

Que. If $x = 3 \cos \theta$, $y = 3 \sin \theta$, then find the value of $x^2 + y^2$.

Soln: Given that-

$$x = 3 \cos \theta \quad \text{--- (1)}$$

$$y = 3 \sin \theta \quad \text{--- (2)}$$

squaring and adding, we get

$$\Rightarrow x^2 + y^2 = (3 \cos \theta)^2 + (3 \sin \theta)^2$$

$$\Rightarrow x^2 + y^2 = 9 \cos^2 \theta + 9 \sin^2 \theta$$

$$\Rightarrow x^2 + y^2 = 9 (\cos^2 \theta + \sin^2 \theta)$$

$$\Rightarrow x^2 + y^2 = 9 \times 1 \quad [\because \sin^2 \theta + \cos^2 \theta = 1]$$

$$\therefore x^2 + y^2 = 9$$

This is the desired value. Ans: