Circles - Class XI

Related Questions with Solutions

Questions

Quetion: 01

The equation(s) of the tangent at the point $(0,0)$ to the circle, making intercepts of length $2\mathrm{a}$ and $2\ \mathrm{b}$ units on the coordinate axes, is(are) -
A. $ax+by=0$
B. $ax-by=0$
C. $x=y$
D. None of these

Quetion: 02

The line $2x-y+1=0$ is tangent to the circle at the point $(2,5)$ and the centre of the circles lies on $x-2y=4$. The radius of the circle is
A. $3\sqrt{5}$
B. $5\sqrt{3}$
C. $2\sqrt{5}$
D. $5\sqrt{2}$

Quetion: 03

The lines $y-y_1=m\left(x-x_1\right)\pm a\sqrt{1+m^2}$ are tangents to the same circle. The radius of the circle is:
A. $\mathrm{a}/2$
B. a
C. 2a
D. none

Quetion: 04

Equation of the tangent to the circle, at the point (1, – 1), whose centre is the point of intersection of the straight lines $x - y = 1$ and $2x + y = 3$ is
A. $x + 4y + 3 = 0$
B. $3x - y - 4 = 0$
C. $x - 3y - 4 = 0$
D. $4x + y - 3 = 0$

Quetion: 05

The normal drawn at $P(-1, 2)$ on the circle $x^2 + y^2 - 2x - 2y - 3 = 0$ meets the circle at another point Q. Then the coordinates of Q are
A. (3, 0)
B. (–3, 0)
C. (2, 0)
D. (–2, 0)

Quetion: 06

Suppose the straight line $x + y = 5$ touches the circle $x^2 + y^2 - 2x - 4y + 3 = 0$. Then, the coordinates of the point of contact are
A. (3, 2)
B. (2, 3)
C. (4, 1)
D. (1, 4)

Solutions

Solution: 01

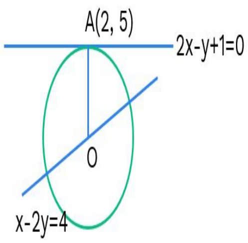
Equation of circle passing through origin and cutting off intercepts $2\mathrm{a}$ and $2\ \mathrm{b}$ units on the coordinate axes is $x^2+y^2\pm 2ax\pm 2by=0$
Hence, $(A),(B)$ are correct answers.

Solution: 02

$2x-y+1=0$ is tangent

slope of line $\mathrm{OA}=-\frac{1}{2}$

equation of $OA,(y-5)=-\frac{1}{2}(x-2)$



$2y-10=-x+2$
$x+2y=12$
$\therefore$ intersection with $\mathrm{x}-2\mathrm{y}=4$ will give coordinates of centre
solving we get $(8,2)$
distance $OA=\sqrt{(8-2)^2+(2-5)^2}=\sqrt{36+9}=\sqrt{45}=3\sqrt{5}$

Solution: 03

Two parallel lines $y=mx+(y_1-mx_1)+a\sqrt{1+m^2}]$

$y=mx+(y_1-mx_1)-a\sqrt{1+m^2}$
Distance between lines

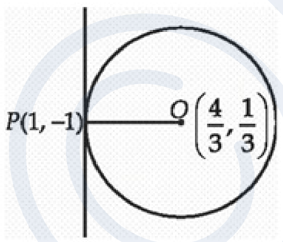
Diameter $=\left|\frac{2a\left(1+m^2\right)}{\sqrt{1+m^2}}\right|$

$D=2a$
Radius $=\mathrm{a}$

Solution: 04

Point of intersection of lines

$x-y=1$ and $2x+y=3$ is $O\left(\frac{4}{3},\frac{1}{3}\right)$



Slope of $OP=\frac{\frac{1}{3}+1}{\frac{4}{3}-1}=\frac{\frac{4}{3}}{\frac{1}{3}}=4$

$\therefore$ Slope of tangent $=-\frac{1}{4}$

So, equation of tangent at $P[1,-1]$ is

$y+1=-\frac{1}{4}(x-1)\Rightarrow 4y+4=-x+1\Rightarrow x+4y+3=0$

Solution: 05

Given : $P[-1, 2]$ on circle $x^2+y^2-2x-2y-3=0$

$\Rightarrow\quad(x-1)^2+(y-1)^2=(\sqrt{5})^2$

$\therefore$ Centre $\equiv(1,1)$ and C is mid point of PQ.

Let $Q\equiv(x_1,y_1)$. Then, $\frac{x_1-1}{2}=1$ and $\frac{y_1+2}{2}=1$

$\Rightarrow x_1=3$ and $y_1=0$

Solution: 06

For given situation, equation of normal at point of contact is of the form, $x - y = k$
Also $x - y = k$ passes through centre of circle [1, 2]
So, $x - y = -1$ ...[i]
Equation of tangent is $x + y = 5$ ...[ii]
Adding [i] and [ii], $2x = 4 \Rightarrow x = 2$
Putting $x = 2$ in [ii], $y = 3$. Thus [2, 3] is the point of contact.

Correct Options

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