Circles - Class XI

Related Questions with Solutions

Questions

Quetion: 01

The points (x_1, y_1) , (x_2, y_2) , (x_1, y_2) & (x_2, y_1) are always:
A. collinear
B. concyclic
C. vertices of a square
D. vertices of a rhombus

Quetion: 02

The circle passing through the distinct points $(1, t), (t, 1) \& (t, t)$ for all values of ' t ', passes through the point:
A. $(-1, -1)$
B. $(-1, 1)$
C. $(1, -1)$
D. $(1, 1)$

Quetion: 03

A circle passes through the points $(-1, 1), (0, 6)$ and $(5, 5)$. The point(s) on this circle, the tangent(s) at which is/are parallel to the straight line joining the origin to its centre is/are:
A. $(1, -5)$
B. $(5, 1)$
C. $(-5, -1)$
D. $(-1, 5)$

Quetion: 04

If $\left(a, \frac{1}{a}\right)$, $\left(b, \frac{1}{b}\right)$, $\left(c, \frac{1}{c}\right)$ & $\left(d, \frac{1}{d}\right)$ are four distinct points on a circle of radius 4 units then, abcd is equal to

Quetion: 05

The area of the circle $x^2 - 2x + y^2 - 10y + k = 0$ is 25π. The value of k is equal to

Quetion: 06

The radius of the circle passing through the points (2, 3), (2, 7) and (5, 3) is k, find $2k$.

Solutions

Solution: 01

All the points lie on the circle $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) = 0]$

Solution: 02

Equation of circle is $x^2 + y^2 + 2gx + 2fy + c = 0$
$(1, t) \Rightarrow \quad 1 + t^2 + 2g + 2ft + c = 0$
$(t, t) \Rightarrow t^2 + t^2 + 2gt + 2ft + c = 0$
$(t, 1) \Rightarrow \quad 1 + t^2 + 2gt + 2f + c = 0$
subtract $1 + 2g - t^2 - 2gt = 0$
$\Rightarrow \quad 1 - t^2 + 2g(1 - t) = 0 \Rightarrow (1 - t)(1 + t + 2g) = 0$
$\Rightarrow \quad t = 1$
$\therefore$ one point (t, t)
$\therefore$ passes through $(1, 1)]$

Solution: 03

Note that D is right angled at [0, 6]. Centre of the circle is [2, 3] . Slope of the line joining origin to the centre is 3/2. Take parametric equation of a line through [2, 3] with

$\tan\theta = -\frac{2}{3}$ as $\frac{x-2}{\cos\theta} = \frac{y-3}{\sin\theta} = \pm r$ where $r = \sqrt{13}$

Now, Get the co-ordinates on the circle

Solution: 04

Let us assume that circle: $x^2 + y^2 = 16$

points are of form $\left(t, \frac{1}{t}\right) \Rightarrow t^2 + \frac{1}{t^2} = 16$ should satisfy

$\Rightarrow \quad t^4 - 16t^2 + 1 = 0$

$\therefore$ product of roots $= 1]$

Solution: 05

Let *r* be the radius of given circle.

Given, area of circle $x^2 - 2x + y^2 - 10y + k = 0$ is 25π

i.e., $\pi r^2 = 25\pi \Rightarrow r^2 = 25$ .....[i]

Also, radius from the given equation is

$r = \sqrt{(1)^2 + (5)^2 - k} \Rightarrow r^2 = 26 - k$

$\Rightarrow \quad 25 = 26 - k[$ Using $(\mathrm{i})] \Rightarrow k = 1$

Solution: 06

Let the equation of circle be

$x^2 + y^2 + 2gx + 2fy + c = 0$

Since circle passes through [2, 3], [2, 7] and [5, 3]

$\therefore 2^2 + 3^2 + 2(2)g + 2(3)f + c = 0$

$\Rightarrow 4g + 6f + c = -13$ .....[i]

Similarly, $4g + 14f + c = -53$ ...[ii]

and $10g + 6f + c = -34$ ...[iii]

On solving [i], [ii] and [iii], we get $g = \frac{-7}{2}, f = -5, c = 31$

$\therefore$ Radius $= \sqrt{g^2 + f^2 - c}$

$= \sqrt{\left(\frac{-7}{2}\right)^2 + (-5)^2 - 31} = \frac{5}{2}$ units $= k$

$\Rightarrow 2k = 5$

Correct Options

Answer:01
Correct Options: B
Answer:02
Correct Options: D
Answer:03
Correct Options: B, D
Answer:04
Correct Answer: 1
Answer:05
Correct Answer: 1
Answer:06
Correct Answer: 5