MATHS

BOOKS - A N EXCEL PUBLICATION

CONIC SECTION

Question Bank

1. Find the equation of the circle with (a) centre (0,2) and radius 2 (b) centre (-2,3) and radius 4

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2. Find the equation of the circle in following cases.

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

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4. Find the equation of the circle with centre (-a,-b) and radius $\sqrt{a^2 - b^2}$

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5. Find the centre and the radius of the following circle $(x + 5)^2 + (y - 3)^2 = 36$

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6. Find the centre and radius of the following circles.

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

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7. Find the centre and radius of the circle.

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

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8. Find the centre and radius of the following circles.

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

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9. 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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10. 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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11. 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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12. Find the equation of the circle passing through (0,0) and making intercepts a and b on the co-ordinate axes.

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13. Find the equation of the circle with centre (2,2) and passing through the point(4,5).

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

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15. Consider a circle with centre (2,-1) and which passes through (3,6) Find the radius of the circle

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16. Consider a circle with centre (2,-1) and which passes through (3,6).Find the equation of the circle

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17. Find the point of intersection of the lines $3x-y = 2$ and $x+2y = 3$

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18. If the lines $3x-y = 2$ and $x+2y = 3$ are two diameters of a circle and if the circle passes through (2,0), find the equation of the circle.

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19. If (-a,-a) are the co-ordinates of a point which lies on $x-2y = 3$, find the value of a

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20. Find, the equation of the circle which touches both the axes and whose centre lies on $x-2y=3$

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21. Consider a triangle whose sides are along $x+y=2$, $3x-4y=6$ and $x-y=0$

Find the vertices of the triangle

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22. Consider a triangle whose sides are along $x+y = 2$, $3x-4y = 6$ and $x-y = 0$ .Prove that the triangle is right angled

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23. Consider a triangle whose sides are along $x+y = 2$, $3x-4y = 6$ and $x-y = 0$.Find the mid point of the hypotenuse and the length of the hypotenuse

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24. Consider a triangle whose sides are along $x+y = 2$, $3x-4y = 6$ and $x-y = 0$

Find the equation of the circum circle of the triangle

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25. Consider the points A (4,3), B (8,-3) and C (0,9).Find the slopes of AB and BC

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26. Consider the points A (4,3), B (8,-3) and C (0,9)

Prove that A, B, C can't lie on a circle

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27. Express the equation $2x^2 + 2y^2 - 3x + 4y - 1 = 0$ in standard form

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28. Find the centre and radius of the circle

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29. Prove that the equations of concentric circles differ only in the constant term

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30. Find the radius and hence the area of the circle $x^2 + y^2 - 6x + 12y + 15 = 0$

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31. Find the equation of the circle concentric with the circle $x^2 + y^2 - 6x + 12y + 15 = 0$ and double of its area

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32. Consider the circle $x^2 + y^2 - 4x - 6y - 3 = 0$.What is the general form of the equation of a circle concentric with the given circle?

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33. Consider the circle

$x^2 + y^2 - 4x - 6y - 3 = 0$

Find the radius of the circle

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34. Consider the circle

$x^2 + y^2 - 4x - 6y - 3 = 0$

If this circle touches the y axis, find its equation

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35. Arun draws a circle with centre at (-1,-2) and radius $\sqrt{5}$. What may be its algebric equation?

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36. If (-1,-2) and (5,2) are the end points of a diameter of a circle, find its centre and radius

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37. Can you write the equation of circle by using two different methods?

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38. Write the slopes of the lines $2x+3y-9=0$ and $4x+6y+19=0$. What do you observe?

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39. Find the distance between them.

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40. If they are the tangents of a circle, write the radius of the circle

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41. Find the centre of the circle $x^2 + y^2 - 5x + 2y - 48 = 0$

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42. Prove that (5,6) lies on the circle $x^2 + y^2 - 5x + 2y - 48 = 0$

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43. Find the equation of this normal

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44. Complete the following table

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45. Find the equation of the circle passing through (1,0),(2,-7) and (8,1). Hence prove that (1,0),(2,-7),(8,1) and (9,-6) are concyclic

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46. For the following parabolas find the co-ordinates of the focus, equation to the directrix, equation to the axis, co-ordinates of the vertex and length of latus rectum. $y^2 = 6x$

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47. For the following parabolas find the co-ordinates of the focus, equation to the directrix, equation to the axis, co-ordinates of the vertex and length of latus rectum. $2y^2 = -8x$

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48. For the following parabolas find the co-ordinates of the focus, equation to the

directrix, equation to the axis, co-ordinates of the vertex and length of latus rectum. $x^2 = 4y$

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49. For the following parabolas find the co-ordinates of the focus, equation to the directrix, equation to the axis, co-ordinates of the vertex and length of latus rectum. $16x^2 = -25y$

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50. Find the equation of the parabola if the vertex is at the origin and the focus is (1,0)

51. Find the equation of the parabola if the vertex is at the origin and the focus is (0,-4)

52. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum $y^2 = 12x$

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53. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum $x^2 = 6y$

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54. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum $y^2 = -8x$

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55. In each of the following cases, find the co-ordinates of the focus, equation of axis of the parabola, the equations of the directrix and

the length of the latus rectum

$x^2 = -16y$

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56. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum

$y^2 = 10x$

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57. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum

$x^2 = -9y$

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58. Find the equation of the parabola satisfying the following condition,

focus(6,0), directrix $x = -6$.

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59. Find the equation of the parabola whose focus is (0,-3) and directrix is y=3

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

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61. Find the equation of the parabola whose vertex is (0,0) and focus is (-2,0)

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62. Find the equation of the parabola satisfying the following condition,

Vertex (0,0) passing through (2,3) and axis along x-axis.

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63. Find the equation of the parabola whose vertex is (0,0) which is passing through (5,2) and which is symmetric with respect to y-axis

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64. What is the general form of the equation of a parabola with vertex at the origin and axis as the x-axis?

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65. Find the equation of a parabola with vertex at the origin, focus at (4,0) and directrix x=-4

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66. Find the equation of the parabola satisfying the following condition,

Vertex (0,0) passing through (2,3) and axis along x-axis.

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67. Find the focus and latus rectum of this parabola

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68. A parabolic path is with focus (-6,-6) and vetex (-2,-2).Find the equation of the parabolic path.

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69. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the vertex of the parabola

if 1 cms is the side of the equilateral triangle prove that the length of each altitude of the triangle is $\frac{1\sqrt{3}}{2} cms$

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70. An equilateral triangle with side 1c.m is inscribed in the parabola $y^2 = 4ax$ whose one

vertex is at the vertex of the parabola

Prove that $\left[\frac{1\sqrt{3}}{2}, \frac{1}{2}\right]$ is a point on the parabola

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71. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the vertex of the parabola

Show that $sideofthe \triangle = 8\sqrt{3}acms$

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72. In each of the following cases, find the co-ordinates of the focus, axis of the parabola, the equations of the directrix and the length of the latus rectum $x^2 = 6y$

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73. Find the equation of the directrix of the parabola $y^2 = -12x$

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74. Find the length of the latus rectum of the parabola $x^2 = -8y$

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75. Suppose that a parabola has vertex (0,4) and focus (0,2) Is y-axis the axis of the parabola?

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76. Suppose that a parabola has vertex (0,4) and focus (0,2)

Prove that the equation of the directrix of the parabola is y=6

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77. Suppose that a parabola has vertex (0,4) and focus (0,2)

Prove that the equation of the parabola is $x^2 + 8y - 32 = 0$

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78. Complete the following table

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79. Find the equation of the parabola with vertex at the origin and focus at (-4,0)

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80. Match the following

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81. Find the lengths of the major and minor axis, co-ordinates of foci and vertices, eccentricity and equation to directrices for the ellipse, $9x^2 + 25y^2 = 225$

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82. Find the ellipse satisfying the following conditions:

vertex $(\pm 5, 0)$, foci $(\pm 4, 0)$

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83. Find the equation to the ellipse with axes along the x-axis and y-axis , with centre origin and which passes through the points P(4,3) and Q(6,2)

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84. Find the equation of the ellipse passing through (4,1) and which is having foci $(\pm 3, 0)$

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85. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the following ellipses. $\frac{x^2}{36} + \frac{y^2}{16} = 1$

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86. Find the coordinate of the foci, the verticles,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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87. Find the coordinate of the foci, the verticles,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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88. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the following ellipses

$$\frac{x^2}{25} + \frac{y^2}{100} = 1$$

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89. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the following ellipses $\frac{x^2}{49} + \frac{y^2}{36} = 1$

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90. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor

axis, the eccentricity and the length of the latus rectum of the following ellipses $\frac{x^2}{100} + \frac{y^2}{400} = 1$

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91. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the following ellipses $36x^2 + 4y^2 = 144$

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92. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the latus rectum of the following ellipses

$16x^2 + y^2 = 16$

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93. Find the co-ordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the length of the

latus rectum of the following ellipses

$4x^2 + 9y^2 = 36$

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94. Find the ellipse satisfying the following conditions:

vertex $(\pm 5, 0)$, foci $(\pm 4, 0)$

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

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

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97. Find the equation of the ellipse satisfying the conditions ends of major axis are $(0, \pm\sqrt{5})$ and ends of minor axis are $(\pm 1, 0)$

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98. Find the equations of the ellipse whose end points of major axis are $(\pm 3, 0)$ and end points of minor axis are $(0, \pm 2)$

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99. Find the equations of the ellipse satisfying the conditions length of minor axis is 16 and foci are $(0, \pm 6)$

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100. Find the equations of the ellipse satisfying the conditions

minor axis is 16 and foci are $(0, \pm 6)$

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101. Find the equation of the ellipse whose length of major axis is 26 and foci are $(\pm 5, 0)$

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102. Find the equation of the ellipse whose foci are $(\pm 3, 0)$ and $a = 4$

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103. Find the equations of the ellipse having the following properties

centre is at (0,0) and major axis as Y axis.

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104. Centre at (0,0), major axis on the y-axis and passes through the points (3,2) and (1,6).

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105. Find the ellipse satisfying the following conditions:

$b = 3, c = 4$, centre at origin, foci on the x-axis.

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106. Find the equation of the ellipse with major axis on the x-axis and passes through the points (4,3) and (6,2)

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107. Express the equation $3x^2 + 2y^2 = 6$ of an ellipse in standard form

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108. Consider the equation of the ellipse $3x^2 + 2y^2 = 6$.Find e, foci, directrices, length of major axis and minor axis and length of latus rectum of the above ellipse

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109. Express the equation $9x^2 + 16y^2 = 144$ of an ellipse standard form

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110. Find the length of major axis and minor axis, co-ordinates of foci and vertices and the eccentricity of the ellipse $9x^2 + 16y^2 = 144$

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111. Consider an ellipse whose foci are $(\pm 2\sqrt{3}, 0)$ and which passes through $(2\sqrt{3}, 1)$ Prove that the equation of the ellipse may be written as $\frac{x^2}{a^2} + \frac{y^2}{a^2 - 12} = 1$

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112. Consider an ellipse whose foci are $(\pm 2\sqrt{3}, 0)$ and which passes through $(2\sqrt{3}, 1)$

Find the value of a^2

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113. Consider an ellipse whose foci are $(\pm 2\sqrt{3}, 0)$ and which passes through $(2\sqrt{3}, 1)$ Prove that the equation of the ellipse is $x^2 + 4y^2 = 16$

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114. Consider an ellipse with eccentricity 4/5, foci on y-axis, centre at origin and which is passing through $(3\sqrt{2}, 5\sqrt{2})$

Assuming the equation of the ellipse as $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$, prove that $a^2 = 100$

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115. Consider an ellipse with eccentricity 4/5, foci on y-axis, centre at origin and which is passing through $\left(3\sqrt{2}, 5\sqrt{2}\right)$

Prove that the equation of the ellipse is $\frac{x^2}{36} + \frac{y^2}{100} = 1$

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116. Complete the following table

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117. For the hyperbola $9x^2 - 16y^2 = 144$ .find the vertices, foci and eccentricity

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118. Find the equation of the hyperbola with vertices $(\pm 5, 0)$ and foci $(\pm 7, 0)$

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119. Determine the eccentricity and length of latus rectum of the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$

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120. Find the coordinates of foci, the vertices, eccentricity and length of latus rectum of the following hyperbolas.

$$\frac{y^2}{9} - \frac{x^2}{27} = 1$$

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121. Find the co-ordinates of the foci and vertices, the eccentricity and the length of latus rectum of the following hyperbolas

$$9y^2 - 4x^2 = 36$$

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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 for $16x^2 - 9y^2 = 576$

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123. Find the coordinates of foci, the vertices, eccentricity and length of latus rectum of the

following hyperbolas.

$5y^2 - 9x^2 = 36$

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124. Find the co-ordinates of the foci and vertices, the eccentricity and the length of latus rectum of the following hyperbolas

$49y^2 - 16x^2 = 784$

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125. Find the hyperbola satisfying the following conditions:

Vertices $(\pm 2, 0)$, foci $(\pm 3, 0)$.

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126. Find the equations of the hyperbola having vertices $(0, \pm 3)$ and foci $(0, \pm 5)$

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127. Find the equation of the hyperbola having foci $(\pm 5, 0)$ and transverse axis with length 8

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128. Find the hyperbola satisfying the following conditions:

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

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129. Find the hyperbola satisfying the following conditions:

Foci $\left(\pm 3\sqrt{5}, 0\right)$, the latus rectum is of length 8.

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130. Find the equation of the hyperbola having foci $\left(\pm 4, 0\right)$ an d latus rectum with length 12

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131. Find the hyperbola satisfying the following conditions:

Vertices $(\pm 7, 0), e = \frac{4}{3}$.

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132. Find the equation of the hyperbola having foci $\left(0, \pm\sqrt{10}\right)$ and which is passing through (2,3)

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133. Express the equation $16x^2 - 9y^2 = 144$ of a hyperbola in standard form

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134. Find the length of transverse axis and conjute axis, eccentricity and the co-ordinates of foci and vertices of $16x^2 - 9y^2 = 144$

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135. Express the equation $3x^2 - y^2 = 4$ of a hyperbola in standard form

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136. Find the eccentricity, vertices, foci, equations to the directrices, length of transverse axis and conjugate axis and the length of latus rectum of the hyperbola $3x^2 - y^2 = 4$

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137. Consider the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

If the hyperbola passes through (3,0), find a^2

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138. Consider the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

If the hyperbola passes through $(3, 0)$ and $(3\sqrt{2}, 2)$, find the eccentricity of the hyperbola

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139. Suppose $x = \frac{e^t + e^{-t}}{2}$ and $y = \frac{e^t - e^{-t}}{2}$ are the parametric equations of a curve

Find e^t and e^{-t} in terms of x and y

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140. Suppose $x = \frac{e^t + e^{-t}}{2}$ and $y = \frac{e^t - e^{-t}}{2}$ are the parametric equations of a curve

Eliminate t and obtain the cartesian equation

of the curve. Hence, prove that the given curve is a hyperbola

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141. Complete the following table

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142. Consider the ellipse $\frac{x^2}{4}+\frac{y^2}{3}=1$ and the hyperbola $\frac{x^2}{64}-\frac{y^2}{b^2}=1$. Find the

eccentricity of the ellipse

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143. Consider the ellipse $\frac{x^2}{4}+\frac{y^2}{3}=1$ and the hyperbola $\frac{x^2}{64}-\frac{y^2}{b^2}=1$.Find the eccentricity of the hyperbola

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144. Consider the ellipse $\frac{x^2}{4}+\frac{y^2}{3}=1$ and the hyperbola $\frac{x^2}{64}-\frac{y^2}{b^2}=1$.If the

eccentricities of ellipse and hyperbola are reciprocals to each other, find b^2

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

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146. An arch is in the form of a parabola with its axis vertical. The arch is 10m high and 5m

wide at the base. How wide is it at 2 m from the vertex of the paraabola

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147. An arch 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 1.5m from one end.

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148. A rod of length 12 cm moves with its ends always touching the co-ordinates axes. Determine the equations 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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149. 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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150. A man running a race course notes that the sum of the distances from 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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151. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose one vertex is at the

vertex of the parabola

Show that $sideofthe\ \triangle\ = 8\sqrt{3}acms$

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