MATHS

BOOKS - MBD MATHS (ODIA ENGLISH)

CONIC SECTIONS

Question Bank

1. Fill in the blanks by choosing the correct answer from the given alternatives : The

center of the circle $x^2 + y^2 + 2x - 6y + 1 = 0$ is _____.

A. (2, -6)

B. (-2, 6)

C. (-1, 3)

D. (1, -3)

Answer:

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2. Fill in the blanks by choosing the correct answer from the given alternatives :The equation $2x^2 - ky^2 - 6x + 4y - 1 = 0$ represents a circle if k = _____.

A. 2

B. -2

C. 0

D. 1

Answer:

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3. Fill in the blanks by choosing the correct answer from the given alternatives : The point (-3, 4) lies _____the circle $x^2 + y^2 = 16$

A. outside

B. inside

C. on

D.

Answer:

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4. Fill in the blanks by choosing the correct answer from the given alternatives : The line y = x + k touches the circle $x^2 + y^2 = 16$ if k = _____.

A. $\pm 2\sqrt{2}$

B. $\pm 4\sqrt{2}$

C. $\pm 8\sqrt{2}$

D. $\pm 16\sqrt{2}$

Answer:

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5. Fill in the blanks by choosing the correct answer from the given alternatives : The radius of circle $x^2 + y^2 - 2x + 4y + 1 = 0$ is _____.

A. 1

B. 2

C. 4

D. $\sqrt{19}$

Answer:

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6. State (with reasons), which of the following are true or false : Every second degree equation in x and y represents a circle.

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7. State (with reasons), which of the following are true or false : The circle $(x-1)^2+(y-1)^2=1$ passes through origin.

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8. State (with reasons), which of the following are true or false : The line y = 0 is a tangent to the circle $(x+1)^2+(y-2)^2=1$.

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9. State (with reasons), which of the following are true or false : The radical axis of two circles always passes through the center of one of the circles.

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10. State (with reasons), which of the following are true or false : The circles $x^2 + (y-3)^2 = 4$ and $(x-4)^2 + y^2 = 9$ touch each other.

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11. Find the equation of circles determined by the following conditions. The centre at (1, 4) and passing through (-2, 1).

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12. Find the equation of circles determined by the following conditions.The centre at (-2, 3) and passing through origin.

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13. Find the equation of circles determined by the following conditions. The centre at (3, 2) and circle is tangent to x-axis.

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14. Find the equation of circles determined by the following conditions. The centre at (-1, 4) and circle tangent to y-axis.

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15. Find the equation of circles determined by the following conditions. The ends of diameter are (-5, 3) and (7, 5).

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16. Find the equation of circles determined by the following conditions. The radius is 5 and circle is tangent to both axes.

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17. Find the equation of circles determined by the following conditions.The centre is on the x-axes and the circle passes through the origin and the point (4, 2).

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18. Find the equation of circles determined by the following conditions. The centre is on the line $8x+5y=0$ and the circle passes through the points (2, 1) and (3, 5).

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19. Find the equation of circles determined by the following conditions. The centre is on the line $2x+y-3=0$ and the circle passes through the points $(5, 1)$ and $(2, -3)$.

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20. Find the equation of circles determined by the following conditions. The circle touches

the axis of x at (3, 0) and also touches the line $3y - 4x = 12$.

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21. Find the equation of circles determined by the following conditions. Circle is tangent to x-axis and passes through (1, -2) and (3, -4)

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22. Find the equation of circles determined by the following conditions. Circle passes through origin and cuts off intercepts a and b from the axes.

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23. Find the equation of circles determined by the following conditions. Circle touches the axis of x at a distance 3 from origin and intercepts a distance of 6 on the y-axis.

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24. Find the centre and radius of the following circles : $x^2 + y^2 + 6x - 4y - 12 = 0$

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25. Find the centre and radius of the following circles : $ax^2 + ay^2 + 2gx + 2fy + K = 0$

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26. Find the centre and radius of the following circles : $4x^2 + 4y^2 - 4x + 12y - 15 = 0$

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27. Find the centre and radius of the following circles : $a\left(x^2 + y^2\right) - bx - cy = 0$

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28. Obtain the equation of circles passing through the following points and determine

the coordinates of centre and radius of the circle in each case : the points (3, 4) (4, -3) and (-3, 4).

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29. Obtain the equation of circles passing through the following points and determine the coordinates of centre and radius of the circle in each case : the points (2, 3) (6, 1) and (4, -6).

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30. Obtain the equation of circles passing through the following points and determine the coordinates of centre and radius of the circle in each case : the points (a, 0), (-a, 0) and (0, b).

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31. Obtain the equation of circles passing through the following points and determine the coordinates of centre and radius of the

circle in each case : the points (-3, 1), (5, -3) and (-3, 4).

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32. Find the equation of the circles circumscribing the triangles formed by the lines given below : the lines $x = 0$, $y = x$, $2x + 3y = 10$

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33. Find the equation of the circles circumscribing the triangles formed by the lines given below : the lines $x = 0$, $y = 0$, $3x + 4y - 12 = 0$

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34. Find the equation of the circles circumscribing the triangles formed by the lines given below : the lines $y = x$, $y = 2$, and $y = 3x + 2$

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35. Find the equation of the circles circumscribing the triangles formed by the lines given below : the lines x + y = 6, 2x + y = 4 and x + 2y = 5

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36. Find the coordinates of the points where the circle $x^2 + y^2 - 7x - 8y + 12 = 0$ meets

the coordinates axes and hence find the intercepts on the axes.

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37. Find the equation of the circle passing through the point (1, -2) and having its centre at the point of intersection of lines $2x-y+3=0$ and $x+2y-1=0$.

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38. Find the equation of the circle whose ends of a diameter are the points of intersections of the lines and $x+y-1=0$, $4x+3y+1=0$ and $4x+y+3=0$, $x-2y+3=0$.

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39. Find the equation of the circle inscribed inside the triangle formed by the line $x/4+y/3=1$ and the co-ordinate axes.

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40. Find the equation of the circle with its centre at (3, 2) and which touches to the line $x+2y-4=0$.

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41. The line $3x + 4y + 30 = 0$ is a tangent to the circle whose centre is at $(-12/5, -16/5)$. Find the equation of the circle.

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42. Prove that the points (9, 7), (11, 3) lie on a circle with centre at origin. Find the equation of the circle.

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43. Find the equation of the circle which touches the line $x = 0$, $x = a$ and $3x + 4y + 5a = 0$.

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44. If a circle touches the co-ordinate axes and also touches the straight line x/a + y/b = 1 and has its centre in the 1st quadrant, find its equation.

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45. ABCD is a square of side 'a'. If AB and AD are taken as co-ordinate axes, prove that the equation of the circle circumscribing the square is $x^2 + y^2 = a(x + y)$.

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46. Find the equation of the tangent and normal to the circle $x^2 + y^2 = 25$ at the point (3, -4).

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47. Find the equation of the tangent and normal, to the circle, $x^2 + y^2 - 3x + 4y - 31 = 0$ at the point (-2, 3).

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48. Find the equation of the tangents to the circle $x^2 + y^2 + 4x - 6y - 16 = 0$ at the point where it meets the y-axis.

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49. Find the condition under which the tangents at (x_1, y_1) and (x_2, y_2) to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ are perpendicular.

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50. Calculate the radii and distance between the centres of the circle whose equations are,

$x^2 + y^2 - 16x - 10y + 8 = 0$

$x^2 + y^2 + 6x - 4y - 36 = 0$

Hence or otherwise prove that the tangents drawn to the circles at their points of intersection are perpendicular.

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51. Find the equation of the tangents to the circle $x^2 + y^2 = 9$, perpendicular to the line x - y - 1 = 0.

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52. Find the equation of the tangents to the circle $x^2 + y^2 - 2x + 4y = 4$, parallel to the line 3x + 4y = 1

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53. Show that the line x - 7y + 5 = 0 is a tangent to the circle $x^2 + y^2 - 5x + 5y = 0$. Find the point of contact. Find also the equation of tangent parallel to the given line.

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54. Prove that the line ax + by + c = 0 will be a tangent to the circle $x^2 + y^2 = r^2$ if $r^2(a^2 + b^2) = c^2$.

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55. prove that the line 2x + y = 1 is a tangent to the circle $x^2 + y^2 + 6x - 4y + 8 = 0$.

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56. If the line 4y - 3x = k is a tangent to the circle $x^2 + y^2 + 10x - 6y + 9 = 0$ find 'k'. Also find the co-ordinates of the point of contact.

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57. Find the length of the tangent, drawn to the circles $x^2 + y^2 + 10x - 6y + 8 = 0$ from the centre of the circle $x^2 + y^2 - 4x = 0$

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58. Find the length of the tangent drawn from the point (2, -1) to the circle $x^2 + y^2 - 6x + 10y + 18 = 0.$

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59. Find the length of the tangent drawn from the point $(4, 7)$ to the circle $x^2 + y^2 = 15$.

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60. Prove that the circles given by the equations $x^2 + y^2 + 2x - 8y + 8 = 0$ and $x^2 + y^2 + 10x - 2y + 22 = 0$ touches each other externally. Find also the point of contact.

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61. Prove that the circles given by the equations $x^2 + y^2 = 4$ and $x^2 + y^2 + 6x + 8y - 24 = 0$ touche each other and find the equation of the common tangent.

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62. Prove that the two circles $x^2 + y^2 + 2by + c^2 = 0$ and $x^2 + y^2 + 2ax + c^2 = 0$, will touch each other $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$.

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63. Prove that the circles given by $x^2 + y^2 + 2ax + 2by + c = 0,$ and $x^2 + y^2 + 2bx + 2ay + c = 0,$ touch each other, if (a + b)^2 = 2c.

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64. Find the equation of the circle through the point of intersection of circles

$x^2 + y^2 - 6x = 0$ and $x^2 + y^2 + 4y - 1 = 0$

and the point (-1, 1).

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65. Find the equation of the circle passing through the intersection of the circles, $x^2 + y^2 - 2ax = 0$ and $x^2 + y^2 - 2by = 0$ and having the centre on the line x/a - y/b = 2.

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66. Find the radical axis of the circles $x^2 + y^2 - 6x - 8y - 3 = 0$ and $2x^2 + 2y^2 + 4x - 8y = 0.$

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67. Find the radical axis of the circles $x^2 + y^2 - 6x + 8y - 12 = 0$ and $x^2 + y^2 + 6x - 8y + 12 = 0.$ Prove that the radical axis is perpendicular to the line joining the centers of the two circles.

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68. If centre of one circle lies on or inside another, prove that the circle cannot be orthogonal.

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69. If a circle S intersects circles S_1 and S_2 orthogonally. Prove that the centre of S lies on the radical axis of S_1 and S_2.

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70. R is the radical centre of circles S_1, S_2 and S_3. Prove that if R is on/inside/outside one of the circles then it is similarly situated with respect to other two.

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71. Determine a circle which cuts orthogonally each of the circles.

$S_1 : x^2 + y^2 + 4x - 6y + 12 = 0$

$S_2 : x^2 + y^2 + 4x + 6y + 12 = 0$

$S_3 : x^2 + y^2 - 4x + 6y + 12 = 0$

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72. Prove that on pair of concentric circles can have a radical axis.

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73. The equation of the directrix to the parabola $x^2 = -6y$is _____.

A. y+6=0

B. 2y-3=0

C. y-6=0

D. 2y+3=0

Answer: B

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74. The eccentricity of the parabola $y^2 = 8x$ is _____.

A. 2

B. 8

C. 0

D. 1

Answer: D

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75. The line y+x=k is tangent to the parabola $y^2 + 12x = 0$ if k=_____.

A. (-3)

B. 3

C. 6

D. (-6)

Answer: B

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76. The latus rectum of the parabola `(y-2)^2=8(x+3) is _____.

A. 2

B. 4

C. 8

D. 16

Answer: C

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77. The equation of tangent to the parabola $x^2 = 6y$ at vertex is _____.

A. x=0

B. y=0

C. x=-3/2

D. y=-3/2

Answer: B

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78. The equation of axis of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is _____.

A. x=4

B. y=3

C. x=0

D. y=0

Answer: D

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79. The equation of the major axis of ellipse $\frac{(x+1)^2}{16} + \frac{(y-2)^2}{9} = 1$ is _____.

A. x=4

B. x=-1

C. y=5

D. y=2

Answer: B

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80. The distance between the focii of the ellipse $3x^2 + 4y^2 = 1$ is ____.

A. 1

B. 1/sqrt3

C. 2/sqrt3

D. 1/2sqrt3

Answer: B

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81. The ecentricity of the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ is _____.

A. 4/5

B. 5/4

C. 3/5

D. 16/25

Answer: C

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82. The line y=2x+k is a tangent to the ellipse $5x^2 + y^2 = 5$ if k =____.

A. 2

B. 5

C. sqrt3

D. sqrt(21)

Answer: C

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83. The length of the latus rectum of the ellipse $\frac{(x-2)^2}{4}+\frac{(y+3)^2}{25}=1$ is _____.

A. 4/25

B. 2/5

C. 5/2

D. 8/5

Answer: D

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84. The equation of the conjugate axis of the hyperbola $\frac{x^2}{9} - \frac{(y+2)^2}{16} = 1$ is _____

A. x=0

B. x=3

C. y=-2

D. y=4

Answer: A

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85. The hyperbola $\frac{y^2}{16} - \frac{x^2}{12} = 1$ intersects x-axis at _____.

A. $(0, \pm 4)$

B. `(+-2 sqrt3,0)

C. (2,0)

D. no where

Answer: D

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86. The eccentricity of the parabola $4x^2 - 3y^2 = 1$ is _____.

A. 4/3

B. 3/4

C. $\frac{\sqrt{21}}{3}$

D. $\frac{\sqrt{7}}{2}\sqrt{3}$

Answer: C

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87. The latus rectum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$ is _____.

A. 16/9

B. 9/16

C. 1/9

D. 32/9

Answer: D

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88. The line y=3x-k is a tangent to the hyperbola $6x^2 - 9y^2 = 1$ if k=____.

A. 1

B. $5/3\sqrt{2}$

C. $1/\sqrt{6}$

D. 2/3

Answer: B

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89. The equation $y = x^2 + 2x + 3$ represent a parabola with its axis parallel to y-axis

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90. The latus rectum of the parabola $y^2 = -8x$ is 2.

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91. The eccentricity of the parabola $(y-1)^2 = 2(x+3)^2$ is 1/3.

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92. The line y=3 is a tangent to the parabola $(x+2)^2 = 6(y-3)$.

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93. The equation $Ax^2 + By^2 = 1$ represent an ellipse with its axis parallel to x-axis if $A > B > 0$.

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94. The focii of the ellipse $\frac{x^2}{3}+\frac{y^2}{2}=1$ are the points `(+-1,0).

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95. The equation of the ellipse with focii(0 , +-4) and vertices (0,+-7) is $\frac{x^2}{16}-\frac{y^2}{16}$=1 .

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96. Mention the statement true or False. The length of the latera recta of the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ and $\frac{(x+2)^2}{4}+\frac{(y-1)^2}{9}=1$ are equal.

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97. Mention the statement true or False. The length of the latera recta of the ellipse $\frac{(x+2)^2}{4}+\frac{(y-1)^2}{9}=1$ are$x=4\pm\sqrt{7}$

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98. The line y=x+2 is a tangent to the ellipse $\frac{x^2}{2}+\frac{y^2}{1}=1$

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99. The conjugate axis of the hyperbola $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets the hyperbola at two points which are at distance 2b from each other.

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100. The conjugate axis of the hyperbola $\frac{(y-3)^2}{9}+\frac{(x+2)^2}{3}=1$ is parallel to the line x=4.

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101. The length of the transverse axis of the hyperbola with focii at `(+-5,0) and vertices at (+-2,0) is 10.

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102. The latus rectum of the ellipse $\frac{x^2}{25} - \frac{y^2}{16} = 1$ are same .

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103. The y-axis is tangent to the hyperbola $ay^2 - bx^2 = 1.$

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104. Find the equation of the parabola in each of the following cases: at the vertex at(0,0) and focus at (0,3)

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105. Find the equation of the parabola in each of the following cases: the vertex at (0,0) and directrix x-2=0.

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106. Find the equation of the parabola in each of the following cases: the vertex at (6,-2) and focus at (-3,-2)

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107. Find the equation of the parabola in each of the following cases: the vertex at (-2,1) and focus at (-2,4).

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108. Find the equation of the parabola in each of the following cases:The length of the latus rectum is 6 and the vertex is at (0,0) the parabola opening to the right.

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109. Find the equation of the parabola in each of the following cases:The vertex is at (0,0) the parabola opening to the left and passing through (-1,2).

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110. Find the equation of the parabola in each of the following cases: the vertex at (0,0) the parabola opens downwards and the latus rectum of length 10.

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111. Find the equation of the parabola in each of the following cases: the axis of vertical and the parabola passes through the points(0,2) , (-1,1) , (2,10).

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112. Find the equation of the parabola in each of the following cases: the axis is horizontal and the parabola passes through the points (2,-1) , (-2,-4) and (-1,3).

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113. Find the equation of the parabola in each of the following cases: vertex at (1,3) and the

directrix x+3=0.

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114. Find the equation of the parabola in each of the following cases:vertex at (1,-1) and the directrix y-2=0

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115. Find the equation of the parabola in each of the following cases: the focus at (-2,3)and

the directrix $3x+4y-2=0$.

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116. Find the equation of the ellipse in each of the following cases:centre at (0,0) one vertex at (0,-5) and one end of minor axis is (3,0).

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117. Find the equation of the ellipse in each of the following cases:centre at (0,0) one vertex

at (7,0) and one end of the minor axis is (0,-5).

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118. Find the equation of the ellipse in each of the following cases: foci at `(+-5,0) and length of major axis is 12.

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119. Find the equation of the ellipse in each of the following cases:vertices at `(+-5,0) and

length of latus rectum is 8/5.

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120. Find the equation of the ellipse in each of the following cases: centre at (5,4) and the major axis is of length 16 and the minor axis is of length 10.

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121. Find the equation of the ellipse in each of the following cases: centre at (-3,3) vertex at (-3,6) and one end minor axis at (0,3).

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122. Find the equation of the ellipse in each of the following cases: centre at (0,0) axes parallel to co-ordinate axes eccentricity is $\frac{1}{\sqrt{2}}$ and minor axis of length 5.

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123. Find the equation of the ellipse in each of the following cases: centre at (0,0) axes parallel to co-ordinate axes eccentricity is $\frac{\sqrt{3}}{2}$ and the ellipse passing through the point `(sqrt3,1/2).

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124. Find the equation of the ellipse in each of the following cases: centre at (0,0) one end of major axis is (-5,0) and eccentricity 3/5.

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125. Find the equation of the ellipse in each of the following cases: axis parallel to co-orrdinates axes the centre at (0,0) and the ellipse passing through (3,-2) and (-1,3).

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126. Find the equation of the ellipse in each of the following cases: centre at (3,4) axis parallel

to x-axis and passing through (6,4) and (3,6)

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127. Find the equation of the ellipse in each of the following cases: centre at (-2,1) axis parallel to y-axis eccentricity is $\frac{\sqrt{7}}{4}$ and the ellipse passing through (-2,5).

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128. obtain the equation of hyperbola in each of the following cases : foci at $(\pm 4, 0)$ and vertices at $(\pm 2, 0)$.

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129. obtain the equation of hyperbola in each of the following cases: foci at $(0, \pm\sqrt{2})$ and vertices $(0, \pm 1)$

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130. obtain the equation of hyperbola in each of the following cases: centre at (0,0) transverse axis along x-axis of length 4 and focus at $\left(2\sqrt{5}, 0\right)$.

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131. obtain the equation of hyperbola in each of the following cases: centre at (0,0) conjugate axis along x-axis of length 6 and eccentricity 2.

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132. obtain the equation of hyperbola in each of the following cases:foci at $\left(\pm 2\sqrt{3}, 0 \right)$ and eccentricity $\sqrt{3}$.

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133. obtain the equation of hyperbola in each of the following cases: centre at (0,0) transverse axis is along y-axis the distance

between the foci is 14 and distance between the vertices is 12.

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134. obtain the equation of hyperbola in each of the following cases: centre (1,-2) transverse axis parallel to x-axis of length 6 and conjugate axis of length 10.

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135. obtain the equation of hyperbola in each of the following cases: centre at (2,-3) eccentricity 5/3 and hyperbola passing through (5,-3)

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136. obtain the equation of hyperbola in each of the following cases: centre at origin axis perpendicular to y-axis and the hyperbola passes through the points(3,-2) and (5,-7).

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137. obtain the equation of hyperbola in each of the following cases: The transverse axis parallel to y-axis the hyperbola passes through the points (11/3,0) , (1,2) and its centre is the intersections of lines x+y-6=0 , 4x-y+1=0.

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138. Reducing to standard form obtain the co-ordiante of the vertes focus , end points of the

latus rectum the length of latus retum the equation of axis and directrix of the following parabolas: $y^2 - 4x + 4y - 1 = 0$

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139. Reducing to standard form obtain the co-ordiante of the vertes focus , end points of the latus rectum the length of latus retum the equation of axis and directrix of the following parabolas:$2x^2 - 4y + 6x - 3 = 0$

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140. Reducing to standard form obtain the co-ordiante of the vertes focus , end points of the latus rectum the length of latus retum the equation of axis and directrix of the following parabolas: $x^2 + x + y + 1 = 0$

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141. Reducing to standard form obtain the co-ordiante of the vertes focus , end points of the latus rectum the length of latus retum the

equation of axis and directrix of the following parabolas: $y^2 + 14y - 3x + 1 = 0$

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142. Reducing to standard form obtain the co-ordinates of centre the foci the vertices the endpoints of latera recta the equation of the directrices and the eccentricity of the following ellipses:

$3x^2 + 4y^2 + 6x + 8y - 5 = 0$

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143. Reducing to standard form obtain the co-ordinates of centre, the foci, the vertices, the end points of latera recta, the equation of the directrices and the eccentricity of the following ellipses:

$4x^2 + 8y^2 + 4x + 24y - 13 = 0$

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144. Reducing to standard form obtain the co-ordinates of centre the foci the vertices the

endpoints of latera recta the equation of the directrices and the eccentricity of the following ellipses:

$2x^2 + 3y^2 - 12x + 24y + 60 = 0$

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145. Reducing to standard form obtain the co-ordinates of centre, the foci, the vertices, the endpoints of latera recta, the equation of the directrices and the eccentricity of the

following ellipses:

$9x^2 + 4y^2 + 36x - 8y + 4 = 0$

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146. Reducing to standard form obtain the co-ordinates of the centre the vertices the foci the endpoints of conjugate axis, the endpoints of latera recta the equation of directrices and the eccentricity of the following hyperbola :

$x^2 - 2y^2 - 6x - 4y + 5 = 0$

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147. Reducing to standard form obtain the co-ordinates of the centre the vertices the foci the endpoints of conjugate axis, the endpoints of latera recta the equation of directrices and the eccentricity of the following hyperbola : $9y^2 - 4x^2 - 90y + 189 = 0.$

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148. Reducing to standard form obtain the co-ordinates of the centre the vertices the foci

the end points of conjugate axis, the end points of latera recta the equation of directrices and the eccentricity of the following hyperbola :

$$49x^2 - 4y^2 - 98x + 48y - 291 = 0$$

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149. Reducing to standard form obtain the co-ordinates of the centre the vertices the foci the end points of conjugate axis, the end points of latera recta the equation of

directrices and the eccentricity of the following hyperbola :

$3x^2 - 2y^2 - 4y - 26 = 0.$

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150. Prove that the equation of the parabola whose vertex and focus are at distances α and β from origin on x-axis respectively is $y^2 = 4(\beta - \alpha)(x - \alpha).$

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151. Find the locus of the points of trisection of a double ordinate of the parabola $y^2 = 4ax$

.

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152. Prove that a double ordinate of the parabola $y^2 = 4ax$ of length 8a subtends a right angle at its vertex.

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153. Find the angle which a double ordinate of length 2a subtends at its vertex and focus.

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154. Obtain the equations of the tangent and normal of the parabola $y^2 = 4ax$ at a point where the ordinate is equal to three times the abscissa.

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155. Find the equation of tangents and normals to the parabola $y^2 = 4ax$ at the ends of its latus rectum.

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156. Find the equtions of tangent and normals to the parabola $y^2 = 4ax$ at the points where it is cut by the line y=3x-a`

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157. Show that the tangent to the parabola $y^2 = 4ax$ at the point (a' , b') is perpendicular to the tangnet at the point $\left(\frac{a^2}{a}', -4\frac{a^2}{b}'\right)$.

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158. A tangent to the parabola $y^2 = 8x$ makes an angle 45° with the line 3x-y+5=0 Find the equation and the point of contact.

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159. Prove that for all values of k the line y=k(x+a)+a/k is a tangent to the parabola y^2,=4a(x+a).

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160. obtain the condition that the line lx+my+n=0 will touch the parabola $y^2 = 4ax$.

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161. Prove that the line $4x-2y-1=0$ touches the parabola whose focus it at $(0,0)$ and directrix is the line $y=2x-1$.

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162. If $(-2,0)$ and $(2,0)$ are the two vertices of a triangle with perimeter 16 then obtain the locus of the third vertex.

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163. A point in a plane is such that the sum of its distances from the point (2,2) and (6,2) is 12. Find the locus of the point.

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164. Obtain the equation of the elllipse which has its centre at origin a focus at (2,0) and the corresponding directrix is the line $2x=7$ calculate the length of the latus rectum.

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165. Find the equation of the ellipse which has its centre at (-1,4)b eccentricity $\frac{1}{\sqrt{3}}$and the ellipse passes through the point (3,2).

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166. Find the equation of tangent and normal to the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ at the point (8/3, $\sqrt{5}$).

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167. Find the equations of tangents and normals to the ellipse $2x^2 + 3y^2 = 6$ at the end points of the latera recta.

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168. Prove that the line y=2x+5 is a tangent to the ellipse $9x^2 + 4y^2 = 36$ and find the point of contact.

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169. Find the equation of the tangent to the ellipse $4x^2 + 5y^2 = 20$ which are parallel to the line x-y=2.

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170. Find the equation of the tangent to the ellipse $4x^2 + 9y^2 = 1$ which are perpendicular to 2ax+y-1=0.

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171. Prove that the line $x\cos\alpha + y\sin\alpha = p$ touches the ellipse $\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right) = 1$ If $p^2 = a^2 coas^2\alpha + b^2\sin^2\alpha.$

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172. Prove that the product of the distances of the foci from any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is equal to b^2.

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173. Find the equation of the hyperbola which has its foci at (0,0) and (0,4) and which passes through the point (12,9)

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174. Find the equation of the hyperbola with foci at $(\pm 3, 0)$ and directrices $x = \pm 2$

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175. Find the foci and latus rectum of the hyperbola whose transverse and conjugate axis are 6 and 4 and center is at (0, 0,).

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176. Find the equation of tangent and normal to the hyperbola $x^2 - 6y^2 = 3$ at the point (-3, -1).

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177. Find the equation of the tangent to the hyperbola $4x^2 - 11y^2 = 1$ which are parallel to the straight line 20x - 33y = 13.

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178. Find the equation of tangents to hyperbola $9x^2 - 16y^2 = 144$ which are perpendicular to the line 2x + 3y = 4.

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179. Prove that the line x + y + 2 = 0 touches the hyperbola $3x^2 - 5y^2 = 30$ and find the point of contact. Find also the equation of normal at the point.

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