

Exemplar Problem

Conic Section

12. Given the ellipse with equation $9x^2 + 25y^2 = 225$, find the eccentricity and foci

Ans:

Given

Equation of ellipse $9x^2 + 25y^2 = 225$

$$9x^2 + 25y^2 = 225 \text{ (given)}$$

$$\Rightarrow \frac{x^2}{25} + \frac{y^2}{9} = 1$$

$$\Rightarrow a = 5, b = 3$$

We know that $b^2 = a^2 (1 - e^2)$

$$\Rightarrow 9 = 25 (1 - e^2)$$

$$\Rightarrow \frac{9}{25} = 1 - e^2$$

$$\Rightarrow e^2 = 1 - 9/25$$

therefore $e = \sqrt{1 - 9/25}$

$$= \sqrt{\frac{25 - 9}{25}}$$

$$= \sqrt{\frac{16}{25}}$$

$$= \frac{4}{5}$$