Rahul's Science Academy

CET JEE -7020329384

Conic- Circle Ellipse Parabola Hyperbola

1. DPP

Let V be the vertex and L be the latusrectum of the parabola $x^2 = 2y + 4x - 4$. Then the equation of the parabola whose vertex is at V, latusrectum is L/2 and axis is perpendicular to the axis of the given parabola.

(a) $y^2 = x - 2$ (b) $y^2 = x - 4$

(c) $y^2 = 6 - x$ (d) $y^2 = 4 - x$

2. DPP

The latus rectum of a parabola whose directrix is $x + y - 2 = 0$ and focus is $(3, -4)$ is :

(a) $-3\sqrt{2}$ (b) $3\sqrt{2}$

(c) $\frac{-3}{\sqrt{2}}$ (d) $\frac{3}{\sqrt{2}}$

3.

The locus of the poles of the focal chords of a parabola is the :

(a) axis (b) directrix

(c) tangent at the vertex (d) none of these

4.

The equation of parabola, whose vertex is $(1, -2)$ and focus $(1, -1)$ is :

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

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

5.

The equation of the parabola with the axis on the y-axis and passing through origin and point $(6, -3)$ is :

(a) $x^2 = 12y$ (b) $x^2 = -12y$

(c) $y^2 = 12x + 6$ (d) $y^2 = -12x + 6$

6.

The equation of the line parallel to x-axis and passes through the vertex of the parabola $2x^2 + 5y - 3x + 4 = 0$ is :

(a) $x = \frac{3}{4}$ (b) $y = \frac{3}{4}$

(c) $x = -\frac{1}{2}$ (d) $x - 3y = 5$

7.

The equation of the latus rectum of the parabola $x^2 + 4x + 2y = 0$ is

(a) $2y + 3 = 0$ (b) $3y = 2$

(c) $2y = 3$ (d) $3y + 2 = 0$

8.

Eccentricity of the parabola $x^2 - 4x - 4y + 4 = 0$ is equal to

(a) $e = 0$ (b) $e = 1$

(c) $e > 4$ (d) $e = 4$

9.

The line $y = mx + 1$ is a tangent to the parabola $y^2 = 4x$, if :

(a) $m = 1$ (b) $m = 2$

(c) $m = 4$ (d) $m = 3$

10.

The directrix of the parabola $x^2 - 4x - 8y + 12 = 0$ is :

(a) $y = 0$ (b) $x = 1$

(c) $y = -1$ (d) $x = -1$

11.

Two tangents are drawn from the point $(-2, -1)$ to the parabola $y^2 = 4x$. If α is the angle between these tangents, then $\tan\alpha$ is equal to

(a) 3 (b) 1/3

(c) 2 (d) 1/2

12.

The equation of the parabola whose vertex is at (0, 1) and the focus is at (0, 0) is

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

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

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

(d) None of these

13.

The slope of tangents drawn from a point (4, 10) to the parabola $y^2 = 9x$ are

(a) $\frac{1}{4}, \frac{3}{4}$ (b) $\frac{1}{4}, \frac{9}{4}$

(c) $\frac{1}{4}, \frac{1}{3}$ (d) none of these

14.

The focus of the parabola $y^2 - 4y - 8x + 4 = 0$ is:

(a) (1, 1) (b) (1, 2)

(c) (2, 1) (d) (2, 2)

15.

If $x = my + c$ is a normal to the parabola $x^2 = 4ay$, then value of c is:

(a) $-2am - am^3$ (b) $2am + am^3$

(c) $-\frac{2a}{m} - \frac{a}{m^3}$ (d) $\frac{2a}{m} + \frac{a}{m^3}$

16.

The vertex of the parabola $x^2 + 8x + 12y + 4 = 0$ is:

(a) (−4, 1) (b) (4, −1)

(c) (−4, −1) (d) (4, 1)

17.

The solution of $\frac{dy}{dx} = \frac{ax + h}{by + k}$ represents a parabola when

(a) $a = 1, b = 2$ (b) $a = 0, b = 0$

(c) $a = 0, b \neq 0$ (d) $a = 2, b = 1$

18.

At what point on the parabola $y^2 = 4x$ the normal makes equal angles with the axes?

(a) (4, 4) (b) (9, 6)

(c) (4, −4) (d) (1, −2)

19.

If (2, 0) is the vertex and y-axis is the directrix of a parabola, then its focus is:

(a) (2, 0) (b) (−2, 0)

(c) (4, 0) (d) (−4, 0)

20.

If m_1 and m_2 are the slopes of the tangent to the parabola $\frac{x^2}{25} + \frac{y^2}{16} = 1$, which passes through the point (6, 2), then the value of $(m_1 + m_2)$ is

(a) $\frac{14}{11}$ (b) $\frac{4}{11}$

(c) $\frac{11}{4}$ (d) $\frac{24}{11}$

21.

Common tangents to the parabola $y = x^2$ and $y = -(x-2)^2$ are

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

(3) $y = -4(x-1)$ (4) $y = -30x - 50$

22.

Three normals to the parabola $y^2 = x$ can be drawn through a point $(c, 0)$, if

(1) $c = \frac{3}{4}$ (2) $0 < c < \frac{1}{2}$

(3) $c > \frac{1}{2}$ (4) $c = \frac{1}{2}$

23.

If $x \cos\alpha + y \sin\alpha = P$ is a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then –

(a) $a \cos\alpha + b \sin\alpha = P^2$

(b) $a \sin\alpha + b \cos\alpha = P^2$

(c) $a^2 \cos^2\alpha + b^2 \sin^2\alpha = P^2$

(d) $a^2 \sin^2\alpha + b^2 \cos^2\alpha = P^2$

24.

The equation of tangents to the ellipse $9x^2 + 16y^2 = 144$ which pass through the point (2, 3) is

(a) $y = 3$ (b) $x + y = 2$

(c) $x - y = 3$ (d) $y = 3 ; x + y = 5$

25.

If $\tan\theta_1 \tan\theta_2 = -\frac{a^2}{b^2}$, then the chord joining two point θ_1 and θ_2 on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ will subtend a right angle at

(a) Focus
(b) Centre
(c) End of the major axes
(d) End of minor axes

26. CET

The line $x = at^2$ meets the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ in the real points if -

(a) $|t|<2$ (b) $|t|\le 1$
(c) $|t|>1$ (d) None of these

27.

The equation $x^2+4y^2+2x+16y+13=0$ represents a ellipse -

(a) whose eccentricity is $\sqrt{3}$

(b) whose focus is $(\pm\sqrt{3}, 0)$

(c) whose directrix is $x=\pm\frac{4}{\sqrt{3}}-1$

(d) None of these

28. CET

The line $\ell x + my + n = 0$ cut the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ in points whose eccentric angle differ by $\pi/2$. Then the value of $a^2\ell^2 + b^2m^2$ is-

(a) $2n^2$ (b) $2n$
(c) $2m^2$ (d) $2m$

29.

The equation of the ellipse which passes through origin and has its foci at the points (1, 0) and (3, 0) is-

(a) $3x^2+4y^2=x$ (b) $3x^2+y^2=12x$
(c) $x^2+4y^2=12x$ (d) $3x^2+4y^2=12x$

30.

The distance of a point on the ellipse $\frac{x^2}{6}+\frac{y^2}{2}=1$ from the centre is 2. Then eccentric angle of the point is

(a) $\pm\frac{\pi}{2}$ (b) $\pm\pi$

(c) $\frac{\pi}{4}, \frac{3\pi}{4}$ (d) $\pm\frac{\pi}{4}$

31.

Find the equation of the ellipse whose eccentricity is 1/2, the focus is (–1, 1) and the directrix is $x - y + 3 = 0$.

(a) $7x^2+7y^2+10x-10y+2xy+7=0$
(b) $5x^2+7y^2+10x-12y+2xy+7=0$
(c) $7x^2+7y^2-10x+10y+2xy+7=0$
(d) $x^2+5y^2+10x+10y+2xy+7=0$

Previous Year JEE Questions

Problem 1

If the tangent at (1, 7) to the curve $x^2 = y - 6$ touches the circle $x^2 + y^2 + 16x + 12y + c = 0$, then the value of c is

(a) 95 (b) 195 (c) 185 (d) 85 *(2018)*

Problem 2

Tangent and normal are drawn at $P(16, 16)$ on the parabola $y^2 = 16x$, which intersect the axis of the parabola at A and B, respectively. If C is the centre of the circle through the points P, A and B and $\angle CPB = \theta$, then a value of $\tan\theta$ is

(a) $\frac{4}{3}$ (b) $\frac{1}{2}$ (c) 2 (d) 3 *(2018)*

Problem 3

In a triangle ABC, coordinates of A are (1, 2) and the equations of the medians through B and C are respectively, $x + y = 5$ and $x = 4$. Then area of ΔABC (in sq. units) is

(a) 12 (b) 9 (c) 4 (d) 5
(Online 2018)

Problem 4

A circle passes through the points (2, 3) and (4, 5). If its centre lies on the line, $y - 4x + 3 = 0$, then its radius is equal to

(a) 1 (b) 2 (c) $\sqrt{5}$ (d) $\sqrt{2}$
(Online 2018)

Problem 5

Two parabolas with a common vertex and with axes along x-axis and y-axis, respectively, intersect each other in the first quadrant. If the length of the latus rectum of each parabola is 3, then the equation of the common tangent to the two parabolas is

(a) $4(x + y) + 3 = 0$ (b) $8(2x + y) + 3 = 0$

(c) $3(x + y) + 4 = 0$ (d) $x + 2y + 3 = 0$

(Online 2018)

Problem 6

Tangents drawn from the point $(-8, 0)$ to the parabola $y^2 = 8x$ touch the parabola at P and Q. If F is the focus of the parabola, then the area of the triangle PFQ (in sq. units) is equal to

(a) 24 (b) 64 (c) 32 (d) 48

(Online 2018)

Problem 7

The tangent to the circle $C_1 : x^2 + y^2 - 2x - 1 = 0$ at the point $(2, 1)$ cuts off a chord of length 4 from a circle C_2 whose centre is $(3, -2)$. The radius of C_2 is

(a) $\sqrt{2}$ (b) $\sqrt{6}$ (c) 3 (d) 2

(Online 2018)

Problem 8

Let P be a point on the parabola, $x^2 = 4y$. If the distance of P from the centre of the circle, $x^2 + y^2 + 6x + 8 = 0$ is minimum, then the equation of the tangent to the parabola at P, is

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

(c) $x - y + 3 = 0$ (d) $x + 2y = 0$

(Online 2018)

Problem 9

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) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{9}$ (d) $\frac{1}{2}$

Problem 10

If a circle C, whose radius is 3, touches externally the circle, $x^2 + y^2 + 2x - 4y - 4 = 0$ at the point $(2, 2)$, then the length of the intercept cut by this circle C, on the x-axis is equal to :

(a) $2\sqrt{3}$ (b) $3\sqrt{2}$ (c) $\sqrt{5}$ (d) $2\sqrt{5}$

Problem 11

The locus of the point of intersection of the lines, $\sqrt{2}x - y + 4\sqrt{2}k = 0$ and $\sqrt{2}kx + ky - 4\sqrt{2} = 0$ (k is any non-zero real parameter), is

(a) a hyperbola with length of its transverse axis $8\sqrt{2}$.

(b) a hyperbola whose eccentricity is $\sqrt{3}$.

(c) an ellipse whose eccentricity is $\frac{1}{\sqrt{3}}$.

(d) an ellipse with length of its major axis $8\sqrt{2}$.

(Online 2018)

Problem 12

Let k be an integer such that triangle with vertices $(k, -3k)$, $(5, k)$ and $(-k, 2)$ has area 28 sq. units. Then the orthocentre of this triangle is at the point

(a) $\left(1, \frac{3}{4}\right)$ (b) $\left(1, -\frac{3}{4}\right)$ (c) $\left(2, \frac{1}{2}\right)$ (d) $\left(2, -\frac{1}{2}\right)$

(2017)

Problem 13

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) $4x - 2y = 1$ (b) $4x + 2y = 7$

(c) $x + 2y = 4$ (d) $2y - x = 2$ *(2017)*

Problem 14

If the common tangents to the parabola, $x^2 = 4y$ and the circle, $x^2 + y^2 = 4$ intersect at the point P, then the distance of P from the origin, is

(a) $2(\sqrt{2} + 1)$ (b) $3 + 2\sqrt{2}$

(c) $2(3 + 2\sqrt{2})$ (d) $\sqrt{2} + 1$ *(Online 2017)*

Problem 15

Consider an ellipse, whose centre 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) 8 (b) 32 (c) 80 (d) 40

(Online 2017)

Problem 16

If a point P has co-ordinates $(0, -2)$ and Q is any point on the circle, $x^2 + y^2 - 5x - y + 5 = 0$, then the maximum value of $(PQ)^2$ is

(a) $\frac{25 + \sqrt{6}}{2}$ (b) $8 + 5\sqrt{3}$

(c) $14 + 5\sqrt{3}$ (d) $\frac{47 + 10\sqrt{6}}{2}$ *(Online 2017)*

Problem 17

A square, of each side 2, lies above the x-axis and has one vertex at the origin. If one of the sides passing through the origin makes an angle $30°$ with the positive direction of the x-axis, then the sum of the x-coordinates of the vertices of the square is

(a) $\sqrt{3}-2$ (b) $2\sqrt{3}-1$
(c) $\sqrt{3}-1$ (d) $2\sqrt{3}-2$

Problem 18

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) $\frac{1}{2}$

(Online 2017)

Problem 19

Two sides of a rhombus are along the lines, $x - y + 1 = 0$ and $7x - y - 5 = 0$. If its diagonals intersect at $(-1, -2)$, then which one of the following is a vertex of this rhombus?

(a) $(-3, -9)$ (b) $(-3, -8)$
(c) $\left(\frac{1}{3}, -\frac{8}{3}\right)$ (d) $\left(-\frac{10}{3}, -\frac{7}{3}\right)$ *(2016)*

Problem 20

If one of the diameters of the circle, given by the equation, $x^2 + y^2 - 4x + 6y - 12 = 0$, is a chord of a circle S, whose centre is at $(-3, 2)$, then the radius of S is

(a) $5\sqrt{2}$ (b) $5\sqrt{3}$ (c) 5 (d) 10

(2016)

Problem 21

(2016)

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) $\sqrt{3}$

(2016)

Problem 22

A circle passes through $(-2, 4)$ and touches the y-axis at $(0, 2)$. Which one of the following equations can represent a diameter of this circle?

(a) $2x - 3y + 10 = 0$ (b) $3x + 4y - 3 = 0$
(c) $4x + 5y - 6 = 0$ (d) $5x + 2y + 4 = 0$

(Online 2016)

Problem 23

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) $9\sqrt{3}$

(Online 2016)

Problem 24

The minimum distance of a point on the curve $y = x^2 - 4$ from the origin is

(a) $\frac{\sqrt{15}}{2}$ (b) $\sqrt{\frac{19}{2}}$ (c) $\sqrt{\frac{15}{2}}$ (d) $\frac{\sqrt{19}}{2}$

(Online 2016)

Problem 25

Equation of the tangent to the circle, at the point $(1, -1)$, whose centre is the point of intersection of the straight lines $x - y = 1$ and $2x + y = 3$ is

(a) $x + 4y + 3 = 0$ (b) $3x - y - 4 = 0$
(c) $x - 3y - 4 = 0$ (d) $4x + y - 3 = 0$

(Online 2016)