e = \sqrt{3}$ from

45 - 3557863

its asymptotes is equal to 6, then the length of the transverse

axis of the hyperbola is (A) 3 (B) 4 (C) 8 (D) 12

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46 - 3645918

The graph of the conic $x^2 - (y - 1)^2 = 1$ has one tangent line with positive slope that passes through the origin . The

point of the tangency being (a, b) then find the value of

$$\sin^{-1}\left(\frac{a}{b}\right) \text{ (A) } \frac{5\pi}{12} \text{ (B) } \frac{\pi}{6} \text{ (C) } \frac{\pi}{3} \text{ (D) } \frac{\pi}{4}$$



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The equation of the hyperbola which passes through the point

$(2, 3)$ and has the asymptotes $4x + 3y - 7 = 0$ and

$x - 2y - 1 = 0$ is (A)

$$4x^2 + 5xy - 6y^2 - 11x + 11y + 50 = 0 \text{ (B)}$$

$$4x^2 + 5xy - 6y^2 - 11x + 11y - 43 = 0 \text{ (C)}$$

$$4x^2 - 5xy - 6y^2 - 11x + 11y + 50 = 0 \text{ (D)}$$

$$x^2 - 5xy - 6y^2 - 11x + 11y - 43 = 0$$



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If the normal at $\left(ct_1, \frac{c}{t_1}\right)$ on the hyperbola $xy = c^2$ cuts the hyperbola again at $\left(ct_2, \frac{c}{t_2}\right)$, then $t_1^3 t_2 =$ (A) 2 (B) – 2 (C) – 1 (D) 1

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If P is a point on the hyperbola $\frac{x^2}{7} - \frac{y^2}{3} = 1$ and N is the foot of perpendicular from P on the transverse axis. The tangent to the hyperbola at P meets the transverse axis at T . If O is the centre of hyperbola, then $OT \cdot ON =$ (A) 4 (B) 7 (C) 3 (D) 10

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A hyperbola does not have mutually perpendicular tangents,
 then its eccentricity can be (A) $\frac{7}{6}$ (B) $\frac{7}{5}$ (C) $\frac{3}{2}$ (D) 2

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The co-ordinates of the centre of the hyperbola,

$x^2 + 3xy + 3y^2 + 2x + 3y + 2 = 0$ is (A) (-1, 0) (B)
 (1, 0) (C) (-1, 1) (D) (1, -1)

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52 - 5040026

The locus of point $\left(\frac{e^t + e^{-t}}{2}, \frac{e^t - e^{-t}}{2} \right)$ is a hyperbola
 with eccentricity (A) $\sqrt{3}$ (B) 3 (C) $\sqrt{2}$ (D) 2

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If $y = mx + c$ be a tangent to the hyperbola

$$\frac{x^2}{\lambda^2} - \frac{y^2}{(\lambda^3 + \lambda^2 + \lambda)^2} = 1, (\lambda \neq 0), \text{ then (A)}$$

$$|m| < \lambda^2 + \lambda + 1 \text{ (B)} \quad m=0 \text{ (C)} \quad m = \frac{1}{2} \text{ (D)}$$

$$|m| \geq \lambda^2 + \lambda + 1$$

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If P is a point on the rectangular hyperbola $x^2 - y^2 = a^2$,

C is its centre and S, S' are the two foci , then the product

54 - 5654073

$$(SP \cdot S'P) = \text{ (A) } 2 \text{ (B) } (cp)^2 \text{ (C) } (cs)^2 \text{ (D) } (ss)^2$$

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Equation of the locus of all points such that the difference of

its distances from $(-3, -7), (-3, 3)$ is 8 is (A)

$$\frac{(x + 3)^2}{16} - \frac{(y + 2)^2}{9} = 1 \text{ (B)}$$

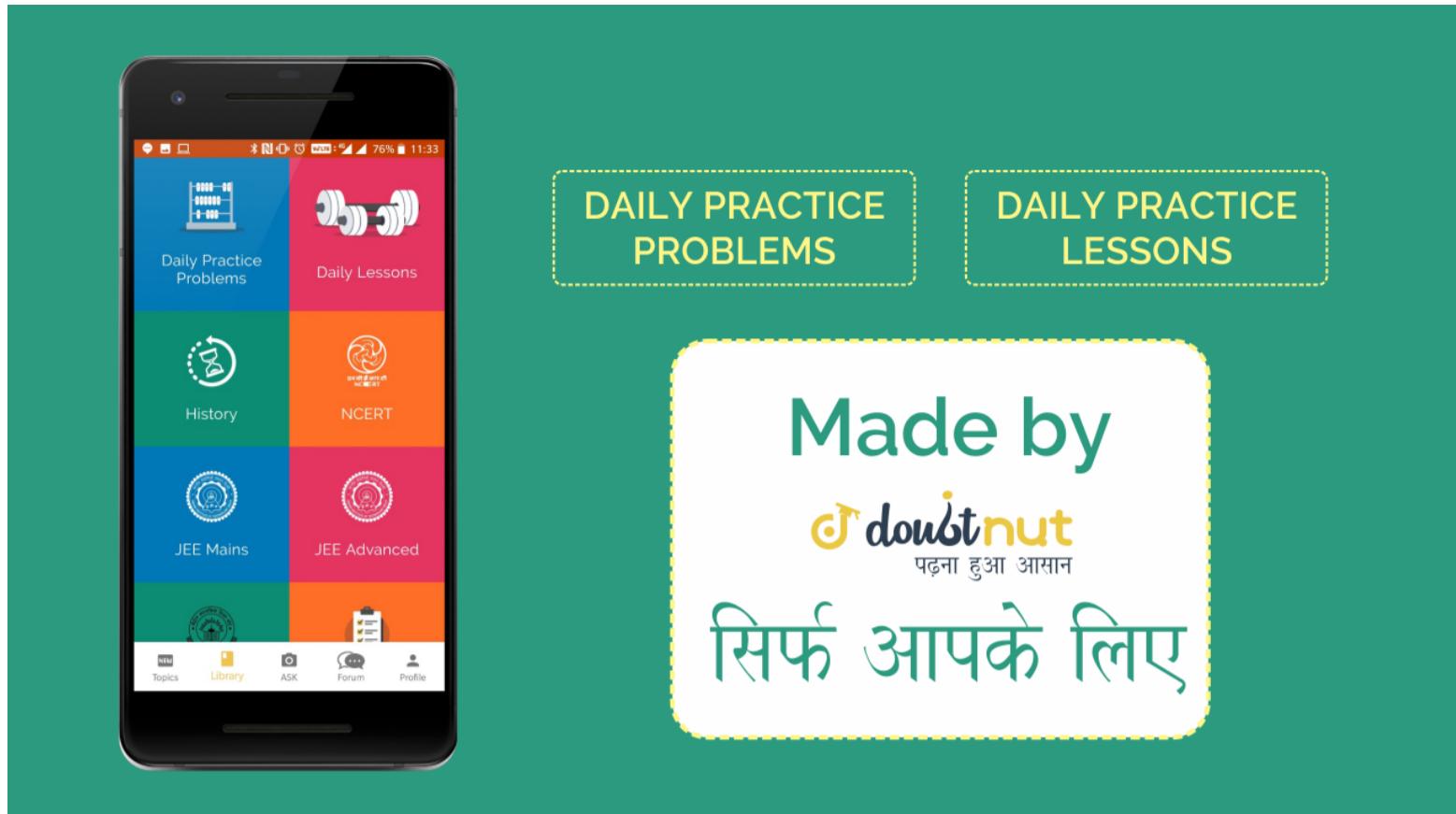
$$\frac{(x + 3)^2}{9} - \frac{(y + 2)^2}{16} = -1 \text{ (C)}$$

$$\frac{(x + 3)^2}{9} - \frac{(y + 2)^2}{19} = 1 \text{ (D)}$$

55 - 5673629

$$\frac{(x + 3)^2}{7} - \frac{(y + 2)^2}{19} = -1$$

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A rectangular hyperbola whose centre is C is cut by any circle of radius r in four points P, Q, R and S. Then,

56 - 6193021

$$CP^2 + CQ^2 + CR^2 + CS^2 = \begin{array}{l} (A) r^2 \\ (B) 2r^2 \\ (C) 3r^2 \\ (D) 4r^2 \end{array}$$

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If the hyperbola $xy = 8$ and ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ have a common tangent, then (A) $|b| \geq 4$ (B) $0 < |b| \leq 4$ (C) $2 \leq |b| \leq 4$ (D) $|b| \geq 6$

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Suppose the circle having equation $x^2 + y^2 = 3$ intersects the rectangular hyperbola $xy = 1$ at points A, B, C , and D .

The equation $x^2 + y^2 - 3 + \lambda(xy - 1) = 0, \lambda \in R$,

represents. (A) a pair of lines through the origin for

$\lambda = -3$ (B) an ellipse through A, B, C , and D for

$\lambda = -3$ (C) a parabola through A, B, C , and D for

$\lambda = -3$ (D) a circle for any $\lambda \in R$

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A normal to the hyperbola $\frac{x^2}{4} - \frac{y^2}{1} = 1$ has equal

intercepts on the positive x- and y-axis. If this normal touches

the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then $a^2 + b^2$ is equal to (A) 5

(B) 25 (C) 16 (D) none of these

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If the sum of the slopes of the normal from a point P to the

hyperbola $xy = c^2$ is equal to $\lambda (\lambda \in R^+)$, then the locus

of point P is (A) $x^2 = \lambda c^2$ (B) $y^2 = \lambda c^2$ (C) $xy = \lambda c^2$ (D)

none of these



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