Circles - Class XI

Related Questions with Solutions

Questions

Quetion: 01

If (– 4, 3) and (12, –1) are the ends of diameter of a circle which makes an intercept of 2λ on the *y*-axis, then λ is

A. $\sqrt{13}$
B. $4\sqrt{13}$
C. $3\sqrt{13}$
D. $2\sqrt{13}$

Quetion: 02

The parametric equations of the circle $x^2 + y^2 + x + \sqrt{3}y = 0$ are

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

B. $x = -\frac{1}{2} + \cos\theta, y = -\frac{\sqrt{3}}{2} + \sin\theta$

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

D. $x = \frac{1}{2} + \frac{1}{2}\cos\theta, y = \frac{\sqrt{3}}{2} + \frac{1}{2}\sin\theta$

Quetion: 03

If a circle C, whose radius is 3, touches externally the circle, $x^2 + y^2 + 2x - 4y - 4 = 0$ at the point (2, 2), then the length of the intercept cut by this circle *C*, on the *x*-axis is equal to :

A. $2\sqrt{3}$

B. $3\sqrt{2}$

C. $\sqrt{5}$
D. $2\sqrt{5}$

Quetion: 04

If the curve $x^2 + y^2 - 2x - 2y + 1 = 0$ intersects or touches the co-ordinate axes at A and B, then equation of straight line joining A and B is

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

B. $x + y = 1$
C. $x - y = 1$
D. $x - y = \sqrt{2}$

Quetion: 05

The equation of two circles which touch the *y*-axis at (0, 3) and make an intercept of 8 units on *x*-axis are

A. $x^2 + y^2 \pm 10x - 6y + 9 = 0$
B. $x^2 + y^2 \pm 6x - 10y + 9 = 0$
C. $x^2 + y^2 - 8x \pm 10y + 9 = 0$
D. $x^2 + y^2 + 10x \pm 6y + 9 = 0$

Quetion: 06

The length of the chord of the circle $x^2 + y^2 + 3x + 2y - 8 = 0$ intercepted by the *y*-

axis is

Solutions

Solution: 01

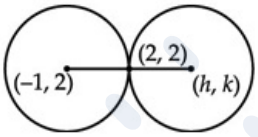
The circle is [x + 4] [x – 12] + [y – 3] [y + 1] = 0
Also, $x = 0 \Rightarrow y^2 - 2y - 51 = 0$
y intercept $= 2\sqrt{(1)^2 - (-51)}$
$\left(\because y \ -intercept \ = 2\sqrt{f^2 - c}\right)$
$= 2\sqrt{52} = 4\sqrt{13}$
$\Rightarrow \quad 2\lambda = 4\sqrt{13} \Rightarrow \lambda = 2\sqrt{13}$

Solution: 02

For a circle of the form,
$(x-\alpha)^2 + (y-\beta)^2 = r^2$, the parametric equation of the circle is,
$x = \alpha + r\cos\theta, y = \beta + r\sin\theta$
$x^2 + y^2 + x + \sqrt{3}y = 0$ has centre at $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ and radius $= \sqrt{\frac{1}{4} + \frac{3}{4} - 0} = 1$
So, the parametric equations are,
$x = -\frac{1}{2} + \cos\theta, y = -\frac{\sqrt{3}}{2} + \sin\theta$

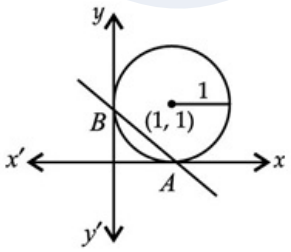
Solution: 03

Centre of circle $x^2 + y^2 + 2x - 4y - 4 = 0$ is $(-1, 2)$ and radius $= \sqrt{1+4+4} = 3$
Let [h, k] be the centre of another circle.



Now, $\frac{h-1}{2} = 2$ and $\frac{k+2}{2} = 2$
$\Rightarrow h = 4 + 1 = 5$ and $k = 4 - 2 = 2$
So, centre of required circle is [5, 2] and radius = 3.
$\therefore$ Equation of circle becomes $(x-5)^2 + (y-2)^2 = (3)^2$
$\Rightarrow x^2 + y^2 - 10x - 4y + 20 = 0$ .....[i]
Length of intercept made by [i] on x-axis
$= 2\sqrt{g^2 - c} = 2\sqrt{25 - 20}$
$(\because g = -5, c = 20)$
$= 2\sqrt{5}$

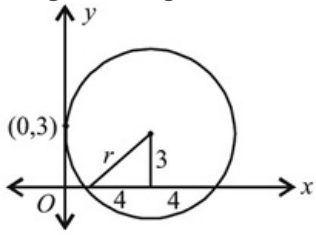
Solution: 04



Given curve is $x^2 + y^2 - 2x - 2y + 1 = 0$
$\Rightarrow \quad (x-1)^2 + (y-1)^2 = 1^2$
Above equation is the equation of circle, centre at [1, 1] and radius 1.
$\therefore$ Coordinates of A and B are $(1, 0)$ and $(0, 1)$ respectively.
$\therefore$ Equation of AB is $y - 0 = \frac{1-0}{0-1}(x-1)$
$\Rightarrow -y = x - 1 \Rightarrow x + y = 1$

Solution: 05

From figure, we get $r = 5$



So, centre of circle is [5, 3]

Similarly, if circle lies in left of y-axis its centre is [–5, 3]

$\therefore$ Equation of circle of centre $(5, 3)$ and radius 5 is $(x-5)^2 + (y-3)^2 = 5^2$

$\Rightarrow x^2 + y^2 - 10x - 6y + 9 = 0$

and equation of circle of centre $(-5, 3)$ and radius 5 is $(x+5)^2 + (y-3)^2 = 5^2$

$\Rightarrow x^2 + y^2 + 10x - 6y + 9 = 0$

Hence, equation of circle are $x^2 + y^2 \pm 10x - 6y + 9 = 0$

Solution: 06

We have, $x^2 + y^2 + 3x + 2y - 8 = 0$

Here, $g = \frac{3}{2}, f = 1, c = -8$

Length of intercept made by y-axis

$= 2\sqrt{f^2 - c} = 2\sqrt{(1) + 8} = 6$

Correct Options

Answer:01
Correct Options: D
Answer:02
Correct Options: B
Answer:03
Correct Options: D
Answer:04
Correct Options: B
Answer:05
Correct Options: A
Answer:06
Correct Answer: 6