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

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

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

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

2. For an ellipse with eccentricity ½ 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. $\frac{a}{e} = 4 \Rightarrow \frac{a}{1/2} = 4 \Rightarrow 2a = 4$

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

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

Ans: 2

Sol. The sides of a rectangle of greatest area that can be inscribed in a 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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