

MATHEMATICS LECTURES FOR IIT-JEE BY MANISH KALIA

Ellipse

JEE-MAINS (PREVIOUS YEAR)

MCQ-Single Correct

1. The eccentricity of an ellipse whose centre is at the origin is $\frac{1}{2}$. If one of its directrices is $x = -4$, then the equation of the normal to it at $\left(1, \frac{3}{2}\right)$ is :
- (1) $2y - x = 2$ (2) $4x - 2y = 1$
(3) $4x + 2y = 7$ (4) $x + 2y = 4$ [2017]
2. The area (in sq. units) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$, is :
- (1) 18 (2) $\frac{27}{2}$
(3) 27 (4) $\frac{27}{4}$ [2015]
3. The locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it is
- (1) $(x^2 - y^2)^2 = 6x^2 + 2y^2$ (2) $(x^2 - y^2)^2 = 6x^2 - 2y^2$
(3) $(x^2 + y^2)^2 = 6x^2 + 2y^2$ (4) $(x^2 + y^2)^2 = 6x^2 - 2y^2$ [2014]
4. The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, and having centre at (0,3) is
- (1) $x^2 + y^2 - 6y + 7 = 0$ (2) $x^2 + y^2 - 6y - 5 = 0$
(3) $x^2 + y^2 - 6y + 5 = 0$ (4) $x^2 + y^2 - 6y - 7 = 0$ [2013]

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5. An ellipse is drawn by taking a diameter of the circle $(x-1)^2 + y^2 = 1$, as its semi-minor axis and a diameter of the circle $x^2 + (y-2)^2 = 4$ as its semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is

(1) $4x^2 + y^2 = 8$ (2) $x^2 + 4y^2 = 16$
(3) $4x^2 + y^2 = 4$ (4) $x^2 + 4y^2 = 8$ [2012]

6. The ellipse $x^2 + 4y^2 = 4$ is inscribed in a rectangle aligned with the coordinate axes, which in turn is inscribed in another ellipse that passes through the point $(4,0)$. Then the equation of the ellipse is

(1) $x^2 + 16y^2 = 16$ (2) $x^2 + 12y^2 = 16$
(3) $4x^2 + 48y^2 = -48$ (4) $4x^2 + 64y^2 = 48$ [2009]

7. A focus of an ellipse is at the origin. The directrix is the line $x = 4$ and the eccentricity is $\frac{1}{2}$. Then the length of the semi-major axis is

(1) $\frac{8}{3}$ (2) $\frac{2}{3}$
(3) $\cot\left(\cos^{-1}\frac{5}{3} + \tan^{-1}\frac{2}{3}\right)$ (4) $\frac{6}{17}$ [2008]

8. In an ellipse, the distance between its foci is 6 and minor axis is 8. Then its eccentricity is

(1) $\frac{3}{5}$ (2) $\frac{1}{2}$
(3) $\frac{4}{5}$ (4) $\frac{1}{\sqrt{5}}$ [2006]

9. An ellipse has OB as semi minor axis, F and F' its foci and the angle FBF' is a right angle. Then the eccentricity of the ellipse is

(1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{2}$
(3) $\frac{1}{4}$ (4) $\frac{1}{\sqrt{5}}$ [2005]

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10. The eccentricity of an ellipse, with its centre at the origin, is $\frac{1}{2}$. If one of the directrices is $x = 4$, then the equation of the ellipse is

(1) $3x^2 + 4y^2 = 1$

(2) $3x^2 + 4y^2 = 12$

(3) $4x^2 + 3y^2 = 12$

(4) $4x^2 + 3y^2 = 1$

[2004]

11. The foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide. Then the value of b^2 is

(1) 1

(2) 5

(3) 7

(4) 9

[2003]

ALPHA CLASSES