MATHS

BOOKS - BHARATI BHAWAN MATHS (HINGLISH)

Circles

Example

1. Find the equation of the circle circumscribing the rectangle whose sides are $x - 3y = 4,\ 3x + y = 32,\ x - 3y = 14\ and\ 3x + y = 62.$

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2. Find the equation of a circle which passes through the point $(2, 0)$ and whose centre is the limit of the point of intersection of eth lines $3x + 5y = 1 and (2 + c)x + 5c^2y = 1 asc \overrightarrow{1}$.

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3. 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

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4. If the line $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ cut the coordinate axes in concyclic points, prove that : $a_1a_2 = b_1b_2$.

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5. The point $(1, 4)$ are inside the circle $S: x^2 + y^2 - 6x - 10y + k = 0$. What are the possible values of k if the circle S neither touches the axes nor cut them

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6. The set of values of a for which the point $(2a, a+1)$ is an interior point of the larger segment of the circle $x^2+y^2-2x-2y-8=0$ made by the chord $x-y+1=0$, is

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7. 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 $\left(a, \frac{b}{2}\right)$

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8. 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 $x(x-4)+y(y-3)=0$

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9. If two curves whose equations are $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x + 2f'y + c = 0$ intersect in four concyclic point., then

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10. 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 $c > 0$.

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

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12. Find the equation of the circle whose centre is at $(3, -1)$ and which cuts off a chord of length $6units$ on the line $2x - 5y + 18 = 0$.

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13. A circle touches the line $y = x$ at point P such that $OP = 4\sqrt{2}$, Circle contains (-10,2) in its interior & length of its chord on the line $x + y = 0$ is $6\sqrt{2}$. Determine the equation of the circle

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14. . 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

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15. 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.

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16. Show that the circles $x^2 + y^2 + 2x - 8y + 8 = 0$ and x^2 + y^2 + 10x - 2y+ 22=0` touch each other. Also obtain the equaitons of the two circles, each of radius 1, cutting both these circles orthogonally.

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17. Find the equation of the circle of minimum radius which contains the three cricles

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

$x^2 + y^2 + 12x + 4y + 31 = 0$ and

$x^2 + y^2 + 6x + 12y + 36 = 0$

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18. 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.

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

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20. Tangent PQ and PR are drawn to the circle $x^2 + y^2 = a^2$ from the pint $P(x_1, y_1)$. Find the equation of the circumcircle of ΔPQR.

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21. Prove that ,for all $c \in R$,the pole of the line x/a+y/b=1 with respect to the circle $x^2 + y^2 = c^2$ lies on a fixed line.

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22. 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

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23. A fixed circle is cut by circles passing through two given points $A(x_1, y_1)$ and $B(x_2, y_2)$. Show that the chord of intersection of the fixed circle with any one of the circles, passes through a fixed point.

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24. Circles are drawn passing through the origin O to intersect the coordinate axes at point P and Q such that $m.OP + n.OQ = k$, then the fixed point satisfying all of them, is given by

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25. (iii)If two circles cut a third circle orthogonally; then the radical axis of two circle will pass through the center of the third circle .

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26. Find the equation of the circle which cuts each of the circles $x^2 + y^2 = 4$, $x^2 + y^2 - 6x - 8y. + 10 = 0$ & $x^2 + y^2 + 2x - 4y - 2 = 0$ at the extremities of a diameter

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27. Find the locus of the middle points of the chords of the circle $x^2 + y^2 = a^2$which pass through a given point(x_1, y_1)

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28. Find the locus of the mid point of the circle $x^2 + y^2 = a^2$ which subtend a right angle at the point (p,q)

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29. The locus of the point of intersection of the two tangents drawn to the circle $x^2 + y^2 = a^2$ which include are angle α is

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30. Find the equation of the system of coaxial circles that are tangent at $(\sqrt{2}, r)$ to the locus of the point of intersection of two mutually

perpendicular tangents to the circle $x^2 + y^2 = 9$.

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31. A ball moving around the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ in anticlockwise direction leaves it tangentially at $P(-2, -2)$. After getting reflected from a straight 'L' it passes through the centre of circle. If distance of P from line L is $\frac{5}{2}$ and 2α be the angle between incident ray and reflected say then $10 \cot 2\alpha \cot a$ is equal to

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Exercise

1. Find the equation of a circle whose diameter has the length 20 and the equation of two of its diameters are $2x + y = 6$ and $3x + 2y = 4$.

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2. Find the equations of the circles touching y-axis at (0,3) and making an intercept of 8 units on the x-axis.

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3. Find the equation of the circle which passes through the points $(1, -2), (4, -3)$ and whose center lies on the line $3x + 4y = 7$.

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4. The abscissa of the two points A and B are the roots of the equation $x^2 + 2ax - b^2 = 0$ and their ordinates are the roots of the equation $x^2 + 2px - q^2 = 0$. Find the equation of the circle with AB as diameter. Also, find its radius.

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5. 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 abscissae of the points of intersection of C with the x-axis.

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6. Find the area of the triangle formed by the lines $y = x, y = 2x, y = 3x + 4$

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7. Find the length of the chord $x^2 + y^2 - 4y = 0$ along the line $x + y = 1$. Also find the angle that the chord subtends at the circumference of the larger segment.

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8. Prove that the circles $x^2 + y^2 - 9 = 4r^2, r = 1, 2, 3$ cut off equal intercepts between the circles on the line $3x + 4y + 15 = 0$.

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9. Determine all those values of $p \in R$ for which two chords can be drawn from the point $(p, p)$to the circle $(x - p)^2 + y^2 = p^2$ both of which are bisected by the line $x - 2y + 2 = 0$.

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10. A circle of radius 2 lies in the first quadrant and touches both the axes of coordinates. Find the equation of the circle with centre at (6,5) and touching the above circle externally.

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11. 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.

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

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13. Prove that $x^2 + y^2 = a^2$ and $(x - 2a)^2 + y^2 = a^2$ are two equal circles touching each other.

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14. 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, is

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15. Find the area of equilateral triangle inscribed in a circle $x^2 + y^2 + 2gx + 2fy + c = 0$

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16. 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.

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

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18. The equation of one of the circles which touch the pair of lines $x^2 - y^2 + 2y - 1 = 0$ is

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

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20. 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.

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21. 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.

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22. 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.

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23. The extremities of a diagonal of a rectangle are (-4,4) and (6,-1). A circle circumscribe 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.

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24. Tangents are drawn to the circle $x^2 + y^2 = 12$ at the points where it is met by the circle $x^2 + y^2 - 5x + 3y - 2 = 0$, find the point of intersection of these tangents.

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25. Find the equation of the tangent to the circle $x^2 + y^2 - 80x - 60y + 2100 = 0$ at the point nearest to the origin.

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26. The tangent to the circle $x^2 + y^2 = 5$ at the point $(1, -2)$ also touches the circle $x^2 + y^2 - 8x + 6y + 20 = 0$ at the point

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27. AB is a diameter of a circle. CD is a chord parallel to AB and $2CD = AB$. The tangent at B meets the line AC produced at E then AE is equal to -

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28. 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 $AB = 4$.

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29. 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.

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30. 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.

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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 angle between the tangents is

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32. 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

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33. If the pole of a straight line with respect to the circle $x^2 + y^2 = a^2$ lies on the circle $x^2 + y^2 = 9a^2$, then the straight line touches the circle

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34. Tangents are drawn from the point (h,k) to ^circle $x^2 + y^2 = a^2$; Prove that the area of the triangle formed by them and the straight line joining their point of contact is $\frac{a\left(h^2 + k^2 - a^2\right)^{\frac{3}{2}}}{h^2 + k^2}$

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35. Find the equation of the circle which has for its diameter the chord out off on the line$px + qy - 1 = 0$ by the circle $x^2 + y^2 = a^2$

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36. If $y = mx$ be the equation of a chord of the circle prove that the circle of which this chord is the diameter is $(1 + m^2)(x^2 + y^2) - 2a(x + my) = 0$

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

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38. The equation of the circle on the common chord of the circles $(x - a)^2 + y^2 = a^2$ and $x^2 + (y + b)^2 = b^2$ as diameter, is

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39. Find the equation of the circle passing through the intersection of the circles $x^2 + y^2 - 4 = 0$ and $x^2 + y^2 - 2x - 4y + 4 = 0$ and touching the line $x + 2y = 0$

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40. 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 $y = x$.

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41. Find the equation of the circle whose diameter is the common chord of the circles

$x^2 + y^2 + 2x + 3y + 1 = 0$ and $x^2 + y^2 + 4x + 3y + 2 = 0$

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42. The line Ax+By+=0 cuts the circle by $x^2 + y^2 + Ax + By + C = 0$at P and Q. The line A'x +B'x+C'=0 cuts the circle $x^2 + y^2 + a'x + b'y + c' = 0$ at R and S.If P,Q, R and S are concyclic then show that $\det \begin{pmatrix} a - a & b - b' & c - c' \\ A & B & C \\ A' & B' & C' \end{pmatrix} = 0$

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43. Prove that the equation $x^2 + y^2 - 2x - 2ay - 8 = 0, a \in R$ represents the family of circles passing through two fixed points on x-axis.

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44. The common chord of the circle $x^2 + y^2 + 6x + 8y - 7 = 0$ and a circle passing through the origin and touching the line $y = x$ always passes through the point. $\left(-\frac{1}{2}, \frac{1}{2}\right)$ (b) (1, 1) $\left(\frac{1}{2}, \frac{1}{2}\right)$ (d) none of these

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45. Consider a family of circles passing through two fixed points $A(3,7) \& B(6,5)$ then 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.

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46. If the circle $C_1: x^2+y^2=16$ intersects another circle C_2 of radius 5 in such a manner that,the common chord is of maximum length and has a slope equal to $\frac{3}{4}$, then the co-ordinates of the centre of C_2 are:

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47. The equation of the circle passing through the origin & cutting the circles $x^2+y^2-4x+6y+10=0$ and $x^2+y^2+12y+6=0$ at right angles is -

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48. The equation of the circle which passes through the origin, center lies on the line x+y = 4 and cuts the circle $x^2 + y^2 - 4x + 2y + 4 = 0$ orthogonally :

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49. Prove that the two circles each of which passes through the point $(0, k)$ and $(0, -k)$ and thouches the line $y = mx + b$ will cut orthogonally, if $b^2 = k^2(2 + m^2)$.

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50. 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

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

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52. The centre of the circle that cuts the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ and lines $x = g$ and $y = f$ orthogonally is

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53. Find the equation of a circle which is co-axial with circles $2x^2 + 2y^2 - 2x + 6y - 3 = 0$ & $x^2 + y^2 + 4x + 2y + 1 = 0$. It is given that the centre of the circle to be determined lies on the radicalaxis of these two circles.

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54. 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.

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55. From a point P, tangents drawn to the circle $x^2 + y^2 + x - 3 = 0, 3x^2 + 3y^2 - 5x + 3y = 0$ and $4x^2 + 4y^2 + 8x + 7y$ are of equal lengths. Find the equation of the circle through P, which touches the line $x + y = 5$ at the point $(6, -1)$.

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56. Let $A = (-2, 0)$ and $B = (1, 0)$ and P is a variable point such that $\angle APB = 60^\circ$. Prove analytically that the locus of P is a circle. Find

its radius and centre.

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57. 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

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58. Two rods of lengths $aandb$ slide along the $x-$ and $y-a\xi s$, respectively, in such a manner that their ends are concyclic. Find the locus of the center of the circle passing through the endpoints.

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59. 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 $(x-1)^2=8y$.

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60. From the point A (0, 3) on the circle $x^2 + 4x + (y-3)^2 = 0$ a chord AB is drawn & extended to a M point such that AM=2AB. The equation of the locus of M is: (A)$x^2 + 8x + y^2 = 0$ (B)$x^2 + 8x + (y-3)^2 = 0$ (C) $(x-3)^2 + 8x + y^2 = 0$ (D)$x^2 + 8x + 8y^=0$

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61. 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 is circle with radius

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62. A circle of radius 'r' passes through the origin O and cuts the axes at A and B,Locus of the centroid of triangle OAB is

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63. 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.

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64. Find the locus of the midpoint of the chords of the circle $x^2 + y^2 = a^2$ which subtend a right angle at the point $(c, 0)$.

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65. Let A be one point of intersection of two intersecting circles with centres $OandQ$. The tangents at A to the two circls meet the circles again at $BandC$, respectively. Let the point P be located so that $AOPQ$ is a parallelogram. Prove that P is the circumcentre of the triangle ABC.

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66. Prove that the locus of a point which moves such that the sum of the square of its distances from the vertices of a triangle is constant is a circle having centre at the centroid of the triangle.

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67. 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.

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68. 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.

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

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70. Let $S \equiv x^2 + y^2 + 2gx + 2fy + c =$ 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.

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71. 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 $x^2 + y^2 = a^2$.

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72. Find the locus of the point of intersection of tangents to the circle $x = a\cos\theta, y = a\sin\theta$ at the points whose parametric angles differ by $(i)\frac{\pi}{3}$,

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73. 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 $x + y - xy + k\left(x^2 + y^2\right)^{\frac{1}{2}} = 0$. Find k.

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74. The locus of the centres of the circles which touch $x^2 + y^2 = a^2$ and

`x^2+y^2=4ax, externally

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75. Locus of the point of intersection of perpendicular tangents to the circle $x^2 + y^2 = 16$ is

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76. If the polar of a point (p, q) with respect to the circle $x^2 + y^2 = a^2$ touches the circle $(x - c)^2 + (y - d)^2 = b^2$, then

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77. Find the locus of the centres of the circle which cut the circles $x^2 + y^2 + 4x - 6y + 9 = 0$ and $x^2 + y^2 + 4x + 6y + 4 = 0$ orthogonally

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

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79. The circle $x^2+y^2-4x-8y+16=0$ rolls up the tangent to it at $\left(2+\sqrt{3},3\right)$ by 2 units,assuming the x-axis as horizontal, find the equation of the circle in the new position.

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80. The centre of a circle $(1,1)$ and its radius is 5 units. If the centre is shifted along the line $y-x=0$ through a dis-tance $\sqrt{2}$ units. Find the equation(s) of the circle(s) in the new position.

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81. The point of intersection of the lines $x - y + 1 = 0$ and $x + y + 5 = 0$ is P. A circle with centre at $(1, 0)$ passes through P. The tangent to the circle at P meets the x-axis at $(k, 0)$. The value of k is

A.

B.

C.

D.

Answer:

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

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83. Tht line L passes through the points f intersection of the circles $x^2 + y^2 = 25$ and $x^2 + y^2 - 8x + 7 = 0$. The length of perpendicular from center of second circle onto the line L is

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84. 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 at its centre is $\frac{2\pi}{3}$ at its centre is $x^2 + y^2 - kx + y + \frac{31}{16} = 0$ then k is

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85. The sides of a square are $x = 4, x = 7, y = 1$ and $y = 4$. The equation of the circumcircle of the square is :

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86. If (4, 1) be an end of a diameter of the circle $x^2 + y^2 - 2x + 6y - 15 = 0$, find the coordinates of the other end of the diameter.

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87. $7y - x - 5 = 0$ touches the circle $x^2 + y^2 - 5x + 5y = 0$. The equation of other parallel tangent is

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88. Find the equation of the tangents to the circle $x^2 + y^2 = 4$ which make an angle of 60° with the x-axis

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89. If the circles $(x-a)^2+(y-b)^2=c^2$ and $(x-b)^2+(y-a)^2=c^2$ touch each other, then

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90. If a circle passes through the points of intersection of the coordinate axes with the lines $\lambda x-y+1=0$ and $x-2y+3=0$, then the value of λ is.....

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91. The area of the triangle formed by the positive x-axis with the normal and the tangent to the circle $x^2+y^2=4$ at $\left(1,\sqrt{3}\right)$ is

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92. The equation of the circle passing through $(2, 0)$ and $(0, 4)$ and having minimum radius is

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93. The equation of the line passing through the points of intersection of the circles $3x^2 + 3y^2 - 2x + 12y - 9 = 0$ and $x^2 + y^2 + 6x + 2y - 15 = 0$ is

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94. The area bounded by circles $x^2 + y^2 = r^2$, r = 1, 2 and rays given by $2x^2 - 3xy - 2y^2 = 0$,is

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95. If the cirles $x^2 + y^2 = 2$ and $x^2 + y^2 - 4x - 4y + \lambda = 0$ have exactly three real common tangents then $\lambda =$

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96. Show that the circle $x^2 + y^2 - 2ax - 2ay + a^2 = 0$ touches both the coordinate axes.

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97. The chords of contact of the pair of tangents drawn from each point on the line 2x+y=4 to the circle $x^2 + y^2 = 1$ pass through a fixed point

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98. 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.

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99. A square is inscribed in the circle $x^2 + y^2 - 2x + 4y + 3 = 0$. Its sides are parallel to the coordinate axes. One vertex of the square is $\left(1 + \sqrt{2},\ -2\right)$ (b) $\left(1 - \sqrt{2},\ -2\right)$ $\left(1,\ -2 + \sqrt{2}\right)$ (d) none of these

A. a) $\left(1 + \sqrt{2},\ -2\right)$

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

C. c) $\left(1,\ -2 + \sqrt{2}\right)$

D. d)none of these

Answer:

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100. The number of integral values of r for which the circle $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ intersect at two distinct points is ____

A. a)2ltrlt8

B. b)rlt2

C. c)r=2

D. d)rgt2

Answer:

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101. The centre of a circle passing through the points (0, 0), (1, 0) and touching the circle $x^2+y^2=9$, is

A. a)(3/2,1/2)

B. b)1/2,3/2)

C. c)1/2,1/2)

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

Answer:

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102. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = k^2$ orthogonally, then the equation of the locus of its center is

A. a) $2ax + 2by - \left(a^2 + b^2 + k^2\right) = 0$

B. b)2ax+2by-(a^2-b/62+k^2)=0`

C. c) $x^2 + y^2 - 3ax - 4by + \left(a^2 + b^2 - k^2\right) = 0$

D. d) $x^2 + y^2 - 2ax - 3by + \left(a^2 - b^2 - k^2\right) = 0$

Answer:

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103. For any $\lambda \in R$, the locus $x^2 + y^2 - 2\lambda x - 2\lambda y + \lambda^2 = 0$ touches the line

A. a)x=0

B. b)x=y

C. c)x+y=0

D. d)y=0

Answer:

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104. Find the equation of the circle which touch the line 2x-y=1 at (1,1) and line 2x+y=4

A. a)$x^2 + y^2 - 3y + 1 = 0$

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

C. c)$4\left(x^2 + y^2\right) + 10x + 7y - 9 = 0$

D. d)$4\left(x^2+y^2\right)-10x-7y+9=0$

Answer:

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105. The circle for which the points $\left(am^2, 2am\right)$ and $\left(\frac{a}{m^2}, \frac{-2a}{m}\right)$ are the end points of a diameter istouched for all values of m by the line

A. a)x=a

B. b)x+a=0

C. c)x=2a

D. d)x+2a=0

Answer:

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106. The radius of the circle passing through the point (6,2) and having $x + y = 6$ as its normal and $x + 2y = 4$ as its diameter is :

A. a)10

B. b)$2\sqrt{5}$

C. c)$5\sqrt{2}$

D. d)4sqrt5`

Answer:

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107. A circle passes through point $\left(3, \sqrt{\frac{7}{2}}\right)$ and touches the line-pair $x^2 - y^2 - 2x + 1 = 0$. Centre of circle lies inside the circle $x^2 + y^2 - 8x + 10y + 15 = 0$. Coordinates of centre of circle are given by (A) $(4, 0)$ (B) $(5, 0)$ (C) $(6, 0)$ (D) $(0, 4)$

A. a)(4,0)

B. b)(6,0)

C. c)(0,4)

D. d)(5,0)

Answer:

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

A. a)$x^2 + y^2 + 4x - 6y + 4 = 0$

B. b)$x^2 + y^2 + 4x - 6y - 9 = 0$

C. c)$x^2 + y^2 + 4x - 6y - 4 = 0$

D. d)$x^2 + y^2 + 4x - 6y + 9 = 0$

Answer:

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109. Let AB be a line segment of length 4 with A on the line $y = 2x$ and B on the line $y = x$. The locus of the middle point of the line segment is

A. a)a line

B. b)a pair of lines

C. c)a circle

D. d)none of these

Answer:

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110. The locus of the centre of a circle which touches externally the circle $x^2 + y^2 - 6x - 6y + 14 = 0$ and also touches Y-axis, is given by the equation (a) x2-6x-10y+14 = 0 (b) x2-10x-6y + 14 = 0 (c) yr_6x-10y+14-0 (d) y,2-10x-6y + 14 = 0

A. a) $x^2 - 6x - 10y + 14 = 0$

B. b) $x^2 - 10x - 6y + 14 = 0$

C. c) $y^2 - 6x - 10y + 14 = 0$

D. d) $y^2 - 10x - 6y + 14 = 0$

Answer:

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111. Prove that the centres of the circles $x^2 + y^2 = 1$, $x^2 + y^2 + 6x - 2y - 1 = 0$ and $x^2 + y^2 - 12x + 4y = 1$ are collinear

A. a)vertices of an equilateral `/_\`

B. b)vertices of a right-angles traingle

C. c)collineat

D. d)none of these

Answer:

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112. Find the equation of the circle which passes through the origin and cut off equal chords of $\sqrt{2}$ units from the lines $y = xandy = -x$.

A. a)$x^2 + y^2 + 2y = 0$

B. b)$x^2 + y^2 - 2x = 0$

C. c)$x^2 + y^2 - 2y = 0$

D. d)$x^2 + y^2 + 2x = 0$

Answer:

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113. The line $x + 3y = 0$ is a diameter of the circle $x^2 + y^2 - 6x + 2y = 0$

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114. The lines $2x + 3y + 19 = 0$ and $9x + 6y - 17 = 0$, cut the coordinate axes at concyclic points.

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115. The area of an equilateral triangle inscribed in the circle $x^2 + y^2 - 2x = 0$ is

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116. The range of values of a such that the angle θ between the pair of tangents drawn from $(a, 0)$ to the circle $x^2 + y^2 = 1$ satisfies `pi/2

A. a)(1,2)

B. b)$(1, \sqrt{2})$

C. c)$(-\sqrt{2}, -1)$

D. d)$(-\sqrt{2}, -1) \cup (1, \sqrt{2})$

Answer:

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117. Let $A \equiv (-1, 0), B \equiv (3, 0),$ and PQ be any line passing through (4, 1) having slope m. Find the range of m for which there exist two points on PQ at which AB subtends a right angle.

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118. (C) 2 45. Three concentric circles of which the biggest is $x^2 + y^2 = 1$, have their radii in A.P If the line $y = x + 1$ cuts all the circles in real and distinct points. The interval in which the common difference of the A.P will lie is:

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119. The equation of radical axis of two circles is $x + y = 1$. One of the circles has the ends ofa diameter at the points $(1, -3)$ and $(4, 1)$ and the other passes through the point (1, 2).Find the equating of these circles.

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120. Find the locus of the centers of the circles $x^2 + y^2 - 2x - 2by + 2 = 0$, where a and b are parameters, if the tangents from the origin to each of the circles are orthogonal.

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121. The range of parameter $'a'$ for which the variable line $y = 2x + a$ lies between the circles $x^2 + y^2 - 2x - 2y + 1 = 0$ and $x^2 + y^2 - 16x - 2y + 61 = 0$ without intersecting or touching either circle is $a \in (2\sqrt{5} - 15, 0)$ $a \in (-\infty, 2\sqrt{5} - 15,)$ $a \in (0, -\sqrt{5} - 10)$ (d) $a \in (-\sqrt{5} - 1, \infty)$

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122. Let $C_1$and C_2 be two circles with C_2 lying inside C_1 circle C lying inside C_1 touches C_1 internally andexternally. Identify the locus of the centre of C

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