

India's Number 1 Education App

MATHS

BOOKS - S CHAND MATHS (ENGLISH)

CIRCLE

Multiple Choice Questions

1. The equation of the circle which touches x-

axis and whose centre is (1,2) is

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

B. (b) $x^2 + y^2 - 2x - 4y + 1 = 0$
C. (c) $x^2 + y^2 + 2x + 4y - 1 = 0$
D. (d) $x^2 + y^2 + 2x - 4y + 1 = 0$

Answer: B

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2. The equation of a circle which touches both

the coordinate axes and the line x = 3 is

A. $4x^2 + 4y^2 - 12x \pm 12y + 9 = 0$

- B. $4x^2 + 4y^2 + 12x \pm 12y + 9 = 0$
- C. $4x^2 + 4y^2 \pm 12x 12y + 9 = 0$
- D. $4x^2 + 4y^2 \pm 12x + 12y + 9 = 0$

Answer: A

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3. If a circle passes through the point (0,0), (a,0) and (0,b), then the coordinates of its centre are

A. (a,b)

$$\mathsf{B}.\left(-\frac{a}{2},\,-\frac{b}{2}\right)$$
$$\mathsf{C}.\left(\frac{a}{2},\,\frac{b}{2}\right)$$

Answer: C

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4. The farthest distance of the point (1,5) from

the circle $(x-1)^2 + (y+1)^2 = 16$ is

A. 4

B. 5

C. 6

D. 10

Answer: D

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5. If the lines 3 x - 4y + 4 = 0 and 6x - 8y - 7 = 0

are tangents to a circle, then the radius of the

circle is

A.
$$\frac{3}{4}$$
 units
B. $\frac{3}{2}$ units

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

Answer: A

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6. If one end of a diameter of the circle $x^2+y^2-4x-6y+11=0$ is (3, 4), then the

coordinates of the other end of the diameter

are

A. (a) (2,1)

B. (b) (-2,1)

C. (c) (1,2)

D. (d) (-1,-2)

Answer: C



7. The equation of a circle concentric with the circle $x^2 + y^2 - 6x + 12y + 15 = 0$ and double its area is

A. A.
$$x^2 + y^2 - 6x + 12y + 30 = 0$$

B. B. $x^2 + y^2 - 6x + 12y + 45 = 0$
C. C. $x^2 + y^2 - 6x + 12y - 30 = 0$
D. D. $x^2 + y^2 - 6x + 12y - 15 = 0$

Answer: D

8. The eqaution of the circle concentric with $x^2 + y^2 - 3x + 4y + c = 0$ and passing through the point (-1,-2) is

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

B. B. $x^2 + y^2 - 3x + 4y - 1 = 0$
C. C. $x^2 + y^2 - 3x + 4y - 5 = 0$
D. D. $x^2 + y^2 - 3x + 4y = 0$

Answer: D

9. If the point (2,-3) lies on the circle $x^2+y^2+2gx+2fy+c=0$ which is concentric with the circle $x^2+y^2+6x+8y-25=0$, then the value of c is A. (a) 1 B. (b) −1

- C. (c) 49
- D. (d) -49

Answer: B

10. Find the equation of the circle which passes through the origin and cuts off intercepts -2 and 3 from the coordinate axes .

A. `x^(2) + y^(2) + 2x + 3y = 0
B.
$$x^2 + y^2 + 2x - 3y = 0$$

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

Answer: B



11. The equation of the smallest circle passing through the point (1,0) and (0,1) is

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

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

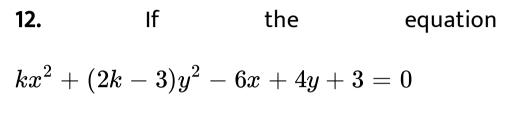
C. C.
$$x^2+y^2-x-y+2=0$$

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

Answer: B







represents a circle, then its centre is

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

B. $\left(2, -\frac{4}{3}\right)$
C. $\left(1, -\frac{2}{3}\right)$
D. $\left(1, \frac{2}{3}\right)$

Answer: C



13. The equation of two diameters of a cirlce are x - y = 5 and 2x + y = 4 and the radius of the circle is 5 units, then the equation of the circle is

A.
$$x^2 + y^2 - 6x + 4y - 12 = 0$$

B. $x^2 + y^2 + 6x - 4y - 12 = 0$
C. $x^2 + y^2 + 6x + 4y + 12 = 0$
D. $x^2 + y^2 - 6x + 4y + 12 = 0$

Answer: A



14. The equation of the circle whose center is (3,-2) and which touches the line 3x - 4y + 13 = 0 is A. A. $x^2 + y^2 + 6x - 4y - 23 = 0$ B. B. $x^2 + y^2 - 6x - 4y - 23 = 0$ C. C. $x^2 + y^2 - 6x + 4y - 23 = 0$ D. D. $x^2 + y^2 + 6x + 4y + 23 = 0$

Answer: C



15. The equation of the incircle of the triangle formed by the coordinate axes and the line 4x + 3y - 6 = 0 is

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

(B) $4(x^2 + y^2 - x - y) + 1 = 0$
(C) $4(x^2 + y^2 + x + y) + 1 = 0$
(D) $4(x^2 + y^2 - x - y) - 1 = 0$

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

B. $4(x^2 + y^2 - x - y) + 1 = 0$
C. $4(x^2 + y^2 + x + y) + 1 = 0$
D. $4(x^2 + y^2 - x - y) - 1 = 0$

Answer:



16. Equation of a circle which passes through

(3,6) and touches the axes is

A.
$$x^2 + y^2 + 6x + 6y + 3 = 0$$

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

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

D. none of these

Answer: C

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17. If the circle $x^2 + y^2 + 2gx + 8y + 16 = 0$

touches the x axis, then the values of g are

A. A. ± 16

$\mathsf{B.B.}\pm8$

${\rm C.\,C.}\pm4$

D. D. ± 2

Answer: C

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18. If the circle $2x^2 + 2y^2 = 5x$ touches the

line 3x + 4y = k ,then the values of k are

A.
$$-10, \frac{5}{2}$$

B. $10, -\frac{5}{2}$
C. $10, \frac{5}{2}$
D. $5, \frac{5}{4}$

Answer: B



19. Equation of the circle with centre lies on yaxis and passing through the origin and the point (2,3) is

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

$$\mathsf{B}.\, 3x^2 + 3y^2 - 13y^2 = 0$$

$$\mathsf{C.}\, 6x^2 + 6y^2 - 13x = 0$$

D.
$$x^2 + y^2 + 13x + 3 = 0$$

Answer: B

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20. If the centroid of an equilateral triangle is (1,1) and its one vertex is (2,-1), then equation of the circumcircle of the triangle is

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

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

Answer: A



21. The equation of a circle with origin as centre and passing through the vertices of an

equilateral triangle whose median is of length

3a is

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

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

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

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

Answer: A

22. The circle $x^2 + y^2 + 2gx + 2fy + c = 0$ does not intersect the y-axis if

A. A.
$$g^2 < c$$

B. B.
$$f^2 < c$$

C. C.
$$4f^2 < c$$

D. D.
$$f^2 < 4c$$

Answer: B

23. If the circles $x^2 + y^2 = k$ and $x^2 + y^2 + 8x - 6y + 9 = 0$ touch externally, then the value of k is

A. 1

 $\mathsf{B}.-1$

C. 9

D. 81

Answer: A



24. The equation of the diameter of the circle $x^2 + y^2 - 6x + 2y = 0$ which passes through origin is

A.
$$y + 3x = 0$$

B.
$$x - 3y = 0$$

$$C. x + 3y = 0$$

Answer: C



Example

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

A. (3, - 4)

- B. (- 3, 4)
- C. (1, 0)

D. (3, 4)

Answer: C

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2. If the lines 2x + 3y + 1 = 0 and 3x - y-4 = 0 lie along two diameters of a circle of circumference 10π , then the equation of circle is (i) $x^2 + y^2 + 2x + 2y + 23 = 0$ (ii) $x^2 + y^2 - 2x - 2y - 23 = 0$ (iii) $x^2 + y^2 - 2x + 2y - 23 = 0$ (iv) $x^2 + y^2 + 2x - 2y + 23 = 0$

A.
$$x^2 + y^2 + 2x + 2y + 23 = 0$$

B.
$$x^2 + y^2 - 2x - 2y - 23 = 0$$

C.
$$x^2 + y^2 - 2x + 2y - 23 = 0$$

D.
$$x^2 + y^2 + 2x - 2y + 23 = 0$$

Answer: C

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3. The equation of the circle which, passes through the point (-2, -3) and has its

centre on the negative direction of x-axis and

is of radius 5 units is `

A.
$$x^2 + y^2 + 12x + 11 = 0$$

 $\mathsf{B.}\,x^2 + y^2 - 12x + 11 = 0$

C.
$$x^2 + y^2 - 12x - 11 = 0$$

D.
$$x^2 + y^2 + 12x - 11 = 0$$

Answer: A

4. The equation of a circle which touches the yaxis at origin and whose radius is 3 units is

A.
$$x^2+y^2\pm 6y=0$$

B.
$$x^2+y^2\pm 6x=0$$

$$\mathsf{C.}\,x^2+y^2\pm 3x=0$$

D.
$$x^2+y^2\pm 3y=0$$

Answer: B

5. The shortest distance of the point (8,1) from the circle $(x + 2)^2 + (y - 1)^2$ = 25 is A. 15 B.10 C. 5 D. 6

Answer: C



6. The smallest circle with centre on y-axis and

passing through the point (7,3) has radius

A. $\sqrt{58}$

B. 7

C. 3

D. 4

Answer: B

7. If the equation
$$(4\lambda-3)x^2+\lambda y^2+6x-2y+2=0$$
 represents a circle, then its centre is

A. (a) (3,-1)

B. (b) (3,1)

C. (c) (-3,1)

Answer: C



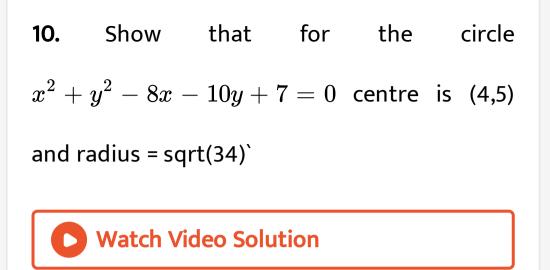
8. Equation of the circle whose centre is at (-5,

4) and the radius is 7 is



9. The equation of the circle described on the line joining the points (3, 4) and (2, -7) as diameter is (x - 3)(x - 2) + (y - 4)(y + 7) = 0 i.e

$$x^2 + y^2 - 5x + 3y - 22 = 0.$$



11. Find the lengths of the intercepts of the circle $x^2 + y^2 - 5x - 13y - 14 = 0$ on the axes of co-ordinates

12. Find the equation of the circle which passes through the points (1,1), (0, -1) and (-2, 0)



13. Find the points in which the line y = 2x + 1

cuts the circle $x^2 + y^2 = 2$.

14. Find the length of the chord intercepted by

the circle $x^2+y^2-8x-6y=0$ on the line

x - 7y - 8 = 0.



15. Find the equation of the circle centre C(1,2)

and tangent x+y-5 =0



16. Find the equation of the tangent to the circle $x^2 + y^2 - 2x + 8y - 23 = 0$ at the point P(3, -10) on it.



17. Write the equation of the circle having radius 5. and tangent as the line' 3x - 4y + 5 = 0 at (1.2).



18. Find the value of p so that the straight line $x \cos \alpha + y \sin \alpha - p$ may touch the circle $x^2 + y^2 - 2ax \cos \alpha - 2ay \sin \alpha = 0.$

19. Find the condition, that the line |x + my + n|= 0 may be a tangent to the circle $(x - h)^2 + (y - k)^2 = r^2$. Watch Video Solution 20. Prove that the straight line $y = x + a\sqrt{2}$ touches the circle $x^2 + y^2 - a^2 = 0$ Find the point of contact.

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21. Find the equations of the tangents to the circle $x^2 + y^2 = 16$ drawn from the point (1,4).

22. Find the locus of the point of intersection of perpendicular tangents to the circle $x^2 + y^2 = 4$



23. Find the equations of the two tangents to the circle $x^2 + y^2 - 8x - 10y - 8 = 0$ which

are perpendicular to the line 5x - 12y = 2.



1. Find the equation of the circle (i) whose centre is (4,5), radius is 7, (ii) whose centre is (0, -4) and which touches the x-axis, (iii) which passes through the origin and cuts off intercepts of length 'a ', each from positive direction of the axes.



2. Find the equation of the circle

(i) whose centre is (a,b) which passes through the origin

(ii) whose centre is the point (2,3) and which

passes through the intersection of the lines

3x-2y-1=0 and 4x+y-27 =0

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3. Find the equation of the circle which has A (1, 3) and B (4,5) as opposite ends of a

diameter. Find also the equation of the

perpendicular diameter.



4. Find the equation to the circles which pass through the origin and cut off intercepts equal to (i) 3 and 4, (ii) 2a and 2b from the x-axis and the y-axis respectively.

5. Find the equation of the circles which touch

the axis of x at a distance of 4 from the origin

and cut off an intercept of 6 from the axis of y.



6. A circle having its centre in the first quadrant touches the y-axis at the point (0,2) and passes through the point (1,0). Find the equation of the circle

7. Obtain the equation of the circle, radius 2 units, which lies in the positive quadrant and touches both axes of co-ordinates. Find also the equation of the circle, with centre (6, 5) which touches the above circle externally.



8. Obtain the equation of the circle, centre (1, 0), which passes through the point P(3, 1 $\frac{1}{2}$).

Find also the equation of the equal circle

which touches the given circle externally at P.



9. Calculate the co-ordinates of the foot of the perpendicular from the point(-4, 2) to the line 3x + 2y=5. Also find the equation of the smallest circle passing through (-4, 2) and having its centre on the line 3x + 2y=5.

10. The point diametrically opposite to the point P(1, 0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is A. (3,-4) B. (-3,4) C. (-3,-4) D. (3,4). Answer: C

1. Find'the centre and radius of the circle

$$(i)x^2+y^2+4x-1=0$$

$$(ii)2x^2+2y^2=3x-5y+7$$

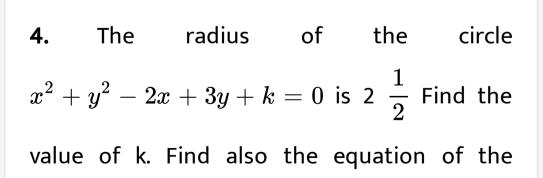
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2. Find the lengths of the intercepts of the circle $3x^2 + 3y^2 - 5x + 3y = 0$ on the co-

ordinate axes

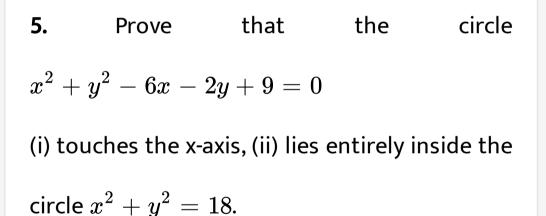


3. Find the equation of the circle, which passes through the point (5,4) and is concentric with the circle $x^2 + y^2 - 8x - 12y + 15 = 0$.



diameter of the circle, which passes through the point $\left(5, 2\frac{1}{2}\right)$

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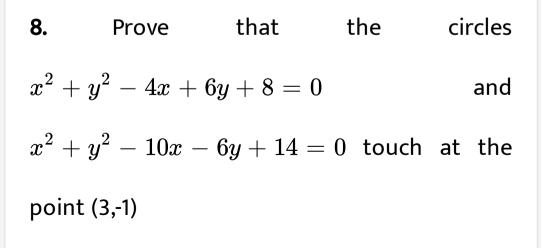
6. Find the co-ordinates of the centre of the circle $x^2 + y^2 - 4x + 6y = 3$ Given that the point A, outside the circle, has co-ordinates (a, b) where a and b are both positive, and that the tangents drawn from A to the circle are parallel to the two axes respectively, find the values of a and b



7. Find the equation of the Circle whose centre is at the point (4, 5) and which touches the x-axis. Also find the co-ordinates of the points at

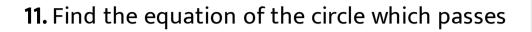
which the circle cuts the y-axis.







9. Show that the circles $x^2 + y^2 + 2x = 0$ and $x^2+y^2-6x-6y+2=0$ touch externally at the point $\left(\frac{1}{5}, \frac{3}{5}\right)$ Watch Video Solution Show that circles 10. the $x^2 + u^2 + 2x - 6y + 9 = 0$ and $x^2+y^2+8x-6y+9=0$ touch internally.



through the points (0,0), (0,1) and (2,3)

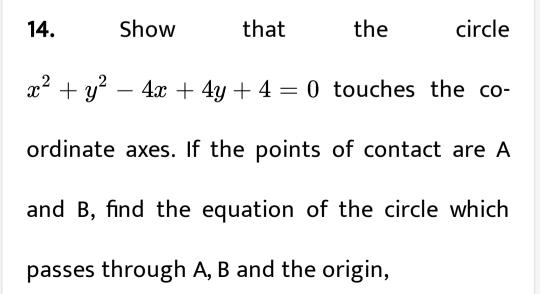


12. Find the centre and radius of the circle which passes through lie points (7,5), (6, - 2), (-1

, -1)

13. Find the equation of the circle circumscribing the triangle formed by the lines x + y + 1 = 0, 3x + y - 5 = 0, and 2x + y - 4 = 0.





15. Find the equation of the circle which passes through the points P(I, 0), Q(3, 0), and R(0, 2). Find also (i) the coordinates of the other point in which the axis of y cuts the circle, (n) the coordinates of the other end of the diameter through Q.



16. 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).



17. Find the equation of the circle which passes

through the points (1,-2), (4, - 3) and has its

centre on the line 3x + 4y + 10 = 0.



18. The vertices A, B, C of a triangle ABC have co-ordinates (4,4), (5,3) and (6,0) respectively. Find the equations of the perpendicular bisectors of AB and BC, the coordinates of the circumcentre and the radius of the circumcircle of the triangle ABC.

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19. The radius of a circle is 5 units and it touches the circle

 $x^2 + y^2 - 2x - 4y - 20 = 0$ externally at the

point (5,5). Find the equation of the circle.



20. Find the equation of the circle which passes through the points (5,0) and (1,4) and whose centre lies on the line x + y - 3 = 0.



Exercise 17 C

1. The circle $4x^2 + 4y^2 = 25$ cuts the line 3x + 4y - 10 = 0 at A and B. Calculate the

coordinates of Aand B.

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2. Find the length of the chord x+ 2y = 5 of the circle whose equation is $x^2 + y^2 = 9$. Determine also the equation of the circle described on the chord as diameter.

3. Find the intercept made by the circle $4x^2 + 4y^2 - 24x + 5y + 25 = 0$ on the st. line 4x - 2y = 7

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4. Find the equation of circle with Centre C (1,-

3) and tangent to $2 \times -y - 4 = 0$.

5. Find the length of the chord made by the axis of x, with the circle whose centre is (0,3) and which touches the straight line 3x + 4y =

37.



6. Find the equation of the circle which has centre C (3, 1) and which touches the line 5x-12y + 10 = 0.

7. Tangents from an external point. Find the equations of the tangents to the circle $x^2 + y^2 = 10$ through the external point (4, -2).

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8. Find the equations of the tangents to the circle $x^2 + y^2 = 25$ inclined at an angle of 60° to the x-axis.

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

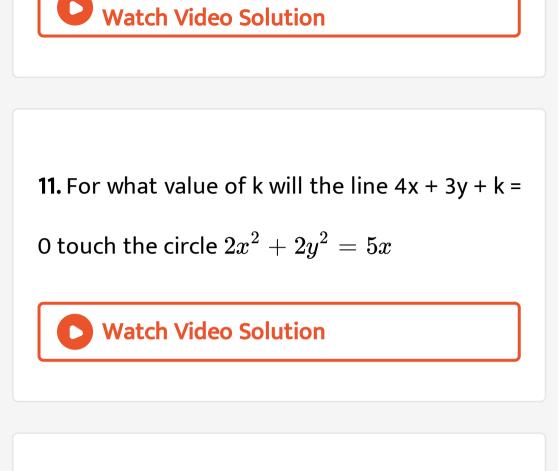
does not intersect the y-axis if

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10. Find the conditions that the line

(i) y = mx + c may touch the circle $x^2 + y^2 = a^2$, (ii) y = mx + c may touch the circle $x^2 + y^2 + 2gx + 2fy + c = 0$.





12. Show that 3x - 4y - 11 = 0 is a tangent to the circle $x^2 + y^2 - 8y + 15 = 0$ and find the equation of the other tangent which is parallel to the st. line 3x = 4y.

13. Show that x = 7 and y = 8 touch the circle

 $x^2+y^2-4x-6y-12=0$ and find the

points of contact.

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14. Show that the line 3x+4y +20=0 touches the circle $x^2 + y^2 = 16$ and find the point of contact

15. Length of the tangent. Prove that the length t o f the tangent from the point P $(x_1, y(1))$ the circle to $x^2 \div y^2 \div 2qx \div 2fy \div c = 0$ is given by $t=\sqrt{x_1^2+y_1^2+2gx_1+2fy_1+c}$ Hence, find the length of the tangent (i) to the circle $x^2 + y^2 - 2x - 3y - 1 = 0$ from the origin, (2,5) the circle (ii) to $x^2 + y^2 - 6x + 18y + 4 = -0$ from the origin

(iii) to the circle $3x^2+3y^2-7x-6y=12$ from the point (6, -7) (iv) to the circle $x^2+y^2-4y-5=0$ from

the point (4, 5).

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16. If $x = 4 + 5\cos \theta$ and $y = 3 + 5\sin \theta$, show

that the locus of the point (x, y) as θ varies, is a

circle. Find the centre and radius of the circle.

17. A (1,0) and B (7,0) are two points on the axis o f x. A point P is taken in the first quadrant such that PAB is an isosceles triangle and PB = 5 units. Find the equation of the circle described on PA as diameter.

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18. Find the equation of the circle which touches the line y = 2, passes through the origin and the point where the curve $y^2 - 2x + 8 = 0$ meets the x-axis.

19. (i) Prove that the line y = 2x touches the circle $x^2 + y^2 + 16x + 12y4 - 80 = 0$ and find the co-ordinates of the point of contact. (ii) The circle $x^2 + y^2 - 6x - 10y + y = 0$ does not intersect or touch either axis and the point (1,4) is inside the circle. Calculate the range of possible values of p .



1. Find the equations of the tangent to the circle $2x^2 + 2y^2 = 5$ which are perpendicular to y = 2x

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2. Find the equations of the tangents to the circle $x^2 + y^2 - 8y - 8 = 0$ which are parallel to the line 5 x -2 y = 2.

3. Find the equation of the circle which has extremities of a diameter the origin and the point (2, - 4). Find also the equations of the tangents to the circle which are parallel to this diameter

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4. Show that, whatever be the value of a, the lines x cos a + y sin ct = a and x sin ct - y cos a =

a are tangents to the circle $x^2+y^2=-a^2$. Hence obtain the locus of the points from which perpendicular tangents can be drawn to the circle $x^2+y^2=a^2$

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5. Find the locus of the feet of the perpendiculars drawn from the point (b, 0) on

tangents to the circle $x^2 + y^2 = a^2$

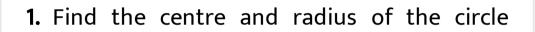
6. (i) Find the equation of that chord of the circle $x^2 + y^2 = 15$, which is bisected at the point (3,2).

(ii) Find the locus of mid-points of all chords of the circle $x^2+y^2=15$ that pass through the point (3,4),

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7. Find the locus of the middle points of the chords of the circle $x^2 + y^2 = 4(y+1)$ drawn through the origin.

Chapter Test

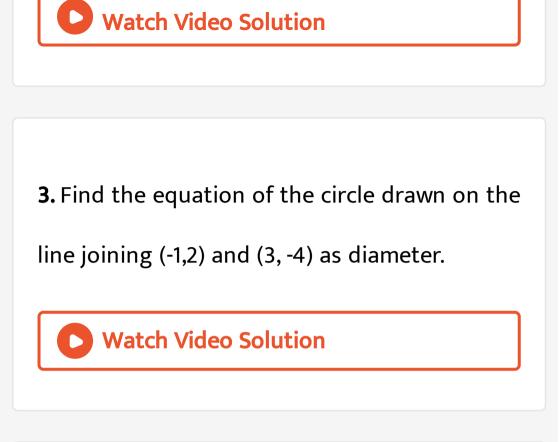


$$2x^2 + 2y^2 - x = 0$$

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2. Find the equation of the circle with centre (-

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



4. Find the equation of the circle passing through the points (4,1) and (6,5) and whose centre lies on the line 4x + y = 16.

5. Find the equation of a circle of radius 5 units whose centre lies on x-axis and passes through the point (2, 3).



6. Find the equation of the circle concentric with the circle $x^2 + y^2 - 8x + 6y - 5 = 0$ and passing through the point (-2, -7).

7. Find the equation of the circle through the points (0,0), (2,0) and (0,4). Also find the coordinates of its centre and its radius.



8. Find the parametric representation of the

circle $x^2 + y^2 - 2x - 4y - 4 = 0$

9. Find the length of the chord intercepted by

the circle $x^2 + y^2 = 25$ on the line 2x -y + 5= 0

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10. Find the equations of the tangents to the circle $x^2 \div y^2 - 9$, which are parallel to the line $3x \div 4y = 0$

11. Find the equation of the circle which touches the y-axis at a distance of +4 from the origin and cuts off an intercept 6 from the x-axis.