MATHS

BOOKS - KC SINHA ENGLISH

CONIC SECTIONS - FOR BOARDS

Solved Examples

1. Find the equation of the parabola whose: focus is (1,1) and the directrix is $x + y = 1 = 0$

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2. Find the equation of the parabola whose focus is $(1, -1)$ and whose vertex is $2, 1$. Also, find its axis and latus-rectum.

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3. Find the focus and the equation of the parabola whose vertex is $(6, -3)$ and directrix is $3x - 5y + 1 = 0$

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4. Find the equation of the parabola whose focus is $(1, 1)$ and equation of directrix is $x + y = 1$.

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5. Find the equation of the parabola which is symmetric about the y-axis, and passes through the point $(2, -3)$.

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6. Find the equation of the parabola whose axis is parallel to x-axis and which passes through points (0,0), (1,1) and (2, 3)`

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7. Find the equation of the parabola whose latus-rectum is $4units$, axis is the line $3x + 4y - 4 = 0$ and the tangent at the vertex is the line $4x - 3 + 7 = 0.$

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8. Find the equation of the parabola the extremities of whose latus rectum are (1, 2) and (1, -4).

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9. The equation of the parabola whose vertex and focus lie on the axis of x at distances a and a_1 from the origin, respectively, is (a) $y^2 - 4(a_1 - a)x$ (b) $y^2 - 4(a_1 - a)(x - a)$ (c) $y^2 - 4(a_1 - a)(x - a)$ (d) $none$

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

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11. Find the vertex, focus, directrix and length of the latus rectum of the parabola $y^2 - 4y - 2x - 8 = 0$

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12. Find the vertex, axis, focus, directrix, tangent at the vertex, and length of the latus rectum of the parabola $2y^2 + 3y - 4x - 3 = 0$.

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13. The focal distance of a point on the parabola $y^2 = 12\xi s4$. Find the abscissa of this point.

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14. Find the axis, tangent at the vertex, vertex, focus, directrix and latus rectum of the parabola $9y^2 - 16x - 12y - 57 = 0$

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15. Find the angle made by a double ordinate of length $8a$ at the vertex of the parabola $y^2 = 4ax$.

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16. An equilateral trinalge is inscribed in the parabola $y^2 = -8x$, where one vertex is at the vertex of the parabola. Find the length of the side of the tringle.

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17. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = -36y$ to the ends of the latus rectum.

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18. If y_1, y_2, y_3 be the ordinates of a vertices of the triangle inscribed in a parabola $y^3 = 4ax$, then show that the area of the triangle is $\frac{1}{8a}|(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$.

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

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20. An arc 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 high is it 2 m from the vertex of the parabola ?

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21. The cable of a uniformly loaded suspension bridge hangs in the form of a parabola. The roadway which is horizontal and 100m long is supported by vertical wires attached to the cable, the longest wire being 30m and the shortest

being 6m. Find the length of the supporting wire attached to the roadway 18m from the middle.

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22. Obtain the equation of the ellipse whose focus is the point (-1, 1), and the corresponding directrix is the line $x - y + 3 = 0$, and the eccentricity is $\frac{1}{2}$.

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23. Find the equation of the ellipse whose axes are parallel to the coordinate axes having its centre at the point $(2, -3)$ one focus at $(3, -3)$ and vertex at $(4, -3)$.

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24. 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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25. Find the equation of the ellipse whose foci are $(2, 3), (-2, 3)$ and whose semi-minor axes is $\sqrt{5}$

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26. Find the equation of the ellipse the extremities of whose minor axis are $(3, 1)$ and $(3, 5)$ and whose eccentricity is $\frac{1}{2}$.

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27. The equation of the ellipse with its centre at $(1, 2)$, one focus at $(6, 2)$ and passing through the point $(4, 6)$ is-

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28. Find the equation of the ellipse whose axes are along the coordinate axes, foci at $(0, \pm 4)$ and eccentricity 4/5.

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29. Find the equation of an ellipse the distance between the foci is 8 units and the distance between the directrices is 18 units.

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30. Find the equation of the ellipse with foci at $(\pm 5, 0) and x = \frac{36}{5}$ as one of the directrices.

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31. Find the equation of the ellipse that passes through the origin and has the foci at the points $(-1, 1)$ and $S'(1, 1)$.

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32. Find the length and equation of major and minor axes, centre, eccentricity, foci, equation of directrices, vertices and length of latus rectum of the ellipses : $\frac{x^2}{225} + \frac{y^2}{289} = 1$

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33. 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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34. For the ellipse $12x^2 + 4y^2 + 24x - 16y + 25 = 0$ centries $(-1, 2)$ b. lengths of the axes are $\sqrt{3}\, and\, 1$ c. eccentricity $= \sqrt{\frac{2}{3}}$ d. all of these

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35. Find the latus rectum, the eccentricity and coordinates of the foci of the ellipse $9x^2 + 5y^2 + 30y = 0$.

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36. 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 3cm from the end in contact with the x-axis.

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37. A rod AB of length $15cm$ rests in between two coordinate axes in such a way that the end point A lies on $x - a\xi s$ and end point B lies on $y - a\xi s$. A point is taken on the rod in such a way that $AP = 6cm$. Show that the locus of P is an ellipse. Also find its eccentricity.

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38. An arch way is in the shape of a semi-ellipse, the road level being the major axis. If the breadth

of the arch way is 30 feet and a man 6 feet tall just touches the top when 2 feet from the side, find the greatest height of the arch.

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39. An arc is in the form of a semi-ellipse. It is $8m$ wide and $2m$ high at the centre. Find the height of the arch at a point $1.5cm$ from one end.

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40. 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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41. Find the equation of the hyperbola whose one directrix is $2x + y = 1$, the corresponding focus is $(1, 2)$ and eccentricity is $\sqrt{3}$

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42. Find the equation of the hyperbola having $e = 32$ and foci at $(\pm 3, 0)$

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43. Find the equation of the hyperbola having eccentricity $e = \frac{4}{3}$ and vertices at $(0, \pm 7)$.

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44. Find the equation of the hyperbola, the length of whose latus rectum is 8, eccentricity is $\frac{3}{\sqrt{5}}$ and whose transverse and conjugate axes are along the x and y axes respectively.

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45. Find the equation of the hyperbola having vertices at $(\pm 5, 0)$ and foci at $(\pm 7, 0)$

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46. Find the equation of the hyperbola whose eccentricity is $\sqrt{2}$ and the distance between the foci is 16, taking transverse and conjugate axes of the hyperbola as $x \text{ and } y - axes$ respectively.

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47. Referred to the principal axes as the axes of coordinates find the equation of the hyperbola whose foci are at $\left(0, \pm\sqrt{10}\right)$ and which passes through the point $(2, 3)$.

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48. Find the equation of the hyperbola for which the distance between focie is $32, e = 2\sqrt{2}$ and transverse and conjugate axes are along $x \text{ and } y - axes$ respectively.

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49. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Find the equation of the hyperbola, if its eccentricity is 2.

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50. Find the length of the transverse axis, conjugate axis, eccentricity, vertices, foci and directrices of the hyperbola $9x^2 - 16y^2 = 144$.

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51. Find the length of axes of the ellipse whose eccentricity is 4/5 and whose foci coincide with those of the hyperbola $9x^2 - 16y^2 + 144 = 0$

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52. Find the length of the transverse and conjugate axes, eccentricity, centre, foci and directrices of the hyperbola. $9x^2 - 16y^2 - 72x + 96y - 144 = 0$

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53. Find the centre, eccentricity and foci of the hyperbola, $9x^2 - 16y^2 - 18x - 64y - 199 = 0$

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54. If $eande'$ the eccentricities of a hyperbola and its conjugate, prove that $\frac{1}{e^2}+\frac{1}{e'^2}=1$.

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55. If S and S'' are the foci, C is the centre, and P is a point on a rectangular hyperbola, show that $SP\times S'P=(CP_2)$.

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56. Find the equation of the locus of all points such that difference of their distances from $(4, 0)$ and $(-4, 0)$ is always equal to 2.

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Exercise

1. Find the equaiton of the parabola whose focus is $(0, -2)$ and directrix is $y = 2$.

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2. Find the equaiton of the parabola whose focus is $(0, -3)$ and $directrixis$y=3`.

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3. Find the equaiton of the parabola whose focus is $(4, 0)$ and directrix is $x = -4$

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4. Find the equation of parabola whose focus is $(6, 0)$ and directrix $x = -6$.

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

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6. Find the equation of the parabola whose focus is $(-1, 2)$ and $directrixis$x-2y-15=0`.

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7. Find the equation of the parabola whose focus is $(2, 3)$ and directrix is $x - 2y - 6 = 0$.

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9. Find the equation of the parabola whose focus is at $(-1, 1)$ and the directrix is $x + y + 1 = 0$.

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10. Find the equation of the parabola whose focus is (5,3) and directrix is the line 3x-4y+1=0.

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11. Find the equation of the parabola if the focus is the point $\left(\frac{5}{4}, -1\right)$ and the directrix is $4x - 13 = 0$.

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12. Find the equation of the parabola having ther vertex at $(0, 1)$ and the focus at $(0, 0)$.

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

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15. Find the equation of the parabola whose focus is $(3, 0)$ and vertex is $(0, 0)$.

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

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17. Find the equation of the parabola passing through (5, 2), having vertex at (0, 0) and symmetric about y-axis.

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19. Find the equation of the parabola whose focus is at (0, 0) and vertex is at the intersection of the

line $x + y = 1$ and $x - y = 3$.

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20. Prove that the equation of the parabola whose focus is (0, 0) and tangent at the vertex is $x - y + 1 = 0$ is $x^2 + y^2 + 2xy - 4x + 4y - 4 = 0$.

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21. Find the equation of the parabola with vertex is at $(2, 1)$ and the directrix is $x = y - 1$.

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22. Find the equatin to the parabola whose axis is parallel to the y-xis and which passes through the point $(0, 4), (1.9), \text{ and } (-2, 6)$ and determine its latus rectum.

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23. Equation of parabola which has its axis along x-axis and which passes through the points $(3, 2) \text{ and } (-2, -1)$ is

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24. Find the equation of a parabola whose end points of latus rectum are (3,5) and (3,-3).

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25. Find the equation of the parabola with its axis parallel to x-axis and which passes through the points $(1, 2), (-1, 3)$ and $(-2, 1)$.

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26. For each of that parabolas, find the coordinates of the focus, the equation of the directrix and the length of latus rectum : $x^2 = 6y$

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27. 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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28. For the following parabola find the coordinates of the focus, the equation of the directrix and the length of the latus rectum.

$y^2 = 12x$

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29. For each of that parabolas, find the coordinates of the focus, the equation of the directrix and the length of latus rectum :

$x^2 = -9y$

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30. For each of that parabolas, find the coordinates of the focus, the equation of the directrix and the length of latus rectum : $y^2 = -12x$

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31. For each of that parabolas, find the coordinates of the focus, the equation of the directrix and the length of latus rectum : $y^2 = 10x$

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32. For each of that parabolas, find the coordinates of the focus, the equation of the directrix and the length of latus rectum : $y^2 = -8x$

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33. 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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34. Find the vertex , focus, axis , directrix and latusrectum of the parabola $4y^2 + 12x - 20y + 67 = 0$.

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35. Find the vertex, focus, axis, directrix and latus rectum of that parabola : $(y-2)^2 = 3(x+1)$

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36. Find the vertex, focus, axis, directrix and latus rectum of that parabola : $y^2 - 3x - 2y + 7 = 0$

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37. Find the vertex, focus, axis, directrix and latus rectum of that parabola : $y^2 - 3x - 2y + 7 = 0$

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38. Find the focus and directrix of the parabola $3x^2 + 12x + 8y = 0.$

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39. Find the equation of the parabola with focus (5, 0), and directrix $x = -5$. Also, find the length of the latus rectum.

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40. Find the equation of the circle described on the line segment as diameter joining the foci of the parabolas $x^2 = 4ay$ and $y^2 = 4a(x - a)$ as diameter.

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41. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose vertex is at of the parabola. Find the length of its side.

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42. 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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43. PQ is a double ordinate of a parabola $y^2 = 4ax$. Find the locus of its points of trisection.

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44. The focus of a parabolic mirror as shown in the figure alongside is at a distance of 6cm from its vertex. If the mirror is 20cm deep, find the distance BC.

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45. A water jet from a function reaches it maximum height of 4 m at a distance 0.5 m from the vertical passing through the point O of water outlet. The height of the jet above the horizontal OX at a distance of 0.75 m from the point O is 5 m (b) 6 m (c) 3 m (d) 7 m

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47. Obtain the equation of the ellipse whose focus is the point (-1, 1), and the corresponding directrix is the line $x - y + 3 = 0$, and the eccentricity is $\frac{1}{2}$.

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48. Find the equation of the ellipse whose : One focus is $(6, 7)$, directrix is $x + y + 2$ and eccentricity is $\frac{1}{\sqrt{3}}$

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49. Find the equation to the ellipse whose one focus is (2, 1), the directrix is $2x - y + 3 = 0$ and the eccentricity is $\frac{1}{\sqrt{2}}$

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50. Find the equation of the ellipse with centre at the origin, the length of the major axis 12 and one focus at (4, 0).

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51. Find the equation of the ellipse whose centre is (-2,3) and whose semi axis are 3 and 2 when major axis is i. parallel to x-axis ii. parallel to y-axis.

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52. Find the equation of an ellipse whose vertices are $(0, \pm 10)$ and eccentricity $e = \frac{4}{5}$

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

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54. Find the equation of ellipse whose vetices are $(p, 5, 0)$ and foci are $(\pm 4, 0)$

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

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56. Find the equation of the ellipse whose vetices are $(\pm 6, 0)$ and foci are $(\pm 4, 0)$.

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57. Find the equation of the ellipse having, length of major axis 26 and foci $(\pm 5, 0)$

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

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59. Find the equation of the ellipse having, length of major axis 8 and foci $(\pm 3, 0)$

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60. Find the equation of the ellipse having, length of major axis 16 and foci $(0, \pm 6)$

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61. Find the equation of the ellipse passing through the point $(3, 2)$, having centre at $(0, 0)$ and major axis on y-axis.

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62. 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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63. If a be the length of semi-major axis, b the length of semi-minor axis and c the distance of one focus from the centre of an ellipse, then find the equation of the ellipse for which centre is (0, 0), foci is on x-axis, $b = 3$ and $c = 4$.

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64. The distance between the foci of an ellipse is 10 and its lactusrectum is 15, find its equation reffered to its axes as axes of cordinates.

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65. find the equation of the ellipse refer refer to it Centre whose major axis is equal to distance between the foci and latus rectum is 10.

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66. The eccentricity of an ellipse is $\frac{1}{2}$ and the distance between its foci is 4 units. If the major and minor axes of the ellipse are respectively along the x and y axes, find the equation of the ellipse

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67. Find the equation of the ellipse passing through (6, 4), foci on y-axis, centre at the origin and having eccentricity $\frac{3}{4}$.

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68. Find the equation of the ellipse passing through (4, 1) with focus as $(\pm 3, 0)$

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69. Find the equation of the set of all points whose distance from (0,4) are $\frac{2}{3}$ of their distance from the line y=9.

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70. Find the equation of the ellipse whose foci re (4,0) and (-4,0) eccentricity =1/3.

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71. Find the equation to the ellipse (referred to its axes as the axes of $x \; and \; y$ respectively) which passes through the point (-3,1) and has eccentricity $\sqrt{\frac{2}{5}}$

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72. If the angle between the lines joining the foce of any ellipse to an extremity of the minor axis is 90^0, find the accentricity. Find also the equation of the ellipse if the major axis is $2\sqrt{2}$.

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73. For the ellipse $9x^2 + 16y^2 = 144$, find the length of the major and minor axes, the eccentricity, the coordinatse of the foci, the vertices and the equations of the directrices.

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74. Find the lengths of the major and the minor axes, the coordinates of the foci, the vertices, the eccentricity, the length of latus rectum and the eqatuion of the directrices of that ellipses : $\frac{x^2}{169} + \frac{y^2}{25} = 1$

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75. Find the lengths of the major and the minor axes, the coordinates of the foci, the vertices, the eccentricity, the length of latus rectum and the

eqatuion of the directrices of that ellipses : $\frac{x^2}{25}+\frac{y^2}{169}=1$

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76. Find the lengths of the major and the minor axes, the coordinates of the foci, the vertices, the eccentricity, the length of latus rectum and the eqatuion of the directrices of that ellipses : $3x^2+2y^2=18$

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77. Find the lengths of the major and the minor axes, the coordinates of the foci, the vertices, the eccentricity, the length of latus rectum and the eqatuion of the directrices of that ellipses : $x^2 + 16y^2 = 16.$

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

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80. 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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81. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of latus rectum of that ellipses: $25x^2 + 4y^2 = 100$

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

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84. 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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85. 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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86. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of latus rectum of that ellipses: $\frac{x^2}{25}+\frac{y^2}{100}=1$

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87. Show that the following equation represents an ellipse and find its centre and eccentricity : $8x^2+6y^2-16x+12y+13=0$

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88. Find the centre, the length of the axes and the accentricity of the ellipse : $x^2 + 3y^2 - 4x - 12y + 13 = 0$

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89. Eccentricity of the ellipse $4x^2 + y^2 - 8x + 2y + 1 = 0$ is

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90. Find the latus rectum, eccentricity, coordinates of the foci and the length of axes of that ellipses : $9x^2 + 5y^2 - 30y = 0$

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91. Find the latusrectum,eccentricity,coordinates of the foci,coordinates of the vertices, the length of the axes and the centre of the ellipse $4x^2 + 9y^2 - 8x - 36y + 4 = 0$

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92. Find the eccentricity of an ellipse if its latus rectum is equal to one-half of its major axis.

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93. Find the eccentricity of the ellipse whose latus rectum is one third of the major axis.

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

point A lies on $x - a\xi s$ and end point B lies on $y - a\xi s$. A point is taken on the rod in such a way that $AP = 6cm$. Show that the locus of P is an ellipse. Also find its eccentricity.

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95. Find the equation of the hyperbola whose : focus is (2,2) directrix is $x + y = 9$ and eccentricity $= 2$.

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96. The equation of the directrix of a hyperbola is $x - y + 3 = 0$. Its focus is (-1,1) and eccentricity 3. Find the equation of the hyperbola.

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97. Find the equation of the hyperbola whose conjugate axis is 5 and the distance between the foci is 13.

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98. Find the equation of the hyperbola having foci $(0, \pm 4)$ and transverse axis of length. 6.

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99. Find the equation of the hyperbola with vertices at $(0, \pm 6)$ and $e = \frac{5}{3}$

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100. In each of the following find the equations of the hyperbola satisfying he given condition:

vertices $(0, \pm 5)$ ficu $(0, \pm 8)$

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101. Find the equation of the hyperbola having :

vertices $(0, \pm 3)$ and $foci(0, \pm 5)$.

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102. 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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103. find the equation of hyperbola having Vertices $(\pm 2, 0)$ and $foci(\pm 3, 0)$

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104. 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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105. find the equation of hyperabola where foci are (0,12) and (0,-12)and the length of the latus rectum is 36

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

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107. Foci $(0, \pm 13)$ the conjugate axis is length 24.

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108. 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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109. Find the equation of the hyperbola having vertices $(\pm 7, 0)$ and $e = \frac{4}{3}$.

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110. Find the equation of the hyperbola whose vertices are $(\pm 7, 0)$ and $e = \frac{4}{3}$.

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111. if in a hyperbola the eccentricity is $\sqrt{3}$ and the distance between the foci is 9 then the equation

of hyperbola in the standard form is:

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112. The equation of the hyperbola, whose foci are $(6, 4)$ and $(-4, 4)$ and eccentricity is 2, is

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113. The coordinates of the foci of a hyperbola are $(\pm 6, 0)$ and its latus rectum is of 10 units. Find the equation of the hyperbola.

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114. Find the equation to the hyperbola referred to its axes as coordinate axes whose conjugate axis is 7 and passes through the point $(3, -2)$.

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115. In the hyperbola $4x^2 - 9y^2 = 36$, find the axes, the coordinates of the foci, the eccentricity, and the latus rectum.

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116. Find the coordinates of the vertices, the foci, the eccentricity and the equations of directrices of the hyperbola $4x^2 - 25y^2 = 100$.

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117. Find the coordinates to the vertices, the foci, the eccentricity and the equation of the directrices of the hyperbola : $3x^2 - 2y^2 = 1$

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118. Find the eccentricity, coordinates of the foci equations of directrices and length of the latus rectum of the hyperbola $16x^2 - 9y^2 = 144$

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119. Find the coordinates to the vertices, the foci, the eccentricity and the equation of the directrices of the hyperbola : $16y^2 - 4x^2 = 1$

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120. Find the coordinates to the vertices, the foci, the eccentricity and the equation of the directrices of the hyperbola : $y^2 - 16x^2 = 16$.

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121. 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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122. 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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123. Find the foci, vertices, eccentricity and length of latus rectum of the hyperbola : $3y^2 - x^2 = 27.$

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124. 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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125. Find the foci, vertices, eccentricity and length of latus rectum of the hyperbola : $\frac{y^2}{4} - \frac{x^2}{9} = 1.$

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126. Find the centre, eccentricity, foci and directrices of the hyperbola : $16x^2 - 9y^2 + 32x + 36y - 164 = 0$

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127. Show that the equation $9x^2 - 16y^2 - 18x - 64y - 199 = 0$ represents a hyperbola. Fof this hyperbola, find the length of axes, eccentricity, centre, foci, vertices, latus rectum and directrices.

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128. Find the length of axes, eccentricity, centre, foci and latus rectum of the hyperbola $16x^2 - 3y^2 - 32x - 12y - 44 = 0.$

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129. Foot of perpendicular from point P on hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ to its transverse axis is N. If A and A' are vartices of hyperbola and Q divides AP in the ratio $a^2 : b^2$, then prove that NQ is perpendicular to A'P. Vertix A is near to point P.

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130. Prove that the locus of the point of intersection of the lines $\sqrt{3}x - y - 4\sqrt{3}k = 0$ and $\sqrt{3}kx + ky - 4\sqrt{3} = 0$, for different values of k, is a hyperbola whose eccentricity is 2.

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