Circles - Class XI

Past Year JEE Questions

Questions

Quetion: 01

Let PQ be a diameter of the circle $x^2 + y^2 = 9$. If α and β are the lengths of the perpendiculars from P and Q on the straight line,

$x + y = 2$ respectively, then the maximum value of $\alpha\beta$ is _____.

Solutions

Solution: 01

Answer

Correct Answer is **7**

Explanation

Let $P(3\cos\theta, \ 3\sin\theta)$

$Q(-3\cos\theta, \ -3\sin\theta)$

$\alpha = \left| \dfrac{3\cos\theta + 3\sin\theta - 2}{\sqrt{2}} \right|$

$\beta = \left| \dfrac{-3\cos\theta - 3\sin\theta - 2}{\sqrt{2}} \right|$

$\alpha\beta = \left| \dfrac{(3\cos\theta + 3\sin\theta)}{2} \right|$

$= \left| \dfrac{5 + 9\sin 2\theta}{2} \right|$

$\alpha\beta_{max} = \dfrac{5+9}{2} = 7$ (when sin2θ = 1)