

ELLIPSE

PREVIOUS EAMCET BITS

1. If the distance between the foci of an ellipse is 6 and the length of the minor axis is 8, then the eccentricity is **[EAMCET 2009]**

1) $\sqrt{\frac{1}{5}}$ 2) $\frac{1}{2}$ 3) $\frac{3}{5}$ 4) $\frac{4}{5}$

Ans: 3

Sol: $2ae = 6 \Rightarrow ae = 3$

$\therefore b^2 = a^2(1 - e^2)$ $2b = 8 \Rightarrow b = 4$

$\Rightarrow 16 = a^2 - 9 \Rightarrow a = 5$

$\therefore e = \frac{3}{5}$

2. For an ellipse with eccentricity $\frac{1}{2}$ the centre is at the origin. If one directrix is $x = 4$, then the equation of the ellipse is **[EAMCET2008]**

1) $3x^2 + 4y^2 = 1$ 2) $3x^2 + 4y^2 = 12$ 3) $4x^2 + 3y^2 = 1$ 4) $4x^2 + 3y^2 = 12$

Ans: 2

Sol. $\frac{a}{e} = 4 \Rightarrow \frac{a}{1/2} = 4 \Rightarrow 2a = 4$

$\Rightarrow a = 2$ $b^2 = a^2(1 - e^2) = 4\left(1 - \frac{1}{4}\right) = 3$

Equation of the ellipse is $\frac{x^2}{4} + \frac{y^2}{3} = 1 \Rightarrow 3x^2 + 4y^2 = 12$

3. The value of k if $(1, 2)$, $(k, -1)$ are conjugate points with respect to the ellipse $2x^2 + 3y^2 = 6$ is **[EAMCET 2007]**

1) 2 2) 4 3) 6 4) 8

Ans: 3

Sol. $S_{12} = 0 \Rightarrow k = 6$

4. Equation of the latus recta of the ellipse $9x^2 + 4y^2 - 18x - 8y - 23 = 0$ are **[EAMCET 2006]**

1) $y = \pm\sqrt{5}$ 2) $x = \pm\sqrt{5}$ 3) $y = 1 \pm\sqrt{5}$ 4) $x = -1 \pm\sqrt{5}$

Ans: 3

Sol. Equation can be written as $\frac{(x-1)^2}{4} + \frac{(y-1)^2}{9} = 1$

Equation of latus recta of $\frac{(x-\alpha)^2}{b^2} + \frac{(y-\beta)^2}{a^2} = 1$ are

$y = b \pm ae$ $y = 1 \pm\sqrt{5}$

5. The sides of the rectangle of greatest area that can be inscribed in the ellipse $x^2 + 4y^2 = 64$ are **[EAMCET 2006]**

1) $(6\sqrt{2}, 4\sqrt{2})$ 2) $(8\sqrt{2}, 4\sqrt{2})$ 3) $(8\sqrt{2}, 8\sqrt{2})$ 4) $(16\sqrt{2}, 4\sqrt{2})$

Ans: 2

Sol. The sides of a rectangle of greatest area that can be inscribed in an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ are given

equation $\frac{x^2}{64} + \frac{y^2}{16} = 1$

$1 = a\sqrt{2}$ breadth = $b\sqrt{2}$
 $= 8\sqrt{2}$ $4\sqrt{2}$

6. The eccentricity of the conic $36x^2 + 144y^2 - 36x - 96y - 119 = 0$ is **[EAMCET 2004]**

- 1) $\frac{\sqrt{3}}{2}$ 2) $\frac{1}{2}$ 3) $\frac{\sqrt{3}}{4}$ 4) $\frac{1}{\sqrt{3}}$

Ans: 1

Sol. $e = \sqrt{\frac{144 - 36}{144}} = \frac{\sqrt{3}}{2}$

7. The eccentricity of the ellipse $9x^2 + 5y^2 - 18x - 20y - 16 = 0$ is **[EAMCET 2003]**

- 1) $\frac{1}{2}$ 2) $\frac{2}{3}$ 3) $\frac{3}{2}$ 4) 2

Ans: 2

Sol. $9x^2 + 5y^2 - 18x - 20y - 16 = 0$

$\Rightarrow \frac{(x-1)^2}{5} + \frac{(y-2)^2}{9} = 1$

$e = \sqrt{\frac{b^2 - a^2}{b^2}} = \frac{2}{3}$

8. The pole of the straight line $x + 4y = 4$ with respect to the ellipse $x^2 + 4y^2 = 4$ is **[EAMCET 2002]**

- 1) (1, 4) 2) (4, 1) 3) (4, 4) 4) (1, 1)

Ans: 4

Sol. Pole = $\left(\frac{-a^2\ell}{n}, \frac{-b^2m}{n} \right)$

$\ell x + my + n = x + 4y - 4 = 0$

$\frac{x^2}{4} + \frac{y^2}{1} = 1$

Pole = (1, 1)

9. The eccentricity of the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$ is **[EAMCET 2001]**

- 1) $\frac{7}{16}$ 2) $\frac{5}{4}$ 3) $\frac{\sqrt{7}}{4}$ 4) $\frac{\sqrt{7}}{2}$

Ans: 3

Sol. $e = \sqrt{\frac{b^2 - a^2}{b^2}} = \frac{\sqrt{7}}{4}$

10. The eccentricity of the ellipse $5x^2 + 9y^2 = 1$ is **[EAMCET 2000]**

- 1) $2/3$ 2) $3/4$ 3) $4/5$ 4) $1/2$

Ans: 1

Sol. $e = \sqrt{\frac{9-5}{9}} = \frac{2}{3}$

11. The product of the perpendicular from the foci on any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

[EAMCET 2000]

1) a

2) a^2b^2

3) b^2

4) $\sqrt{a^2 + b^2}$

Ans: 3

Sol. The product of \perp ers from foci to any tangent = b^2

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