MATHS

BOOKS - VK JAISWAL MATHS (HINGLISH)

HYPERBOLA

Exercise 1 Single Choice Problems

1. The normal to curve $xy = 4$ at the point (1, 4) meets curve again at :

A. $(-4, -1)$

B. $\left(-8, -\frac{1}{2}\right)$

C. $\left(-16, -\frac{1}{4}\right)$

D. $(-1, -4)$

Answer: C

Watch Video Solution

2. Let $PQ: 2x + y + 6 = 0$ is a chord of the curve $x^2 - 4y^2 = 4$. Coordinates of the point $R(\alpha, \beta)$ that satisfy $\alpha^2 + \beta^2 - 1 \leq 0$, such that area of triangle PQR is minimum, are given by :

A. $\left(\frac{-2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$

B. $\left(\frac{-2}{\sqrt{5}}, \frac{-1}{\sqrt{5}}\right)$

C. $\left(\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$

D. $\left(\frac{2}{\sqrt{5}}, \frac{-1}{\sqrt{5}}\right)$

Answer: B

View Text Solution

3. If $y = mx + c$ be a tangent to the hyperbola $\frac{x^2}{\lambda^2} - \frac{y^2}{(\lambda^3 + \lambda^2 + \lambda)^2} = 1, (\lambda \neq 0)$, then

A. 0

B. 1

C. 4

D. 9

Answer: D

Watch Video Solution

4. The area of quadrilateral formed by focii of hyperbola $\frac{x^2}{4} - \frac{y^2}{3} = 1$ & its conjugate hyperbola is

A. 3

B. 4

C. 1

D. 5

Answer: A

Watch Video Solution

5. 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) $\frac{3}{\sqrt{7}}$

A. 12

B. 14

C. 17

D. 10

Answer: D

Watch Video Solution

6. 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 5 (b) 25 (c) 16 (d) none of these

A. 5

B. 25

C. 16

D. None of these

Answer: B

Watch Video Solution

7. The locus of a point whose chord of contact with respect to the circle $x^2 + y^2 = 4$ is a tangent to the hyperbola $xy = 1$ is a/an ellipse (b) circle hyperbola (d) parabola

A. ellipse

B. circle

C. hyperbola

D. parabola

Answer: C

Watch Video Solution

8. If the chord $x\cos\alpha + y\sin\alpha = p$ of the hyperbola $\frac{x^2}{16} - \frac{y^2}{18} = 1$ subtends a right angle at the center, and the diameter of the circle, concentric with the hyperbola, to which the given chord is a tangent is d, then the value of $\frac{d}{4}$ is_____

A. 4

B. 5

C. 4

D. 7

Answer: C

Watch Video Solution

9. If the tangent and the normal to a rectangular hyperbola $xy = c^2$, at a point , cuts off intercepts a_1 and a_2 on the x- axis and $b_1 b_2$ on the y- axis, then $a_1 a_2 + b_1 b_2$ is equal to

A. 2

B. $\frac{1}{2}$

C. 0

D. -1

Answer: C

Watch Video Solution

Exercise 2 One Or More Than One Answer Is Are Correct

1. A common tangent to $9x^2 - 16y^2 = 144$ and $x^2 + y^2 = 9$, is

A. $y = \frac{3}{\sqrt{7}}x + \frac{15}{\sqrt{17}}$

B. $y = 3\sqrt{\frac{2}{\sqrt{17}}}x + \frac{25}{\sqrt{7}}$

C. $y = 2\sqrt{\frac{3}{7}}x + 15\sqrt{7}$

D. $y = -3\sqrt{\frac{2}{\sqrt{7}}}x + \frac{25}{\sqrt{7}}$

Answer: B::D

Watch Video Solution

2. The tangent to the hyperbola $x^2 - y^2 = 3$ are parallel to the straight line $2x + y + 8 = 0$ at the following points

A. (2, 1)

B. (2, -1)

C. (-2, -1)

D. (-2, -1)

Answer: B::D

Watch Video Solution

3. If the line $ax + by + c = 0$ is a normal to the curve $xy = 1$, then $a > 0, b > 0$ $a > 0, b < 0$ $a\langle 0, b\rangle 0$ (d) $a < 0, b < 0$ none of these

A. $a > 0, b > 0$

B. $a > 0, b < 0$

C. $b < 0, a < 0$

D. $a < 0, b > 0$

Answer: B::D

Watch Video Solution

4. A circle cuts the rectangular hyperbola $xy = 1$ in the points $(x_1, y_1), r = 1, 2, 3, 4.$

Prove that $x_1x_2x_3x_4 = y_1y_2y_3y_4 = 1$

A. $y_1y_2y_3y_4 = 1$

B. $x_1x_2x_3x_4 =$

C. $x_1x_2x_3x_4 = y_1y_2y_3y_4 = -1$

D. $y_1y_2y_3y_4 = 0$

Answer: A::B

Watch Video Solution

Exercise 3 Comprehension Type Problems

1. A point P moves such that sum of the slopes of the normals drawn from it to the hyperbola xy=16 is equal to the sum of ordinates of feet of normals. The locus of P is a curve C

A. $x^2 = 4y$

B. $x^2 = 16y$

C. $x^2 = 12y$

D. $y^2 = 8x$

Answer: B

Watch Video Solution

2. A point P moves such that the sum of the slopes of the normals drawn from it to the hyperbola $xy = 4$ is equal to the sum of the ordinates of feet of normals. The locus of P is a curve C.

Q.If the tangent to the curve C cuts the coordinate

axes at A and B, then , the locus of the middle point of AB is

A. $x^2 = 4y$

B. $x^2 = 2y$

C. $x^2 + 2y = 0$

D. $x^2 + 4y = 0$

Answer: C

Watch Video Solution

3. A point P moves such that the sum of the slopes of the normals drawn from it to the hyperbola $xy = 4$ is equal to the sum of the ordinates of feet of normals. The locus of P is a curve C.

Q. The area of the equilateral triangle inscribed in the curve C having one vertex as the vertex of curve C is

A. $768\sqrt{3}$

B. $776\sqrt{3}$

C. $760\sqrt{3}$

D. None of these

Answer: A

Watch Video Solution

Exercise 4 Subjective Type Problems

1. Let $y = mx + c$ be a common tangent to $\frac{x^2}{16} - \frac{y^2}{9} = 1$ and $\frac{x^2}{4} + \frac{y^2}{3} = 1$, then find the value of $m^2 + c^2$.

A. 6

B. 1

C. 8

D. 7

Answer: C

Watch Video Solution

2. The maximum number of tangents that can be drawn to a circle from a point outside it is.....

Watch Video Solution

3. Tangents at P to rectangular hyperbola $xy = 2$ meets coordinate axes at A and B, then area of

triangle OAB (where O is origin) is :

View Text Solution