MATHS

BOOKS - CHHAYA PUBLICATION MATHS (BENGALI ENGLISH)

CIRCLE

Illustrative Example

1. The corrdinates of the centre of a circle are (2, -3) and it passes through the point (5, -1), find the equation of the circle.

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2. Find the coordinates of the centre and the length of radius of the circle $5x^2 + 5y^2 - 8x + 6y - 15 = 0$

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3. Find the parametric equation of the circle $x^2 + y^2 - 5x + 2y + 5 = 0.$

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4. Find the equation to the circle whose parametric equations are, $x = \frac{1}{2}(1 + 5\cos\theta), y = \frac{1}{2}(-2 + 5\sin\theta)$

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5. Find the equation of the circle which is concentric with the circle $2x^2 + 2y^2 + 5x - 7y - 1 = 0$ and whose radius is $\frac{1}{4}\sqrt{26}$ unit.

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6. Prove that the centres of the three circles $x^2 + y^2 - 2x + 6y + 1 = 0, x^2 + y^2 + 4x - 12y + 9 = 0$ and $x^2 + y^2 - 16 = 0$ are collinear.

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7. Find the equation of the circle through the points (1, -6), (2, 1) and (5, 2), find the coordinates of its centre and the length of the radius.

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8. The equation of in circle of an equilateral triangle is $2x^2 + 2y^2 + 3x - y - 5 = 0$. Find the area of the triangle.

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9. Determine the positions of the points

(1, -1) with respect to the circle $x^2 + y^2 - 4x + 6y + 4 = 0$.

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10. Determine the positions of the points

(-1, 2) with respect to the circle $x^2 + y^2 - 4x + 6y + 4 = 0$.

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11. Determine the positions of the points

(-1, -3) with respect to the circle $x^2 + y^2 - 4x + 6y + 4 = 0$.

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

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13. A circle passes through the points (3, 4), (-1, 2) and its radius is 5 unit, find the equation of the circle.

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14. Find the equation of the circle whose diameter is the join of the origin and the point $\left(a^3, \frac{1}{a^3}\right)$. Prove that the circle passes through the point $\left(\frac{1}{a}, a\right)$.

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15. Show that the circle with the portion of the line $3x + 4y = 12$ intercepted between the axes as diameter, passes through the origin.

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16. Find the equation to the circle which touches the x-axis at the origin and passes through the point (h, k).

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17. ABCD is a square whose side is a. Taking AB and AD as axes, find the equation of the circle circumscribing the square.

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18. Find the equation of the circle which passes through the points of intersection of the circle $x^2 + y^2 + 4(x + y) + 4 = 0$ with the line x+y+2 = 0 and has its centre at the origin.

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19. Show that the circles $x^2 + y^2 + 6x + 2y + 8 = 0$ and $x^2 + y^2 + 2x + 6y + 1 = 0$ intersect each other.

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20. Find the equation of the circle passing through the points of intersection of the circles $x^2 + y^2 - x + 7y - 3 = 0, x^2 + y^2 - 5x - y + 1 = 0$ and having its centre on the line x+y = 0.

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21. Show that the circles $x^2 + y^2 + 6x + 14y + 9 = 0$ and $x^2 + y^2 - 4x - 10y - 7 = 0$ touch each other externally, find also the equation of the common tangent of the two circles.

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22. Show that the circles $x^2 + y^2 - 8x - 4y - 16 = 0$ and $x^2 + y^2 - 2x + 4y + 4 = 0$ touch each other internally and find the coordinates of their point of contact.

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23. Show that the two circles $x^2 + y^2 + 2gx + 2fy = 0$ and $x^2 + y^2 + 2g'x + 2f'y = 0$ will touch each other if f'g = g'f.

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24. The variable coefficients a, b in the equation of the straight line $\frac{x}{a} + \frac{y}{b} = 1$ are connected by the relation $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$ where c is a fixed constant. Show that the locus of the foot of the perpendicular from the origin upon the line is a circle. Find the equation of the circle.

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25. Find the centre and radius of the circle $x^2 + y^2 - 4x + 2y - 20 = 0$. Find also the point on the circle which

is nearest to $\left(2, \frac{3}{2}\right)$.

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26. Find the equation of the common chord of the two circles $x^2 + y^2 - 4x - 2y - 31 = 0$ and $2x^2 + 2y^2 - 6x + 8y - 35 = 0$ and show that this chord is perpendicular to the line joining the two centres.

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27. Show that the circle $x^2 + y^2 + 4(x + y) + 4 = 0$ touches the coordinates axes. Also find the equation of the circle which passes through the common points of intersection of the above circle and the straight line x+y+2 = 0 and which also passes through the origin.

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28. Whatever be the values of θ, prove that the locus of a point of intersection of the lines $x\cos\theta + y\sin\theta = a$ and $x\sin\theta - y\cos\theta = b$ is a circle.

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29. Find the equation to the circle described on the common chord of the given circles $x^2 + y^2 - 4x - 5 = 0$ and $x^2 + y^2 + 8x + 7 = 0$ as diameter.

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30. The straight line $x + y - 1 = 0$ cuts the circle $x^2 + y^2 - 6x - 8y = 0$ at A and B. Find the equation of the circle of which AB is a diameter.

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31. Show that the equation of the circles which touches the coordinates axes and whose centre lies on the straight line lx + my + n = 0 is

$$(l+m)^2(x^2+y^2)+2n(l+m)(x+y)+n^2=0$$

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

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33. Prove that the area of a right-angled triangle of a given hypotenuse is maximum when the triangle is isosceles.

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34. Find the equation to the locus of mid-points of chords drawn through the point (a, 0) on the circle $x^2 + y^2 = a^2$.

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35. Find the equations to the circles which pass through the origin and cut off equal chords of length a unit from the lines y = x and y = -x.

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36. A circle touches the lines x = 0 , y = 0 and x + y = 1. If the centre of the circle lies in first quadrant, show that there are two such circles and find their equations. Specify which of these is inscribed whithin the triangle formed by the given lines.

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

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38. Find the equations to the circles which touch the axis of y at a distance +4 from the origin and intercept a length 6 unit on the axis of x.

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39. Find the equation of the circle which bisects the circumference of the circle $x^2 + y^2 + 2y - 3 = 0$ and touches the straight line y = x at the origin.

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40. A circle passes through the point (-2, 1) and touches the straight line 3x - 2y = 6 at the point (4, 3) . Find its equation.

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Exercise 3 Multiple Choice Questions

1. If the equation of a circle is $\lambda x^2 + (2\lambda - 3)y^2 - 4x + 6y - 1 = 0$, then the coordinates of centre are -

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

B. $\left(\frac{4}{3}, -1\right)$

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

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

Answer: A

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2. The diameter of the circle concentric to the circle $x^2 + y^2 + 4x - 2y = 20$ and passes through the origin is -

A. 10 unit

B. $\sqrt{20}$ unit

C. $\sqrt{5}$ unit

D. none of these

Answer: C

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3. The equation of the circle for which the line segment joining the points A(3, -5) and B(-3, 7) is a diameter, is -

A. $x^2 + y^2 + 2y + 44 = 0$

B. $x^2 + y^2 - 2y + 44 = 0$

C. $x^2 + y^2 + 2y - 44 = 0$

D. $x^2 + y^2 - 2y - 44 = 0$

Answer: D

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4. The circle $(x + 2)^2 + (y - 3)^2 = 4$ touches -

A. both the axes

B. the x-axis

C. the y-axis

D. none of these

Answer: C

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5. The equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a point-circle when -

A. $g^2 + f^2 = -c$

B. $g^2 - f^2 = -c$

C. $g^2 + f^2 = c$

D. $f^2 - g^2 = c$

Answer: C

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6. The area (in sq. units) of an equilateral triangle inscribed in the circle $x^2 + y^2 - 4x - 6y - 23 = 0$ is -

A. $27\sqrt{2}$

B. $27\sqrt{3}$

C. $27\sqrt{5}$

D. $25\sqrt{3}$

Answer: B

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7. The coordinates of two extremities of a diameter are (x, 3) and (3, 5) and centre is at (2, y). The values of x, y are respectively -

A. 2, 3

B. 3, 2

C. 1, 4

D. 4, 1

Answer: C

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8. Which of the following points lies on the circumference of the circle $x^2 + y^2 = 16$?

A. (0, 2)

B. (0, 3)

C. (-4, 0)

D. (2, 3)

Answer: C

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9. Which of the following points lies on the circumference of the circle $(x-2)^2+(y+3)^2=25$?

A. (0, 0)

B. (-2, 0)

C. (1, -4)

D. (0, -2)

Answer: B

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10. A circle is concentric with the circle $x^2+y^2=8$ and its radius is 4 unit, state which of the following will be the equation of the circle ?

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

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

C. $x^2 + y^2 = 12$

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

Answer: D

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11. State which of the following is the radius of the circle $x^2 + y^2 + 4x - 8y - 5 = 0$?

A. 5 unit

B. 4 unit

C. 3 unit

D. 6 unit

Answer: A

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12. Center of the circle $x^2 + y^2 - 4x + 6y - 12 = 0$ is -

A. (2, 3)

B. (2, -3)

C. (-2, 3)

D. (-2, -3)

Answer: B

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13. The circle $(x - 4)^2 + (y - 3)^2 = 9$ -

A. touches the x-axis

B. touches the y-axis

C. touches both the coordinates axes

D. does not touch any of the two axes

Answer: A

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14. The point (0, 0) _____ the circle $x^2 + y^2 + 2x - 2y - 2 = 0$.

A. lies on

B. lies inside

C. lies outside

D. is centre of

Answer: B

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15. The point (2, -1) _____ the circle $x^2 + y^2 - 4x + 6y + 8 = 0$.

A. lies inside

B. lies on

C. lies outside

D. is centre of

Answer: A

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Exercise 3 Very Short Answer Type Questions

1. Examine whether the equation $x^2 + y^2 - x - 4y + 7 = 0$ represents a circle.

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2. Find the equation of the circle passing through (6, -5) and having centre at (3, -1).

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3. Find the centre and radius of each of the following circles :

$4x^2 + 4y^2 = 25$

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4. Find the centre and radius of each of the following circles :

$x^2 + y^2 - 3x + 2y - 19 = 0$

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5. Find the centre and radius of each of the following circles :

$3\left(x^2+y^2\right)=5x+6y-4$

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

$(x-a)^2+(y+b)(y-b)=0$

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7. Under the conditions $ax^2+2hxy+by^2+2gx+2fy+c=0$ will be the equation of a circle ? In that case what will be the coordinates of the centre ?

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8. Find the radius of the circle which passes through the origin and the points (a, 0) and (0, b).

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9. Find the equation of the circle for which the line segment joining the points (i) (2a, 0) and (0, -2a) (ii) (3, 7) and (9, 1) is a diameter.

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10. Find the position of the unit (-3, -2) with respect to the circle whose equation is $x^2 + y^2 - 3x + 2y - 19 = 0$.

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11. Find the equation of the diameter of the circle $x^2 + y^2 - 4x + 6y + 9 = 0$ which passes through the point (1, -2).

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12. The straight line $3x - 4y + 7 = 0$ is a tangent to the circle $x^2 + y^2 + 4x + 2y + 4 = 0$ at P, find the equation of its normal at the same point.

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13. The length of diameter of the circle $x^2 + y^2 + 4x - 7y - k = 0$ is 9, find k.

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14. The coordinates of the centre of the circle $2x^2 + 2y^2 + ax + by + c = 0$ are (3, - 4), find a and b.

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15. Find the equation of the circle which touches both the coordinates axes at a distance +3 unit from the origin.

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16. Find the parametric equation of the circle $x^2 + y^2 + 4x - 8y - 5 = 0.$

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17. The parametric equations of a circle are, $x = \frac{1}{2}(-3 + 4\cos\theta), y = \frac{1}{2}(1 + 4\sin\theta)$. Find the equation of the circle.

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18. The equation of the in-circle of an equilateral triangle is $x^2 + y^2 + 2x - 4y - 8 = 0$, find the area of the equilateral triangle.

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Exercise 3 Short Answer Type Questions

1. Find the equation of the circle whose centre is (2, -4) and which passes through the centre of the circle $x^2 + y^2 - 2x + 2y - 38 = 0$.

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

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3. Find the equation of the circle concentric with the circle $x^2 + y^2 + 4x - 6y - 13 = 0$ and passing through the centre of the circle $x^2 + y^2 - 8x - 10y - 8 = 0$.

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4. Find the equation of the straight line which passes through the centre of the circle $x^2 + y^2 + 2x + 2y - 23 = 0$ and is perpendicular to the straight line x-y+8 = 0.

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5. Find the equation of each of the circles passing through the points :

(0, 0), (1, 2), (2, 0)

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6. Find the equation of each of the circles passing through the points :

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

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7. Show that the points (2, 0), (5, -3), (2, -6) and (-1, -3) are concyclic, find the equation of the circle on which the points lie and the coordinates of the centre of the circle.

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8. Prove that the centres of the circles $x^2 + y^2 - 10x + 9 = 0, x^2 + y^2 - 6x + 2y + 1 = 0$ and $x^2 + y^2 - 18x - 4y + 21 = 0$ lie on a line, find the equation of the line on which they lie.

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9. Show that the centres of the following circles lie on a line and their radii are in A.P. :

$x^2 + y^2 = 1, x^2 + y^2 + 6x - 2y - 6 = 0, x^2 + y^2 - 12x + 4y - 9 = 0$

.

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10. Find the equation of the circle which passes through the origin and cuts off intercepts 3 unit and 4 unit from x and y-axes

respectively. Find the equation of that diameter of the circle which passes through the origin.

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11. Find the equation of the circle circumscribing the triangle formed by the straight line $2x + 3y = 6$ with the axes of coordinates. What is the diameter of the circle ?

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12. The extremities of a diameter of a circle are the points (4, -2) and (1, -3), find the equation of the circle. Also find the equation of that diameter of this circle which passes through the origin.

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13. Find the equation of the circle through the points (4, 3) and (-2, 5) and having its centre on the line $2x - 3y = 4$.

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14. A circle has its centre on the straight line 5x - 2y + 1 = 0 and cuts the x-axis at the two points whose abscissae are (-5) and 3, find the equation of the circle and its radius.

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15. The equations of a diameter of a circle is 2x - y + 4 = 0 and it passes through the points (4, 6) and (1, 9). Find the equation of the circle, the coordinates of its centre and length of its radius.

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16. A circle passes through the points (-6, 5), (-3, -4) and its radius is 5 unit, find the equation of the circle.

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17. $3x + y = 5$ and $x+y+1 = 0$ are two diameters to the circle which passes through the point (-2, 2). Find its equation. Also find the radius of the circle.

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18. A circle passes through the points (-3, 4), (1, 0) and its centre lies on the x-axis. Find the equation of the circle.

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19. Find the equation of the circle which has its centre on the line y = 2 and which passes through the points (2, 0) and (4,0).

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20. Find the equation to the circle which touches the y-axis at the origin and passes through the point (α, β).

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21. A circle touches the x-axis at (3, 0) and its radius is twice the radius of the circle $x^2 + y^2 - 2x - 2y - 2 = 0$, find the equation of the circle and the length of its chord intercepted on the y-axis.

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22. A circle touches y-axis at (0, 5) and whose centre lies on the line $2x + y = 13$, find the equation of the circle.

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23. Find the equation of a circle which passes through the point (4, 2) and touches both the coordinate axes. How many such circles are possible?

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24. Two cirles of radii 2 and 10 units respectively pass through (2, 4) and touch both the x and y axes. Find the equations of the two circles. Also find the other common point of intersection.

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25. Prove that the point (-1, -2) lies on the circle $x^2 + y^2 - xy - 8 = 0$. Find the coordinates of the other extremity of the diameter through (-1, -2).

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26. Show that for all values of p, the circle $x^2 + y^2 - x(3p + 4) - y(p - 2) + 10p = 0$ passes through the point (3, 1). If p varies, find the locus of the centre of the above circle.

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27. Find the coordinates of points equidistant from the axes and lying on the circle $x^2 + y^2 - 6x - 2y + 6 = 0$.

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28. Find the equation to the common chord of the two circles $x^2 + y^2 - 4x + 6y - 36 = 0$ and $x^2 + y^2 - 5x + 8y - 43 = 0$.

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29. Find the equation of the common chord of the two circles $x^2 + y^2 - 4x - 10y - 7 = 0$ and $2x^2 + 2y^2 - 5x + 3y + 2 = 0$. Show that this chord is perpendicular to the line joining the centres of the two circles.

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30. Find the equation of the circles which passes through the origin and the points of intersection of the circles $x^2 + y^2 - 4x - 8y + 16 = 0$ and $x^2 + y^2 + 6x - 4y - 3 = 0$.

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31. A point moves in such a manner that the sum of the squares of its distances from the origin and the point (2, -3) is always 19. Show that the locus of the moving point is a circle. Find the equation to the locus.

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32. A(3, 0) and B(-3, 0) are two given points and P is a moving point : if $\overline{AP} = 2\overline{BP}$ for all positions of P, show that the locus of P is a circle. Find the radius of the circle.

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33. Show that the locus of the point of intersection of the lines $x\cos\alpha + y\sin\alpha = a$ and $x\sin\alpha - y\cos\alpha = a$, when α varies, is a circle.

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34. Whatever be the values of θ, prove that the locus of the point of intersection of the straight lines $y = x\tan\theta$ and $x\sin^3\theta + y\cos\theta = a\sin^3\theta\cos\theta$ is a circle. Find the equation of the circle.

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35. Show that, $x = \frac{1}{2}(3 + 5\cos\theta), y = \frac{1}{2}(-4 + 5\sin\theta)$ represent a circle passing through the origin. Find the coordinates of centre and length of radius of the circle.

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36. Prove that the square of the distance between the two points (x_1, y_1) and (x_2, y_2) of the circle $x^2 + y^2 = a^2$ is

$2(a^2 - x_1x_2 - y_1y_2)$.

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37. The equations of two diameters of a circle are x-2y+1 = 0 and x+y -2 = 0 and the length of the chord intercepted on the straight line 3x + 4y + 8 = 0 by the circle is 6 units. Find the equation of the circle.

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38. Find the equation of the circle circumscribing the rectangle whose sides are given by x - 3y = 4, 3x + y = 22, x - 3y = 14 and 3x + y = 62.

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39. A and B are two fixed points on a plane and P moves on the plane in such a way that PA : PB = constant. Prove analytically that the locus of P is a circle.

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

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41. Find the circumcentre and circumradius of the triangle formed by the lines $3y - 4x - 1 = 0, y - x - 3 = 0$ and $x + y - 5 = 0.$

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Exercise 3 Long Answer Type Questions

1. Find the equations to the circles which touch the y-axis and pass through (-2, 1) and (-4, 3) .

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2. If the two straight lines $3x - 2y = 8$ and $2x - y = 5$ lie along two diameters of a circle, which touches the x-axis, find the equation of the circle.

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3. A circle touches the lines $x = 0$, $y = 0$ and $x + y = 1$. If the centre of the circle lies in first quadrant, show that there are two such circles and find their equations. Specify which of these is inscribed whithin the triangle formed by the given lines.

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4. Find the equations to the circles which touch the axis of y at a distance +4 from the origin and intercept a length 6 unit on the axis of x.

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5. A circle passes through the point (-2, 1) and touches the straight line $3x - 2y = 6$ at the point (4, 3) . Find its equation.

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6. Find the equation of the circle which touches the x-axis at a distance +5 unit from the origin and cuts off an intercept of length 24 unit from the y-axis.

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7. Show that the circles $x^2 + y^2 - 4x + 6y + 8 = 0$ and $x^2 + y^2 - 10x - 6y + 14 = 0$ touch each other externally, find the coordinates of their point of contact.

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8. Prove that the circles $x^2 + y^2 + 4x - 10y - 20 = 0$ and $x^2 + y^2 - 4x - 4y + 4 = 0$ touch each other internally. Find the equation of their common tangent.

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9. If the circles $x^2 + y^2 + 2ax + c^2 = 0$ and $x^2 + y^2 + 2by + c^2 = 0$ touch each other, prove that, $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$.

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10. Prove that the circles $x^2 + y^2 - 2x - 4y - 12 = 0$ and $3x^2 + 3y^2 - 2x + 4y - 140 = 0$ touch each other. Find the coordinates of the point of contact.

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11. Show that the circle $x^2 + y^2 + 6(x - y) + 9 = 0$ touches the coordinates axes. Also find the equation of the circle which passes through the common points of intersection of the above circle and the straight line x-y+4 = 0 and which also passes through the origin.

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12. A circle through the common points of the circles $x^2 + y^2 - 2x - 4y + 1 = 0$ and $x^2 + y^2 - 2x - 6y + 1 = 0$ has its

centre on the line 4x - 7y - 19 = 0 . Find the centre and radius of the circle .

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13. The circle $x^2 + y^2 + 2x - 4y - 11 = 0$ and the line $x - y + 1 = 0$ intersect at A and B. Find the equation to the circle on AB as diameter.

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14. Find the equation to the circle described on the common chord of the circles $x^2 + y^2 - 4x - 2y - 31 = 0$ and $2x^2 + 2y^2 - 6x + 8y - 35 = 0$ as diameter.

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15. Find the equation to the locus of mid-points of chords drawn through the point (0, 4) on the circle $x^2 + y^2 = 16$.

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16. A circle passes through the origin O and intersects the coordinate axes at A and B. If the length of diameter of the circle be 3k unit, then find the locus of the centroid of the triangle OAB.

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

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

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19. Find the area of the equilateral triangle inscribed in the circle $x^2 + y^2 - 4x + 6y - 3 = 0.$

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20. Prove analytically that the straight line joining the middle point of a chord of a circle with the centre is perpendicular to the chord.

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21. Find the equation of the circle passing through the point (13, 6) and touching externally the two circles $x^2 + y^2 = 25$ and

$x^2 + y^2 - 25x + 150 = 0.$

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22. Show that the length of the common chord of the circles $(x-a)^2 + (y-b)^2 = c^2$ and $(x-b)^2 + (y-a)^2 = c^2$ is $\sqrt{4c^2 - 2(a-b)^2}$ unit.

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23. The abscissae 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 and the radius of the circle with $\overline{AB}$ as diameter.

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24. Find the equation of the circle which touches the x-axis at a distance +5 unit from the origin and cuts off an intercept of length 24 unit from the y-axis.

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25. Prove that the circles $x^2 + y^2 + 4x - 10y - 20 = 0$ and $x^2 + y^2 - 4x - 4y + 4 = 0$ touch each other internally. Find the equation of their common tangent.

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Sample Questions For Competitive Exams Mcqs

1. If the circle C_2 of radius 5 intersects othe circle $C_1 : x^2 + y^2 = 16$ such that the common chord is in maximum length and its slope is

$\frac{3}{4}$, then the centre of C_2 will be-

A. $\left(\frac{9}{5}, \frac{-12}{5}\right)$

B. $\left(\frac{-9}{5}, \frac{12}{5}\right)$

C. $\left(\frac{9}{5}, \frac{12}{5}\right)$

D. $\left(\frac{-9}{5}, \frac{-12}{5}\right)$

Answer: A::B

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2. The circle $x^2 + y^2 - 4x - 4y + 4 = 0$ is inscribed in a triangle having two of its sides along the coordinate axes. If the locus of the circumcentre of triangle is $x + y - xy + k\sqrt{x^2 + y^2} = 0$, then k is equal to-

A. 1

B. -1

C. 2

D. -2

Answer: A::B

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3. Equation of the circles concentric with the circle $x^2 + y^2 - 2x - 4y = 0$ and touching the circle $x^2 + y^2 + 2x = 1$ must be-

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

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

C. $x^2 + y^2 - 2x - 4y - 13 = 0$

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

Answer: B::C

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4. If $(\lambda, 1+\lambda)$ be lying inside the circle $x^2+y^2=1$, then-

A. $\lambda = -\frac{1}{2}$

B. $\lambda < 0$

C. $-1\lambda < \lambda < 0$

D. for any real value of λ

Answer: A::C

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5. Points (2k, 3k), (1, 0), (0, 1) and (0, 0) will be concyclic if the value of k is equal to-

A. k=0

B. k=1

C. $k = \frac{5}{13}$

D. k=5

Answer: A::C

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Sample Questions For Competitive Exams B Integer Answer Type

1. The coordinate of one end of a diameter of a circle is (3, 3) and its other end is on the line x+y = 4. If the equation of locus of its centre is x+y = k, then value of k is -

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2. The greatest distance from (10, 7) to circle $x^2 + y^2 - 4x - 2y - 20 = 0$ is 5α unit, then the value of α is-

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3. If the circles $x^2 + y^2 + 2ax + c^2 = 0$ and $x^2 + y^2 + 2by + c^2 = 0$ touch each other, prove that, $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$.

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4. The sum of least distance and greatest distance from (4, -3) to circle $x^2 + y^2 + 4x - 10y - 7 = 0$ is 5k then the value of k is -

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5. The number of integral coordinates of the points (x, y) which are lying inside the circle $x^2 + y^2 = 25$ is n, then the integer value of $\frac{n}{9}$ will be -

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Sample Questions For Competitive Exams D Comprehension Type

1. ABCD is a rectangular A circle circumscribing the rectangle. The coordinates of A and C are (-3, 4) and (5, 4) respectively.

Coordinate of centre of the circle will be -

A. (1, 1)

B. (2, 2)

C. (1, 4)

D. (2, 1)

Answer: C

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2. ABCD is a rectangular A circle circumscribing the rectangle. The coordinates of A and C are (-3, 4) and (5, 4) respectively.

Equation of circle will be -

A. $x^2 + y^2 - 2x - 4y - 15 = 0$

B. $x^2 + y^2 + 2x - 4y - 16 = 0$

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

D. None of these

Answer: A

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3. ABCD is a rectangular A circle circumscribing the rectangle. The coordinates of A and C are (-3, 4) and (5, 4) respectively.

If (a, 0) is lying inside the circumscribe circle then the expected value of a will be -

A. -3

B. 3

C. -5

D. 5

Answer: B

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4. Distance between two points A and B is 4 unit. Both A and B are lying same side of a variable line L. Let p_1 and p_2 be the length of perpendicular from A and B on the L respectively such that

$p_1 + 3p_2 = k$ (k is constant). The line always touches a fixed circle C.

Centre of C is -

A. lying on ine AB

B. lying on perpendicular bisector of AB

C. any one of A or B

D. nothing particular can be said

Answer: A

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5. Distance between two points A and B is 4 unit. Both A and B are lying same side of a variable line L. Let p_1 and p_2 be the length of perpendicular from A and B on the L respectively such that $p_1 + 3p_2 = k$ (k is constant). The line always touches a fixed circle C.

If k = 4 then the raidus of C will be -

A. 1

B. 2

C. 4

D. 8

Answer: A

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6. Distance between two points A and B is 4 unit. Both A and B are lying same side of a variable line L. Let p_1 and p_2 be the length of perpendicular from A and B on the L respectively such that $p_1 + 3p_2 = k$ (k is constant). The line always touches a fixed circle C. If the coordinates of A and B be (-2, 0) and (2, 0) respectively, then coordinate of C-

A. is (0, 1)

B. is (1, 0)

C. is $\left(\frac{3}{2}, 0\right)$

D. is imposible to find out

Answer: B

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Sample Questions For Competitive Exams E Assertion Reason Type

1. Statement - I : There are no transverse common tangents of circles $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$

Statement-II : Circles are not concentric.

A. Statement- I is true, Statement - II is true and Statement- II is a correct explanation for Statement - I.

B. Statement- I is true, Statement - II is true but Statement- II is not a correct explanation for Statement - I.

C. Statement- I is true, Statement-II is false.

D. Statement- I is false, Statement-II is true.

Answer: B

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2. Statement - I : $(x+2)^2+(y-3)^2=-1$, this equation cannot represent the equation of a circle.

Statement - II : $(x+2)^2+(y-3)^2=-1$ cannot represent a real equation of a locus

A. Statement- I is true, Statement - II is true and Statement- II is a correct explanation for Statement - I.

B. Statement- I is true, Statement - II is true but Statement- II is not a correct explanation for Statement - I.

C. Statement- I is true, Statement-II is false.

D. Statement- I is false, Statement-II is true.

Answer: D

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