MATHS

NCERT - NCERT MATHEMATICS(HINGLISH)

CONIC SECTIONS

Exercise 11 3

1. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the

eccentricity and the length of the latus rectum of the ellipse.$16x^2 + y^2 = 16$

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2. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse.$4x^2 + 9y^2 = 36$

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3. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{36} + \frac{y^2}{16} = 1$

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4. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{4} + \frac{y^2}{25} = 1$

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5. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{16} + \frac{y^2}{9} = 1$

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6. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the

eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{25} + \frac{y^2}{100} = 1$

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7. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{49} + \frac{y^2}{36} = 1$

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8. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $\frac{x^2}{100} + \frac{y^2}{400} = 1$

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9. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse. $36x^2 + 4y^2 = 144$

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10. Find the equation for the ellipse that satisfies the given conditions:Centre at (0, 0), major axis on the y–axis and passes through the points (3, 2) and (1, 6).

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11. Find the equation for the ellipse that satisfies the given conditions:b = 3, c = 4, centre at the origin; foci on a x axis.

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12. Find the equation for the ellipse that satisfies the given conditions:Ends of major axis $(\pm 3, 0)$, ends of minor axis $(0, \pm 2)$

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13. Find the equation for the ellipse that satisfies the given conditions:Vertices $(\pm 6, 0)$, foci $(\pm 4, 0)$

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14. Find the equation for the ellipse that satisfies the given conditions:Vertices $(0, \pm 13)$, foci $(0, \pm 5)$

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15. Find the equation for the ellipse that satisfies the given conditions:Vertices $(\pm 5, 0)$, foci $(\pm 4, 0)$

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16. Find the equation for the ellipse that satisfies the given conditions:Foci $(\pm 3, 0), a = 4$

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17. Find the equation for the ellipse that satisfies the given conditions:Length of minor axis 16, foci $(0, \pm 6)$.

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18. Find the equation for the ellipse that satisfies the given conditions:Length of major axis 26, foci $(\pm 5, 0)$

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19. Find the equation for the ellipse that satisfies the given conditions:Ends of major axis $(0, \pm\sqrt{5})$, ends of minor axis $(\pm 1, 0)$

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20. Find the equation for the ellipse that satisfies the given conditions:Major axis on the x–axis and passes through the points (4, 3) and (6, 2).

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Solved Examples

1. Find the equation of the hyperbola where foci are $(0, \pm 12)$and the length of the latus

rectum is 36.

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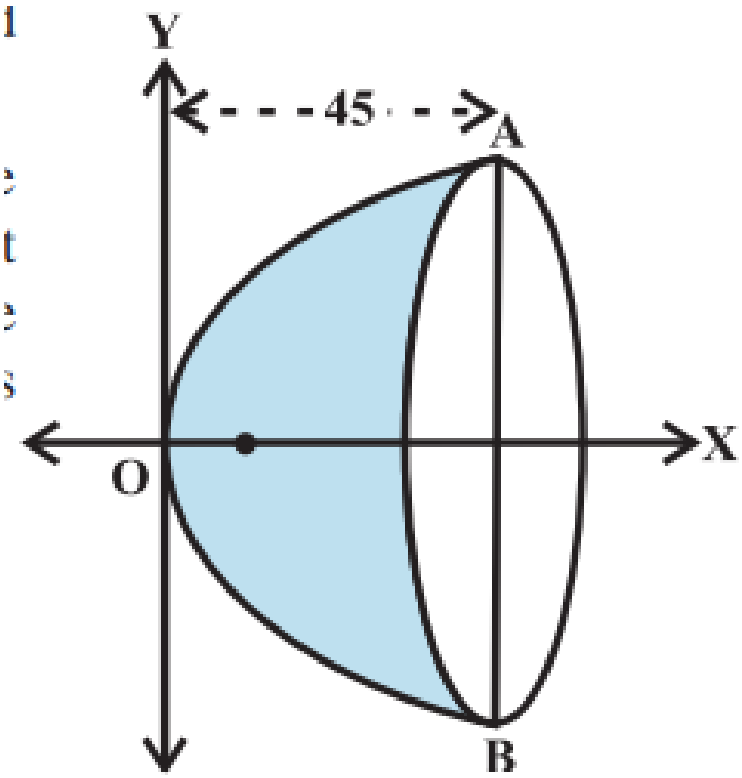
2. The focus of a parabolic mirror is at a distance of 5 cm from its vertex. If the mirror is

45 cm deep, find the distance AB



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3. Find the coordinates of the foci and the vertices, the eccentricity, the length of the latus rectum of the hyperbolas:

(i) $\frac{x^2}{9} - \frac{y^2}{16} = 1$ (ii) $y^2 - 16x^2 = 16$

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4. Find the equation of the hyperbola with foci $(0, \pm 3)$ and vertices $\left(0, \pm \frac{\sqrt{11}}{2}\right)$

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5. Find the equation of the ellipse, whose length of the major axis is 20 and foci are $(0, \pm 5)$.

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6. Find the equation of the ellipse, with major axis along the x-axis and passing through the points $(4, 3)$and $(-1, 4)$.

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7. Find the coordinates of the foci, the vertices, the lengths of major and minor axes and the eccentricity of the ellipse $9x^2 + 4y^2 = 36$.

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8. Find the equation of the ellipse whose vertices are $(\pm 13, 0)$ and foci are $(\pm 5, 0)$.

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9. A beam is supported at its ends by supports which are 12 metres apart. Since the load is connected at its centre, there is a deflection f 3 cm at the centre and the deflected beam is in the shape of a parabola. How far from the centre is the deflection 1 cm?

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10. A rod AB of length 15 cm rests in between two coordinate axes in such a way that the

end point A lies on x-axis and end point B lies on y-axis. A point P(x, y) is taken on the rod in such a way that AP = 6 cm. Show that the locus of P is an ellipse.

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11. Find an equation of the circle with centre at (0,0) and radius r.

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12. Find the centre and the radius of the circle

$x^2 + y^2 + 8x + 10y - 8 = 0.$

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13. Find the equation of the circle with centre

(–3, 2) and radius 4.

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14. Find the coordinates of the focus, axis, the equation of the directrix and latus rectum of the parabola $y^2 = 8x$.

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15. Find the equation of the circle which passes through the points $(2, -2)$, and (3,4) and whose centre lies on the line $x + y = 2$.

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16. Find the equation of the parabola with vertex at (0, 0) and focus at (0, 2).

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17. Find the equation of the parabola with focus (2, 0) and directrix $x = -2$.

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18. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$

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19. Find the equation of the parabola with vertex at origin, symmetric with respect to y-axis and passing through $(2, -2)$

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Exercise 11 4

1. Find the equations of the hyperbola satisfying the given conditions :Vertices $(\pm 7, 0), e = \frac{4}{3}$

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2. Find the equations of the hyperbola satisfying the given conditions :Foci $\left(0, \pm \sqrt{10}\right)$, passing through (2,3)

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3. Find the equations of the hyperbola satisfying the given conditions :Foci $(\pm 3\sqrt{5}, 0)$, the latus rectum is of length 8.

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4. Find the equations of the hyperbola satisfying the given conditions :Foci $(\pm 4, 0)$, the latus rectum is of length 12

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5. Find the equations of the hyperbola satisfying the given conditions

:Foci $(\pm 5, 0)$, the transverse axis is of length 8.

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6. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $\frac{x^2}{16} - \frac{y^2}{9} = 1$

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7. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $9y^2 - 4x^2 = 36$

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8. Find the coordinates of the foci and the vertices, the eccentricity and the length of the

latus rectum of the hyperbolas. $\frac{y^2}{9} - \frac{x^2}{27} = 1$

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9. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $5y^2 - 9x^2 = 36$

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10. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $16x^2 - 9y^2 = 576$

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11. Find the equations of the hyperbola satisfying the given conditions :Vertices $(\pm 2, 0), foci(\pm 3, 0)$

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12. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $49y^2 - 16x^2 = 784$

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13. Find the equations of the hyperbola satisfying the given conditions :Vertices $(0, \pm 3), foci(0, \pm 5)$

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14. Find the equations of the hyperbola satisfying the given conditions :Vertices $(0, \pm 5), foci(0, \pm 8)$

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Exercise 11 2

1. Find the equation of the parabola that satisfies the given conditions:Vertex (0, 0);

focus $(-2, 0)$

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2. Find the equation of the parabola that satisfies the given conditions:Vertex (0,0) passing through (2,3) arid axis is along x–axis.

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3. Find the equation of the parabola that satisfies the given conditions:Vertex (0, 0),

passing through (5, 2) and symmetric with respect to y–axis.

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4. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum.$y^2 = -8x$

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5. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum.$x^2 = 6y$

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6. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum. $x^2 = -16y$

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7. Find the equation of the parabola that satisfies the given conditions:

Focus $(6, 0)$; directrix $x = 6$

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8. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum.$x^2 = -9y$

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9. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum.$y^2 = 10x$

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10. Find the coordinates of the focus, axis of the parabola, the equation of the directrix and the length of the latus rectum.$x^2 = -16y$

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11. Find the equation of the parabola that satisfies the given conditions:Vertex (0, 0); focus (3,0)

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12. Find the equation of the parabola that satisfies the given conditions:Focus $(0, -3)$; directrix $y = 3$

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Miscellaneous Exercise

1. If a parabolic reflector is 20 cm in diameter and 5 cm deep, find the focus.

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2. An arch is in the form of a parabola with its axis vertical. The arch is 10 m high and 5 m wide at the base. How wide is it 2 m from the vertex of the parabola?

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3. The cable of a uniformly loaded suspension bridge hangs in the form of a parabola. The roadway which is horizontal and 100 m long is supported by vertical wires attached to the cable, the longest wire being 30 m and the shortest being 6 m. Find the length of a supporting wire attached to the roadway 18 m from the middle.

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4. An arch is in the form of a semi–ellipse. It is 8 m wide and 2 m high at the centre. Find the height of the arch at a point 1.5 m from one end.

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5. A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point P on the rod, which is 3 cm from the end in contact with the x–axis.

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6. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.

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7. A man running a racecourse notes that the sum of the distances from the two flag posts from him is always 10 m and the distance

between the flag posts is 8 m. Find the equation of the posts traced by the man.

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8. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ where one vertex is at the vertex of the parabola. Find the length of the side of the triangle.

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9. Find the equations of the hyperbola satisfying the given conditions :Foci $(0, \pm 13)$, the conjugate axis is of length 24.

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Exercise 11 1

1. Find the equation of the circle with centre : $(-2, 3)$and radius 4

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2. Find the equation of the circle with centre : $\left(\frac{1}{2}, \frac{1}{4}\right)$ and radius $\frac{1}{12}$

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3. Find the equation of the circle with centre :

(0, 2) and radius 2

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4. Find the centre and radius of the circles

$$(x+5)^2+(y-3)^2=36$$

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5. Find the centre and radius of the circles

$$x^2+y^2-4x-8y-45=0$$

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6. Find the equation of the circle with centre :

(1, 1) and radius $\sqrt{2}$

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7. Find the equation of the circle with centre :

$(-a, -b)$and radius $\sqrt{a^2 - b^2}$.

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8. Find the centre and radius of the circles

$$x^2 + y^2 - 8x + 10y - 12 = 0$$

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9. Find the centre and radius of the circles

$$2x^2 + 2y^2 - x = 0$$

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10. Does the point $(-2.5, 3.5)$ lie inside, outside or on the circle $x^2 + y^2 = 25$?

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11. Find the equation of a circle with centre (2, 2) and passes through the point (4, 5).

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12. Find the equation of the circle passing through the points $(2, 3)$and $(-1, 1)$and whose centre is on the line $x - 3y - 11 = 0$.

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13. Find the equation of the circle passing through the points (4, 1) and (6, 5) and whose centre is on the line $4x + y = 16$.

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14. Find the equation of the circle passing through (0, 0) and making intercepts a and b on the coordinate axes.

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15. Find the equation of the circle with radius 5 whose centre lies on x–axis and passes through the point (2, 3).

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