MATHS

BOOKS - KC SINHA ENGLISH

CIRCLES - FOR COMPETITION

Solved Examples

1. Find the equation of the circle having the lines $x^2 + 2xy + 3x + 6y = 0$ as its normal and having size just sufficient to contain the circle $x(x-4) + y(y-3) = 0$

Watch Video Solution

2. Let C denote the circle $x^2 + y^2 - 6y + 5 = 0$. Determine the equaiton of a circle $(sayD)$ which is concentric with C and the angle between the tangents to which (i.e. D) from every point on the circumference of C, is a given constant.

Watch Video Solution

3. A circle touches x-axis at (2, 0) and has an intercept of 4 units on the y-axis. Find its equation.

Watch Video Solution

4. 2x-y+4=0 is a diameter of the circle which circumscribed a rectangle ABCD. If the coordinates of A and B are A (4,6) and B(1,9) find the area of rectangle ABCD.

Watch Video Solution

5. Find the equation of the circle passing through the point (2, 8), touching the lines $4x - 3y - 24 = 0$ and $4x + 3y - 42 = 0$ andhaving x-coordinate of the centre of the circle numerically less than or equal to 8.

Watch Video Solution

6. about to only mathematics

Watch Video Solution

7. Find the equations of the circles touching the lines $y = 0$ and $y = \sqrt{3}(x+1)$ and having the centres at a distance 1 from the origin.

Watch Video Solution

8. about to only mathematics

Watch Video Solution

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

Watch Video Solution

10. The values of constant term in the equation of circle passing through $(1, 2)$ and $(3, 4)$ and touching the line $3x + y - 3 = 0$, is

Watch Video Solution

11. Find the equations of the circles passing through the point $(-4, 3)$ and touching the lines $x + y = 2$ and $x - y = 2$

Watch Video Solution

12. A circle touches both the x-axis and the line $4x - 3y + 4 = 0$. Its centre is in the third quadrant and lies on the line $x - y - 1 = 0$. Find the equation of the circle.

Watch Video Solution

13. If $\left(m_i, \frac{1}{m_i}\right), i = 1, 2, 3, 4$ are concyclic points then the value of $m_1 m_2 m_3 m_4$ is

Watch Video Solution

14. Find the equation of the circle passing through the point of intersection of the circles $x^2 + y^2 - 6x + 2y + 4 = 0, x^2 + y^2 + 2x - 4y - 6 = 0$ and with its centre on the line y=x.

Watch Video Solution

15. The equation of the circle described on the common chord of the circles $x^2 + y^2 - 4x + 5 = 0$ and $x^2 + y^2 + 8y + 7 = 0$ as a diameter, is

Watch Video Solution

16. Show that the circle on the chord $x \cos \alpha + y \sin \alpha - p = 0$ of the circle $x^2 + y^2 = a^2$ as diameter is $x^2 + y^2 - a^2 - 2p(x \cos \alpha + y \sin \alpha - p) = 0$.

Watch Video Solution

17. If the circle $x^2 + y^2 + 2gx2fy + c = 0$ bisects the circumference of the circle $x^2 + y^2 + 2g'x + 2f'y + c' = 0$, then prove that $2g'(g - g') + 2f'(f - f') = c - c'$.

Watch Video Solution

18. Show that equation $x^2 + y^2 - 2ay - 8 = 0$ represents, for different values of 'a, asystem of circles"passing through two fixed points A, B on the X-axis, and find the equation ofthat circle of the system the tangents to which at AB meet on the line $x + 2y + 5 = 0.$

Watch Video Solution

19. The line $Ax + By + C = 0$ cuts the circle $x^2 + y^2 + ax + by + c = 0$ at $PandQ$. The line $A'x + B'x + C' = 0$ cuts the circle $x^2 + y^2 + a'x + b'y + c' = 0$ at $RandS$. If $P, Q, R,$ and S are concyclic, then show that $|a - a'b - b'c - c'ABCA'B'C'| = 0$

Watch Video Solution

20. Examine if the two circles $x^2 + y^2 - 2x - 4y = 0$ and $x^2 + y^2 - 8y - 4 = 0$ touch each other externally or internally.

Watch Video Solution

Watch Video Solution

21. If the circles $x^2+y^2+2ax+c=0$ and $x^2+y^2+2by+c=0$ touch each other, then find the relation between a, b and c.

Watch Video Solution

22. Prove that the circle $x^2+y^2=a^2$ and $(x-2a)^2+y^2=a^2$ are equal and touch each other. Also find the equation of a circle (or circles) of equal radius touching both the circles.

Watch Video Solution

23. The extremities of a diagonal of a rectangle are $(-4, 4)$ and $(6, -1)$. A circle circumscribes the rectangle and cuts an intercept AB on the y-axis. If Δ be the area of the triangle formed by AB and the tangents to the circle at A and B, then $8\Delta=$.

Watch Video Solution

24. The extremities of a diagonal of a rectangle are (0,0) and (4,3). The equation of tangents to the circumcircle of the rectangle which are parallel to the diagonal are

Watch Video Solution

25. A circle of radius 2 units rools on the outer side of the circle $x^2 + y^2 + 4x = 0$, touching it externally. Find the locus of the centre of this outer circle. Also find the equations of the common tangents of the two circles when the line joining the centres of the two circles makes an angle of 60^0 with x-axis.

Watch Video Solution

26. Lines $5x + 12y - 10 = 0$ and $5x - 12y - 40 = 0$ touch a circle C1 of diameter 6. If the center of C1, lies in the first quadrant then the equation

of the circle C2, which is concentric with C1, and cuts intercept of length 8 on these lines

Watch Video Solution

27. about to only mathematics

Watch Video Solution

28. Two parallel tangents to a given circle are cut by a third tangent at the point $RandQ$. Show that the lines from $RandQ$ to the center of the circle are mutually perpendicular.

Watch Video Solution

29. If $4l^2 - 5m^2 + 6l + 1 = 0$. Prove that $lx + my + 1 = 0$ touches a definite circle. Find the centre & radius of the circle.

Watch Video Solution

30. Find the equation of the two tangents from the point $(0, 1)$ to the circle $x^2 + y^2 - 2x + 4y = 0$

Watch Video Solution

31. If from any point P on the circle $x^2 + y^2 + 2gx + 2fy + c = 0$, tangents are drawn to the circle $x^2 + y^2 + 2gx + 2fy + c\sin^2\alpha + (g^2 + f^2)\cos^2\alpha = 0$, then find the angle between the tangents.

Watch Video Solution

32. about to only mathematics

Watch Video Solution

33. Tangent drawn from the point $P(4, 0)$ to the circle $x^2 + y^2 = 8$ touches it at the point A in the first quadrant. Find the coordinates of another point B on the circle such that $AB = 4$.

Watch Video Solution

34. From a point on the line $4x - 3y = 6$, tangents are drawn to the circle $x^2 + y^2 - 6x - 4y + 4 = 0$ which make an angle of $\tan^{-1}\left(\frac{24}{7}\right)$ between them. Find the coordinates of all such points and the equation of tangents.

Watch Video Solution

35. If the distances from the origin of the centers of three circles $x^2 + y^2 + 2\lambda x - c^2 = 0, (i = 1, 2, 3)$, are in GP, then prove that the lengths of the tangents drawn to them from any point on the circle $x^2 + y^2 = c^2$ are in GP.

Watch Video Solution

Watch Video Solution

36. If the chord of contact of the tangents drawn from a point on the circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touches the circle $x^2 + y^2 = c^2$, then prove that a, b and c are in GP.

Watch Video Solution

37. Tangents PA and PB are drawn to $x^2 + y^2 = a^2$ from the point $P(x_1, y_1)$. Then find the equation of the circumcircle of triangle PAB.

Watch Video Solution

38. Tangents PT_1, and PT_2, are drawn from a point P to the circle $x^2 + y^2 = a^2$. If the point P lies on the line $Px + qy + r = 0$, then the locus of the centre of circumcircle of the triangle PT_1T_2 is

Watch Video Solution

39. Show that the common tangents to the parabola $y^2 = 4x$ and the circle $x^2 + y^2 + 2x = 0$ form an equilateral triangle.

Watch Video Solution

40. Find the equation of the circle which passes through the points of intersection of circles $x^2 + y^2 - 2x - 6y + 6 = 0$ and $x^2 + y^2 + 2x - 6y + 6 = 0$ and intersects the circle $x^2 + y^2 + 4x + 6y + 4 = 0$ orthogonally.

Watch Video Solution

41. Find the length of the chord of the circle $x^2 + y^2 = 4$ through $\left(1, \frac{1}{2}\right)$ which is of minimum length.

Watch Video Solution

42. Find the equation to the chord of contact of the tangents drawn from an external point $(-3, 2)$ to the circle $x^2 + y^2 + 2x - 3 = 0$.

Watch Video Solution

43. about to only mathematics

Watch Video Solution

44. about to only mathematics

Watch Video Solution

45. Show that the circles $x^2 + y^2 - 2x - 6y - 12 = 0$ and $x^2 + y^2 + 6x + 4y - 6 = 0$ cut each other orthogonally.

Watch Video Solution

46. If the equations of two circles, whose radii are r and R respectively, be S = 0 and S' = 0, then prove that the circles $\frac{S}{r} \pm \frac{S'}{R} = 0$will intersect orthogonally

Watch Video Solution

47. The two circles which pass through $(0, a) and (0, -a)$ and touch the line $y = mx + c$ will intersect each other at right angle if

$a^2 = c^2(2m + 1)$ $a^2 = c^2(2 + m^2)$ $c^2 = a^2(2 + m^2)$ (d) $c^2 = a^2(2m + 1)$

Watch Video Solution

48. The equation of the circle, orthological to both the circle $x^2 + y^2 + 3x - 5y + 6 = 0$ and $x^2 + 4y^2 - 28x + 29 = 0$ and whose centre lies on the line $3x + 4y + 1 = 0$ is

Watch Video Solution

49. The centre of the circle $S=0$ lie on the line $2x-2y+9=0$ & $S=0$ cuts orthogonally $x^2+y^2=4$. Show that circle $S=0$ passes through two fixed points & find their coordinates.

Watch Video Solution

50. Line 2x+3y+1=0 is a tangent to the circle at (1,-1). This circle is orthogonal to a circle which is drawn having diameter as a line segment with end points (0, -1) and (-2, 3). Then the equation of the circle is

Watch Video Solution

51. about to only mathematics

Watch Video Solution

52. about to only mathematics

Watch Video Solution

53. Find the locus of the mid-point of the chords of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ which subtend an angle of 120^0 at the centre of the circle.

Watch Video Solution

54. Show that the locus of a point such that the ratio of its distances from two given points is constant, is a circle. Hence show that the circle cannot pass through the given points.

Watch Video Solution

55. Two rods of lengths $a and b$ slide along the $x-$ and y-axis , respectively, in such a manner that their ends are concyclic. Find the locus of the center of the circle passing through the endpoints.

Watch Video Solution

56. Two straight lines rotate about two fixed points $(-a, 0)$ and $(a, 0)$ in anticlockwise sense. If they start from their position of coincidence such that one rotates at a rate double the other, then find the locus of curve.

Watch Video Solution

57. A circle of radius r passes through the origin O and cuts the axes at A and B. Let P be the foot of the perpendicular from the origin to the line AB. Find the equation of the locus of P.

Watch Video Solution

58. Show that the locus of points from which the tangents drawn to a circle are orthogonal, is a concentric circle. Or Find the equation of the director circle of the circle $x^2 + y^2 = a^2$.

Watch Video Solution

59. From the origin, chords are drawn to the circle $(x-1)^2 + y^2 = 1$. The equation of the locus of the mid-points of these chords

Watch Video Solution

60. Let $S \equiv x^2 + y^2 + 2gx + 2fy + c = 0$ be a given circle. Find the locus of the foot of the perpendicular drawn from the origin upon any chord of S which subtends a right angle at the origin.

Watch Video Solution

61. The locus of the point of intersection of the tangents to the circle $x = a\cos\theta, y = a\sin\theta$ at the points, whose parametric angles differ by $\frac{\pi}{3}$ is

Watch Video Solution

62. A triangle has two of its sides along the axes, its third side touches the circle $x^2 + y^2 - 2ax - 2ay + a^2 = 0$. Find the equation of the locus of the circumcentre of the triangle.

Watch Video Solution

63. Let a circle be given by $2x(x-1) + y(2y-b) = 0, (a \neq 0, b \neq 0)$. Find the condition on $aandb$ if two chords each bisected by the x-axis, can be drawn to the circle from $\left(a, \frac{b}{2}\right)$

Watch Video Solution

64. Find the intervals of the values of a for which the line $y+x=0$ bisects two chords drawn from the point $\left(\frac{1+\sqrt{2}a}{2}, \frac{1-\sqrt{2}a}{2}\right)$ to the circle $2x^2+2y^2-(1+\sqrt{2}a)x-(1-\sqrt{2}a)y=0$

Watch Video Solution

65. Let C be any circle with centre $(0, \sqrt{2})$. Prove that at most two rational points can be there on C. (A rational point is a point both of whose coordinates are rational numbers)

Watch Video Solution

66. Find the point P on the circle $x^2+y^2-4x-6y+9=0$ such that (i) $\angle POX$ is minimum (ii) OP is maximum, where O is the origin and OX is the x-axis.

Watch Video Solution

67. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the coordinate axes, and the point (1, 4) is inside the circle. Find the range of value of k.

Watch Video Solution

68. Show that the line $3x - 4y - c = 0$ will meet the circle having centre at (2, 4) and the radius 5 in real and distinct points if $-35 < c < 15$.

Watch Video Solution

69. Three concentric circles, of which the biggest is $x^2 + y^2 = 1$, have their radii in AP. If the line $y = x + 1$ cuts all the circles at real and distinct point, then find the interval in which the common difference of AP will lie.

Watch Video Solution

70. about to only mathematics

Watch Video Solution

71. The value of $\frac{6r^2}{11}$ where r is the radius of the largest circle with centre (1, 0) which can be inscribed in the ellipse $x^2 + 4y^2 = 16, is\cdot$

Watch Video Solution

72. The angle between the pair of tangents drawn from a point P to the circle $x^2 + y^2 + 4x - 6y + 9\sin^2\alpha + 13\cos^2\alpha = 0$ is 2α . then the equation of the locus of the point P is $x^2 + y^2 + 4x - 6y + 4 = 0$

$x^2 + y^2 + 4x - 6y - 9 = 0$ $x^2 + y^2 + 4x - 6y - 4 = 0$

$x^2 + y^2 + 4x - 6y + 9 = 0$

Watch Video Solution

73. If two distinct chords, drawn from the point (p, q) on the circle $x^2 + y^2 = px + qy$ (where $pq \neq q$) are bisected by the x-axis, then $p^2 = q^2$ (b) $p^2 = 8q^2$ $p^2 < 8q^2$ (d) $p^2 > 8q^2$

Watch Video Solution

74. 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) $x^2 + y^2 = \frac{9}{4}$

Watch Video Solution

75. Consider a family of circles which are passing through the point $(-1, 1)$ and are tangent to the x-axis. If (h, k) are the coordinates of the center of the circles, then the set of values of k is given by the interval.

(a)$k \geq \frac{1}{2}$ (b) $-\frac{1}{2} \leq k \leq \frac{1}{2}$ $k \leq \frac{1}{2}$ (d) $0<k<\frac{1}{2}$

Watch Video Solution

76. The point diametrically opposite to the point P (1, 0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is (1) $(3, -4)$ (2) $(-3, 4)$ (3) $(-3, -4)$ (4) $(3, 4)$

Watch Video Solution

77. 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 (1) all values of p (2) all except one value of p (3) all except two values of p (4) exactly one value of p

Watch Video Solution

78. If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally then k equals (A)

2 or $-\frac{3}{2}$ (B) -2 or $-\frac{3}{2}$ (C) 2 or $\frac{3}{2}$ (D) -2 or $\frac{3}{2}$

Watch Video Solution

79. about to only mathematics

Watch Video Solution

80. If $a > 2b > 0$, then find 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 $(x-a)^2 + y^2 = b^2$.

Watch Video Solution

81. The radius of the circle, having at (2,1) whose one of the chord is a diameter of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ is

Watch Video Solution

82. Tangents drawn from the point $P(1, 8)$ to the circle $x^2 + y^2 - 6x - 4y - 11 = 0$ touch the circle at points A and B. The equation of the cricumcircle of triangle PAB is

Watch Video Solution

83. Let L_1 be a straight line passing through $(0, 0)$ and L_2 be x+y=1. If the intercepts made by the circel $x^2 + y^2 - x + 3y = 0 on L_1$ and L_2 are equal, then which of the following equations can represent L_1?

Watch Video Solution

84. Statement 1 : The curve $y = -\frac{x^2}{2} + x + 1$ is symmetric with respect to the line $x = 1$ Statement 2 : A parabola is symmetric about its axis. Both the statements are true and Statements 1 is the correct explanation of Statement 2. Both the statements are true but Statements 1 is not the correct explanation of Statement 2. Statement 1 is true and Statement 2 is false Statement 1 is false and Statement 2 is true

Watch Video Solution

85. about to only mathematics

Watch Video Solution

86. Consider: $L_1 : 2x + 3y + p - 3 = 0$ $L_2 : 2x + 3y + p + 3 = 0$ where p is a real number and $C : x^2 + y^2 + 6x - 10y + 30 = 0$ Statement 1 : If line L_1 is a chord of circle C, then line L_2 is not always a diameter of circle C. Statement 2 : If line L_1 is a a diameter of circle C, then line L_2 is not a chord of circle C. Both the statement are True and Statement 2 is the correct explanation of Statement 1. Both the statement are True but Statement 2 is not the correct explanation of Statement 1. Statement 1 is True and Statement 2 is False. Statement 1 is False and Statement 2 is True.

Watch Video Solution

87. The circle $x^2+y^2-8x=0$ and hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ intersect at points A and B.

The equation of a common tangent with positive slope to the circle as well as to the hperbola is

Watch Video Solution

88. The circle $x^2+y^2-8x=0$ and hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$ intersect at the points A and B. Then the equation of the circle with AB as its diameter is

Watch Video Solution

89. A circle C of radius 1 is inscribed in an equilateral triangle PQR. The points of contact of C with the sides PQ, QR, RP and D, E, F respectively. The line PQ is given by the equation $\sqrt{3}+y-6=0$ and the point D is $\left(\frac{3\sqrt{3}}{2},\frac{3}{2}\right)$ The equation of circle C is : (A)

$\left(x-2\sqrt{3}\right)^2+(y-1)^2=1$ (B) $\left(x-2\sqrt{3}\right)^2+\left(y+\frac{1}{2}\right)^2=1$ (C) $\left(x-\sqrt{3}\right)^2+(y+1)^2=1$ (D) $\left(x-\sqrt{3}\right)^2+(y-1)^2=1$

Watch Video Solution

90. A circle C of radius 1 is inscribed in an equilateral triangle PQR. The points of contact of C with the sides PQ, QR, RP are D, E, F, respectively. The line PQ is given by the equation $\sqrt{3}x+y-6=0$ and the point D is $\left(\frac{3\sqrt{3}}{2},\frac{3}{2}\right)$. Further, it is given that the origin and the centre of C are on the same side of the line PQ. (1)The equation of circle C is (2)Points E and F are given by (3)Equation of the sides QR, RP are

A. $y=\frac{2}{\sqrt{3}}+x+1,\ y=-\frac{2}{\sqrt{3}}x-1$

B. $y=\frac{1}{\sqrt{3}}x,\ y=0$

C. $y=\frac{\sqrt{3}}{2}x+1,\ y=-\frac{\sqrt{3}}{2}x-1$

D. $y=\sqrt{3}x,\ y=0$

Watch Video Solution

91. A circle C of radius 1 is inscribed in an equilateral triangle PQR. The points of contact of C with the sides PQ, QR, RP are D, E, F, respectively. The line PQ is given by the equation $\sqrt{3}x + y - 6 = 0$ and the point D is $\left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$. Further, it is given that the origin and the centre of C are on the same side of the line PQ. (1)The equation of circle C is (2)Points E and F are given by (3)Equation of the sides QR, RP are

A. $y = \frac{2}{\sqrt{3}} + x + 1, y = -\frac{2}{\sqrt{3}}x - 1$

B. $y = \frac{1}{\sqrt{3}}x, y = 0$

C. $y = \frac{\sqrt{3}}{2}x + 1, y = -\frac{\sqrt{3}}{2}x - 1$

D. $y = \sqrt{3}x, y = 0$

Watch Video Solution

92. The circle $x^2 + y^2 - 4x - 4y + 4 = 0$ is inscribed in a triangle which has two of its sides along the coordinate axes. The locus of the circumcenter of the triangle is $x + y - xy + k(x^2 + y^2)^{\frac{1}{2}} = 0$. Find k.

Watch Video Solution

Exercise

1. Find the equation of the circle passing through the points $A(4, 3)$. $B(2, 5)$ and touching the axis of y. Also find the point P on the y-axis such that the angle APB has largest magnitude.

Watch Video Solution

2. Find the equation of the circle in which the chord joining the points (a, b) and $(b, -a)$ subtends an angle of 45° at any point on the circumference of the circle.

Watch Video Solution

3. Prove that the circle $x^2 + y^2 - 6x - 4y + 9 = 0$ bisects the circumference of the circle $x^2 + y^2 - 8x - 6y + 23 = 0$

Watch Video Solution

4. Prove that the circle $x^2 + y^2 = a^2$ and $(x - 2a)^2 + y^2 = a^2$ are equal and touch each other. Also find the equation of a circle (or circles) of equal radius touching both the circles.

Watch Video Solution

5. Find the coordinates of the point at which the circles $x^2 + y^2 - 4x - 2y + 4 = 0$ and $x^2 + y^2 - 12x - 8y + 36 = 0$ touch each other. Also, find equations of common tangents touching the circles the distinct points.

Watch Video Solution

6. 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.

Watch Video Solution

7. Two circles have the equations $x^2 + y^2 + \lambda x + c = 0$ and $x^2 + y^2 + \mu x + c = 0$. Prove that one of the circles will be within the other if $\lambda\mu > 0$ and $c > 0$.

Watch Video Solution

8. Show that the length of the least chord of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ which passes through an internal point (α, β) is equal to $2\sqrt{-(\alpha^2 + \beta^2 + 2g\alpha + 2f\beta + c)}$.

Watch Video Solution

9. If the lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ cut the coordinae axes at concyclic points, then prove that $|a_1a_2| = |b_1b_2|$

Watch Video Solution

10. The chord along the line $y - x = 3$ of the circle $x^2 + y^2 = k^2$, subtends an angle of 30^0 in the major segment of the circle cut off by the chord. Find k.

Watch Video Solution

11. Find the equations of the tangents to the circle $x^2 + y^2 = 169$ at $(5, 12)$ and $(12, -5)$ and prove that they cut at right angles. Also find their point of intersection.

Watch Video Solution

12. The tangent at the point (α, β) to the circle $x^2 + y^2 = r^2$ cuts the axes of coordinates in A and B. Prove that the area of the triangle OAB is $\frac{a}{2} \frac{r^4}{|\alpha\beta|}$, O being the origin.

Watch Video Solution

13. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ Suppose that the tangents at the points B(1,7) and D(4,-2) on the circle meet at the point C. Find the area of the quadrilateral ABCD

Watch Video Solution

14. The tangent to the circle $x^2 + y^2 = 5$ at $(1, -2)$ also touches the circle $x^2 + y^2 - 8x + 6y + 20 = 0$. Find the coordinats of the corresponding point of contact.

Watch Video Solution

15. Show that the circles $x^2 + y^2 - 10x + 4y - 20 = 0$ and $x^2 + y^2 + 14x - 6y + 22 = 0$ touch each other. Find the coordinates of the point of contact and the equation of the common tangent at the point of contact.

Watch Video Solution

16. Find the equation of the normal to the circle $x^2 + y^2 - 2x = 0$ parallel to the line $x + 2y = 3$.

Watch Video Solution

17. If the length of tangent from (f,g) to the circle $x^2 + y^2 = 6$ be twice the length of the tangent from (f,g) to circle $x^2 + y^2 + 3x + 3y = 0$, then find the value of $f^2 + g^2 + 4f + 4g$.

Watch Video Solution

18. Find the area of the triangle formed by the tangents from the point (4, 3) to the circle $x^2 + y^2 = 9$ and the line joining their points of contact.

Watch Video Solution

19. Find the length of the tangent drawn from any point on the circle $x^2 + y^2 + 2gx + 2fy + c_1 = 0$ to the circle $x^2 + y^2 + 2gx + 2fy + c_2 = 0$

Watch Video Solution

20. The equation of three circles are given $x^2 + y^2 = 1, x^2 + y^2 - 8x + 15 = 0, x^2 + y^2 + 10y + 24 = 0$. Determine the coordinates of the point P such that the tangents drawn from it to the circle are equal in length.

Watch Video Solution

21. If A is the centre of the circle, $x^2 + y^2 + 2g_i x + 5 = 0$ and t_i is the length of the tangent from any point to this circle, $i = 1, 2, 3,$ then show that $(g_2 - g_3)t_1^2 + (g_3 - g_1)t_2^2 + (g_1 - g_2)t_3^2 = 0$

Watch Video Solution

22. Show that if the length of the tangent from a point P to the circle $x^2+y^2=a^2$ be four times the length of the tangent from it to the circle $(x-a)^2+y^2=a^2$, then P lies on the circle $15x^2+15y^2-32ax+a^2=0$.

Watch Video Solution

23. Find the equations of tangents to the circle $x^2+y^2=25$ which pass through $(-1, 7)$ and show that they are at right angles.

Watch Video Solution

24. Find the equation of the chord of the circle $x^2+y^2+6x+8y+9=0$, whose middle point is $(-2, -3)$.

Watch Video Solution

25. Find the coordinates of the middle point of the chord which the circle $x^2 + y^2 + 4x - 2y - 3 = 0$ cuts off on the line $x - y + 2 = 0$

Watch Video Solution

26. Find the equation to the chord of contact of the tangents drawn from an external point $(-3, 2)$ to the circle $x^2 + y^2 + 2x - 3 = 0.$

Watch Video Solution

27. Find the co-ordinates of the point of intersection of tangents at the points where the line $2x + y + 12 = 0$ meets the circle $x^2 + y^2 - 4x + 3y - 1 = 0$

Watch Video Solution

28. The length of tangents from two given points to a given circle are t_1 and t_2. If the two points are conjugate to each other w.r.t. the given circle, prove that the distance between the points will be $\sqrt{t_1^2 + t_2^2}$.

Watch Video Solution

29. From the origin O tangents OP and OQ are drawn to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$. Then the circumcentre of the triangle OPQ lies at

Watch Video Solution

30. Tangents PA and PB are drawn to $x^2 + y^2 = a^2$ from the point $P(x_1, y_1)$. Then find the equation of the circumcircle of triangle PAB.

Watch Video Solution

31. Show that the equation of the straight line meeting the circle $x^2+y^2=a^2$ in two points at equal distance d from (x_1, y_1) on the curve is $xx_1+yy_1-a^2+\frac{1}{2}d^2=0$. Deduce the equaiton of the tangent at (x_1, y_1).

Watch Video Solution

32. The area of the equadrilateral by the tangents from the point (4.5) to the circle $x^2+y^2-4x-2y-11=0$ with pair of radii through the points of contact of the tangents is :

Watch Video Solution

33. Find the radius of the smalles circle which touches the straight line $3x-y=6$ at $(-,\ -3)$ and also touches the line $y=x$. Compute up to one place of decimal only.

Watch Video Solution

34. Obtain the equations of the straight lines passing through the point A(2, 0) & making 45 with the tangent at A to the circle $(x+2)^2+(y-3)^2=25$. Find the equations of the circles each of radius 3 whose centres are on these straight lines at a distance of $5\sqrt{2}$ from A.

Watch Video Solution

35. Find 'all equation to the four common tangents to the circles $x^2+y^2=25$ and $(x-12)^2+y^2=9$

Watch Video Solution

36. A straight line AB is divided at C so that $AC=3CB$. Circles are described on AC and CB as diameters and a common tangent meets AB produced at D. Show that BD is equal to the radius of the smaller circle.

Watch Video Solution

Watch Video Solution

37. Two circle of radii a and b touch the axis of y on the opposite side at the origin, the former being on the possitive side. Prove that the other two common tangents are given by $(b-a)x \pm 2\sqrt{ab}y - 2ab = 0$.

Watch Video Solution

38. For what value of k is the circle $x^2+y^2+5x+3y+7=0$ and $x^2+y^2-8x+6y+k=0$ cut each other orthogonally.

Watch Video Solution

39. Find the equation of circle passing through the origin and cutting the circles

$x^2+y^2-4x+6y+10=0$ and $x^2+y^2+12y+6=0$ orthogonally.

Watch Video Solution

40. The two circles which pass through $(0, a) and (0, -a)$ and touch the line $y = mx + c$ will intersect each other at right angle if

$a^2 = c^2(2m + 1)$ $a^2 = c^2(2 + m^2)$ $c^2 = a^2(2 + m^2)$ (d) $c^2 = a^2(2m + 1)$

Watch Video Solution

41. Find the general equation of a circle cutting $x^2 + y^2 = c^2$ orthogonally and show that if it passes through the point (a, b), it will also pass through the point. $\left(\frac{c^2 a}{a^2 + b^2}, \frac{c^2 b}{a^2 + b^2}\right)$.

Watch Video Solution

42. If P and Q a be a pair of conjugate points with respect to a circle S. Prove that the circle on PQ as diameter cuts the circle S orthogonally.

Watch Video Solution

43. $P(a, 5a)$ and $Q(4a, a)$ are two points. Two circles are drawn through these points touching the axis of y.

Angle of intersection of these circles is

Watch Video Solution

44. Find the condition that the chord of contact of tangents from the point (α, β) to the circle $x^2 + y^2 = a^2$ should subtend a right angle at the centre. Hence find the locus of (α, β).

Watch Video Solution

45. Locus of the mid points of the chords of the circle $x^2 + y^2 = a^2$ which pass through the fixed point (h, k) is $x^2 + y^2 + 2hx + 2ky = 0$

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

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

Watch Video Solution

46. The locus of the point of intersection of the tangent to the circle $x^2 + y^2 = a^2$, which include an angle of 45° is the curve $\left(x^2 + y^2\right)^2 = \lambda a^2\left(x^2 + y^2 - a^2\right)$. The value of λ is :

Watch Video Solution

47. In Figure, AP and BQ are perpendiculars to the line segment AB and $AP = BQ$. Prove that O is the mid-point of line segment AB and PQ. Figure

Watch Video Solution

48. A variable circle passes through the point $P(1, 2)$ and touches the x-axis. Show that the locus of the other end of the diameter through P is $(x - 1)^2 = 8y$.

Watch Video Solution

49. A point moves such that the sum of the squares of its distances from the sides of a square of side unity is equal to 9, the locus of such point is

Watch Video Solution

50. The locus of the centres of the circles which touch $x^2 + y^2 = a^2$ and `x^2+y^2=4ax, externally

Watch Video Solution

51. The tangent at any point P on the circle $x^2 + y^2 = 2$ cuts the axes in L and M. Find the locus of the middle point of LM.

Watch Video Solution

52. A triangle has two of its sides along the axes, its third side touches the circle : $x^2 + y^2 - 2ax - 2ay + a^2 = 0, (a \neq 0)$

Watch Video Solution

53. A straight line moves such that the algebraic sum of the perpendiculars drawn to it from two fixed points is equal to $2k$. Then, then straight line always touches a fixed circle of radius. $2k$ (b) $\frac{k}{2}$ (c) k (d) none of these

Watch Video Solution

54. A point is moving in such a way that sum of the squares of perpendiculars drawn from it to the sides of an equilaeral triangle is constant. Prove that its locus is a circle.

Watch Video Solution

55. The equation of the locus of the mid-points of chords of the circle $4x^2 + 4y^2 - 12x + 4y + 1 = 0$ that subtends an angle of $\frac{2\pi}{3}$ at its centre is $x^2 + y^2 - kx + y + \frac{31}{16} = 0$ then k is

Watch Video Solution

56. about to only mathematics

Watch Video Solution

57. A variable circle passes through the point $A(a, b)$ and touches the x-axis. Show that the locus of the other end of the diameter through A is $(x-a)^2 = 4by$.

Watch Video Solution

58. The locus of the point of intersection of the tangents to the circle $x = a\cos\theta, y = a\sin\theta$ at the points, whose parametric angles differ by $\frac{\pi}{3}$ is

Watch Video Solution

59. P is variable point on the line $y = 4$. tangents are drawn to the circle $x^2 + y^2 = 4$ from the points touch it at A and B. The parallelogram PAQB be completed.If locus of Q is $(y + a)(x^2 + y^2) = by^2$,the value of $a + b$ Is:

Watch Video Solution

60. Find the locus of the centre of a circle which passes through the origin and cuts off a length $2l$ from the line $x = c$.

Watch Video Solution

61. A straight line is drawn from a fixed point O meeting a fixed straight line in P. A point Q is taken on the line OP such that $OP.\,OQ$ is constant. Show that the locus of Q is a circle.

Watch Video Solution

62. The locus of the perpendiculars drawn from the point $(a, 0)$ on tangents to the circlo $x^2 + y^2 = a^2$ is

Watch Video Solution

63. From the points on the circle $x^2 + y^2 = a^2$, tangents are drawn to the hyperbola $x^2 - y^2 = a^2$: prove that the locus of the middle-points $\left(x^2 - y^2\right)^2 = a^2\left(x^2 + y^2\right)$

Watch Video Solution

64. If the radical axis of the circles $x^2 + y^2 + 2gx + 2fy + c = 0$ and $2x^2 + 2y^2 + 3x + 8y + 2c = 0$ touches the circle $x^2 + y^2 + 2x - 2y + 1 = 0$, show that either $g = \frac{3}{4}$ or $f = 2$

Watch Video Solution

65. Consider a family of circle passing thorugh two fixed points A(3,7) and B(6,5) . Show that the chords in which the circle $x^2 + y^2 - 4x - 6y - 3 = 0.$ Cuts the members of the family are concurrent at a point. Find the coordinates of this point.

Watch Video Solution

66. The four points of intersection of the lines (2x-y+1)(x-2y+3)=0 with the axes lie on a circle whose centre is at the point

Watch Video Solution

67. If the tangents are drawn to the circle $x^2 + y^2 = 12$ at the point where it meets the circle $x^2 + y^2 - 5x + 3y - 2 = 0,$ then find the point of intersection of these tangents.

Watch Video Solution

68. Find the equation of a circle circumscribing the triangle whose sides are $x = 0, y = 0$ and $lx + my = 1$. If l, m can vary so that $l^2 + m^2 = 4l^2m^2$, find the locus of the centre of the circle.

Watch Video Solution

69. Find the equation of the system of coaxial circles that are tangent at $(\sqrt{2}, 4)$ to the locus of the point of intersection of two mutually perpendicular tangents to the circle $x^2 + y^2 = 9$.

Watch Video Solution

70. Let $A = (0, 1)$ and $B = \left(-\frac{p}{2}, \frac{q+1}{2}\right)$ be two fixed points in a plane. Let C denote a circle with centre B and passing through A. Prove that the real roots of the equation $x^2 + px + q = 0$ are given by the abscissa of the points of intersection of C with the x-axis.

Watch Video Solution

71. If the line $lx + my - 1 = 0$ touches the circle $x^2 + y^2 = a^2$, then prove that (l, m) lies on a circle.

Watch Video Solution

72. A circle touches the hypotenuse of a right angled triangle at its middle point and passes through the mid-point of the shorter side. If a and $b(a < b)$ be the lengths of the sides, then prove that the radius of the circle is $\frac{b}{4a}\sqrt{a^2 + b^2}$

Watch Video Solution

73. If two distinct chords, drawn from the point (p, q) on the circle $x^2 + y^2 = px + qy$ (where $pq \neq q$) are bisected by the x-axis, then $p^2 = q^2$ (b) $p^2 = 8q^2$ $p^2 < 8q^2$ (d) $p^2 > 8q^2$

Watch Video Solution

74. about to only mathematics

Watch Video Solution

75. about to only mathematics

Watch Video Solution

76. The tangents drawn from the origin to the circle $x^2 + y^2 - 2px - 2gy + q^2 = 0$ are perpendicular only if :

Watch Video Solution

77. The equation of the circle passing through (1, 0) and (0, 1) and having smallest possible radius is : (A) $2x^2 + y^2 - 2x - y = 0$ (B) $x^2 + 2y^2 - x - 2y = 0$ (C) $x^2 = y^2 - x - y = 0$ (D) $x^2 + y^2 + x + y = 0$

Watch Video Solution

78. The square of the length of the tangent from $(3, -4)$ on the circle $x^2 + y^2 - 4x - 6y + 3 = 0$ is: (A) 20 (B) 30 (C) 40 (D) 50

Watch Video Solution

79. The length of the common chord of the circle $x^2 + t^2 + 2x + 3y + 1 = 0$ and $x^2 + y^2 + 4x + 3y + 2 = 0$

Watch Video Solution

80. The length of the tangent from the point $(4, 5)$ to the circle $x^2 + y^2 + 2x - 6y = 6$ is : (A) $\sqrt{13}$ (B) $\sqrt{38}$ (C) $2\sqrt{2}$ (D) $2\sqrt{13}$

Watch Video Solution

81. The two circles $x^2 + y^2 - 2x + 6y + 6 = 0$ and $x^2 + y^2 - 5x + 6y + 15 = 0$ touch eachother. The equation of their common tangent is : (A) $x = 3$ (B) $y = 6$ (C) $7x - 12y - 21 = 0$ (D) $7x + 12y + 21 = 0$

Watch Video Solution

82. Show that the equation of the circle passing through (1, 1) and the points of intersection of the circles $x^2 + y^2 + 13x - 13y = 0$ and $2x^2 + 2y^2 + 4x - 7y - 25 = 0$ is $4x^2 + 4y^2 + 30x - 13y - 25 = 0.$

Watch Video Solution

83. If $y = 3x + c$ is a tangent ot the circle $x^2 + y^2 - 2x - 4y - 5 = 0$ then corrdinates of points of contact are

Watch Video Solution

84. The locus of the point $\left(\sqrt{3h+2}, \sqrt{3k}\right)$ if (h, k) lies on $x+y=1$ is : (A) a circle (B) an ellipse (C) a parabola (D) a pair of straight lines

Watch Video Solution

85. Two fixed circles with radii r_1 and $r_2, (r_1 > r_2)$, respectively, touch each other externally. Then identify the locus of the point of intersection of their direction common tangents.

Watch Video Solution

86. Two circles with radii a and b touch each other externally such that θ is the angle between the direct common tangents, $(a > b \geq 2)$. Then prove that $\theta = 2\sin^{-1}\left(\frac{a-b}{a+b}\right)$.

Watch Video Solution

87. Given a circle of radius r. Tangents are drawn from point A and B lying on one of its diameters which meet at a point P lying on another diameter perpendicular to the other diameter. The minimum area of the triangle PAB is : (A) r^2 (B) $2r^2$ (C) πr^2 (D) $\frac{r^2}{2}$

Watch Video Solution

88. The equation of the circle passing through the point of intersection of the circles $x^2+y^2-6x+2y+4=0$ and $x^2+y^2+2x-6y-6=0$ and having its centre on $y=0$ is : (A) $2x^2+2y^2+8x+3=0$ (B) $2x^2+2y^2-8x-3=0$ (C) $2x^2+2y^2-8x+3=0$ (D) none of these

Watch Video Solution

89. The chord of contact of the pair of tangents drawn from any point on $3x+4y=8$ to the circle $x^2+y^2=4$ passes through a fixed point. (A) $\left(\frac{1}{2}, \frac{15}{8}\right)$ (B) $\left(2, \frac{3}{2}\right)$ (C) $\left(\frac{3}{2}, 2\right)$ (D) none of these

Watch Video Solution

Watch Video Solution

90. $f(x, y) = 0$ is a circle such that $f(0, \lambda) = 0$ and $f(\lambda, 0) = 0$ have equal roots and $f(1, 1) = -2$ then the radius of the circle is : (A) 4 (B) 8 (C) 2 (D) 1

Watch Video Solution

91. $2x^2 + 2y^2 + 4\lambda x + \lambda = 0$ represents a circle for

A. no real value of λ

B. all real values of λ

C. $\lambda \in$ (-infinity,0) U (1/2 , infinity)

D. $\lambda \in$ (-infinity,0) U (1/16, infinity)

Answer: null

Watch Video Solution

92. The locus of the mid-point of a chord of the circle $x^2+y^2-2x-2y-23=0$, of length 8 units is :

$(A) x^2+y^2-x-y+1=0$ (B) $x^2+y^2-2x-2y-7=0$ (C) $x^2+y^2-2x-2y+1=0$ (D) $x^2+y^2+2x+2y+5=0$

Watch Video Solution

93. The equation of the circle having the intercept on the line $y+2x=0$ by the circle $x^2+y^2+4x+6y=0$ as a diameter is :

(A) $5x^2+5y^2-8x+16y=0$

(B) $5x^2+5y^2+8x-16y=0$

(C) $5x^2+5y^2-8x-16y=0$

(D) $5x^2+5y^2+8x\pm16y=0$

Watch Video Solution

94. If tangents at (1,2) to the circle $C_1 : x^2+y^2=5$ intersects the circle $C_2 : x^2+y^2=9$ at A and B and tangents at A and B to the second circle

meet at point C, then the co-ordinates of C are given by

Watch Video Solution

95. (A) Number of values of a for which the common chord of the circles $x^2 + y^2 = 8$ and $(x - a)^2 + y^2 = 8$ subtends a right angle at the origin is

Watch Video Solution

96. The locus of the centre of the circle passing through $(1, 1)$ and cutting $x^2 + y^2 = 4$ orthogonally is : (A) $x + y = 3$ (B) $x + 2y = 3$ (C) $2x + y = 3$ (D) $2x - y = 3$

Watch Video Solution

97. Tangents are drawn to the circle $x^2 + y^2 = 9$ at the points where it is met by the circle $x^2 + y^2 + 3x + 4y + 2 = 0$. Fin the point of intersection of these tangents.

Watch Video Solution

98. The shortest distance between the parabola $y^2 = 4x$ and the circle $x^2 + y^2 + 6x - 12y + 20 = 0$ is : (A) 0 (B) 1 (C) $4\sqrt{2} - 5$ (D) $4\sqrt{2} + 5$

Watch Video Solution

99. The number of tangents which can be drawn from the point $(2, 3)$ to the circle $x^2 + y^2 = 13$ are (A) 2 (B) 3 (C) 1 (D) 4

Watch Video Solution

100. The equation of the circle which inscribes a suqre whose two diagonally opposite vertices are $(4, 2)$ and $(2, 6)$ respectively is : $(A)x^2 + y^2 + 4x - 6y + 10 = 0$ (B) $x^2 + y^2 - 6x - 8y + 20 = 0$ (C) $x^2 + y^2 - 6x + 8y + 25 = 0$ (D) $x^2 + y^2 + 6x + 8y + 15 = 0$

Watch Video Solution

101. The image of the centre of the circle $x^2 + y^2 = 2a^2$ with respect to the line $x + y = 1$ is : (A) $(\sqrt{2}, \sqrt{2}$ (B) $\left(\frac{1}{\sqrt{2}}, \sqrt{2}\right)$ (C) $\left(\sqrt{2}, \frac{1}{\sqrt{2}}\right)$ (D) none of these

Watch Video Solution

102. The radius of the circle passing through the points $(1, 2), (5, 2)$ and $(5, -2)$ is : (A) $5\sqrt{2}$ (B) $2\sqrt{5}$ (C) $3\sqrt{2}$ (D) $2\sqrt{2}$

Watch Video Solution

103. Angle of intersection of two circle having distance between their centres d is given by : (A) $\cos\theta = \frac{r_1^2 + r_2^2 - d}{2r_1^2 + r_2^2}$ (B) $\sec\theta = \frac{r_1^2 + r_2^2 + d^2}{2r_1 r_2}$ (C) $\sec\theta = \frac{2r_1 r_2}{r_1^2 + r_2^2 - d^2}$ (D) none of these

Watch Video Solution

104. Find the length of the tangent drawn from any point on the circle $x^2 + y^2 + 2gx + 2fy + c_1 = 0$ to the circle $x^2 + y^2 + 2gx + 2fy + c_2 = 0$

Watch Video Solution

105. Examine if the two circles $x^2 + y^2 - 2x - 4y = 0$ and $x^2 + y^2 - 8y - 4 = 0$ touch each other externally or internally.

Watch Video Solution

106. The equation $x = \frac{2a\theta}{1 + \theta^2}, y = \frac{a(1 - \theta^2)}{1 + \theta^2}$ where a is constant, is the parametric equation of the curve (A) $x^2 - y^2 = a^2$ (B) $x^2 + 4y^2 = 4a^2$ (C) $x^2 + y^2 = a^2$ (D) $x - 2y = a^2$

Watch Video Solution

107. If a circle having the point $(-1, 1)$ as its centre touches the straight line $x + 2y + 9 = 0$, then the coordinates of the point(s) of contact are : (A) $\left(\frac{7}{3}, -\frac{17}{3}\right)$ (B) $(-3, -3)$ (C) $(-3, 3)$ (D) $(0, 0)$

Watch Video Solution

108. The radius of the circle touching the straight lines $x - 2y - 1 = 0$ and $3x - 6y + 7 = 0$ is (A) $\frac{1}{\sqrt{2}}$ (B) $\frac{\sqrt{5}}{3}$ (C) $\sqrt{3}$ (D) $\sqrt{5}$

Watch Video Solution

109. If one end of a diameter of the circle $x^2 + y^2 - 8x - 14y + c = 0$ is the point $(-3, 2)$, then its other end is the point. (A) $(5, 7)$ (B) $(9, 11)$ (C) $(10, 11)$ (D) $(11, 12)$

Watch Video Solution

110. The equation of the circle which has normals $x - 1)x(y - 2) = 0$ and a tangent $3x + 4y = 6$ is $x^2 + y^2 - 2x - 4y + 4 = 0$ $x^2 + y^2 - 2x - 4y + 5 = 0$ $x^2 + y^2 = 5$ $(x - 3)^2 + 9y - 4\big)\hat{2} = 5$

Watch Video Solution

111. If the straight line $y = mx$ lies outside the circle $x^2 + y^2 - 20y + 90 = 0$ then the value of m will satisfy (A) $m < 3$ (B) $|m| < 3$ (C) $m > 3$ (D) $|m| > 3$

Watch Video Solution

112. If the equation $x^2 + y^2 + 2hxy + 2gx + 2fy + c = 0$ represents a circle, then the condition for that circle to pass through three quadrants only but not passing through the origin is $f^2 > c$ (b) $g^2 > 2$ $c > 0$ (d) $h = 0$

Watch Video Solution

113. If the chord of contact of tangents from a point P to a given circle passes through Q, then the circle on PQ as diameter. cuts the given circle orthogonally touches the given circle externally touches the given circle internally none of these

Watch Video Solution

114. The point from which the tangents to the circle $x^2 + y^2 - 4x - 6y - 16 = 0, 3x^2 + 3y^2 - 18x + 9y + 6 = 0$ and $x^2 + y^2$ are equal in length is : (A) $\left(\frac{2}{3}, \frac{4}{17}\right)$ (B) $\left(\frac{51}{5}, \frac{4}{15}\right)$ (C) $\left(\frac{17}{16}, \frac{4}{15}\right)$ (D) $\left(\frac{5}{4}, \frac{2}{3}\right)$

Watch Video Solution

115. If the two circles $(x+1)^2 + (y-3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect at two distinct point,then (A) $r > 2$ (B) $2 < r < 8$ (C) $r < 2$ (D) $r = 2$

Watch Video Solution

Watch Video Solution

116. The shortest distance from the point $(0, 5)$ to the circumference of the circle $x^2 + y^2 - 10x + 14y - 151 = 0$ is: (A) 13 (B) 9 (C) 2 (D) 5

Watch Video Solution

117. If the radii of the circle $(x - 1)^2 + (y - 2)^2 = 1$ and $(x - 7)^2 + (y - 10)^2 = 4$ are increasing uniformly w.r.t. times as 0.3 unit/s is and 0.4 unit/s, then they will touch each other at t equal to $45s$ (b) $90s$ (c) $11s$ (d) $135s$

Watch Video Solution

118. The equation of the circle passing through the point of intersection of the circles $x^2 + y^2 - 4x - 2y = 8$ and $x^2 + y^2 - 2x - 4y = 8$ and the point $(-1, 4)$ is $x^2 + y^2 + 4x + 4y - 8 = 0$

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

$x^2 + y^2 - 3x - 3y - 8 = 0$

Watch Video Solution

119. The distance from the center of the circle $x^2 + y^2 = 2x$ to the common chord of the circles $x^2 + y^2 + 5x - 8y + 1 = 0$ and $x^2 + y^2 - 3x + 7y - 25 = 0$ is 2 (b) 4 (c) $\frac{34}{13}$ (d) $\frac{26}{17}$

Watch Video Solution

120. The locus of the centre of all circles passing through (2, 4) and cutting $x^2 + y^2 = 1$ orthogonally is : (A) $4x + 8y = 11$ (B) $4x + 8y = 21$ (C) $8x + 4y = 21$ (D) $4x - 8y = 21$

Watch Video Solution

121. The line $x + y = k$ will cut the circle $x^2 + y^2 - 4x - 6y + 5 = 0$ at two distinct points if (A) $k < 1$ (B) $k < 1$ or $K > 9$ (C) $1 < k < 9$ (D) none of these

Watch Video Solution

122. The locus of the centre of the circle touching the line $2x - y = 1$ at (1, 1) and also touching the line $x + 2y = 1$ is : (A) $x + 3y = 2$ (B) $x + 2y = 3$ (C) $x + y = 2$ (D) none of these

Watch Video Solution

123. The circles $x^2 + y^2 + 2ux + 2vy = 0$ and $x^2 + y^2 + 2u_1x + 2v_1y = 0$ touch each other at $(1, 1)$ if : (A) $u + u_1 = v + v_1$ (B) $u + v = v_1 + u_1$ (C) $\frac{u}{u_1} = \frac{v}{v_1}$ (D) none of these

Watch Video Solution

124. The radius of the circle $ax^2 + (2a - 3)y^2 - 4x - 7 = 0$ is : (A) 1 (B) $\frac{5}{3}$ (C) $\frac{4}{3}$ (D) 3

Watch Video Solution

125. The equation of the circle passing through $\left(\frac{1}{2}, -1\right)$ and having pair of straight lines $x^2 - y^2 + 3x + y + 2 = 0$ as its two diameters is : (A) $4x^2 + 4y^2 + 12x - 4y - 15 = 0$ (B) $4x^2 + 4y^2 + 15x + 4y - 12 = 0$ (C) $4x^2 + 4y^2 - 4x + 8y + 5 = 0$ (D) none of these

Watch Video Solution

126. The equation of the circle passing through the point of intersection of the circle $x^2 + y^2 = 4$ and the line $2x + y = 1$ and having minimum possible radius is

Watch Video Solution

127. If the circumference of the circle $x^2 + y^2 + 8x + 8y - b = 0$ is bisected by the circle $x^2 = y^2 - 2x + 4y + a = 0$, then $a + b$ equals

Watch Video Solution

128. If two circles $x^2 + y^2 + ax + by = 0$ and $x^2 + y^2 + kx + ly = 0$ touch each other, then (A) $al = bk$ (B) $ak = bl$ (C) $ab = kl$ (D) none of these

Watch Video Solution

129. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the coordinate axes, and the point (1, 4) is inside the circle. Find the range of value of $k\cdot$

Watch Video Solution

130. The chords of contact of tangents from three points $A, BandC$ to the circle $x^2 + y^2 = a^2$ are concurrent. Then A, B and C will (a)be concyclic (b) be collinear (c)form the vertices of a triangle (d)none of these

Watch Video Solution

131. The centre of circle which passes through $A(h, 0), B(0, k)$ and $C(0, 0)$ is : (A) $\left(\frac{h}{2}, 0\right)$ (B) $\left(0, \frac{k}{2}\right)$ (C) $\left(\frac{h}{2}, \frac{k}{2}\right)$ (D) (h, k)`

Watch Video Solution

132. The number of common tangents to the circles $x^2 + y^2 - 4x + 6y + 8 = 0$ and $x^2 + y^2 - 10x - 6y + 14 = 0$ is : (A) 2 (B) 3 (C) 4 (D) none of these

Watch Video Solution

133. The equation of the circle and its chord are respectively $x^2 + y^2 = a^2$ and $x + y = a$. The equation of circle with this chord as diameter is : (A) $x^2 + y^2 + ax + ay + a^2 = 0$ (B) $x^2 + y^2 + 2ax + 2ay = 0$ (C) $x^2 + y^2 - ax - ay = 0$ (D) $ax^2 + ay^2 + x + y = 0$

Watch Video Solution

134. If $\left(x_i, \frac{1}{x_i}\right), i = 1, 2, 3, 4$ are four distinct points on a circle, then (A) $x_1x_2 = x_3x_4$ (B) $x_1x_2x_3x_4 = 1$ (C) $x_1 + x_2 + x_3 + x_4 = 1$ (D) $\frac{1}{x_1} + \frac{1}{x_2} + \frac{1}{x_3} + \frac{1}{x_4} = 1$

Watch Video Solution

135. Tangents OA and OB are drawn from the origin to the circle $(x-1)^2 + (y-1)^2 = 1$. Then the equation of the circumcircle of the triangle OAB is : $(A) x^2 + y^2 + 2x + 2y = 0$ (B) $x^2 + y^2 + x + y = 0$ (C) $x^2 + y^2 - x - y = 0$ $(D) x^2 + y^2 - 2x - 2y = 0$

Watch Video Solution

136. Four distinct points $(k, 2k), (2, 0), (0, 2)$ and $(0, 0)$ lie on a circle for : (A) $k = 0$ (B) $k = \frac{6}{5}$ (C) $k = 1$ (D) $k = -1$

Watch Video Solution

137. The circles $x^2 + y^2 - 4x - 81 = 0$ and $x^2 + y^2 + 24x - 81 = 0$ intersect each other at A and B. The equation of the circle with AB as the diameter is : (A) $x^2 + y^2 = 81$ (B) $x^2 + y^2 = 9$ (C) $x^2 + y^2 = 16$ (D) $x^2 + y^2 = 1$

Watch Video Solution

138. The coordinates of two points $PandQ$ are $(x_1, y_1)and(x_2, y_2)andO$ is the origin. If the circles are described on $OPandOQ$ as diameters, then the length of their common chord is $\frac{|x_1y_2 + x_2y_1|}{PQ}$ (b) $\frac{|x_1y_2 - x_2y_1|}{PQ}$ $\frac{|x_1x_2 + y_1y_2|}{PQ}$ (d) $\frac{|x_1x_2 - y_1y_2|}{PQ}$

Watch Video Solution

139. A variable straight line is drawn from a fixed point O meeting a fixed circle in P and point Q is taken on this line such that OP.OQ is constant ,then locus of Q is

Watch Video Solution

140. The point on the circle $(x-3)^2 + (y-4)^2 = 4$ which is at least distance from the circle $x^2 + y^2 = 1$ is : (A) $\left(\frac{3}{5}, \frac{4}{5}\right)$ (B) $\left(\frac{9}{5}, \frac{12}{5}\right)$ (C) $(9, 12)$ (D) none of these

Watch Video Solution

141. If two distinct chords drawn from the point (a, b) on the circle $x^2 + y^2 - ax - by = 0$ (where $ab \neq 0$) are bisected by the x-axis, then the roots of the quadratic equation $bx^2 - ax + 2b = 0$ are necessarily.

(A) imaginary (B) real and equal (C) real and unequal (D) rational

Watch Video Solution

142. If the chord of contact of the tangents from a point on the circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touch the circle $x^2 + y^2 = c^2$, then the roots of the equation $ax^2 + 2bx + c = 0$ are necessarily. (A) imaginary (B) real and equal (C) real and unequal (D) rational

Watch Video Solution

143. If the angle of intersection of the circle $x^2 + y^2 + x + y = 0$ and $x^2 + y^2 + x - y = 0$ is θ , then the equation of the line passing through

(1, 2) and making an angle θ with the y-axis is $x = 1$ (b) $y = 2$ $x + y = 3$

(d) $x - y = 3$

Watch Video Solution

144. Locus of the middle points of the line segment joining $P\left(0, \sqrt{1-t^2}+t\right)$ and $Q\left(2t, \sqrt{1-t^2}-t\right)$ cuts an intercept of length a on the line $x + y = 1$, then $a =$ (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$ (C) 2 (D) none of these

Watch Video Solution

145. If $f(x + y) = f(x).\, f(y)$ for all x and y. $f(1) = 2$, and $\alpha_n = f(n), n\varepsilon N,$ then equation of the circle having (α_1, α_2) and (α_3, α_4) as the ends of its one diameter is : (A) $(x-2)(x-8)+(y-4)(y-16)=0$ (B) $(x-4)(x-8)+(y-2)(y-16)=0$ (C) $(x-4)(x-16)+(y-4)(y-8)=0$ (D) none of these

Watch Video Solution

146. If $(1+ax)^n = 1+8x+24x^2+\ldots$ and a line through $P(a, n)$ cuts the circle $x^2+y^2=4$ in A and B, then $PA.\ PB =$

Watch Video Solution

147. If $\left(m_r, \frac{1}{m_r}\right), r = 1, 2, 3, 4$ are concyclic points and $f(x) = x$, when x is rational $= 1-x$, when x is irrational and a is a point where $f(x)$ is continuous, then $m_1 m_2 m_3 m_4 =$ (A) a (B) $2a$ (C) $-2a$ (D) none of these

Watch Video Solution

148. If a circle passes through the point of intersection of the lines $x+y+1=0$ and $x+\lambda y-3=0$ with the coordinate axis, then find the value of λ .

Watch Video Solution

149. An equilateral triangle whose two vertices are $(-2, 0)$ and $(2, 0)$ and which lies in the first and second quadrants only is circumscribed by a circle whose equation is :

(A) $\sqrt{3}x^2 + \sqrt{3}y^2 - 4x + 4\sqrt{3}y = 0$(B) $\sqrt{3}x^2 + \sqrt{3}y^2 - 4x - 4\sqrt{3}y = 0$

(C) $\sqrt{3}x^2 + \sqrt{3}y^2 - 4y + 4\sqrt{3}y = 0$ (D) $\sqrt{3}x^2 + \sqrt{3}y^2 - 4y - 4\sqrt{3} = 0$

Watch Video Solution

150. Three sides of a triangle are represented by lines whose combined equation is $(2x + y - 4)(xy - 4x - 2y + 8) = 0$, then the equation of its circumcircle will be : (A) $x^2 + y^2 - 2x - 4y = 0$ (B) $x^2 + y^2 + 2x + 4y = 0$ (C) $x^2 + y^2 - 2x + 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$

Watch Video Solution

151. Two circles, each having radius 4, have a common tangent given by $3x + 2y - 6 = 0$ at $(2, 0)$. Then their centres are : (A)

$\left(2+\frac{5}{\sqrt{13}}, \frac{8}{\sqrt{13}}\right), \left(2-\frac{5}{\sqrt{13}}, \frac{-8}{\sqrt{13}}\right)$ (B) $\left(2+\frac{12}{\sqrt{13}}, \frac{8}{\sqrt{13}}\right)$, $\left(2-\frac{12}{\sqrt{13}}, \frac{-8}{\sqrt{13}}\right)$ (C) $(2, 3), (4, 5)$ (D) none of these

Watch Video Solution

152. The range of values of $\theta \varepsilon [0, 2\pi]$ for which $(1+\sin\theta, 1+\cos\theta)$ lies inside the circle $x^2+y^2=1$, is : (A) $(0, \pi)$ (B) $\left(5\frac{\pi}{4}, 7\frac{\pi}{4}\right)$ (C) $\left(\pi, 3\frac{\pi}{2}\right)$ (D) $\left(3\frac{\pi}{2}, 2\pi\right)$

Watch Video Solution

153. The value of λ for which the circles $x^2+y^2=1$ and $x^2+y^2-4\lambda x+8=0$ have only two common tangetns, is : (A) $\left(-\frac{9}{4}, \frac{9}{4}\right)$ (B) $\left(-\infty, -\frac{9}{4}\right)\Big] \cup \left[\frac{9}{4}, \infty\right)$ (C) $\left(-\infty, -\frac{9}{4}\right] \cup \left[\frac{9}{4}, \infty\right)$ (D) none of these

Watch Video Solution

154. The chord of contact of the pair of tangents to the circle $x^2 + y^2 = 4$ drawn from any point on the line $x + 2y = 1$ passes through the fixed point. (A) $(2, 4)$ (B) $(4, 8)$ (C) $(2, 8)$ (D) $(3, 2)$

Watch Video Solution

155. The equation of the line(s) parallel to $x - 2y = 1$ which touch(es) the circle $x^2 + y^2 - 4x - 2y - 15 = 0$ is (are) $x - 2y + 2 = 0$ (b) $x - 2y - 10 = 0$ $x - 2y - 5 = 0$ (d) $3x - y - 10 = 0$

Watch Video Solution

156. If $\frac{x}{\alpha} + \frac{y}{\beta} = 1$ touches the circle $x^2 + y^2 = a^2$ then point $\left(\frac{1}{\alpha}, \frac{1}{\beta}\right)$ lies on (a) straight line (b) circle (c) parabola (d) ellipse

Watch Video Solution

157. Tangents are drawn to the circle $x^2 + y^2 = 32$ from a point A lying on the x-axis. The tangents cut the y-axis at points B and C, then the coordinate(s) of A such that the area of the triangle ABC is minimum may be: (A) $\left(4\sqrt{2}, 0\right)$ (B) $(4, 0)$ (C) $(-4, 0)$ (D) $\left(-4\sqrt{2}, 0\right)$

Watch Video Solution

158. The equation of four circles are $(x \pm a)^2 + \left(y \pm a2 = a^2\right.$. The radius of a circle touching all the four circles is $\left(\sqrt{2} + 2\right)a$ (b) $2\sqrt{2}a$ $\left(\sqrt{2} + 1\right)a$ (d) $\left(2 + \sqrt{2}\right)a$

Watch Video Solution

159. The equation of the tangent to the circle $x^2 + y^2 - 4x = 0$ which is perpendicular to the normal drawn through the origin can be :

Watch Video Solution

160. The equation of the tangent to the circle $x^2 + y^2 = 25$ passing through $(-2, 11)$ is (a) $4x + 3y = 25$ (b) $3x + 4y = 38$ (c) $24x - 7y + 125 = 0$ (d) $7x + 24y = 250$

Watch Video Solution

161. The equation of a circle of radius 1 touching the circles $x^2 + y^2 - 2|x| = 0$ is (a) $x^2 + y^2 + 2\sqrt{2}x + 1 = 0$ (b) $x^2 + y^2 - 2\sqrt{3}y + 2 = 0$ (c) $x^2 + y^2 + 2\sqrt{3}y + 2 = 0$ (d) $x^2 + y^2 - 2\sqrt{2} + 1 = 0$

Watch Video Solution

162. A circle C and the circle $x^2 + y^2 = 1$ are orthogonal and have radical axis parallel to y-axis, then C can be : (A) $x^2 + y^2 + 1 = 0$ (B) $x^2 + y^2 + 1 = y$ (C) $x^2 + y^2 + 1 = -x$ (D) $x^2 + y^2 - 1 = -x$

Watch Video Solution

163. Circles $x^2 + y^2 = 1$ and $x^2 + y^2 - 8x + 11 = 0$ cut off equal intercepts on a line through the point $\left(-2, \frac{1}{2}\right)$. The slope of the line is : (A) $\frac{-1 + \sqrt{29}}{14}$ (B) $1 + \frac{\sqrt{7}}{4}$ (C) $\frac{-1 - \sqrt{29}}{14}$ (D) none of these

Watch Video Solution

164. The equations of tangents to the circle $x^2 + y^2 - 6x - 6y + 9 = 0$ drawn from the origin in (a).$x = 0$ (b) $x = y$ (c) $y = 0$ (d) $x + y = 0$

Watch Video Solution

165. Tangents drawn from $(2, 0)$ to the circle $x^2 + y^2 = 1$ touch the circle at A and B Then.

Watch Video Solution

166. If the circles $x^2 + y^2 - 9 = 0$ and $x^2 + y^2 + 2\alpha x + 2y + 1 = 0$ touch each other, then $\alpha$is

Watch Video Solution

167. If P and Q are two points on the circle $x^2 + y^2 - 4x + 6y - 3 = 0$ which are farthest and nearest respectively from the point $(7, 2)$ then.

(A) $P \equiv \left(2 - 2\sqrt{2}, \ -3 - 2\sqrt{2}\right)$

(B) $Q \equiv \left(2 + 2\sqrt{2}, \ -3 + 2\sqrt{2}\right)$

(C) $P \equiv \left(2 + 2\sqrt{2}, \ -3 + 2\sqrt{2}\right)$

(D) $Q \equiv \left(2 - 2\sqrt{2}, \ -3 + 2\sqrt{2}\right)$

Watch Video Solution

168. If point P(x,y) is called a lattice points, if $x, y \in l$. Then the total number of lattice points in the interior of the circle $x^2 + y^2 = a^2, a \neq 0$ cannot be

Watch Video Solution

169. The points on the line $x = 2$ from which the tangents drawn to the circle $x^2 + y^2 = 16$ are at right angles is (are) $(2, 2\sqrt{7})$ (b) $(2, 2\sqrt{5})$ $(2, -2\sqrt{7})$ (d) $(2, -2\sqrt{5})$

Watch Video Solution

170. The point of contact of a tangent from the point $(1, 2)$ to the circle $x^2 + y^2 = 1$ has the coordinates :

Watch Video Solution

171. The equation of a circle S_1 is $x^2 + y^2 = 1$. The orthogonal tangents to S_1 meet at another circle S_2 and the orthogonal tangents to S_2 meet at the third circle S_3. Then (A) radius of S_2 and S_3 are in ratio $1 : \sqrt{2}$ (B) radius of S_2 and S_1 are in ratio $1 : 2$ (C) the circles S_1, S_2 and S_3 are concentric (D) none of these

Watch Video Solution

172. about to only mathematics

Watch Video Solution

173. $A\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ is a point on the circle $x^2+y^2=1$ and B is another point on the circle such that are length $AB=\frac{\pi}{2}$ units. Then, the coordinates of B can be (a) $\left(\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ (b) $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ (c) $\left(-\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$ (d) none of these

Watch Video Solution

174. Statement 1 : The circle $x^2+y^2-8x-6y+16=0$ touches x-axis. Statement : 2 : y-coordinate of the centre of the circle $x^2+y^2-8x-6y+16=0$ is numerically equal to its radius. (A) Both 1 and 2 are true and 2 is the correct explanation of 1 (B) Both 1 and 2 are true and 2 is not a correct explanation of 1 (C) 1 is true but 2 is false (D) 1 is false but 2 is true

Watch Video Solution

175. If point P(x,y) is called a lattice points, if $x, y \in l$. Then the total number of lattice points in the interior of the circle $x^2 + y^2 = a^2, a \neq 0$ cannot be

Watch Video Solution

176. Statement 1 : The line $(x - 12)\cos\theta + (y - 3)\sin\theta = 1$ touches a fixed circle for all values of θ. Statement 2 : $y - \beta = m(x - \alpha) \pm a\sqrt{1 + m^2}$ is tangent to the circle $(x - \alpha)^2 + (y - \beta)^2 = a^2$ for all values of m. (A) Both 1 and 2 are true and 2 is the correct explanation of 1 (B) Both 1 and 2 are true and 2 is not a correct explanation of 1 (C) 1 is true but 2 is false (D) 1 is false but 2 is true

Watch Video Solution

177. Let $S_1 \equiv x^2 + y^2 - a^2 = 0$ and $S_2 \equiv x^2 + y^2 - 2\sqrt{2}x - 2\sqrt{2}y - a = 0$ be two circles. Statement 1 : The value of a for which the circles $S_1 = 0$ and $S_2 = 0$ have exactly three common tangents are 0 and 5. Statement 2 : Two circles have exactly 3 common tangents if they touch each other externally. (A) Both 1 and 2 are true and 2 is the correct explanation of 1 (B) Both 1 and 2 are true and 2 is not a correct explanation of 1 (C) 1 is true but 2 is false (D) 1 is false but 2 is true

Watch Video Solution

178. The equation of the diameter of the circle $x^2 + y^2 + 4x + 4y - 11 = 0$, which bisects the chord cut off by the circle on the line $2x - 3y - 3 = 0$ is $3x + 2y + 10 = 0$. Statement 2 : The diameter of a circle is a chord of the circle of maximum length. (A) Both 1 and 2 are true and 2 is the correct explanation of 1 (B) Both 1 and 2

are true and 2 is not a correct explanation of 1 (C) 1 is true but 2 is false (D) 1 is false but 2 is true

Watch Video Solution

179. $x - y + b = 0$ is a chord of the circle $x^2 + y^2 = a^2$ subtending an angle 60^0 in the major segment of the circle. Statement 1 : $\frac{b}{a} = \pm \sqrt{2}$. Statement 2 : The angle subtended by a chord of a circle at the centre is twice the angle subtended by it at any point on the circumference. (A) Both 1 and 2 are true and 2 is the correct explanation of 1 (B) Both 1 and 2 are true and 2 is not a correct explanation of 1 (C) 1 is true but 2 is false (D) 1 is false but 2 is true

Watch Video Solution

180. A line is tangent to a circle if the length of perpendicular from the centre of the circle to the line is equal to the radius of the circle. For all values of θ the lines $(x-3)\cos\theta + (y-4)\sin\theta = 1$ touch the circle having radius. (A) 2 (B) 1 (C) 5 (D) none of these

Watch Video Solution

181. A line is tangent to a circle if the length of perpendicular from the centre of the circle to the line is equal to the radius of the circle. If $4l^2 - 5m^2 + 6l + 1 = 0$, then the line $lx + my + 1 = 0$ touches a fixed circle whose centre. (A) Lies on x-axis (B) lies on yl-axis (C) is origin (D) none of these

Watch Video Solution

182. A given line L_1 cut x and y-axes at P and Q respectively and has intercepts a and $\frac{b}{2}$ on x and y-axes respectively. Let another line L_2 perpendicular to L_1 cut x and y-axes at R and S respectively. Let T be the point of intersection of PS and QR. Locus of T is a circle having centre at (A) (a, b) (B) $\left(a, \frac{b}{2}\right)$ (C) $\left(\frac{a}{2}, b\right)$ (D) $\left(\frac{a}{2}, \frac{b}{4}\right)$

Watch Video Solution

183. A given line L_1 cut x and y-axes at P and Q respectively and has intercepts a and $\frac{b}{2}$ on x and y-axes respectively. Let another line L_2 perpendicular to L_1 cut x and y-axes at R and S respectively. Let T be the point of intersection of PS and QR. If two chords each bisected by x-axis can be drawn from $\left(a, \frac{b}{2}\right)$ to the locus of T, then (A) $a^2 > 2b^2$ (B) $b^2 > 2a^2$ (C) $a^2 < 2b^2$ (D) $b^2 < 2a^2$

Watch Video Solution

184. A given line L_1 cut x and y-axes at P and Q respectively and has intercepts a and $\frac{b}{2}$ on x and y-axes respectively. Let another line L_2 perpendicular to L_1 cut x and y-axes at R and S respectively. Let T be the point of intersection of PS and QR. A straight line passes through the centre of locus of T. Then locus of the foot of perpendicular to it from origin is : (A) a straight line (B) a circle (C) a parabola (D) none of these

Watch Video Solution

185. A line intersects x-axis at $A(2, 0)$ and y-axis at $B(0, 4)$. A variable lines PQ which is perpendicular to AB intersects x-axis at P and y-axis at Q. AQ and BP intersect at R. Locus of R is : (A) $x^2 + y^2 - 2x + 4y = 0$ (B) $x^2 + y^2 + 2x + 4y = 0$ (C) $x^2 + y^2 - 2x - 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$

Watch Video Solution

186. A line intersects x-axis at $A(2, 0)$ and y-axis at $B(0, 4)$. A variable lines PQ which is perpendicular to AB intersects x-axis at P and y-axis at Q. AQ and BP intersect at R. Locus of R is : (A) $x^2 + y^2 - 2x + 4y = 0$ (B) $x^2 + y^2 + 2x + 4y = 0$ (C) $x^2 + y^2 - 2x - 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$

Watch Video Solution

187. A line intersects x-axis at $A(2, 0)$ and y-axis at $B(0, 4)$. A variable lines PQ which is perpendicular to AB intersects x-axis at P and y-axis at Q. AQ and BP intersect at R. Locus of R is : (A) $x^2 + y^2 - 2x + 4y = 0$ (B) $x^2 + y^2 + 2x + 4y = 0$ (C) $x^2 + y^2 - 2x - 4y = 0$ (D) $x^2 + y^2 + 2x - 4y = 0$

Watch Video Solution

188. Two circles centres A and B radii r_1 and r_2 respectively. (i) touch each other internally iff $|r_1 - r_2| = AB$. (ii) Intersect each other at two points iff $|r_1 - r_2| < AB < r_1 r_2$. (iii) touch each other externally iff $r_1 + r_2 = AB$. (iv) are separated if $AB > r_1 + r_2$. Number of common tangents to the two circles in case (i), (ii), (iii) and (iv) are 1, 2, 3 and 4 respectively. circles $x^2 + y^2 + 2ax + c^2 = 0$ and $x^2 + y^2 + 2by + c^2 = 0$ touche each other if (A) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{2}{c^2}$ (B) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{2}{c^2}$ (C) $\frac{1}{a^2} - \frac{1}{b^2} = \frac{2}{c^2}$ (D) $\frac{1}{a^2} - \frac{1}{b^2} = \frac{4}{c^2}$

Watch Video Solution

189. Two circles centres A and B radii r_1 and r_2 respectively. (i) touch each other internally iff $|r_1 - r_2| = AB$. (ii) Intersect each other at two points iff $|r_1 - r_2| < AB < r_1 + r_2$. (iii) touch each other externally iff $r_1 + r_2 = AB$. (iv) are separated if $AB > r_1 + r_2$. Number of common tangents to the two circles in case (i), (ii), (iii) and (iv) are 1, 2, 3 and 4 respectively. If circles $(x-1)^2 + (y-3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect each other at two different points, then : (A) $1 < r < 5$ (B) $5 < r < 8$ (C) $2 < r < 8$ (D) none of these

Watch Video Solution

190. Two circles centres A and B radii r_1 and r_2 respectively. (i) touch each other internally iff $|r_1 - r_2| = AB$. (ii) Intersect each other at two points iff $|r_1 - r_2| < AB < r_1 r_2$. (iii) touch each other externally iff $r_1 + r_2 = AB$. (iv) are separated if $AB > r_1 + r_2$. Number of common tangents to the two circles in case (i), (ii), (iii) and (iv) are 1, 2, 3 and 4 respectively. Number of common tangents to the circles $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 + 2x = 0$ is (A) 1 (B) 2 (C) 3 (D) 4

Watch Video Solution

191. The circle $x^2 + y^2 - 4x - 4y + 4 = 0$ is inscribed in a triangle which has two of its sides along the coordinate axes. The locus of the circumcenter of the triangle is $x + y - xy + k(x^2 + y^2)^{\frac{1}{2}} = 0$. Find k.

Watch Video Solution

192. Three distinct point A, B and C are given in the 2-dimensional coordinates plane such that the ratio of the distance of any one of them from the point $(1, 0)$ to the distance from the point $(-1, 0)$ is equal to $\frac{1}{3}$. Then, the circumcentre of the triangle ABC is at the point

Watch Video Solution

193. Let ABCD be a square of side length 2 units. C2 is the circle through vertices A, B, C, D and C1 is the circle touching all the sides of the square ABCD. L is a line through A. . If P is a point on C1 and Q in another point on C2, then (PA^2+ PB^2+ PC^2+PD^2)/ (QA^2+ QB^2+ QC^2+ QD^2) is equal to (A) 0.75 (B) 1.25 (C) 1 (D) 0.5

Watch Video Solution

194. A circle touches the line L and the circle C_1 externally such that both the circles are on the same side of the line, then the locus of centre of the circle is (a) Ellipse (b) Hyperbola (c) Parabola (d) Parts of straight line

Watch Video Solution

195. ABCD is a square with side AB = 2. A point P moves such that its distance from A equals its distance from the line BD. The locus of P meets the line AC at T_1 and the line through A parallel to BD at T_2 and T_3. The area of the triangle $T_1T_2T_3$ is :

Watch Video Solution

196. From a point P outside a circle with centre at C, tangents PA and PB are drawn such that $\frac{1}{(CA)^2}+\frac{1}{(PA)^2}=\frac{1}{16}$, then the length of chord AB is

Watch Video Solution

197. the no. of possible integral values of m for which the circle $x^2+y^2=4$ and $x^2+y^2-6x-8y+m^2=0$ has exactly two common tangents are

Watch Video Solution

198. The extermities of a diagonal of a rectangle are $(-4, 4)$ and $(6, -1)$. A circle circumscribes the rectangle and cuts an

intercept AB on the y-axis.Find the area of the triangle formed by AB and the tangents to the circle at A and B.

Watch Video Solution

199. 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 and equation of the circle.

Watch Video Solution

200. Number of integral values λ for which the varaible line $3x + 4y - \lambda = 0$ lies between the circles $x^2 + y^2 - 2x - 2y + 1 = 0$ and $x^2 + y^2 - 18x - 2y + 78 = 0$, without intersecting any circle at two distinct points.

Watch Video Solution

201. If the coordinates of points A, B, C satisfy the relation $xy = 1000$ and (α, β) be the coordinates of the orthocentre of ΔABC, then the value of $\alpha\beta$ is

Watch Video Solution

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

Watch Video Solution