MATHS

BOOKS - MODERN PUBLICATION

CONIC SECTIONS

Example

1. Prove that the equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a circle and find its centre and radius.

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2. Find the equation of the circle whose centre is (-3, 2) and radius 4.

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3. Find the equation of the circle whose centre is (2, -1) and which passes through (3, 6).

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4. Find the equation of the circle whose centre is (h, k) and which touches :

x-axis.

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5. Find the equation of the circle whose centre is (h, k) and which touches :

y-axis.

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6. Find the equation of the circle whose centre is (h, k) and which touches

:

both axes.

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7. Determine the radius and centre of the circle : $x^2 + y^2 - x + 2y - 3 = 0.$

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8. Prove that the radii of the circles $x^2 + y^2 = 1, x^2 = y^2 - 2x - 6y = 6$ and $x^2 + y^2 - 4x - 12y = 9$ are in AP.

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9. Find the equation of the circle whose centre is $(a\cos\alpha, a\sin\alpha)$ and radius is a.

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10. 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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11. A circle of radius 4 units touches the co-ordinate axes in the first quadrant. If the circle makes one complete roll on the x-axis along the positive direction of x-axis, find its equation in new position.

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12. A circle of radius 4 units touches the co-ordinate axes in the first quadrant. Find the equation of its image in the line mirror y= 0.

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13. Find the equation of the image of the circle : $x^2 + y^2 + 8x - 16y + 64 = 0$ in the mirror x = 0.

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14. Find the equation of the circle whose radius is 5 and which touches the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ externally at the point (5, 5).

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15. Find the equation of a circle passing through the points (5, 7), (6, 6) and (2, - 2). Also find its centre and radius.

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16. Find the equation of the circle passing through the point (2,4) and has its centre at the intersection of x-y =4. and 2x +3y=-7.

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17. Find the equation of the circle whose centre lies on the line x-4y = 1 and which passes through the points (3, 7) and (5, 5).

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18. If a circle is concentric with the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ and passes through the point (-4,-5) then its equation is

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19. Find the equation of a circle concentric with the circle : $2x^2 + 2y^2 - 6x + 8y + 1 = 0$ and of double its area.

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20. Show that the four points (1, 0), (2,-7), (8, 1) and (9,- 6) are concyclic.

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21. Show that the points (x, y), where : $x = 5\cos\theta, y = -3 + 5\sin\theta$ lie on a circle for all values of θ .

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22. Find the parametric representation of the circle $x^2 + y^2 - 2x + 4y - 4 = 0.$

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23. Find the equation of the following curve : $x = a + c\cos\alpha, y = b + c\sin\alpha$, where $0 \leq \alpha < 2\pi$, in cartesian form*. In case the curve is a circle, find its centre and radius.

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24. Show that the point : $x = \frac{2rt}{1+t^2}, y = \frac{r(1-t^2)}{1+t^2}$ (r constant) lies on a circle for all values of t such that $-1 \leq t \leq 1$.

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25. Find the equation of the circle, the co-ordinates of the end points of whose diameter are (3, 4) and (- 3, - 4).

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26. Find the equation of the circle drawn on the diagonal of the rectangle as its diameter whose sides are x = 4, x = - 2 and y = 5 and y=-2.

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27. If $y = 2x$ is a chord of a circle $x^2 + y^2 - 10x = 0$, find the equation of the circle with this chord as diameter.

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28. Find the equation of the circle, which passes through the origin and makes intercepts 4 and 2 on the x and y axes respectively.

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29. Find the equation of a circle which has the portion of the line $3x + 4y = 14$ intercepted by the lines $x - y = 0$ and $11x - 4y = 0$ as a

diameter.

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30. If the abscissae and the ordinates of two points A and B be the roots of $ax^2 + bx + c = 0$ and $a'y^2 + b'y + c' = 0$ respectively, show that the equation of the circle described on AB as diameter is : $aa'\left(x^2 + y^2\right) + a'bx + ab'y + (ca' + c'a) = 0.$

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31. Find the equation of the parabola whose focus is the point (- 1,- 2) and directrix is x -2y+3 =0.

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

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33. Find the equation of the parabola, which has vertex (0, 0) and is symmetric about y-axis and passes through the point (2, - 3).

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

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35. For the parabola $2y^2 = 5x$, find the vertex, the axis and the focus.

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36. Show that the equation $y^2 - 8y - x + 19 = 0$ represents a parabola. Find its vertex, focus and directrix.

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

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38. Find the length of the side of an equilateral traingle inscribed in the parabola $y^2 = 4ax$, so that one angular point is at the vertex.

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39. The focus of a parabolic mirror as shown in the figure is at a distance of 5 cm from its vertex. If the mirror is 45 cm deep, find the distance AB.

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40. If a parabolic reflector is 20 cm in diameter and 5 cm deep. Find the fous.

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41. 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 2m from the vertex of the parabola ?

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42. The towers of a bridge, hung in the form of a parabola, have their tops 30 metres above the roadway and are 200 metres apart. If the cable is 5 metres above the road way at the centre of the bridge, find the length of the vertical supporting cable 30 metres from the centre.

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43. Find the lengths of the major and minor axes, co-ordinates of the foci, vertices, the eccentricity and equations of the directrices for the ellipse $9x^2 + 16y^2 = 144$.

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44. Find the equation of the ellipse satisfying the following conditions : Vertices at $(\pm 13, 0)$, foci at (± 5.0).

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45. Find the equation of the ellipse satisfying the following condition :

Foci at $(\pm 3, 0)$, passing through (4, 1).

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

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47. Find the equation of the ellipse with $e = \frac{3}{4}$, foci on y-axis, centre at the origin, and passing through the point (6, 4).

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

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49. Find the equation of the locus of all points, the sum of whose distances from (3, 0) and (9, 0) is 12.

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50. Show that : $4x^2 + 16y^2 - 24x - 32y = 12$ is the equation of ellipse, and find its vertices, foci, eccentricity and directrices.

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51. A rod AB of length 15 cm rests in between two co-ordinate axes in such a way that the end point A lies on the x-axis and end point B lies on y-axis. A point P (x, y) is taken on the rod in such a way that AP = 6 cm. Prove that the locus of P is an ellipse.

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52. 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 1.5 m from one end.

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53. The foci of the hyperbola $9x^2 - 16y^2 = 144$ are

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54. Find the equation of the hyperbola satisfying the following conditions : Vertices at $\left(\pm 0, \frac{\sqrt{11}}{2} \right)$, foci at $(0, \pm 3)$.

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

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56. 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 hyperbola if ecentricity is 2.

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

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58. Show that the equation : $16x^2-3y^2-32x-12y-44=0$ represents a hyperbola , and find the lengths of the axes and eccentricity.

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59. Two vertices of an equilateral triangle are (0, 0) and $\left(0, 2\sqrt{3}\right)$. Find the third vertex.

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60. The co-ordinates of two points A and B are (-1, 4) and (5, 1) respectively. Find the co-ordinates of the point P, which lies on extended time AB such that it is three times as far from B as from A.

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61. AB is a variable line moving between the axes in such a way that A lies on x-axis, and B on y-axis. If P is variable point on AB such that PA = b, PB = a and AB =a + b, find the equation of the locus of P.

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62. Find the equation of the straight line joining the points $(a\cos\theta_1 a\sin\theta_1)$ and $(a\cos\theta_2, a\sin\theta_2)$.

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63. A straight line L through the origin meets the lines x + y = 1 and x + y = 3 at P and Q respectively. Through P and Q two Straight lines L_1 and L_2 are drawn parallel to 2x- y=5 and 3x+y=5 respectively. Lines L_1 and L_2 intersect at R. Show that the locus of R, as L varies, is a straight line.

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64. A straight line L with negative slope passes through the point (8, 2) and cuts the positive co-ordinate axes at points P and Q. Find the absolute minimum value of OP + OQ, as L varies, where O is the origin.

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65. Show that four lines $ax \pm by \pm c = 0$ enclose a rhombus whose area is $\frac{2c^2}{ab}$.

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66. Find the equation of straight lines passing through point (2,3) and having intersept of length 2 units between the straight lines $2x + y = 3, 2x + y = 5$

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67. A line through $A(-5, -4)$ meets the lines $x + 3y + 2 = 0, 2x + y + 4 = 0$ and $x - y - 5 = 0$ at the points B,C and D respectively ,if

$$\left(\frac{15}{AB}\right)^2 + \left(\frac{10}{AC}\right)^2 = \left(\frac{6}{AD}\right)^2$$

find the equation of the line

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68. Consider a curve $ax^2 + 2hxy + by^2 = 1$ and a point P not on the curve. A line drawn from the point P intersects the curve at points Q and R. If the product PQ.PR is independent of the slope of the line, then show that the curve is a circle.

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69. A variable line L is passing through the point B(2, 5) intersects the lines $2x^2 - 5xy + 2y^2 = 0$ at P and Q. Find the locus of the point R on L such that distances BP, BR and BQ are in harmonic progression.

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70. Find the equation of a circle, which touches the line x+ y = 5 at the point (-2, 7) and cuts the circle $x^2 + y^2 + 4x - 6y + 9 = 0$ orthogonally.

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71. A circle has radius 3 units and its centre lies on the line y=x-1. Find the equation of the circle if it passes through (7,3).

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72. Two circles, each of radius 5 units, touch each other at (1, 2). If the equation of their common tangent is 4x + 3y = 10, find the equations of the circles.

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73. Let a circle be given by $2x(x-a)+y(2y-b)=0,(a\neq 0,b\neq 0)$. Find the condition on $a$and b if two chords each bisected by the x-axis, can be drawn to the circle from $\left(a,\frac{b}{2}\right)$

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74. The circle $x^2 + y^2 - 2x - 4y + 1 = 0$ with centre C meets the y axis at points A and B. Find the area of the triangle ABC.

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75. Let $2x^2 + y^2 - 3xy = 0$ be the equation of a pair of tangents drawn from the origin O to a circle of radius 3 with centre in the first quadrant. If A is one of the points of contact, find the length of OA.

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76. Let C_1 and C_2 be two circles with C_2 lying inside C_1. A circle C lying inside C_1 touches C_1 internally and C_2 externally. Idenitfy the locus of the center of C.

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77. Let the mirror image of the point A(5, 6) with respect to the line 2x + 3y = 15 be the point B. Find the equation of the circle described on AB as diameter. AC is any chord of the circle meeting the x-axis at D such that AD = 10DC. How many such chords are possible ?

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78. A circle touches the line 2x + 3y + 1=0 at the point (1, -1) and is orthogonal to the circle which has line segment having end points (0, -1) and (-2, 3) as the diameter.

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79. If From the vertex of a parabola $y^2 = 4ax$ a pair of chords be drawn at right angles to one another and with these chords as adjacent sides a rectangle be made, then the locus of the further angle of the rectangle is

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80. The ordinates of points P and Q on the parabola $y^2 = 12x$ are in the ratio 1 : 2. Find the locus of the point of intersection of the normals to the parabola at P and Q.

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81. Points A, B and C lie on the parabola $y^2 = 4ax$. The tangents to the parabola at A, B and C, taken in pair, intersect at points P, Q and R. Determine the ratio of the areas of the triangles ABC and PQR.

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82. At any point P on the parabola $y^2 - 2y - 4x + 5 = 0$, a tangent is drawn which meets the directrix at Q. Find the locus of R which divides P externally in the ratio $\frac{1}{2} : 1$.

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83. A parabola, of latus-rectum l, touch a fixed equal parabola, the axes of two parabola, being parallel. Prove that the locus of the vertex of the moving parabola is a parabola of latus rectum 2l.

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84. Consider the family of circles $x^2 + y^2 = r^2, 2 < r < 5$. If in the first quadrant, the common tangnet to a circle of this family and the ellipse $4x^2 + 25y^2 = 100$ meets the co-ordinate axes at A and B, then find the equation of the locus of the mid-point of AB.

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85. Let P be a point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, 0 < b < a$. Let the line parallel to y-axis passing through P meet the circle $x^2 + y^2 = a^2$ at the point Q such that P and Q are on the same side of x-axis. For two positive real numbers r and s, find the locus of the point R on PQ such that PR : RQ = r : s and P varies over the ellipse.

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86. Prove that the tangents at the extremities of lactusrectum of an intersect on the correesponding directrix.

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87. Find the locus of the mid-point of the chords of the circle $x^2 + y^2 = 16$, which are tangent to the hyperbola $9x^2 - 16y^2 = 144$.

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88. The angle between a pair of tangents drawn from a point P to the parabola $y^2 = 4ax$ is 45°. Show that the locus of the point P is a hyperbola.

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89. Let d be the perpendicular distance from the centre of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ to the tangent drawn at a point P on the ellipse. If F_1 & F_2 are the two foci of the ellipse, then show the $(PF_1-PF_2)^2=4a^2\left(1-\frac{b^2}{d^2}\right)$.

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Exercise

1. Determine whether the following represents a circle, a point or no circle :

$1-x^2-y^2=0.$

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2. Determine whether the following represents a circle, a point or no circle :

$x^2+y^2+2x+1=0.$

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3. Determine whether the following represents a circle, a point or no circle :

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

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4. Determine whether the following represents a circle, a point or no circle :

$x^2 + y^2 + 2x + 10y + 26 = 0.$

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5. Determine whether the following represents a circle, a point or no circle :

$x^2 + y^2 - 3x + 3y + 10 = 0.$

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6. Write the co-ordinates of the centre of the circle : $2x^2 + 2y^2 - 6x + 8y - 4 = 0.$

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7. Find the equations of the following circle :

Centre (0, 2) and radius 2.

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8. In each of the following find the equation of the circle with centre $\left(\frac{1}{2}, \frac{1}{4}\right)$ and radius $\frac{1}{12}$.

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9. Find the equation of the circle with

Centre (-2,3) and radius 4

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10. Find the equations of the following circle :

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

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11. Find the equations of the following circle :

Centre $\left(\frac{1}{2}, \frac{1}{2}\right)$ and radius $\frac{1}{\sqrt{2}}$.

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12. Find the equations of the following circle :

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

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13. The centre and radius of the circle $x^2 + (y-1)^2 = 2$ are

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14. Find the centre and radius of the circle :

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

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15. Find the centre and radius of the circle :

$\left(x - \frac{1}{2}\right)^2 + \left(y + \frac{1}{3}\right)^2 = \frac{1}{4}$.

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16. Find the centre and radius of the circle :

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

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17. Find the centre and radius of the circle :

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

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18. Find the centre and radius of the circle :

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

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19. Find the centre and radius of the circle :

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

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20. Show that the equation : $Ax^2 + Ay^2 + Dx + Ey + F = 0$ represents a circle.

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21. Find the equation of circle passing through the points :

(0, 0), (2, 0) and (0, 4) .Also find its centre and radius.

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22. Find the equation of circle passing through the points :

(0, 2), (3, 0) and (3, 2) .Also find its centre and radius.

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23. Find the equation of circle passing through the points :

(1, 0), (-1, 0) and (0, 1). Also find its centre and radius.

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24. Find the equation of circle passing through the points :

(2, - 6), (6, 4) and (-3, 1). Also find its centre and radius.

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25. Find the equation of circle passing through the points :

(1, -2), (5, 4) and (10, 5). Also find its centre and radius.

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26. Find the equation of circle passing through the points :

(0, 0), (5,0) and (3, 3). Also find its centre and radius.

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27. Find the equation of circle passing through the points :

(5, 5), (6, 4) and (- 2, 4) . Also find its centre and radius.

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28. Find the equation of circle passing through the points :

(5, 5) (-2, 4) and (7, 1). Also find its centre and radius.

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29. Find the equation of circle passing through the points :

(1, 2) (3,- 4) and (5, - 6).

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30. Find the equation of the circle, which is circumscribed about the triangle whose vertices are (-2, 3), (5, 2) and (6, -1).

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

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32. Find the equation of the circle whose centre is the point (1,-2) and which passes through the centre of the circle $x^2 + y^2 + 2y = 3$.

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

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34. Find the equation of the image of the circle : $x^2 + y^2 + 8x - 16y + 64 = 0$ in the mirror x = 0.

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35. Find the equation of the circle, which touches the axis of x at a distance 3 from the Origin and intercepts a length 6 on the axis of y.

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36. Find the equation of the circle, which touches the axis of y at a distance of + 4 from the origin and intercepts a length 6 on the axis of y and cuts off an intercept 6 from the axis of x.

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37. Find the equation of the circle passing through the point (0, 0) and the points, where the st. line $3x + 4y = 12$ meets the axes of co-ordinates.

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38. A circle has radius 3 units and its centre lies on the line y=x-1. Find the equation of the circle if it passes through (7,3).

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39. Find the equation of the circle of radius 5 whose centre lies on y-axis and Passes through (3, 2).

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40. Find the equation of the circle with radius 5 whose centre lies on y-axis and Passes through the point (2, 3).

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41. Find the equation of the circle concentric with the circle $x^2 + y^2 + 4x + 6y + 11 = 0$ and Passing through the point (5, 4).

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42. Find the equation of the circle whose centre is the point of intersection of the lines $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ and passes through the origin.

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43. Find the equation of the circle passing through the point (2,4) and has its centre at the intersection of x-y =4. and 2x +3y=-7.

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44. Find the equation of the circle, which passes through the points (2, -3) and (3, - 2) and has its centre on the line 2x-3y = 8.

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45. Find the equation of the circle, whose centre lies on the line 2x- y- 3 = 0 and which passes through the points (3, - 2) and (-2, 0).

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

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47. Find the equation of the circle which passes through the points (4,1), (6,5) and has its centre on the line 4x+y=16.

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

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49. Find the equation of the circle whose centre is (2, -3) and which passes through the intersection of the st. lines 3x+2y=11 and 2x+3y=4.

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50. Find the equation of the circle whose centre is (2, -3) and which passes through the intersection of the straight lines 3x-2y=1 and 4x+y = 27.

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51. Find the equation of the circle which passes through the origin and cuts- off chords of lengths 4 and 6 on the positive side of the X-axis and Y-axis, respectively.

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52. Find the equation of a circle concentric with the circle $x^2 + y^2 - 2x - 4y + 1 = 0$ and whose radius is 5.

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53. Find the equation of a circle concentric with $x^2 + y^2 - 4x - 6y - 3 = 0$ and which touches the y-axis.

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54. Find the equation of a circle passing through the centre of the circle $x^2 + y^2 + 8x + 10y - 7 = 0$ and concentric with the circle $2x^2 + 2y^2 - 8x - 12y - 9 = 0.$

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55. Find the equation of the circie concentric with the circle $x^2 + y^2 + 4x - 8y - 6 = 0$ and having radius double of its radius.

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56. Find the equation of the circie concentric with the circle $x^2 + y^2 + 4x - 8y - 6 = 0$ and having radius double of its radius.

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57. The circle $(x-a)^2+(y-a)^2=a^2$ is rolled on the y-axis in the positive direction through one complete revolution. Find the equation of the circle in its new position.

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58. Find the equation of a circle of radius 5 which lies within the circle $x^2+y^2+14x+10y-26=0$ and which touches the given circle at the point (- 1, 3).

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59. Find the equation of the circle passing through the vertices of the triangle whose sides are :

x+y =2, 3x-4y =6 and x-y=0.

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60. Find the equation of the circle passing through the vertices of the triangle whose sides are :

x-y=0, 3x+ 2y = 5 and x + 2y=5.

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61. Show that the points (5, 5),(6, 4),(- 2, 4) and (7, 1) all lie on a circle. Find its equation, centre and radius.

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62. Prove that the points (1,- 6), (5, 2), (7, 0) and (- 1,-4) are concyclic. Find the radius of the circle.

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63. Show that the point (x,y), where : $x = a + r\cos\alpha, y = b + r\sin\alpha$ lie on a circle for all values of α .

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64. Find the parametric representation of the following circle

$x^2 + y^2 = 9.$

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65. Find the parametric representation of the following circle

$3x^2 + 3y^2 = 4.$

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66. Find the parametric representation of the following circle

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

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67. Find the parametric representation of the following circle

$x^2 + y^2 + 2x - 4y - 1 = 0.$

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68. Find the parametric form of the equation of the circle

$x^2 + y^2 + px + py = 0$

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69. Find the parametric representation of the following circle

$x^2 + y^2 + 2gx + 2fy + c = 0.$

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70. Find the parametric equation of the circles :

$2x^2 + 2y^2 - 5x - 7y - 3 = 0.$

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71. Find the parametric equation of the circles :

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

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72. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = 3\cos\alpha, y = 3\sin\alpha.$

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73. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = 1 + 2\cos\alpha, y = 3 + 2\sin\alpha.$

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74. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = 5 + 3\cos\alpha, y = 7 + 3\sin\alpha.$

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75. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = 7 + 4\cos\alpha, y = -3 + 4\sin\alpha$, where $0 \leq \alpha < 2\pi.$

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76. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = \frac{1}{2}t + 1, y = 2t - 1.$

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77. Find the equations of the following curves in cartesian form. Wherever the curve is a circle, find its centre and radius :

$x = at^2, y = 2at.$

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78. Eliminate the parameter 't' from the equations : $x = \frac{20t}{4 + t^2}, y = \frac{5(4 - t^2)}{4 + t^2}.$

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79. Find the equation of the circle when the end points of a diameter are as below :

(2, 3) and (- 1, - 3).

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80. Find the equation of the circle when the end points of a diameter are as below :

(-2,3) and (3, -5).

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81. Find the equation of the circle when the end points of a diameter are as below :

(- 2, -3) and (- 3, 5).

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82. Find the equation of the circle when the end points of a diameter are as below :

(3, 2) and (2, 5).

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83. Find the equation of the circle when the end points of a diameter are as below :

(5,-3) and (2, - 4).

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84. Find the equation of the circle when the end points of a diameter are as below :

(- 1,2) and (3, - 4).

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85. Find the equation of the circle when the end points of a diameter are as below :

(p, q) and (r, s).

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86. Find the equation of the circle, which passes through the origin and makes intercepts 3 and 4 on the axes.

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87. Find the equation of the circle, which passes through the origin and cuts off intercepts 'a' and 'b' from the axes.

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88. If one end of a diameter of the circle : $x^2 + y^2 - 4x - 6y + 11 = 0$ is (8, 4), show that the co-ordinates of the other end are (-4, 2).

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89. One end of a diameter of a circle : $x^2 + y^2 - 3x + 5y - 4 = 0$ is (1, -6), find the other end.

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90. Find the equation of the circle drawn on the diagonals of the rectangle as its diameter whose sides are :

x=6, x=-3, y=3 and y = -1.

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91. Find the equation of the circle drawn on the diagonals of the rectangle as its diameter whose sides are :

$x = 5, x = 8y = 4, y = 7$.

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92. Find the equation of the circle drawn on the diagonals of the rectangle as its diameter whose sides are :

x=4, x=-5, y=5,y= -3.

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93. Find the equation of the parabola with vertex at the origin and satisfying the condition :

Focus (2, 0) , Directrix x = -2 .

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94. Find the equation of the parabola with vertex at the origin and satisfying the condition :

Focus (6,0), Directrix x =- 6.

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95. Find the equation of the parabola with vertex at the origin and satisfying the condition :

Focus (0, - 3) , Directrix y = 3.

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96. Find the length of latus-rectum of the following condition :

Focus (2, 0) , Directrix x = -2 .

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97. Find the length of latus-rectum of the following condition :

Focus (6,0), Directrix x =- 6.

Watch Video Solution

98. Find the length of latus-rectum of the following condition :

Focus (0, - 3) , Directrix y = 3.

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99. Find the equation of the parabola that satisfies the following condition :

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

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100. Find the equation of the parabola that satisfy the given conditions:

Vertex (0,0), passing through (5, 2) and symmetric with respect to y-axis.

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101. Find the equation of the following parabola :

Focus at (3,- 4): Directrix x + y-2=0

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102. Find the equation of the following parabola :

Focus at (5,0), Directrix x = - 5.

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103. Find the equation of the following parabola :

Vertex at (1,2), Directrix x +y+1 =0.

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104. Find the equation of the following parabola :

Vertex at (6,-3) , Directrix $3x - 5y + 1 = 0$.

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105. Find the equation of the following parabola :

Vertex (0,0), Focus (3, 0) .

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106. Find the equation of the following parabola :

Vertex (0, 0), Focus (- 2, 0) .

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

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108. Find the equation of the following parabola :

Vertex (4,1): Focus (4, - 3).

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109. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$y^2 = 8x$.

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110. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$y^2 = 12x.$

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111. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$y^2 = -8x.$

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112. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$y^2 = 10x.$

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113. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$x^2 = 6y$.

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114. In each of the following find the coordinates of the focus , axis of the parabola , the equation of directrix and the length of the latus rectum .

$x^2 = -9y$

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115. For the following parabola, find the axes, co-ordinates of the foci and the equations of the directrices and lengths of latus-rectum :

$x^2 = -16y$.

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116. Find the equations of the parabola with vertices at the origin and satisfying the following condition :

Focus at (- a, 0).

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117. Find the equations of the parabola with vertices at the origin and satisfying the following condition :

Directrix y = 2.

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118. Find the equations of the parabola with vertices at the origin and satisfying the following condition :

Passing through (2, 3) and axis along x-axis.

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

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120. Prove that the equation $y^2 + 2ax + 2by + c = 0$ represent a parabola whose axis is parallel to the axis of x. Find its vertex.

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

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122. Find the foci, vertices, directrices, and axes of following parabola. Also draw their rough sketches :

$y = x^2 - 2x + 3$.

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123. Find the foci, vertices, directrices, and axes of following parabola. Also draw their rough sketches :

$y = -4x^2 + 3x$.

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124. Find the foci, vertices, directrices, and axes of following parabola. Also draw their rough sketches :

$x^2 + 2y - 3x + 5 = 0.$

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125. Find the vertex, focus, latus-rectum, axis and directrix of the parabola $x^2 - y - 2x = 0$.

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126. Find the vertex, axis, focus and directrix of the parabola $x^2 + 4x + 2y - 7 = 0$.

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127. Find the focus, vertex, equation of the directrix and the axis of the parabola $x = y^2 - 2y + 3$.

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128. 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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129. Find the equation of the parabola whose focus is (1, 1) and tangent at the vertex is x + y= 1.

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130. Show that the area of the triangle inscribed in the parabola $y^2 = 4ax$ is : $\frac{1}{8a}|(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$, where y_1, y_2, y_3 are the ordinates of the angular points.

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131. The focus of a parabolic mirror as shown in the figure is at a distance of 6 m from its vertex. If the mirror is 20 cm deep, show that

$MN = 8\sqrt{30}$ m.

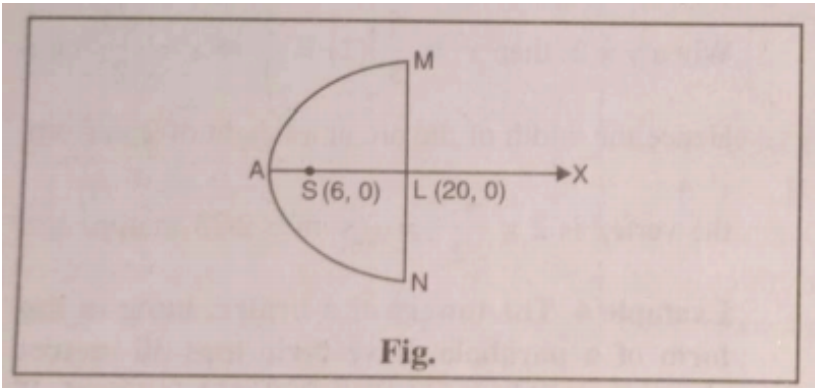

Fig.

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

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133. A water jet from the fountain reaches its maximum height of 4 metres at a distance of 0.5 metre from the vertical passing through the point A of the water outlet. Show that the height of the jet above the horizontal AX at a distance of 0.75 metre from the point A is 3 metres.

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

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135. If the eccentricity is zero, show that the ellipse becomes a circle.

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

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137. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{25} + \frac{y^2}{9} = 1.$$

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138. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{36} + \frac{y^2}{16} = 1.$$

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139. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{4}+\frac{y^2}{25}=1.$$

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140. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{16}+\frac{y^2}{9}=1.$$

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141. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of

the directrices of the following ellipse :

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

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142. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{49}+\frac{y^2}{36}=1.$$

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143. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$$\frac{x^2}{100}+\frac{y^2}{400}=1.$$

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144. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

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

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145. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

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

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146. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

$36x^2 + 4y^2 = 144.$

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147. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

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

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148. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of the directrices of the following ellipse :

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

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149. Find the lengths of the major and minor axes, the co-ordinates of the foci, the vertices, the eccentricity, length of latus-rectum and equations of

the directrices of the following ellipse :

$16x^2 + 25y^2 = 400.$

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150. Find the equation for ellipse that satisfies the given conditions

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

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151. Find the equation of the ellipse satisfying the given condition :

Vertices $(\pm 6, 0)$, foci $(\pm 4, 0)$.

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152. Find the equation for ellipse that satisfies the given conditions

Vertices $(0, \pm 13)$, foci $(0, \pm 5)$

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153. Find the equation of the ellipse satisfying the given condition :

Ends of major axis $(\pm 3, 0)$, ends of minor axis $(0, \pm 2)$.

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154. Find the equation of the ellipse satisfying the given condition :

Ends of major axis $\left(0, \pm \sqrt{5}\right)$, ends of minor axis $(\pm 1, 0)$.

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155. Find the eqation for the ellipse that satisfies the given conditions :

Length of major axis 26 , foci $(\pm 5, 0)$

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156. Find the eqation for the ellipse that satisfies the given conditions :

Length of major axis 16 , foci $(0, \pm 6)$

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157. Find the equation for the elllipse that satisfy the given conditions:

$Foci(\pm 3, 0)$, a=4.

.

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158. Find the equation for the ellipse that satisfies the given condition :

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

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159. Find the equation for the ellipse that satisfies the given condition :

Major axis on the x-axis-an passes through the points (4, 3) and (6,2).

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160. Find the equation of the ellipse satisfying the given condition :

Axes along co-ordinate axes, passing through (4, 3) and (- 1, 4).

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161. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

whose major axis =6 and minor axis = 4 .

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162. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

whose major axis = 8 and eccentricity = $\frac{1}{2}$.

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163. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

which passes through the points (- 2, 1) and eccentricity = $\sqrt{\frac{2}{5}}$

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164. Find the equation of an ellipse whose axes lie along the coordinate axes, which passes through the point (-3,1) and has eccentricity equal to $\sqrt{2/5}$.

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165. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

whose latus-rectum is 5 and eccentricity $\frac{2}{3}$.

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166. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

whose foci are (2, 0), (-2, 0) and latus-rectum is 6.

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167. Find the eccentricity of the ellipse if :

the latus-rectum is one half of its minor axis.

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168. Find the eccentricity of the ellipse if :

the latus-rectum is one half of its major axis.

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169. Find the eccentricity of the ellipse if :

the distance between the foci is equal to the length of latus-rectum.

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170. Find the equation of the ellipse refer to its centre whose minor axis is equal to

distance between the foci and latus rectum is 10.

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

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173. Show that : $4x^2 + 16y^2 - 24x - 32y = 12$ is the equation of ellipse, and find its vertices, foci, eccentricity and directrices.

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174. Show that $4x^2 + 8x + y^2 - 4y + 4 = 0$ represents an ellipse. Find its eccentricity, co-ordinates of foci, equations of major and minor axes

and latus-rectum.

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175. Show that $4x^2 + 8x + y^2 - 4y + 4 = 0$ represents an ellipse. Find its eccentricity, co-ordinates of foci, equations of major and minor axes and latus-rectum.

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176. Find the centre, length of the axes, eccentricity and foci of the ellipse : $12x^2 + 4y^2 + 24x - 16y + 25 = 0$.

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177. In the ellipse $25x^2 + 9y^2 - 150x - 90y + 225 = 0$

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

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179. 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 path traced by the man.

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180. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

$$\frac{x^2}{16} - \frac{y^2}{9} = 1.$$

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181. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

$$\frac{x^2}{9} - \frac{y^2}{16} = 1.$$

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182. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

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

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183. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

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

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184. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

$y^2 - 16x^2 = 16.$

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185. Find the coordinates of the foci and the vertices, the ecentricity and the length of the latus rectum of the hyperbolas :

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

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186. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

$49y^2 - 16x^2 = 784\,.$

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187. Find the co-ordinates of the vertices, the foci, the eccentricity and the length of latus-rectum of the hyperbola :

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

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188. Find the lengths of transverse and conjugate axes, co-ordinates of foci, vertices and the eccentricity for the following hyperbola :

$16x^2 - 9y^2 = 144.$

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189. Find the lengths of transverse and conjugate axes, co-ordinates of foci, vertices and the eccentricity for the following hyperbola :

$2x^2 - 3y^2 - 6 = 0.$

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190. Find the lengths of transverse and conjugate axes, co-ordinates of foci, vertices and the eccentricity for the following hyperbola :

$3x^2 - 2y^2 = 1.$

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

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

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

Vertices $(0, \pm 3)$ foci $(0, \pm 5)$

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193. Find the equation of the hyperbola satisfying the given condition :

Vertices $(0, \pm 5)$, Foci $(0, \pm 8)$.

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194. Find the equation of the hyperbola satisfying the given condition :

Foci $(\pm 2, 0), e = \frac{3}{2}$.

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195. Find the equation of the hyperbola satisfying the given condition :

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

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196. Find the equation of the hyperbola satisfying the given condition :

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

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197. Find the equation of the hyperbola satisfying the given condition :

Vertices $(0, \pm 6), e = \frac{5}{3}$.

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198. Find the equation of the hyperbola satisfying the given condition :

Vertices $(\pm 6, 0)$, one of the directrices is x = 4 .

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199. Find the equation of hyperbola satisfying the given conditions.

Foci $(0, \pm \sqrt{10})$, passing through (2,3)

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200. 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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201. Find the equation of the hyperbola satisfying the given condition :

Foci $(0, \pm 4)$, transverse axis is of length 6.

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

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

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203. Find the equation of the hyperbola satisfying the given condition :

Foci $(0, \pm 12)$, conjugate axis is of length 24.

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204. Find the equation 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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205. Find the equation of the hyperbola satisfying the given condition :

Foci $\left(\pm 4, 0 \right)$, latus rectum of length 12.

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206. Find the equation of the hyperbola satisfying the given condition :

Foci $(0, \pm 12)$, latus rectum of length 36.

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207. Find the equation of the hyperbola, referred to its axes as each of co-ordinates if :

distance between foci is 5 and conjugate axis is 3.

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208. Find the equation of the hyperbola, referred to its axes as each of co-ordinates if :

conjugate axis is 5 and passes through the point (1, -2).

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209. Find the equation of the hyperbola whose vertices are $(\pm 6, 0)$ and one of the directrices is x=4.

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210. Find the equation of the hyperbola with vertices are $(\pm 6, 0)$ and $e = \frac{5}{3}$. Locate its foci.

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211. Find the equation of the hyperbola passing through the points (2, 1) and (4, 3).

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212. For the hyperbola $4x^2 - 9y^2 = 36$, find the Foci.

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213. Find the centre, eccentricity, foci and directrices of the hyperbola : $9x^2 - 16y^2 + 18x + 32y - 151 = 0$.

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214. Show that the triangle, the co-ordinates of whose vertices are given by integers can never be an equilateral triangle.

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215. If $a \neq b \neq c$, prove that $(a, a^2), (b, b^2), (c, c^2)$ can never be collinear.

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216. The vertices of a triangle ABC are A(3, 0), B(0, 6) and C(6, 9). A line DE divides both AB and AC in the ratio 1 : 2 meeting AB in D and AC in E. Prove that $\triangle ABC = 9 \triangle ADE$.

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217. A and A' be the points (5, 0) and (-5, 0) respectively. Find the equation of the set of all points P(x, y) such that | AP |-1 A'P | = 6.

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218. The extremities of the base of an isosceles triangle are the points (2a, 0) and (0, a). The equation of one of the sides is x = 2a. Find the equations of the other two sides and the area of the triangle.

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219. A line is such that its segment between the straight line $5x - y - 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point (1,5) Obtain the equation.

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220. Find the distance of the line 4x - y = 0 from the point P (4, 1) measured along the line making an angle of 135° with the positive x-axis.

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221. Prove that the st. line ax + by + c = 0 divides the join of (x_1, y_1) and (x_2, y_2) in the ratio $-\frac{ax_1 + by_1 + c}{ax_2 + by_2 + c}$.

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222. Prove that (-1, 4) is the orthocentre of the triangle formed by the lines whose equations are : x-y+1=0, x-2y + 4=0 and 9x - 3y + 1 =0.

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223. The equation of the perpendicular bisector of the side AB of a triangle ABC is x - y + 5 = 0. If the point A is (1,-2), find the co-ordinates of

the point B.

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224. Let the opposite angular points of a square be (3, 4) and (1, -1). Find the coordinates of the remaining angular points.

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225. Using the concept of slope, prove that medians of an equilateral triangle are perpendicular to the corresponding sides.

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226. Show that the perpendicular drawn from the point (4, 1) on the line segment joining (6, 5) and (2,-1) divides it internally in the ratio 8 : 5.

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227. A rectangle has opposite vertices at the points (1,2) and (5, 5). If the other vertices lie on the line x=3, find the equation of the sides of the rectangle.

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228. Find the centroid, incentre, circumcentre and orthocentre of the triangle whose sides have the equations : 3x- 4y = 0, 12y + 5x =0 and y- 15 =0.

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229. The vertices of a triangle are : $P(x_1, x_1\tan\theta_1)$, $Q(x_2, x_2\tan\theta_2)$ and $R(x_3, x_3\tan\theta_3)$. If the circumcentre of $\triangle PQR$ coincides with the origin and $H(\bar{x}, \bar{y})$ is the orthocentre, show that : $\frac{\bar{y}}{\bar{x}} = \frac{\sin\theta_1 + \sin\theta_2 + \sin\theta_3}{\cos\theta_1 + \cos\theta_2 + \cos\theta_3}$.

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230. The points (1, 3) and (5, 1) are the opposite vertices of a rectangle. The other two vertices lie on the line $y=2x+c$. Find c and the remaining vertices.

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231. One side of a rectangle lies along the line $4x + 7y + 5=0$. Two of its vertices are (-3, 1) and (1, 1).Find the equations of the other three sides.

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232. The consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of one of the diagonals is $11 x + 7y = 9$, find the equation of the other diagonal.

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233. One side of a square is inclined to the x-axis at an angle α and one of its extremities is at the origin. If the side of the square is 4, find the equations of the diagonals of the square.

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234. On the portion of the line x + 3y - 3 = 0, which is intercepted between the co-ordinate axes, a square is constructed on the side of the line away from the Origin. Find the co-ordinates of the intersection of its diagonals. Also, find the equations of its sides.

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235. Find the direction in which a straight line must be drawn through the point (-1, 2) so that its point of intersection with the line x + y = 4 may be at a distance of 3 units from this point.

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236. The hypotenuse of a right triangle has its ends at the points (1, 3) and (-4, 1). Find the equation of the legs (perpendicular sides) of the triangle.

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237. A ray of light passes through the point (1, 2) reflects on the x-axis at a point A and the reflected ray passes through the point (5, 3). Find the coordinates of A.

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238. A person standing at the junction (crossing) of two straight paths represented by the equations : $2x - 3y - 4 = 0$ and $3x + 4y - 5 = 0$, wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find the equation of the path that he should follow.

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239. Let (2, 1), (- 3, -2) and (a, b) form a triangle. Show that the collection of the points (a, b) forms a line for which triangle is isosceles. Find the equation of the line.

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

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241. Prove that the centres of the three circles : $x^2 + y^2 - 4x - 6y - 14 = 0, x^2 + y^2 + 2x + 4y - 5 = 0$ and $x^2 + y^2 - 10x - 16y + 7 = 0$ are collinear.

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242. Prove that, through three given points which are not collinear, there is only one circle.

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243. Find equations to the circles touching Y-axis at (0,3) and making intercept of 8 units on the X-axis.

Watch Video Solution

244. Find the area of the equilateral triangle that can be inscribed in the circle : $x^2 + y^2 - 4x + 6y - 3 = 0$.

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245. Find the equation of the circle circumscribing the quadrilateral formed by the straight lines :

$x - y = 0, 3x + 2y = 5, x - y = 10$ and $2x + 3y = 0$.

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246. If lines 5x + 12y-10 = 0 and 5x- 12y - 40 =0 touch a circle C_1 of diameter 6, and if the centre of C_1 lies in the first quadrant, find the equation of a circle C_2, which is concentric with C_1 and cuts intercept of length 8 on these lines.

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247. If the distances from the origin to the centres of the three circles $x^2 + y^2 - 2\lambda x = c^2$, where c is constant and λ is variable, are in G.P., prove that the lengths of tangents drawn from any point on the circle $x^2 + y^2 = c^2$ to the three circles are also in GP.

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248. Determine the equation of the circle whose diameter is the chord x + y = 1 of the circle $x^2 + y^2 = 4$.

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249. A rectangle ABCD is inscribed in a circle with a diameter lying along the line 3y =x + 10. If A and B are the points (-6, 7) and (4, 7) respectively, find the area of the rectangle

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250. Find the equation of the circle, which passes through the origin and cut off equal chords of the length 'a' from the straight lines y= x and y=-x .

Watch Video Solution

251. Prove that the equation $y^2 + 2Ax + 2By + c = 0$ represents a parabola whose axis is parallel to the x-axis.

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252. A double ordinate of the parabola $y^2 = 4ax$ is of length 8a. Prove that the lines from the Vertex to its two ends are at right angles.

Watch Video Solution

253. Prove that the equation of the parabola whose vertex and focus are on the X-axis at a distance a and a'from the origin respectively is $y^2 = 4(a' - a)(x - a)$

Watch Video Solution

254. Find the focus of the parabola

$x^2 = 4y$

Watch Video Solution

255. Show that the locus of the middle points of normal chords of the parabola $y^2 = 4ax$ is

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256. If any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ cuts off intercepts of length h and k on the axes, then $\frac{a^2}{h^2} + \frac{b^2}{k^2}$ is equal to

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257. The vertices of a quadrilateral are situated at foci and the extremities of the minor axis of the ellipse $4x^2 + 9y^2 = 36$. Find the area of the

quadrilateral.

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258. Find the equation of the hyperbola whose foci are (8, 3), (0, 3) and whose eccentricity is $\frac{4}{3}$.

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259. Find the slope of the line passing through the points :

(3, - 2) and (7, -2).

A. 0

B. undefined

C. 1

D. 4

Answer:

Watch Video Solution

260. The slope of the line passing through the points (3,-2) and (-1,4) is:

A. $-\frac{2}{3}$

B. $-\frac{3}{2}$

C. $\frac{3}{2}$

D. 0

Answer:

Watch Video Solution

261. Slope of the line passing through the points (3, -2) and (3, 4) is:

A. undefined

B. 0

C. 1

D. 6

Answer:

Watch Video Solution

262. If the equation of a circle is: $x^2 + y^2 + 8x - 10y + 8 = 0$, then its centre is :

A. (8, -10)

B. (-8, 10)

C. (- 4, 5)

D. (4, -5).

Answer:

Watch Video Solution

263. The centre of the circle $x^2 + y^2 - 6x + 4y - 1 = 0$ is

A. (- 6, 4)

B. (4, -1)

C. (3, - 2)

D. (- 3, 2).

Answer:

Watch Video Solution

264. If the equation of a circle is: $x^2 + y^2 - 4x - 8y - 45 = 0$, then its centre is :

A. (4, 8)

B. (-4, -8)

C. (-2, -4)

D. (2, 4).

Answer:

Watch Video Solution

265. The centre of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$ is:

A. (- 4, -5)

B. (4, 5)

C. (- 4, 5)

D. (4, -5).

Answer:

Watch Video Solution

266. The radius of the circle : $x^2 + y^2 - 8x + 10y - 12 = 0$ is:

A. $\sqrt{35}$

B. $\sqrt{53}$

C. 53

D. 35

Answer:

Watch Video Solution

267. The directrix of the parabola $y^2 = 4ax$ is :

A. x=-a

B. x-a=0

C. x =0

D. None of these.

Answer:

Watch Video Solution

268. The directrix of the parabola $y^2 + 4x + 3 = 0$ is :

A. $x = \frac{1}{4}$

B. $x + \frac{1}{4} = 0$

C. $x - \frac{4}{3} = 0$

D. $x - \frac{3}{4} = 0$.

Answer:

Watch Video Solution

269. The focus of the parabola $y^2 = 4ax$ is :

A. (a, 0)

B. (0, a)

C. (0, 0)

D. None of these.

Answer:

Watch Video Solution

270. The vertex of the parabola $y^2 = 4ax$ is

A. (0, 0)

B. (- 9, 0)

C. (9, 0)

D. (0, 9).

Answer:

Watch Video Solution

271. The focus of the parabola $y = 2x^2 + x$ is

A. (0, 0)

B. $\left(\frac{1}{2}, \frac{1}{4}\right)$

C. $\left(-\frac{1}{4}, 0\right)$

D. None of these.

Answer:

Watch Video Solution

272. The foci of the ellipse $9x^2 + 4y^2 = 36$ are

A. (- 5, 0)

B. $\left(0, \pm\sqrt{5}\right)$

C. $(\pm 5, 0)$

D. (0, - 5).

Answer:

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273. The eccentricity of the parabola $y^2 = -8x$ is :

A. -2

B. 2

C. -1

D. 1

Answer:

Watch Video Solution

274. The vertex of the parabola $y^2 = 4a(x + a)$ is:

A. (0, 0)

B. (-a, 0)

C. (a, 0)

D. (0, a).

Answer:

Watch Video Solution

275. The eccentricity of the conic $4x^2 - 9y^2 = 2$ is :

A. $\sqrt{\frac{13}{3}}$

B. $\frac{\sqrt{13}}{3}$

C. $\sqrt{\frac{5}{3}}$

D. 2

Answer:

Watch Video Solution

276. If e, e' be the eccentricities of two conics S and S' and if $e^2 + e'^2 = 3$, then both S and S' can be :

A. ellipses

B. parabolas

C. hyperbolas

D. None of these.

Answer:

Watch Video Solution

277. The equation $\frac{x^2}{2-\lambda}+\frac{y^2}{\lambda-5}+1=0$ represents an ellipse if:

A. rgt2

B. rgt5

C. 2lt rlt 5

D. None of these.

Answer:

Watch Video Solution

278. The length of the latus-rectum of the parabola $x^2 - 4x - 8y + 12 = 0$ is:

A. 4

B. 6

C. 8

D. 10

Answer:

Watch Video Solution

279. The focus of the parabola $y = 2x^2 + x$ is

A. (0, 0)

B. $\left(\frac{1}{2}, \frac{1}{4}\right)$

C. $\left(-\frac{1}{4}, 0\right)$

D. $\left(-\frac{1}{4}, 8\right)$.

Answer:

Watch Video Solution

280. The axis of the parabola $9y^2 - 16x - 12y - 57 = 0$ is :

A. 3y=2

B. x +3y=3

C. 2x=3

D. y = 3.

Answer:

Watch Video Solution

281. The equation $x^2 + 3y^2 - 9x + 2y + 1 = 0$ represents

A. ellipses

B. parabolas

C. hyperbolas

D. circle.

Answer:

Watch Video Solution

282. A bridge is in the shape of a semi-ellipse. It is 400 metres One and has a maximum height of 10 metres at the middle point. The height of the bridge at a point distant 80 metres from one end is :

A. 4 metres

B. 2 metres

C. 8 metres

D. $\sqrt{91}$ metres .

Answer:

Watch Video Solution

283. The eccentricity of the ellipse$4x^2 + 9y^2 = 36$ is :

A. $\frac{1}{2\sqrt{3}}$

B. $\frac{1}{\sqrt{3}}$

C. $\frac{\sqrt{5}}{3}$

D. $\frac{\sqrt{5}}{6}$.

Answer:

Watch Video Solution

284. The foci of the ellipse $9x^2 + 4y^2 = 36$ are

A. (- 5, 0)

B. $(0, \pm\sqrt{5})$

C. $(\pm 5, 0)$

D. (0, - 5).

Answer:

Watch Video Solution

285. The foci of the ellipse $25(x+1)^2 + 9(y+2)^2 = 225$, are at :

A. (-1, 2) and (-1, - 6)

B. (-2, 1) and (-2, 6)

C. (-1, -2) and (-2, -1)

D. (-1, -2) and (-1, - 9).

Answer:

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286. The lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular to each other if

A. $a_1b_2 = a_2b_1$

B. $a_1a_2 = b_1b_2$

C. $a_1a_2 + b_1b_2 = 0$

D. $a_1b_2 + a_2b_1 = 0$.

Answer:

Watch Video Solution

287. The equation of straight line passing through the point (2, 3) and perpendicular to the line 4x -3y = 10 is:

A. $-3x + 4y = 15$

B. $4x + 3y = 5$

C. $3x + 4y = 18$

D. $3x + 10y = 4$.

Answer:

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288. The equations $y = x\sqrt{3}$, y =1 are the sides of :

A. an equilateral triangle

B. a right-angled triangle

C. an isosceles triangle

D. an obtuse angled triangle.

Answer:

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289. If a,b,c are in AP then $ax + by + c = 0$ represents

A. (1, -2)

B. (-1, 2)

C. (1, 2)

D. (-1, - 2).

Answer:

Watch Video Solution

290. The coordinates of the foot of the perpendicular from (2,3) to the line $3x + 4y - 6 = 0$ are

A. $\left(\frac{-14}{25}, \frac{-27}{25}\right)$

B. $\left(\frac{14}{25}, \frac{-27}{25}\right)$

C. $\left(\frac{-14}{25}, \frac{27}{25}\right)$

D. $\left(\frac{14}{25}, \frac{27}{25}\right)$.

Answer:

Watch Video Solution

291. Find the orthocentre of the triangle formed by the lines xy = 0 and $x + y = 1$

A. $\left(\frac{1}{2}, \frac{1}{2}\right)$

B. $\left(\frac{1}{3}, \frac{1}{3}\right)$

C. $\left(\frac{1}{4}, \frac{1}{4}\right)$

D. (0, 0) .

Answer:

Watch Video Solution

292. If the sum of the distances of a variable point from two perpendicular lines in a plane is 1, then its locus is :

A. a square

B. a circle

C. a straight line

D. two intersecting lines.

Answer:

Watch Video Solution

293. Point Q is symmetric to P (4, -1) with respect to the bisector of the first quadrant. The length PQ is :

A. $3\sqrt{2}$

B. $5\sqrt{2}$

C. $7\sqrt{2}$

D. $9\sqrt{2}$.

Answer:

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294. The radius of the circle, which is touched by the line y= x and has its centre on the positive direction of x-axis and also cuts-off a chord of length 2 units along the line $\sqrt{3}y - x = 0$ is:

A. $\sqrt{5}$

B. $\sqrt{3}$

C. $\sqrt{2}$

D. 1

Answer:

Watch Video Solution

295. Tangents drawn from the point (4, 3) to the circle $x^2 + y^2 - 2x - 4y = 0$ are inclined at an angle :

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$.

Answer:

Watch Video Solution

296. If l denotes the semi-latus rectum of the parabola $y^2 = 4ax$ and SP and SQ denote the segments of any focal chord PQ, S being the focus, then SP, l and SQ are in the relation :

A. A.P.

B. G.P.

C. H.P.

D. $l^2 = SP^2 + SQ^2$.

Answer:

Watch Video Solution

297. The eccentricity of the ellipse : $x^2 + 4y^2 + 8y - 2x + 1 = 0$ is :

A. $\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{5}}{2}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$.

Answer:

Watch Video Solution

298. The equation of the tangent parallel to y=x drawn to $\frac{x^2}{3} - \frac{y^2}{2} = 1$ is :

A. $x - y + 1 = 0$

B. $x - y + 2 = 0$

C. $x - y + 3 = 0$

D. $x - y - 2 = 0$.

Answer:

Watch Video Solution

299. A line through the point A (2, 0), which makes an angle of 30° with the positive direction of x-axis is rotated about A in clockwise direction through an angle 15°. Then the equation of the straight line in the new position is :

A. $\left(2 - \sqrt{3}\right)x + y - 4 + 2\sqrt{3} = 0$

B. $\left(2 - \sqrt{3}\right)x - y - 4 + 2\sqrt{3} = 0$

C. $\left(2 - \sqrt{3}\right)x - y + 4 + 2\sqrt{3} = 0$

D. $\left(2 - \sqrt{3}\right)x + y + 4 + 2\sqrt{3} = 0$.

Answer:

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300. The total number of tangents through the point (3, 5) that can be drawn to the ellipse $3x^2 + 5y^2 = 32$ and $25x^2 + 9y^2 = 450$ is :

A. 0

B. 2

C. 3

D. 4

Answer:

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301. The co-ordinates of the foot of the perpendicular from (0, 0) upon the line x + y= 2 are :

A. (2,- 1)

B. (- 2, 1)

C. (1, 1)

D. (1, 2).

Answer:

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302. If C is the reflection of A (2, 4) in x-axis and B is the reflection of C in y-axis, then | AB | is :

A. 20

B. $2\sqrt{5}$

C. $4\sqrt{5}$

D. 4

Answer:

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303. The line $y = 2t^2$ intersects the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ in real points if :

A. $|t| \leq 1$

B. $|t| < 1$

C. $|t| > 1$

D. $|t| \geq 1$.

Answer:

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304. The coordinates of the focus of the parabola described parametrically by $x = 5t^2 + 2, y = 10t + 4$ are :

A. (7, 4)

B. (3, 4)

C. (3,-4)

D. (-7, 4).

Answer:

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305. A positive acute angle is divided into two parts whose tangents are $\frac{1}{2}$ and $\frac{1}{3}$. Then the angle is :

A. $\frac{\pi}{4}$

B. $\frac{\pi}{5}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{6}$.

Answer:

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306. The angle between the line joining the foci of an ellipse to one particular extremity of the minor axis is 90°. The eccentricity of the ellipse is :

A. $\frac{1}{8}$

B. $\frac{1}{\sqrt{3}}$

C. $\sqrt{\frac{2}{3}}$

D. $\sqrt{\frac{1}{2}}$.

Answer:

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307. The circles : $x^2 + y^2 - 10x + 16 = 0$ and $x^2 + y^2 = a^2$: intersect at two distinct points if :

A. $a < 2$

B. $2 < a < 8$

C. $a > 8$

D. $a = 2$.

Answer:

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308. The number of points on the line x + y = 4, which are unit distance apart from the line 2x + 2y = 5 is:

A. 0

B. 1

C. 2

D. infinity.

Answer:

Watch Video Solution

309. For the two circles $x^2 + y^2 = 16$ and $x^2 + y^2 - 2y = 0$ there is/are :

A. one pair of common tangents

B. only one common tangents

C. three common tangents

D. no common tangents.

Answer:

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310. If C is a point on the line segment joining A (-3, 4) and B (2, 1) such that AC = 2BC, then the co-ordinates of C are :

A. $\left(\frac{1}{3}, 2\right)$

B. $\left(2, \frac{1}{3}\right)$

C. (2, 7)

D. (7, 2).

Answer:

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311. The point (-4,5) is the vertex of a square and one of its diagonals is 7x-y+8=0. The equation of the other diagonal is :

A. 7x-y+23=0

B. 7y+x=30

C. 7y+x=31

D. x-7y=30.

Answer:

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312. The vertices of a family of triangles have integer co-ordinates. If two of the vertices of all the triangles are (0, 0) and (6, 8), then the least value of areas of the triangles is :

A. 1

B. $\frac{3}{2}$

C. 2

D. $\frac{5}{2}$

Answer:

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313. A line has slope m and y-intercept 4. The distance between the origin and the line is equal to :

A. $\frac{4}{\sqrt{1-m^2}}$

B. $\frac{4}{\sqrt{m^2-1}}$

C. $\frac{4}{\sqrt{m^2+1}}$

D. $\frac{4m}{\sqrt{1+m^2}}$.

Answer:

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314. One side of length 3a of a triangle of area a^2 square units lies on the line x = a. Then one of the lines on which the third vertex lies, is :

A. $x = -a^2$

B. $x = a^2$

C. $x = -a$

D. $x = \frac{a}{3}$.

Answer:

Watch Video Solution

315. The distance of the point (1, 2) from the line x+y+5 = 0 measured along with the line parallel to 3x-y=7 is equal to :

A. $4\sqrt{10}$

B. 40

C. $\sqrt{40}$

D. $10\sqrt{2}$.

Answer:

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316. Area of the triangle formed by the lines y=2x, y=3x and y=5 is equal to (in square units) :

A. $\frac{25}{6}$

B. $\frac{25}{12}$

C. $\frac{5}{6}$

D. $\frac{17}{12}$.

Answer:

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317. Triangle ABC has vertices (0, 0) (11, 60) and (91, 0). If the line y= kx cuts the triangle into two triangles of equal area, then k is equal to :

A. $\frac{30}{51}$

B. $\frac{4}{7}$

C. $\frac{7}{4}$

D. $\frac{30}{91}$.

Answer:

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318. If the lines$y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, $\left(\frac{1}{2} < m < 3\right)$, then the values of m are :

A. $\frac{1}{7}(1 \pm 5\sqrt{3})$

B. $\frac{1}{7}(1 \pm 5\sqrt{5})$

C. $\frac{1}{7}(1 \pm 5\sqrt{2})$

D. $\frac{1}{7}(1 \pm 2\sqrt{5})$.

Answer:

Watch Video Solution

319. The vertices of a triangle are (3, 0), (3, 3) and (0, 3). Then the coordinates of the circumcentre are :

A. (0, 0)

B. (1,1)

C. (2, 2)

D. $\left(\frac{3}{2}, \frac{3}{2}\right)$.

Answer:

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320. Area of the equilateral triangle inscribed in circle $x^2 + y^2 - 7x + 9y + 5 = 0$ is:

A. $\frac{155}{8}\sqrt{3}$ square units

B. $\frac{165}{8}\sqrt{3}$ square units

C. $\frac{175}{8}\sqrt{3}$ square units

D. $\frac{185}{8}\sqrt{3}$ square units.

Answer:

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321. The equation of one of the diameters of the circle $x^2 + y^2 - 6x + 2y = 0$ is:

A. x+y=0

B. x-y=0

C. 3x+y=0

D. x+3y=0.

Answer:

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322. If two chords having lengths $a^2 - 1$ and 3 (a + 1), where a is a constant of a circle bisect each other, then the radius of the circle is :

A. 6

B. $\frac{15}{2}$

C. 8

D. $\frac{19}{2}$.

Answer:

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323. The equation of the parabola having focus (3, 2) and vertex (1, 2), is :

A. $x^2 + 4x - 8y + 12 = 0$

B. $x^2 - 4x - 8y + 12 = 0$

C. $y^2 - 8x - 4y + 12 = 0$

D. $y^2 + 4y - 8x + 12 = 0$.

Answer:

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324. The sum of the distances of a point (2, -3) from the foci of an ellipse $16(x-2)^2+25(y+3)^2=400$ is :

A. 8

B. 6

C. 50

D. 32

Answer:

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325. The equation of one of the tangents to $\frac{x^2}{3}-\frac{y^2}{2}=1$ which is parallel to y = x is :

A. x-y+2=0

B. x+y-1=0

C. x+y-2=0

D. x-y+1=0.

Answer:

Watch Video Solution

326. If e_1 is eccentricity of the ellipse $\frac{x^2}{16}+\frac{y^2}{7}=1$ and e_2 is eccentricity of the hyperbola $\frac{x^2}{9}-\frac{y^2}{7}=1$, then e_1+e_2 is equal to:

A. $\frac{16}{7}$

B. $\frac{25}{4}$

C. $\frac{25}{12}$

D. $\frac{16}{9}$.

Answer:

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327. A line passes through point (2, 2) and perpendicular to the line 3x + y = 3. Then y - intercept is :

A. $\frac{4}{3}$

B. $\frac{2}{3}$

C. $\frac{3}{4}$

D. $\frac{1}{2}$.

Answer:

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328. If $px^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ represents a pair of straight lines, then value of p is :

A. 3

B. 2

C. 4

D. 5

Answer:

Watch Video Solution

329. Points (3, 3), (h, 0), (0, k) are collinear and $\frac{a}{h}+\frac{b}{k}=\frac{1}{3}$. Then :

A. a=3,b=2

B. a=3,b=3

C. a=1,b=1

D. a=2, b=2.

Answer:

Watch Video Solution

330. $\frac{\sqrt{2009}}{3}\left(x^2-y^2\right)=1$, then eccentricity of the hyperbola is :

A. $\sqrt{2}$

B. $\sqrt{5}$

C. $\sqrt{3}$

D. $\sqrt{7}$.

Answer:

Watch Video Solution

331. The value of k for which the line x+y+1=0 touches the parabola $y^2 = 4kx$ is :

A. 2

B. 1

C. -2

D. -1.

Answer:

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332. The eccentricity of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, if its latus rectum is half of its minor axis, is :

A. $\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{5}}{3}$

C. $\frac{3}{2}$

D. $\frac{4}{3}$.

Answer:

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333. The angle between the tangents drawn from the origin to the parabola $y^2=4a(x-a)$ is

A. 90°

B. 45°

C. 60°

D. 30° .

Answer:

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334. The angle between the lines 2x = 3y=-z and 12x=-2y=-8z is:

A. 60°

B. 45°

C. 90°

D. 30° .

Answer:

Watch Video Solution

335. The centres of 3 circles $x^2 + y^2 = 1, x^2 + y^2 + 6x - 2y = 1, x^2 + y^2 - 12x + 4y = 1$ are :

A. collinear

B. form a right angled triangle

C. non-collinear

D. form an equilateral triangle.

Answer:

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336. If the lines 2x + 3y+1=0,3x-y-4=0 are diameters of a circle $x^2 + y^2 + px + qy + r = 0$ of circumterence 10π, then values of p, q, r are:

A. - 2, 2 - 23

B. 2,-2, 23

C. - 1, 2, 23

D. - 2, - 2, 23.

Answer:

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337. The equation of the circle, while touches the line x= y at origin and passes through the point (2, 1), is $x^2 + y^2 + px + qy = 0$. Then p, q are:

A. 5,-5

B. -4,4

C. 4,-4

D. -5, 5.

Answer:

Watch Video Solution

338. The locus of the foot of the perpendicular from the centre of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ on any tangent is given by $\left(x^2+y^2\right)^2=lx^2+my^2$, where:

A. $l=a^2, m=b^2$

B. $l=-a^2, m=b^2$

C. $l=-a^2, m=-b^2$

D. $l=a^2, m=-b^2$.

Answer:

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339. The locus of the mid-points of a chord of the circle $x^2+y^2=4$ which subtends a right angle at the origin is

A. x+y=1

B. x+y=2

C. $x^2 + y^2 = 1$

D. $x^2 + y^2 = 2$.

Answer:

Watch Video Solution

340. The length of the chord joining the points $(4\cos\theta 4\sin\theta)$ and $(4\cos(\theta + 60^\circ), 4\sin(\theta + 60^\circ))$ of the circle $x^2 + y^2 = 16$ is :

A. 16

B. 2

C. 4

D. 8

Answer:

Watch Video Solution

341. The number of common tangents to the circles $x^2 + y^2 - y = 0$ and $x^2 + y^2 + y = 0$ is :

A. 0

B. 1

C. 2

D. 3

Answer:

Watch Video Solution

342. The co-ordinates of the centre of the smallest circle passing through the origin and having y = x +1 as a diameter are :

A. (-1,0)

B. $\left(\frac{-1}{2}, \frac{1}{2}\right)$

C. $\left(\frac{1}{2}, \frac{-1}{2}\right)$

D. $\left(\frac{1}{2}, \frac{1}{3}\right)$.

Answer:

Watch Video Solution

343. The length of the diameter of the circle which cuts three circles : $x^2 + y^2 - x - y - 14 = 0$ $x^2 + y^2 + 3x - 5y - 10 = 0$ $x^2 + y^2 - 2x + 3y - 27 = 0$ orthogonally, is :

A. 4

B. 2

C. 8

D. 6

Answer:

Watch Video Solution

344. For the parabola $y^2 = 4x$, the point P whose focal distance is 17, is :

A. (2, 8) or (2, - 8)

B. (16, 8) or (16, -8)

C. (8,8) or (8,-8)

D. (4, 8) or (4,- 8).

Answer:

Watch Video Solution

345. The angle between the tangents drawn from origin to the parabola $y^2 = 12x$ from the point (-3,2) is :

A. 30°

B. 45°

C. 90°

D. 60° .

Answer:

Watch Video Solution

346. The number of values of c such that the straight line $y = 4x + c$ touches the curve $\frac{x^2}{4} + y^2 = 1$, is

A. infinite

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

347. If the circle $x^2 + y^2 = a^2$ intersects the hyperbola $xy = C^2$ at four points $P(x_1, y_1), Q(x_2, y_2), R(x_3, y_3)$, and $S(x_4, y_4)$, then proove

$x_1 + x_2 + x_3 + x_4 = 0$, $y_1 + y_2 + y_3 + y_4 = 0$, $x_1x_2x_3x_4 = C^4$, $y_1y_2y_3$ y_4=C^4

A. $y_1y_2y_3y_4 = 2c^4$

B. $x_1 + x_2 + x_3 + x_4 = 0$

C. $y_1 + y_2 + y_3 + y_4 = 2$

D. $x_1x_2x_3x_4 = 2c^4$.

Answer:

Watch Video Solution

348. The foot of the perpendicular from the point (2, 4) upon x + y= 4 is:

A. (1,3)

B. (3,- 1)

C. (2, 2)

D. (4, 0).

Answer:

Watch Video Solution

349. The vertices of a triangle are (6, 0), (0, 6) and (6, 6). Then distance between its circumcentre and centroid, is

A. 1

B. $2\sqrt{2}$

C. 2

D. $\sqrt{2}$.

Answer:

Watch Video Solution

350. The angle between the pair of lines : $x^2 + 2xy - y^2 = 0$ is :

A. 0

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{2}$.

Answer:

Watch Video Solution

351. In an ellipse, if the lines joining focus to the extremities of the minor axis form an equilateral triangle with the minor axis, then the eccentricity of the ellipse is :

A. $\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{3}}{4}$

C. $\frac{1}{\sqrt{2}}$

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

Answer:

Watch Video Solution

352. If a hyperbola passes through the foci of the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1$ and, its transverse and conjugate axes coincide with the major and minor axes of the ellipse and product of their eccentricities be 1, then the equation of hyperbola is :

A. $\frac{x^2}{9}-\frac{y^2}{25}=1$

B. $\frac{x^2}{9}-\frac{y^2}{16}=1$

C. $\frac{x^2}{16}-\frac{y^2}{25}=1$

D. None of these.

Answer:

Watch Video Solution

353. The curve described parametrically by $x = t^2 + t$ and $y = t^2 - t$ represents :

A. a pair of straight lines

B. an ellipse

C. a parabola

D. a hyperbola.

Answer:

Watch Video Solution

354. If P is a point (x,y) on the line y=-3x such that P and the point (3,4) are on the opposite sides of the line 3x-4y-8=0, then :

A. $x > \frac{8}{15}, y < -\frac{8}{5}$

B. $x > \frac{8}{5}, y < -\frac{8}{15}$

C. $x > \frac{8}{15}, y = -\frac{8}{5}$

D. None of these.

Answer:

Watch Video Solution

355. A variable line through the point $\left(\frac{1}{5}, \frac{1}{5}\right)$ cuts the coordinate axes in the points A and B. If the point P divides AB internally in the ratio 3: 1, then the locus of P is :

A. 3y+x=20xy

B. y+ 3x = 20xy

C. x+y = 20xy

D. 3x + 3y =20xy.

Answer:

Watch Video Solution

356. Find the equation of the circle which cuts orthogonally the circle $x^2 + y^2 - 6x + 4y - 3 = 0$, passes through (3,0) and touches the axis of y.

A. $x^2 + y^2 + 6x - 6y + 9 = 0$

B. $x^2 + y^2 - 6x + 6y - 9 = 0$

C. $x^2 + y^2 - 6x - 6y + 9 = 0$

D. None of these.

Answer:

Watch Video Solution

357. If the slope of one of the lines represented by $ax^2 + 2hxy + by^2 = 0$ be the square of the other , then $\frac{a+b}{h} + \frac{8h^2}{ab}$ is :

A. 3

B. 4

C. 5

D. 6

Answer:

Watch Video Solution

358. If, in a hyperbola, the distance between the foci is 10 and the transverse axis has length 8, then the length of its latus-rectum is:

A. 9

B. $\frac{9}{2}$

C. $\frac{32}{3}$

D. $\frac{64}{3}$.

Answer:

Watch Video Solution

359. If (3, 3) is a vertex of a triangle and (- 3, 6) and (9,6) are the mid-points of the two sides through this vertex, then the centroid of the triangle is :

A. (3, 7)

B. (1, 7)

C. (-3, 7)

D. (- 1, 7).

Answer:

Watch Video Solution

360. If $px^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$ represents a pair of straight lines, then value of p is :

A. $\frac{125}{367}$

B. $-\frac{125}{367}$

C. 15

D. -15.

Answer:

Watch Video Solution

361. The equation of the circle passing through the point (1, 1) and through the points of intersection of the circles : $x^2 + y^2 = 6$ and $x^2 + y^2 - 6y + 8 = 0$ is :

A. $x^2 + y^2 + 3y - 13 = 0$

B. $x^2 + y^2 - 3y + 1 = 0$

C. $x^2 + y^2 - 3x + 1 = 0$

D. $5x^2 + 5y^2 + 6y + 16 = 0$.

Answer:

Watch Video Solution

362. If the lines : x+2ay+a=0, x+3by+b=0 and x+4cy+c=0 are concurrent, where a,b,c are non-zero real numbers, then :

A. $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P.

B. $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in G.P.

C. a,b,c are in A.P.

D. a,b,c are in G.P.

Answer:

Watch Video Solution

363. If the equation $\lambda x^2 + (2\lambda - 3)y^2 - 4x - 1 = 0$ represents a circle, then its radius is :

A. $\frac{\sqrt{11}}{3}$

B. $\frac{\sqrt{13}}{3}$

C. $\frac{\sqrt{7}}{3}$

D. $\frac{1}{3}$.

Answer:

Watch Video Solution

364. If x= 9 is the chord of contact of the hyperbola $x^2 - y^2 = 9$, then the equation of the corresponding pair of tangents is :

A. $9x^2 - 8y^2 + 18x - 9 = 0$

B. $9x^2 - 8y^2 - 18x + 9 = 0$

C. $9x^2 - 8y^2 - 18x - 9 = 0$

D. $9x^2 - 8y^2 + 18x + 9 = 0$.

Answer:

Watch Video Solution

365. On the ellipse $4x^2 + 9y^2 = 1$, the points at which tangents are parallel to the line 8x =9y are :

A. $\left(\frac{2}{5}, \frac{1}{5}\right)$

B. $\left(-\frac{2}{5}, \frac{1}{5}\right)$

C. $\left(-\frac{2}{5}, -\frac{1}{5}\right)$

D. $\left(\frac{2}{5}, -\frac{1}{5}\right)$.

Answer:

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366. The equation of the common tangent touching the circle $(x-3)^2 + y^2 = 9$ and the parabola $y^2 = 4x$ above the x-axis is :

A. $\sqrt{3}y = 3x + 1$

B. $\sqrt{3}y = (x + 3)$

C. $\sqrt{3}y = x + 3$

D. $\sqrt{3}y = -(3x+1)$.

Answer:

Watch Video Solution

367. The number os integral values of m for which the x - coordinates of the point of intersection of the lines $3x+4y=9$ and $y=mx+1$ is also an integar is

A. 2

B. 0

C. 4

D. 1

Answer:

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368. The equation of the directrix of the parabola : $y^2 + 4y + 4x + 2 = 0$ is:

A. x=- 1

B. x=1

C. $x = -\frac{3}{2}$

D. $x = \frac{3}{2}$.

Answer:

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369. Let AB be a chord of the circle $x^2 + y^2 = r^2$ subtending a right angle at the centre. Then the locus of the centroid of the triangle PAB as P moves on the circle is :

A. a parabola

B. a circle

C. an ellipse

D. a pair of st. lines.

Answer:

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370. Let PQ and RS be tangents at the extremities of the diameter PR or a circle of radius r. If PS and RQ intersect a point X on the circumference of the circle, then prove that $2r = \sqrt{PQ \times RS}$.

A. $\sqrt{PQ.\ RS}$

B. $\frac{PQ + RS}{2}$

C. $\frac{2PQ.\ RS}{PQ + RS}$

D. $\sqrt{\frac{PQ^2 + RS^2}{2}}$.

Answer:

Watch Video Solution

371. The area of the parallelogram formed by the lines $y = mx, y = xm + 1, y = nx, andy = nx + 1$ equals.

A. $\frac{|m+n|}{(m-n)^2}$

B. $\frac{2}{|m+n|}$

C. $\frac{1}{|m+n|}$

D. $\frac{1}{|m-n|}$.

Answer:

Watch Video Solution

372. If $a > 2ab > 0$, then the positive value of m for which $y = mx - b\sqrt{(1+m^2)}$ is a common tangent to $x^2 + y^2 = b^2$ and $(x-a)^2 + y^2 = b^2$ is

A. $\frac{2b}{\sqrt{a^2 - 4b^2}}$

B. $\frac{\sqrt{a^2 - 4b^2}}{2b}$

C. $\frac{2b}{a - 2b}$

D. $\frac{b}{a - 2b}$.

Answer:

Watch Video Solution

373. The locus of the mid-point of the line segment joining the focus to a moving point oh the parabola $y^2 = 4ax$ is a parabola with directrix :

A. x=-a

B. $x = -\frac{a}{2}$

C. x=0

D. $x = \frac{a}{2}$.

Answer:

Watch Video Solution

374. The area bounded by the curves : $y = |x - 1|$ and $y = 1$ is :

A. 1

B. 2

C. $2\sqrt{2}$

D. 4

Answer:

Watch Video Solution

375. The equation of the common tangent to the curves , $y^2 = 8x$ and xy=-1 is :

A. 3y = 9x+2

B. y=2x +1

C. 2y=x+8

D. y=x+ 2.

Answer:

Watch Video Solution

376. If the tangent at the point P on the circle $x^2 + y^2 + 6x + 6y = 2$ meets the straight line 5x- 2y + 6 = 0 at a point Q on the y-axis, then the length of PQ is:

A. 4

B. $2\sqrt{5}$

C. 5

D. $2\sqrt{5}$.

Answer:

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377. A straight line through the origin O meets the parallel lines 4x + 2y = 9 and 2x + y+ 6=0 at points P and Q respectively. Then the point O divides the segment PQ in the ratio :

A. $1:2$

B. $3:4$

C. $2:1$

D. $4:3.$

Answer:

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378. Let $P=(-1,0), Q=(0,0)$ and $R\left(3,3\sqrt{3}\right)$ be three point . The equation of the bisector of the angle PQR is

A. $\frac{\sqrt{3}}{2}x+y=0$

B. $x+\sqrt{3}y=0$

C. $\sqrt{3}x + y = 0$

D. $x + \frac{\sqrt{3}}{2}y = 0$.

Answer:

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379. Let $0 < \alpha < \frac{\pi}{2}$ be a fixed angle. If $P = (\cos\theta, \sin\theta)$ and $Q = (\cos(\alpha - \theta), \sin(\alpha - \theta),$ then Q is obtanied from P by

A. clockwise rotation around origin through an angle α

B. anticlockwise rotation around origin through an angle α

C. reflection in the line through origin with slope tan α

D. reflection in the line through origin with slope tan $\frac{\alpha}{2}$.

Answer:

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380. A triangle with vertices (2, 0), (- 1,- 1),(1,0) is :

A. isosceles and right angled

B. isosceles but not right angled

C. right angled but not isosceles

D. neither right angled nor isosceles.

Answer:

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381. The straight lines $2x + 11y - 5 = 0, 24x + 7y - 20 = 0$ and $4x - 3y - 2 = 0$

A. form a triangle

B. are only concurrent

C. are concurrent with one line bisecting the angle between the other two

D. None of these.

Answer:

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382. A straight line through the point (2, 2) intersects the lines $\sqrt{3}x + y = 0$ and $\sqrt{3}x - y = 0$ at the points A and B. The equation to the line AB so that the triangle OAB is equilateral is ,

A. x-2=0

B. y-2=0

C. x+y-4=0

D. None of these.

Answer:

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383. Find the incentre of the triangle with vertices $A\left(1, \sqrt{3}\right)$, $B(0, 0)$ and $C(2, 0)$.

A. $\left(1, \frac{\sqrt{3}}{2}\right)$

B. $\left(\frac{2}{3}, \frac{1}{\sqrt{3}}\right)$

C. $\left(\frac{2}{3}, \frac{\sqrt{3}}{2}\right)$

D. $\left(1, \frac{1}{\sqrt{3}}\right)$.

Answer:

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384. The equation of the tangent to the circle $x^2 + y^2 + 4x - 4y + 4 = 0$, which makes equal intercepts on the positive axes, is :

A. x+y=2

B. $x + y = 2\sqrt{2}$

C. x+y=4

D. x+y=8.

Answer:

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385. Find the area bounded by the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$

A. 4

B. 3

C. $\sqrt{12}$

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

Answer:

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386. The equation of the chord joining two points (x_1, y_1) and (x_2, y_2) on the rectangular hyperbola $xy = c^2$ is

A. $\frac{x}{x_1 + x_2} + \frac{y}{y_1 + y_2} = 1$

B. $\frac{x}{x_1 - x_2} + \frac{y}{y_1 - y_2} = 1$

C. $\frac{x}{y_1 + y_2} + \frac{y}{x_1 + x_2} = 1$

D. $\frac{x}{y_1 - y_2} + \frac{y}{x_1 - x_2} = 1$.

Answer:

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387. A square of side a lies above the X- axis and has one vertex at the origin . The side passing through the origin makes an angle $\pi/6$ with the positive direction of X-axis .The equation of its diagonal not passing through the origin is

$y(\sqrt{3} - 1) - x(1 - \sqrt{3}) = 2a$

$y(\sqrt{3}+1)+x(1-\sqrt{3})=2a$

$y(\sqrt{3}+1)+x(1+\sqrt{3})=2a$

$y(\sqrt{3}+1)+x(\sqrt{3}-1)=2a$

A. $y(\cos\alpha+\sin\alpha)+x(\sin\alpha-\cos\alpha)=0$

B. $y(\cos\alpha+\sin\alpha)+x(\sin\alpha+\cos\alpha)=0$

C. $y(\cos\alpha+\sin\alpha)+x(\cos\alpha+\sin\alpha)=0$

D. $y(\cos\alpha-\sin\alpha)-x(\sin\alpha-\cos\alpha)=0$.

Answer:

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388. Find the slope of the tangent to the curve $y=3x^4-4$ at x = 4

A. 768

B. 234

C. 764

D. 0

Answer:

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389. The lines $2x - 3y = 5$ and $3x - 4y = 7$ are the diameters of a circle of area 154 sq. units. Then the equation of the circle is

a. $x^2 + y^2 + 2x - 2y - 62 = 0$

b. $x^2 + y^2 + 2x - 2y - 47 = 0$

c. $x^2 + y^2 - 2x + 2y - 62 = 0$

d. $x^2 + y^2 - 2x + 2y - 47 = 0$

A. $x^2 + y^2 + 2x - 2y = 47$

B. $x^2 + y^2 - 2x + 2y = 47$

C. $x^2 + y^2 - 2x + 2y = 62$

D. $x^2 + y^2 + 2x - 2y = 62$.

Answer:

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390. If the two circles $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ intersect in two distinct points, then :

A. $r<2$

B. r=2

C. $r>2$

D. $2<r<8.$

Answer:

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391. The normal at the point $\left(bt_1^2, 2bt_1\right)$ on a parabola meets the parabola again in the point $\left(bt_2^2, 2bt_2\right)$ then :

A. $t_2=-t_1+\frac{2}{t_1}$

B. $t_2 = t_1 - \frac{2}{t_1}$

C. $t_2 + \frac{2}{t_1}$

D. $t_2 = -t_1 - \frac{2}{t_1}$.

Answer:

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392. If the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide, then find the value b^2

A. 5

B. 7

C. 9

D. 1

Answer:

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393. The orthocentre of the triangle with vertices $(0, 0), (3, 4),$ and $(4, 0)$ is

(a) $\left(3, \frac{5}{4}\right)$ (b) $(3, 12)$ $\left(3, \frac{3}{4}\right)$ (d) $(3, 9)$

A. $\left(3, \frac{7}{3}\right)$

B. $\left(3, \frac{5}{4}\right)$

C. (5, - 2)

D. $\left(3, \frac{3}{4}\right)$.

Answer:

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394. A square is formed by following two pairs of straight lines : $y^2 - 14y + 45 = 0$ and $x^2 - 8x + 12 = 0$. A circle is inscribed in it. The centre of the circle is :

A. (7, 4)

B. (4, 7)

C. (3, 7)

D. $\left(\frac{3}{8}, 4\right)$.

Answer:

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395. The focal chord of $y^2 = 16x$ is tangent to $(x-6)^2 + y^2 = 2$, then the possible values of the slope of this chord are :

A. 1, -1

B. $-\frac{1}{2}, 2$

C. $-2, \frac{1}{2}$

D. $\frac{1}{2}, 2$.

Answer:

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396. The area (in sq units) of the quadrilateral formed by the tangents at the end points of the latus rectum to the ellipse $\frac{x^2}{9}+\frac{y^2}{5}=1$ is

A. 27

B. $27/2$

C. $27/4$

D. $27/55.$

Answer:

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397. Which one of the following is independent of α in the hyperbola `(0 < alpha

A. eccentricity

B. abscissa of foci

C. directrix

D. vertex.

Answer:

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398. Angle between tangents drawn from the point (1, 4) to the parabola $y^2 = 4ax$ is :

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$.

Answer:

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399. The eccentricity of an ellipse, with its centre the origin, is $\frac{1}{2}$. If one of the directrices is x = 4, the equation of the ellipse is :

A. $3x^2 + 4y^2 = 1$

B. $3x^2 + 4y^2 = 12$

C. $4x^2 + 3y^2 = 12$

D. $4x^2 + 3y^2 = 1$.

Answer:

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400. If the line $2x + \sqrt{6}y = 2$ touches the hyperbola $x^2 - 2y^2 = 4$, then the point of contact is

A. $\left(-2, \sqrt{6} \right)$

B. $\left(-5, 2\sqrt{6} \right)$

C. $\left(\frac{1}{2}, \frac{1}{\sqrt{6}}\right)$

D. $\left(4, -\sqrt{6}\right)$.

Answer:

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401. The line parallel to the x-axis and passing through the intersection of the lines $ax + 2by + 3b = 0$ and $bx - 2y - 3a = 0$, where $(a, b) \neq (0, 0)$,is

A. below the x-axis at a distance of $\frac{2}{3}$ from it

B. below the x-axis at a distance of $\frac{3}{2}$ from it

C. above the x-axis at a distance of $\frac{2}{3}$ from it

D. above the x-axis at a distance of $\frac{3}{2}$ from it.

Answer:

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402. If non-zero numbers a,b,c are in H.P., then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through a fixed point. That point is :

A. (-1, -2)

B. (-1, 2)

C. $\left(1, -\frac{1}{2}\right)$

D. (1, -2).

Answer:

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403. If a vertex of a triangle is (1, 1) and the mid-points of two side through this vertex are (-1, 2) and (3, 2), then centroid of the triangle is

A. $\left(-\frac{1}{3}, \frac{7}{3}\right)$

B. $\left(-1, \frac{7}{3}\right)$

C. $\left(\frac{1}{3}, \frac{7}{3}\right)$

D. $\left(1, \frac{7}{3}\right)$.

Answer:

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404. If the circles : $x^2 + y^2 + 2ax + cy + a = 0$ and $x^2 + y^2 - 3ax + dy - 1 = 0$ intersect in two distinct points P and Q, then the line 5x + by- a = 0 passes through P and Q for:

A. no value of a

B. exactly one value of a

C. exactly two values of a

D. infinitely many values of a.

Answer:

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405. A circle touches the X-axis and also touches the centre at (0,3) and radius 2. The locus of the centre of the circle is

A. a circle

B. an ellipse

C. a parabola

D. a hyperbola.

Answer:

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406. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = p^2$ orthogonally, then the equation of the locus of its centre is :

A. $2ax + 2by - \left(a^2 - b^2 + p^2\right) = 0$

B. $x^2 + y^2 - 3ax - 4by + \left(a^2 + b^2 - p^2\right) = 0$

C. $2ax + 2by - \left(a^2 + b^2 + p^2\right) = 0$

D. $x^2 + y^2 - 2ax - 3by + \left(a^2 - b^2 - p^2\right) = 0.$

Answer:

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407. An ellipse has OB as semi minor axis, F and F' its focii eccentricity of the ellipse is

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. $\frac{1}{\sqrt{3}}$

D. $\frac{1}{4}.$

Answer:

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408. The locus of a point $P(\alpha, \beta)$ moving under the condition that the line $y = \alpha x + \beta$ is tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

A. a circle

B. an ellipse

C. a hyperbola

D. a parabola.

Answer:

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409. A circle is given by $x^2 + (y-1)^2 = 1$, another circle C touches it externally and also the x-axis, then the locus of its centre is :

A. $\{(x, y) : x^2 = 4y\} \cup \{(x, y) : y \leq 0\}$

B. $\left\{(x, y) : x^2 + (y-1)^2 = 4\right\} \cup \{(x, y) : y \leq 0\}$

C. $\{(x, y) : x^2 = y\} \cup \{(0, y) : y \leq 0\}$

D. $\{(x, y) : x^2 = 4y\} \cup \{(0, y) : y \leq 0\}$.

Answer:

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410. The minimum area of the triangle formed by the tangent to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the coordinate axes is

A. ab sq. units

B. $\frac{a^2 + b^2}{2}$ sq. units

C. $\frac{(a + b)^2}{2}$ sq. units

D. $\frac{a^2 + ab + b^2}{3}$ sq. units.

Answer:

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411. A straight line through the point A(3,4) is such that its intercept between the axes is bisected at A . Its equation is

A. x+ y=7

B. 3x-4y+7=0

C. 4x + 3y = 24

D. 3x + 4y =25.

Answer:

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412. If (a, a^2) falls inside the angle made by the lines $y = \frac{x}{2}, x > 0$ and $y = 3x, x > 0,$ then a belong to

A. $\left(0, \frac{1}{2}\right)$

B. $(3, \infty)$

C. $\left(\frac{1}{2}, 3\right)$

D. $\left(-3, -\frac{1}{2}\right)$.

Answer:

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413. If the lines 3x - 4y- 7 = 0 and 2x - 3y- 5 = 0 are two diameters of a circle of area 49π square units, then the equation of the circle is :

A. $x^2 + y^2 + 2x - 2y - 47 = 0$

B. $x^2 + y^2 + 2x - 2y - 62 = 0$

C. $x^2 + y^2 - 2x + 2y - 62 = 0$

D. $x^2 + y^2 - 2x + 2y - 47 = 0$.

Answer:

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414. Let C be the circle with centre (0, 0) and radius 3 units. The equation of the locus of the mid points of the chords of the circle C that subtend an angle of $\frac{2\pi}{3}$ at its center is

A. $x^2 + y^2 = \frac{3}{2}$

B. $x^2 + y^2 = 1$

C. $x^2 + y^2 = \frac{27}{4}$

D. $x^2 + y^2 = \frac{9}{4}$.

Answer:

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415. The locus of the vertices of the family of parabolas $y = \frac{a^3x^2}{3} + \frac{a^2x}{2} - 2a$ is

A. $xy = \frac{105}{64}$

B. $xy = \frac{3}{4}$

C. $xy = \frac{35}{16}$

D. $xy = \frac{64}{105}$.

Answer:

Watch Video Solution

416. Angle between the tangents to the curve $y = x^2 - 5x + 6$ at the points (2,0) and (3,0) is

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{4}$.

Answer:

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417. The axis of a parabola is along the line y=x and the distance of its vertex from origin is $\sqrt{2}$ and that from its focus is $2\sqrt{2}$. IF vertex and focus both lie in the first quadrant, the equation of the parabola is

A. $(x+y)^2 = (x-y-2)$

B. $(x-y)^2 = (x+y-2)$

C. `(x -y)^2 =4 (x + y- 2)

D. $(x-y)^2 = 8(x+y-2).$

Answer:

Watch Video Solution

418. The equation of the common tangents to the parabola $y = x^2$ and $y = -(x-2)^2$ is/are :

A. y=4(x-1)

B. y=0

C. y= -4 (x-1)

D. y = - 30x - 50.

Answer:

Watch Video Solution

419. Let a hyperbola passes through the focus of the ellipse $\frac{x^2}{25} - \frac{y^2}{16} = 1$. The transverse and conjugate axes of this hyperbola coincide with the major and minor axes of the given ellipse, also the product of eccentricities of given ellipse and hyperbola is 1, then

A. The equation of the hyperbola is : $\frac{x^2}{9} - \frac{y^2}{16} = 1$

B. The equation of the hyperbola is : $\frac{x^2}{9} - \frac{y^2}{25} = 1$

C. Focus of hyperbola is (5, 0)

D. Focus of hyperbola is $\left(5\sqrt{3}, 0\right)$.

Answer:

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420. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines xy=0 , then m is

A. 2

B. 1

C. 3

D. $-\frac{1}{2}$.

Answer:

Watch Video Solution

421. Let ABCD be a quadrilateral with area 18, with side AB parallel to the side CD and AB = 2CD. Let AD be perpendicular to AB and CD. If a circle is drawn inside the quadrilateral ABCD touching all the sides, then its radius is :

A. 3

B. 2

C. $\frac{3}{2}$

D. 1

Answer:

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422. Consider a family of circles which are passing through the point (-1,1) and are tangent to X-axis. If (h,k) are the coordinate of the centre of the circles, then the set of vaues of k is given by the interval

A. $k \geq \frac{1}{2}$

B. $-\frac{1}{2} \leq k \leq \frac{1}{2}$

C. $k \leq \frac{1}{2}$

D. $0 < k < \frac{1}{2}$.

Answer:

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423. The equation of a tangent to the parabola $y^2 = 8xisy = x + 2$. The point on this line from which the other tangent to the parabola is perpendicular to the given tangent is

A. (0, 2)

B. (2, 4)

C. (- 2,0)

D. (- 1, 1).

Answer:

Watch Video Solution

424. A hyperbola having the transverse axis of length $2\sin\theta$, is confocal with the ellipse $3x^2 + 4y^2 = 12$. Then, its equation is

A. $x^2 \cos ec^2\theta - y^2 \sec^2\theta = 1$

B. $x^2 \sec^2\theta - y^2 \cos ec^2\theta = 1$

C. $x^2 \sec^2\theta - y^2 \cos^2\theta = 1$

D. $x^2 \cos^2\theta - y^2 \sin^2\theta = 1.$

Answer:

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425. For the hyperbola $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$, which of the following remains constant when α varies

A. Directrix

B. Abscissae of vertices

C. Abscissae of foci

D. Eccentricity.

Answer:

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426. The perpendicular bisector of the line segment joining $P(1, 4)$ and $Q(k, 3)$ has y - intercept -4 Then a possible value of k is

A. -4

B. 1

C. 2

D. -2.

Answer:

Watch Video Solution

427. The point diametrically opposite to the point P(1,0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is

A. (3, 4)

B. (3, - 4)

C. (- 3, 4)

D. (- 3, - 4).

Answer:

Watch Video Solution

428. A parabola has the origin as its focus and the line x=2 as the directrix. The vertex of the parabola is at

A. (2, 0)

B. (0, 2)

C. (1, 0)

D. (0, 1) .

Answer:

Watch Video Solution

429. A focus of an ellipse Is that the rigin. The directrix is the line x=4 and the eccentricity is 1/2. Then, the length of the semi-major axis is

A. $\frac{5}{3}$

B. $\frac{8}{3}$

C. $\frac{2}{3}$

D. $\frac{4}{3}$.

Answer:

Watch Video Solution

430. Consider three points :

$P(-\sin(\beta-\alpha), -\cos\beta), Q=(\cos(\beta-\alpha), \sin\beta),$ and $R=(\cos(\beta-$

, where$0<\alpha, \beta, \theta<\frac{\pi}{4}$ Then

A. P lies on the line segment RQ

B. Q lies on the line segment PR

C. R lies on the line segment QP

D. P,Q, R are non-collinear.

Answer:

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431. Consider two curves $C1: y^2=4x$; $C2=x^2+y^2-6x+1=0.$

Then,

A. C_1 and C_2 touch each other only at one point

B. C_1 and C_2 touch each other exactly at two points

C. C_1 and C_2 intersect (but do not touch) at exactly two points

D. C_1 and C_2 neither intersect nor touch each other.

Answer:

Watch Video Solution

432. Let a and b be non-zero real numbers. Then the equation : $\left(ax^2+by^2+c\right)\left(x^2-5xy+6y^2\right)=0$ represents :

A. our straight lines. when c= 0 and a=b are of the same sign

B. two straight lines and a circle, where a = b and c is of sign opposite to that of a.

C. two straight lines and a hyperbola when a and b are of the same sign and c is of sign opposite to that of a

D. a circle and an ellipse, when a and b are of the same sign and c is of sign opposite to that of a.

Answer:

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433. Consider a branch of the hyperbola : $x^2 - 2y^2 - 2\sqrt{2}x - 4\sqrt{2}y - 6 = 0$ with vertex at the point A. Let B be one of the end points of the latus -rectum. If C is the focus of the hyperbola nearest to the point A , then the area of the traingle ABC is :

A. $1 - \sqrt{\frac{2}{3}}$

B. $\sqrt{\frac{3}{2}} - 1$

C. $1 + \sqrt{\frac{2}{3}}$

D. $\sqrt{\frac{3}{2}} + 1$.

Answer:

Watch Video Solution

434. Tangents drawn from the piont P(1,8) to the circle $x^2 + y^2 - 6x - 4y - 11 = 0$ touch the circle at the points A and B. The equation of the circumcircle of the triangle PAB is

A. $x^2 + y^2 + 4x - 6y + 19 = 0$

B. $x^2 + y^2 - 4x - 10y + 19 = 0$

C. $x^2 + y^2 - 2x + 6y - 29 = 0$

D. $x^2 + y^2 - 6x - 4y + 19 = 0.$

Answer:

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435. The tangent PT and the normal PN to the parabola $y^2 = 4ax$ at a point P on it meet its axis at points T and N respectively. The locus of the centroid of the triangle PTN is a parabola whose :

A. vertex is $\left(\frac{2a}{3}, 0\right)$

B. directrix is x = 0

C. latus rectum is y

D. focus is (a, 0).

Answer:

Watch Video Solution

436. The line passing through the extremity A of the major axis and extremity B of the minor axis of the ellipse $x^2 + 9y^2 = 9$ meets its auxiliary circle at the point M. Then the area of the triangle with vertices at A, M and the origin O is :

A. $\frac{31}{10}$

B. $\frac{29}{10}$

C. $\frac{21}{10}$

D. $\frac{27}{10}$.

Answer:

Watch Video Solution

437. A triangle ABC with fixed base BC , the vertex A moves such that $\cos B + \cos C = 4\sin^2\left(\frac{A}{2}\right)$. If a, b and $c,$ denote the length of the sides of the triangle opposite to the angles $A, B, andC$, respectively, then

(a)$b + c = 4a$

(b) $b + c = 2a$

(c)the locus of point A is an ellipse

(d)the locus of point A is a pair of straight lines

A. b+c= 4a

B. b+c=2a

C. locus of A is an ellipse

D. locus of point A is a pair of Straight lines.

Answer:

Watch Video Solution

438. The normal at a point P, on the ellipse $x^2 + 4y^2 = 16$ meets the x-axis at Q. If M is the mid-point of the line segment PQ, then the locus of M intersects the latus-rectum of the given ellipse at the points :

A. $\left(\pm \frac{3\sqrt{5}}{2}, \pm \frac{2}{7} \right)$

B. $\left(\pm \frac{3\sqrt{5}}{2}, \pm \frac{\sqrt{19}}{4} \right)$

C. $\left(\pm 2\sqrt{3}, \pm \frac{1}{7} \right)$

D. $\left(\pm 2\sqrt{3}, \pm \frac{4\sqrt{3}}{7} \right)$.

Answer:

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439. The locus of the orthocentre of the triangle formed by the lines : $(1+p)x - py + p(1+p) = 0, (1+q)x - qy + q(1+q) = 0, \text{ and } y = 0$, where $p \neq q$, is :

A. A hyperbola

B. A parabola

C. An ellipse

D. A straight line.

Answer:

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440. An ellipse intersects the hyperbola $2x^2 - 2y^2 = 1$ orthogonally. The eccentricity of the ellipse is reciprocal of that of the hyperbola. If the axes of the ellipse are along the co-ordinate axes, then :

A. Equation of ellipse is$x^2 2y^2 = 2$

B. The foci of ellipse are $(\pm 1, 0)$

C. Equation of ellipse is $x^2 2y^2 = 4$

D. The foci of ellipse are $(\pm 2, 0)$.

Answer:

Watch Video Solution

441. The lines $p(p^2 + 1)x - y + q = 0$ and $(p^2 + 1)^2 x + (p^2 + 1)y + 2q = 0$ are perpendicular to a common line for

A. no value of p

B. exactly one value of p

C. exactly two values of p

D. more than two values of p.

Answer:

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442. If P and Q are the points of intersection of the circles $x^2 + y^2 + 3x + 7y + 2p - 5 = 0$ and $x^2 + y^2 + 2x + 2y - p^2 = 0$ then there is a circle passing through P, Q and (1,1) for:

A. all values of p

B. all except one value of p

C. all except two values of p

D. exactly one value of p.

Answer:

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443. The ellipse $x^2 + 4y^2 = 4$ is inscribed is a rectangle alligned with the co-ordinate axes, which in turn is inscribed in another ellipse that passes through the point (4, 0). Then the equation of the ellipse is :

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

B. $x^2 + 12y^2 = 16$

C. $4x^2 + 48y^2 = 48$

D. $4x^2 + 64y^2 = 48$.

Answer:

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444. The Line L given by $\frac{x}{5} + \frac{y}{b} = 1$ passes through the point (13, 32). The line K is parallel to L and has the equation $\frac{x}{c} + \frac{y}{3} = 1$. Then the distance between L and K is

A. $\frac{23}{\sqrt{15}}$

B. $\sqrt{17}$

C. $\frac{17}{\sqrt{15}}$

D. $\frac{23}{\sqrt{17}}$.

Answer:

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445. The circle $x^2 + y^{2d} = 4x + 8y + 5$ intersects the line 3x-4y=m at two distinct points if

A. -85 ltmlt -35

B. -35lt m lt15

C. 15 lt m lt 65

D. 35 ltmlt85.

Answer:

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446. If two tangents drawn from a point P to the parabola y2 = 4x are at right angles, then the locus of P is

A. x = 1

B. 2x+1=0

C. x =-1

D. 2x+-1=0.

Answer:

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447. Let A and B be two distinct points on the parabola $y^2 = 4x$. If the axis of the parabola touches a circle of radius r having AB as its diameter, The slope of the line joining A and B can be

A. $-\frac{1}{r}$

B. $\frac{1}{r}$

C. $\frac{2}{r}$

D. $-\frac{2}{r}$.

Answer:

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448. A straight line L through the point $(3, -2)$ is incined at an angle 60° to the line $\sqrt{3}x + y = 1$ If L also intersects the X -axis ,then the equation of L is

A. $y + \sqrt{3}x + 2 - 3\sqrt{3} = 0$

B. $y - \sqrt{3}x + 2 + 3\sqrt{3} = 0$

C. $\sqrt{3}y - x + 3 + 2\sqrt{3} = 0$

D. $\sqrt{3}y + x - 3 + 2\sqrt{3} = 0$.

Answer:

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449. The lines x + y =|a| and ax-y= 1 intersect each other in the first quadrant. Then the set of all possible values of a is the interval.

A. $(0, \infty)$

B. $[1, \infty)$

C. $(-1, \infty)$

D. $(-1, 1]$.

Answer:

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450. If A (2, -3) and B (-2, 1) are two vertices of a triangle and third vertex moves on the line 2x + 3y = 9, then the locus of the centroid of the triangle is :

A. x-y=1

B. 2x+3y=1

C. 2x+3y=3

D. 2x-3y= 1.

Answer:

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451. The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2 (c > 0)$ touch each other if :

(1) $2|a| = c$ (2) $|a| = c$ (3) $a = 2c$ (4) $|a| = 2c$

A. 2 |a|=c

B. |a| =c

C. a=2c

D. |a| =2c .

Answer:

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452. The circle passing through the point (-1,0) and touching the Y-axis at (0,2) also passes through the point.

A. $\left(-\frac{3}{2}, 0\right)$

B. $\left(-\frac{5}{2}, 0\right)$

C. $\left(-\frac{3}{2}, \frac{5}{2}\right)$

D. (-4, 0).

Answer:

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453. Find the equation of the circle passing through (1,0) and (0,1) and having the smallest possible radius.

A. $x^2 + y^2 - 2x - 2y + 1 = 0$

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

C. $x^2 + y^2 + 2x + 2y - 7 = 0$

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

Answer:

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454. Let (x,y) be any point on the parabola $y^2 = 4x$. Let P be the point that divides the line segment from (0, 0) to (x, y) in the ratio 1 : 3. Then the locus of P is:

A. $x^2 = y$

B. $y^2 = 2x$

C. $y^2 = x$

D. $x^2 = 2y$.

Answer:

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455. Find the equation of the ellipse referred to its axes as the axes of co-ordinates :

which passes through the points (- 2, 1) and eccentricity $=\sqrt{\frac{2}{5}}$

A. $3x^2 + 5y^2 - 32 = 0$

B. $5x^2 + 3y^2 - 48 = 0$

C. $3x^2 + 5y^2 - 15 = 0$

D. $5x^2 + 3y^2 - 32 = 0$.

Answer:

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456. The equation of the hyperbola whose foci are (- 2, 0) and (2, 0) and eccentricity is 2 is given by :

A. $x^2 - 3y^2 = 3$

B. $3x^2 - y^2 = 3$

C. $-x^2 + 3y^2 = 3$

D. $-3x^2 + y^2 = 3$.

Answer:

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457. Find the equation of the diagonal through the origin of the quadrilateral formed by $x = 0, y = 0, x + y = 1$ and $6x + y = 3$.

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458. Show that all chords of the curve $3x^2 - y^2 - 2x + 4y = 0$, which subtend a right angle at the origin, pass through a fixed point. Find the co-ordinates of the point.

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459. A line is such that its segment between the straight line $5x - y - 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point (1,5) Obtain the equation.

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460. Straight lines : $3x + 4y = 5$ and $4x - 3y = 15$ intersect at the point A. Points B and C are chosen on these two lines such that |AB| =| AC|. Determine the possible equations of the line BC passing through the point (1, 2).

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461. Find the locus of a point whose sum of the distances from the origin and the line x = 2 is 4 units.

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462. Given vertices A (1, 1), B (4, -2) and C (5, 5) of a triangle, find the equation of the perpendicular dropped from C to the interior bisector of the angle A.

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463. If lines 5x + 12y-10 = 0 and 5x- 12y - 40 =0 touch a circle C_1 of diameter 6, and if the centre of C_1 lies in the first quadrant, find the equation of a circle C_2, which is concentric with C_1 and cuts intercept of length 8 on these lines.

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464. Let $S = x^2 + y^2 + 2gx + 2fy + c = 0$ be a gives circle. Find the locus of the foot of the perpendicular drawn from the origin upon any chord, which subtends a right angle at the origin.

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465. The points (1, 3) and (5, 1) are the opposite vertices of a rectangle. The other two vertices lie on the line y=2x+c. Find c and the remaining vertices.

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466. Let $P(x_1, y_1)$ be a point and let ax + by +c =0 be a line. If L (h, k) is the foot of perpendicular drawn from P on this line and $Q(\alpha, \beta)$ is the image of P in the given line, then prove that : $\frac{h - x_1}{a} = \frac{k - y_1}{b} = -\left(\frac{ax_1 + by_1 + c}{a^2 + b^2}\right)$.

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467. Let $P(x_1, y_1)$ be a point and let ax + by +c =0 be a line. If L (h, k) is the foot of perpendicular drawn from P on this line and $Q(\alpha, \beta)$ is the image of P in the given line, then prove that : $\frac{h - x_1}{a} = \frac{k - y_1}{b} = -\left(\frac{ax_1 + by_1 + c}{a^2 + b^2}\right)$.

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468. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. If the tangents at the points B (1, 7) and D(4,-1) on the circle meet at the point C find the area of the quadrilateral ABCD.

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469. Find the equation of the circle passing through the point (0, 0) and the points, where the st. line 3x + 4y = 12 meets the axes of co-ordinates.

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470. Find the equation of the circle which touches the circle $x^2 + y^2 - 6x + 6y + 17 = 0$ externally and to which the lines $x^2 - 3xy - 3x + 9y = 0$ are normals.

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471. Three circles touch one another externally. The tangents at their points of contact meet at a point whose distance from a point of contact is 4. Find the ratio of the product of the radii to the sum of the radii of the circles.

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472. Find the centre and radius of the smaller of the two circles that touch the parabola $75y^2 = 64(5x - 3)$ at $\left(\frac{6}{5}, \frac{8}{5}\right)$ and the x-axis.

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473. C_1 and C_2 are two concentric circles, the radius of C_2 being twice that of C_1. From a point P on C_2, tangents PA and PB are drawn to C_1. Prove that the centroid of the triangle PAB lies on C_1 .

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474. Show that the locus of a point that divides a chord of slope 2 of the parabola $y^2 = 4x$ internally in the ratio 1 : 2 is a parabola. Find the vertex of this parabola.

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475. From the point (-1, 2), tangent lines are drawn to the parabola $y^2 = 4x$. Find the equation of the chord of contact. Also find the area of the triangle formed by the chord of contact and the tangents.

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476. From a point A, common tangents are drawn to the circle $x^2 + y^2 = \frac{a^2}{2}$ and parabola $y^2 = 4x$. Find the area of the quadrilateral formed by the common tangents, the chord of contact of the circle and the chord of contact of the parabola.

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477. Find the equatios of the tangents to the circle $x^2 + y^2 = 16$ drawn from the piont (1,4).

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478. Find the acute angle between the curves $y = |x^2 - 1|$ and $y = |x^2 - 3|$ at their points of intersection whe $x > 0$.

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