MATHS

BOOKS - OBJECTIVE RD SHARMA MATHS VOL I (HINGLISH)

ELLIPSE

Illustration

1. The equation of the ellipse whose focus is (1,0) and the directrix is x+y+1=0 and eccentricity is equal to $1/\sqrt{2}$ is

A. $(x-1)^2+y^2=(x+y+1)^2$

B. $2\left|(x-1)^2+Y^2\right|=(x+y+1)^2$

C. $4\left\{(x-1)^2+y^2\right\}=(x+y+1)^2$

D. none of these

Answer: A

Watch Video Solution

2. The equation $\frac{x^2}{10-a}+\frac{y^2}{4-a}=1$ represents an ellipse , if

A. $a<4$

B. $a>4$

C. $4<a$

D. $a>10$

Answer: A

Watch Video Solution

3. The curve with parametric equations

$x=1+4\cos\theta, y=2+3\sin\theta.$ is

A. an ellipse

B. a parabola

C. a hyperbola

D. a circle

Answer: B

Watch Video Solution

4. The curve represented by $x = 2(\cos t + \sin t)$ and $y = 5(\cos t - \sin t)$ is

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: C

Watch Video Solution

5. A point moves so that the sum of the squares of its distances from two intersecting straight lines is constant. Prove that its locus is an ellipse.

A. a pair of straight lines

B. a parabola

C. an ellipse

D. a hyperbola

Answer:

Watch Video Solution

6. Length of the major axis of the ellipse $9x^2 + 7y^2 = 63,$ is

A. 3

B. 9

C. 6

D. $2\sqrt{17}$

Answer: C

Watch Video Solution

7. The length of the axes of the conic $9x^2 + 4y^2 - 6x + 4y + 1 = 0$, are

A. $\frac{1}{2}, 9$

B. $3, \frac{2}{5}$

C. $1, \frac{2}{3}$

D. $3, 2$

Answer: C

Watch Video Solution

8. The eccentricity of the ellipse $x^2 + 4y^2 + 8y - 2x + 1 = 0$, is

A. $\frac{\sqrt{3}}{2}$

B. $\frac{\sqrt{5}}{2}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer: A

Watch Video Solution

9. If the eccentricities of the two ellipse $\frac{x^2}{169}+\frac{y^2}{25}=1$ and $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and equal , then the value $\frac{a}{b}$, is

A. $\frac{5}{11}$

B. $\frac{6}{13}$

C. $\frac{13}{5}$

D. $\frac{13}{6}$

Answer: C

Watch Video Solution

10. The curve represented by the equation $4x^2 + 16y^2 - 24x - 24x - 32y - 12 = 0$is

A. a parabola

B. a pair of stright lines

C. an ellipse with eccentricity $\frac{1}{2}$

D. an ellipse with eccentricity $\frac{\sqrt{3}}{2}$

Answer: D

Watch Video Solution

11. Find the equation if the ellipse whose axes are along the coordinate axes, vertices are $(\pm 5, 0)$ and foci at $(\pm 4, -0)$.

A. $9x^2 + 25y^2 = 1$

B. $9x^2 + 25y^2 = 225$

C. $25x^2 + 9y^2 = 225$

D. $25x^2 + 9y^2 = 1$

Answer: B

Watch Video Solution

12. The equation of the ellipse whose axes along the coordinate axes, vertices are $(0, \pm 10)$ and eccentricity $e = \frac{4}{5}$, is

A. $36x^2 + 100y^2 = 3600$

B. $36x^2 + 100y^2 = 1$

C. $100x^2 + 36y^2 = 3600$

D. $100x^2 + 36y^2 = 1$

Answer: C

Watch Video Solution

13. If the latusrectum of an ellipse is equal to one half of its minor axis , then eccentricity is equal to

A. $\frac{1}{\sqrt{2}}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. none of these

Answer: B

Watch Video Solution

14. The eccentricity of the ellipse if the distance between the foci is equal to the length of the latusrectum ,is

A. $\frac{\sqrt{5}-1}{2}$

B. $\frac{\sqrt{5}+1}{4}$

C. $\frac{\sqrt{5}-1}{4}$

D. none of these

Answer: A

Watch Video Solution

15. The equation of the circle drawn with the two foci of $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ as the end -point of a diameter , is

A. $x^2 + y^2 = a^2 + b^2$

B. $x^2 + y^2 = a^2$

C. $x^2 + y^2 = 2a^2$

D. $x^2 + y^2 = a^2 - b^2$

Answer: D

Watch Video Solution

16. The foci of the conic $25x^2 + 16y^2 - 150x = 175$ are :

A. $(0, \pm 3)$

B. $(0, \pm 2)$

C. $(3, \pm 3)$

D. $(0, \pm 1)$

Answer: C

Watch Video Solution

17. The foci of the ellipse $\frac{(x-3)^2}{36} + \frac{(y+2)^2}{16} = 1,$ are

A. $\left(3 \pm 2\sqrt{5}, 2\right)$

B. $\left(3 \pm 2\sqrt{5}, -2\right)$

C. $(3 - 2)$

D. none of these

Answer: B

Watch Video Solution

18. The vertices of the ellipse

$9x^2 + 4y^2 - 18x - 27 = 0$ are

A. $(1, \pm 2)$

B. $(1, \pm 3)$

C. $(1, \pm 4)$

D. none of these

Answer: B

Watch Video Solution

19. The equation of the ellipse , with axes parallel to the coordinates axes , whose eccentricity is $\frac{1}{3}$ and foci at (2,-2) and (2,4) is

A. $\frac{(x-1)^2}{8}+\frac{(Y-2)^2}{9}=9$

B. $\frac{(x-2)^2}{8}+\frac{(Y-1)^2}{9}=9$

C. $\frac{(x-1)^2}{9}+\frac{(Y-2)^2}{8}=9$

D. $\frac{(x-2)^2}{9}+\frac{(Y-2)^2}{8}=9$

Answer: B

Watch Video Solution

20. The eccentricity of an ellipse with centre at the orgin and axes along the coordinate axes , is 1/2 if one of the directrices is x=4, the equation of the ellipse is

A. $4x^2+3y^2=1$

B. $3x^2+4y^2=12$

C. $4x^2+2y^2=12$

D. $3x^2+4y^2=1$

Answer: B

Watch Video Solution

21. Find the equation of an ellipse hose axes lie along the coordinate axes, which passes through the point (-3,1) and has eccentricity equal to $\sqrt{2/5}$.

A. $3x^2 + 5y^2 - 32 = 0$

B. $5x^2 + 3y^2 - 48 - 0$

C. $3x^2 + 5y^2 - 15 = 0$

D. $5x^2 + 3y^2 - 32 = 0$

Answer: D

Watch Video Solution

22. The ellipse $E_1 : \frac{x^2}{9} + \frac{y^2}{4} = 1$ is inscribed in a rectangle R whose sides are parallel to the coordinate axes. Another ellipse E_2 passing

through the point (0, 4) circumscribes the rectangle R. The eccentricity of the ellipse E_2 is

A. $\frac{\sqrt{2}}{2}$

B. $\frac{\sqrt{3}}{2}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

Answer: C

Watch Video Solution

23. 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

A. $x^2 + Y^2 - 6y = 7 = 0$

B. $x^2 + Y^2 - 6y + 7 = 0$

C. $x^2 + Y^2 - 6y - 5 = 0$

D. $x^2 + Y^2 - 6y - 5 = 0$

Answer: A

Watch Video Solution

24. For the ellipse $4(x - 2y + 1)^2 + 9(2x + y + 2)^2 = 180$, lengths of major and minor axes are respectively

A. $6\sqrt{5}$ and $4\sqrt{5}$

B. $4\sqrt{5}$ and $6\sqrt{5}$

C. 6 and 4

D. 4 and 6

Answer: C

Watch Video Solution

25. For the ellipse $4(x-2y+1)^2+9(2x+y+2)^2=180$, lengths of major and minor axes are respectively

A. $x-2y+1=0, 6$

B. $x-2y+1=0, 6\sqrt{5}$

C. $2x-y+2=0, 6$

D. $2x-y+2=0, 6\sqrt{5}$

Answer: C

Watch Video Solution

26. Find the equation of the ellipse whose axes are of length 6 and $2\sqrt{6}$ and their equations are $x-3y+3=0$ and $3x+y-1=0$, respectively.

A. $2(x-3y+3)^2+3(3x+y-1)^2=180$

B. $3(x-3y+3)^2+2(3x+y-1)^2=180$

C. $2(x-3y+3)^2+3(3x+y-1)^2=18$

D. $3(x-3y+3)^2+2(3x+y-1)^2=18$

Answer: B

Watch Video Solution

27. The line passing through the extremity A of the major exis and extremity B of the minor axis of the ellipse $x^2+9y^2=9$ meets is auxiliary circle at the point M. Then the area of the triangle with vertices at A, M, and O (the origin) is

A. $31/10$

B. $29/10$

C. $21/10$

D. $27/10$

Answer: D

Watch Video Solution

28. Find the eccentric angles of the extremities of the latus rectum of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

A. $\tan^{-1}\left(\pm\frac{ae}{b}\right)$

B. $\tan^{-1}\left(\pm\frac{ae}{a}\right)$

C. $\tan^{-1}\left(\pm\frac{b}{ae}\right)$

D. $\tan^{-1}\left(\pm\frac{a}{ae}\right)$

Answer: C

Watch Video Solution

29. If the line lx + my +n=0 cuts the ellipse $\frac{x^2}{a^2}+\frac{Y^2}{b^2}=1$ in point eccentric angles differ by $\pi/2$, then

A. $a^2l^2+b^2m^2=2n^2$

B. $a^2l^2 + b^2m^2 = n^2$

C. $a^2m^2 + b^2l^2 = 2n^2$

D. $a^2m^2 + b^2l^2 = n^2$

Answer: A

Watch Video Solution

30. The points P,Q,R are taken on ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with eccentric angles $\theta, \theta + a, \theta + 2a$, then area of ,$\Delta PQR$ is independent of

A. $a : b$

B. $b : a$

C. $a^2 : b^2$

D. $b^2 : a^2$

Answer: B

Watch Video Solution

31. P is a variable point on the ellipse with foci S_1 and S_2. If A is the area of the the triangle PS_1S_2, the maximum value of A is

A. ab

B. abe

C. $\frac{1}{2}ab$

D. $\frac{1}{2}abe$

Answer: B

Watch Video Solution

32. If the chord, joining two points whose eccentric angles are α and β, cuts the major axis ofthe ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at a distance c fromn the centre, then $\tan\alpha/2.\tan\beta/2$ is equal to

A. $\frac{c+a}{c-a}$

B. $\frac{c-a}{c+a}$

C. $\frac{a-c}{a+c}$

D. $\frac{a+c}{a-c}$

Answer: B

Watch Video Solution

33. If α and β are eccentric angles of the ends of a focal chord of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, then $\frac{\tan\alpha}{2}.\frac{\tan\beta}{2}$ is (A) $\frac{1-e}{1+e}$ (B) $\frac{e+1}{e-1}$ (C) $\frac{e-1}{e+1}$ (D) none of these

A. $\frac{1-e}{1+e}$

B. $\frac{e-1}{e+1}$

C. $\frac{e+1}{e-1}$

D. none of these

Answer: B

Watch Video Solution

34. If any two chords be drawn through two points on the major axis of an ellipse equidistant from the centre, show that $\tan\left(\frac{\alpha}{2}\right) \cdot \tan\left(\frac{\beta}{2}\right) \cdot \tan\left(\frac{\gamma}{2}\right) \cdot \tan\left(\frac{\delta}{2}\right) = 1$, where $\alpha, \beta, \gamma, \delta$ are the eccentric angles of the .extremities of the chords.

A. -1

B. 1

C. $\frac{a}{b}$

D. $\frac{b}{a}$

Answer: B

Watch Video Solution

35. If PSQ is a focal chord of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \ (a > b)$ then harmonic mean of SP and SQ is

A. b^2/a

B. $\frac{a^2}{b}$

C. $2b^2/a$

D. $2a^2/b$

Answer: A

Watch Video Solution

36. If PSQ is a focal chord of the ellipse $16x^2 + 25y^2 = 400$ such that $SP = 8$, then find the length of SQ.

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

37. If $SandS'$ are two foci of ellipse $16x^2 + 25y^2 = 400 and PSQ$ is a focal chord such that $SP = 16,$ then find $S'Q$.

A. $44/9$

B. $54/9$

C. $64/9$

D. $74/9$

Answer: D

Watch Video Solution

38. If the line lx+my +n=0 touches the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ then

A. $a^2l^2 + b^2m^2 = n^2$

B. $a^2m^2 + b^2l^2 = n^2$

C. $a^2n^2 + b^2m^2 = l^2$

D. none of these

Answer: C

Watch Video Solution

39. The line x cos $\alpha + y\sin\alpha + y\sin\alpha = p$ is tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. if

A. $a^2\cos^2\alpha - b^2\sin^2\alpha = p^2$

B. $a^2\sin^2\alpha + b^2\cos^2\alpha = p^2$

C. $a^2\cos^2\alpha + b^2\sin^2\alpha = p^2$

D. $a^2\cos^2\alpha + b^2\sin^2\alpha = p$

Answer: A

Watch Video Solution

40. The values of λ for which the line y=x+λ touches the ellipse $9x^2 + 16y^2 = 144$, are

A. ± 5

B. ± 4

C. ± 12

D. ± 3

Answer: A

Watch Video Solution

41. The equations of the tangents to the ellpise $4x^2 + 3y^2 = 5,$ which are incrlined at 60° to the axis of x are

A. $y = \sqrt{3}x \pm \sqrt{\frac{65}{12}}$

B. $y = \sqrt{3}x \pm \sqrt{\frac{12}{65}}$

C. $y = \frac{x}{\sqrt{3}} \pm \sqrt{\frac{12}{65}}$

D. none of these

Answer: A

Watch Video Solution

42. Let P be a point in the first quadrant lying on the ellipse $9x^2 + 16y^2 = 144$, such that the tangent at P to the ellipse is inclined at an angle of 135° to the positive direction of x-axis. The n the coordinates of P are

A. $\left(\frac{16}{5}, \frac{9}{5}\right)$

B. $\left(\frac{\sqrt{143}}{3}, \frac{1}{4}\right)$

C. $\left(\frac{8}{9}, \frac{\sqrt{77}}{3}\right)$

D. $\left(\frac{4}{\sqrt{2}}, \frac{3}{\sqrt{2}}\right)$

Answer: A

Watch Video Solution

43. The equation of the tangents to the ellipse $4x^2 + 3y^2 = 5$, which are parallel to the line y=3x+7 are

A. $y = 3x \pm \sqrt{\frac{155}{3}}$

B. $y = 3x \pm \sqrt{\frac{155}{12}}$

C. $y = 3x \pm \sqrt{\frac{95}{12}}$

D. none of these

Answer: B

Watch Video Solution

44. The product of the perpendiculars drawn from the two foci of an ellipse to the tangent at any point of the ellipse is

A. a^2

B. b^2

C. $4a^2$

D. $4b^2$

Answer: B

Watch Video Solution

45. The locus of the middle point of the a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ included between the axes is the curve

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=4$

B. $\frac{a^2}{x^2}+\frac{b^2}{y^2}=4$

C. $\frac{x^2}{a^2}-\frac{v^2}{a^2}=4$

D. none of these

Answer: B

Watch Video Solution

46. If tangents are drawn to the ellipse $x^2 + 2y^2 = 2,$ then the locus of the midpoint of the intercept made by the tangents between the coordinate axes is $\frac{1}{2x^2} + \frac{1}{4y^2} = 1$ (b) $\frac{1}{4x^2} + \frac{1}{2y^2} = 1$ $\frac{x^2}{2} + y^2 = 1$ (d) $\frac{x^2}{4} + \frac{y^2}{2} = 1$

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

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

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

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

Answer: A

Watch Video Solution

47. Tangents are drawn to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ at the end of latus rectum. Find the area of quadrilateral so formed

A. $\frac{2}{2}$

B. 27

C. $\frac{27}{4}$

D. 18

Answer: B

Watch Video Solution

48. A tangent is drawn to the ellipse $\frac{x^2}{27} + y^2 = 1$ at $\left(3\sqrt{3}\cos\theta\left(0, \frac{\pi}{2}\right)\right.$. Then find the value of θ such that the sum of intercepts on the axes made by this tangent is minimum.

A. $\pi/3$

B. $\pi/6$

C. $\pi/8$

D. $\pi/4$

Answer: B

Watch Video Solution

49. If P and P denote the length of the perpendicular from a focus and the centre of an ellipse with semi - major axis of length a, respectively , on a tangent to the ellipse and r denotes the focal distance of the point , then

A. $ap = rp'$

B. $rp = ap'$

C. $ap = rp' + 1$

D. $ap' + rp = 1$

Answer: A

Watch Video Solution

50. Tangent at a point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is drawn which cuts the coordinates axes at A and B the maximum area of the triangle OAB is (O being origin)

A. ab

B. $\frac{a^3 + b^3 + ab}{3}$

C. $a^2 + b^2$

D. $\frac{a^2 + b^2}{4}$

Answer: A

Watch Video Solution

51. How many real tangents can be drawn to the ellipse $5x^2 + 9y^2 = 32$ from the point (2,3)?

A. 2

B. 1

C. 0

D. 3

Answer: A

Watch Video Solution

52. The number of real tangents that can be drawn to the ellipse $3x^2 + 5y^2 = 32$ passing through (3,5) is

A. 0

B. 1

C. 2

D. infinite

Answer: C

Watch Video Solution

53. If the chords of contact of tangents fromtwo points (x_1, y_1) and (x_2, y_2) to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ are at right angles, then $\frac{x_1 x_2}{y_1 y_2}$ is equal to (a) $\frac{a^2}{-b^2}$ (b) $\frac{b^2}{-a^2}$ (c) $\frac{b^4}{-a^4}$

A. $\frac{a^2}{b^2}$

B. $-\frac{b^2}{a^2}$

C. $-\frac{a^4}{b^4}$

D. $-\frac{b^4}{a^4}$

Answer: C

Watch Video Solution

54. An ellipse slides between two perpendicular lines the locus of its centre , is

A. a circle

B. an ellipse

C. a parabola

D. a pair of straight lines

Answer: A

Watch Video Solution

55. If two tangents drawn to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ intersect perpendicularly at P. then the locus of P is a circle $x^2+y^2=a^2+b^2$ the circle is called

A. circle

B. director circle

C. ellipse

D. none of these

Answer: B

Watch Video Solution

56. Find the equation of the normal to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at the positive end of the latus rectum.

A. $x + ey + e^3 a = 0$

B. $x - ey - e^3 a = 0$

C. $x - ey - e^2 a = 0$

D. none of these

Answer: B

Watch Video Solution

57. Find the points on the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ on which the normals are parallel to the line $2x - y = 1$.

A. $\left(\frac{9}{\sqrt{10}}, \frac{2}{\sqrt{10}} \right)$

B. $\left(-\frac{9}{\sqrt{10}}, \frac{2}{\sqrt{10}} \right)$

C. $\left(-\frac{2}{\sqrt{10}}, \frac{9}{\sqrt{10}} \right)$

D. none of these

Answer: C

Watch Video Solution

58. The line $lx + my = n$ is a normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if

A. $\frac{n^2}{in^2} + \frac{b^2}{l^2} = \frac{\left(a^2 - b^2\right)^2}{n^2}$

B. $\frac{a^2}{l^2} + \frac{b^2}{m^2} = \frac{\left(a^2 - b^2\right)^2}{n^2}$

C. $\frac{n^2}{l^2} + \frac{b^2}{m^2} = \frac{\left(a^2 - b^2\right)^2}{n^2}$

D. none of these

Answer: B

Watch Video Solution

59. The normal at an end of a latus rectum of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ passes through an end of the minor axis if

A. $e^4 - e^2 + 1 = 0$

B. $e^2 - e + 1 = 0$

C. $e^2 + e + 1 = 0$

D. $e^4 + e^2 - 1 = 0$

Answer: D

Watch Video Solution

60. If the normal at any point P on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ meets the axes at $Gandg,$ respectively, then find the raio $PG : Pg$.

A. $a : b$

B. $a^2 : b^2$

C. $b^2 : a^2$

D. $b : a$

Answer: C

Watch Video Solution

61. If the normal at the point $P(\theta)$ to the ellipse $\frac{x^2}{14}+\frac{y^2}{5}=1$ intersects it again at the point Q $(2,\theta)$ then $\cos\theta$ is equal to

A. $\frac{2}{3}$

B. $-\frac{2}{3}$

C. $\frac{3}{2}$

D. $-\frac{3}{2}$

Answer: B

Watch Video Solution

62. 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:

A. $2y-x=2$

B. $4x - 2y = 1$

C. $4x + 2y = 7$

D. $x + 2y = 4$

Answer: B

Watch Video Solution

63. The equation of the chord of $\frac{x^2}{36} + \frac{y^2}{9} = 1$ which is bisected at (2,1) is

A. $x - 2y = 0$

B. $2x + y - 5 = 0$

C. $x + 2y - 4 = 0$

D. $3x + 2y - 8 = 0$

Answer: C

Watch Video Solution

64. The coordinates of the middle point of the chord intercepted on the line $2x - y + 3 = 0$ by the ellipse $\frac{x^2}{10} + \frac{y^2}{6} = 1$ are

A. $\left(\frac{-30}{23}, \frac{9}{23}\right)$

B. $(-1, 1)$

C. $(-2, -1)$

D. none of these

Answer: A

Watch Video Solution

65. The locus of mid-points of a focal chord of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

A. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{ex}{a}$

B. $\frac{x^2}{a^2} - \frac{y^2}{b^2} = \frac{ex}{a}$

C. $x^2 + y^2 = a^2 + b^2$

D. none of these

Answer: A

Watch Video Solution

66. Chords of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ are drawn through the positive end of the minor axis. Then prove that their midpoints lie on the ellipse.

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: C

Watch Video Solution

67. The locus of the mid-point of the chords $2x + 3y + \lambda = 0$ of the ellispe $x^2 + 4y^2 = 1$ is (λ being parameter)

A. $8x - 3y = 0$

B. $8x + 3y = 0$

C. $3x - 8y = 0$

D. $3x + 8y = 0$

Answer: C

Watch Video Solution

68. The locus of poles of tangents to the ellipse $\frac{x^2}{a^2} + \left(y^2\right)\frac{)}{b^2} = 1$ with respect to concentric ellipse $\frac{x^2}{\alpha^2} + \frac{y^2}{\beta^2} = 1$ is

A. $\frac{a^2x^2}{\alpha^2} + \frac{b^2y^2}{\beta^2} = 1$

B. $\frac{a^2x^2}{\alpha^2} + \frac{\beta^2y^2}{\beta^2} = 1$

C. $\frac{\alpha^2x^2}{\alpha^2} + \frac{\beta^2y^2}{\beta^2} = 1$

D. $\frac{a^2x^2}{\alpha^4} + \frac{b^2y^2}{\beta^4} = 1$

Answer: D

Watch Video Solution

69. The locus of pole of tangents to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with respect to the parabola $y^2 = 4ax,$ is

A. $b^2y^2 = a^2(x^2 - a^2)$

B. $b^2y^2 = 4a^2(x^2 + a^2)$

C. $b^2y^2 = 4a^2(x^2 - a^2)$

D. $b^2y^2 = 4b^2(x^2 - a^2)$

Answer: C

Watch Video Solution

70. If CP and CD are semi-conjugate diameters of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, then $CP^2+CD^2=$

A. $a+b$

B. a^2+b^2

C. a^2-b^2

D. $\sqrt{a^2+b^2}$

Answer: B

Watch Video Solution

71. The locus of the point of intersection of tangents at the end-points of conjugate diameters of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is

A. a circle

B. a parabala

C. an ellipse

D. a hyperbola

Answer: C

Watch Video Solution

72. CP and CD are conjugate semi-diameters of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, The locus of the mid-point of PD, is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=2$

B. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{2}$

C. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=4$

D. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{4}$

Answer: B

Watch Video Solution

Section I Solved Mcqs

1. If $\alpha and \beta$ are the eccentric angles of the extremities of a focal chord of an ellipse, then prove that the eccentricity of the ellipse is $\frac{\sin\alpha + \sin\beta}{\sin(\alpha\beta +)}$

A. $\frac{\cos\alpha + \cos\beta}{\cos(\alpha - \beta)}$

B. $\frac{\sin\alpha - \sin\beta}{\sin(\alpha - \beta)}$

C. $\frac{\cos\alpha - \cos\beta}{\cos(\alpha - \beta)}$

D. $\frac{\sin\alpha + \sin\beta}{\sin(\alpha + \beta)}$

Answer: D

Watch Video Solution

2. If $\tan\theta_1 . \tan\theta_2 = \frac{a^2}{b^2}$ then the chord Joining two points θ_1 and θ_2 on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ will subtend a right angle at (A) focus (B) centre (C) end of the major axis (D) end of the major axis

A. focus

B. centre

C. end of the major axis

D. end of the minor axis

Answer: D

Watch Video Solution

3. The locus of point of intersection of tangents to an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at two points the sum of whose eccentric angles is constant is

A. parabola

B. circle

C. ellipse

D. straight line

Answer: D

Watch Video Solution

4. The number of values of c such that the straight line $y = 4x + c$ touches the curve $\frac{x^2}{4} + \frac{y^2}{1} = 1$ is

A. 0

B. 1

C. 2

D. infinite

Answer: C

Watch Video Solution

5. If $P(x, y)$ is any point on the ellipse $16x^2 + 25y^2 = 400$ and $f_1 = (3, 0) F_2 = (-3, 0)$, then find the value of $PF_1 + PF_2$.

A. 8

B. 6

C. 10

D. 12

Answer: C

Watch Video Solution

6. An ellipse slides between two perpendicular straight lines. Then identify the locus of its center.

A. parabola

B. ellipse

C. hyperbola

D. circle

Answer: D

Watch Video Solution

7. The sum fo the squares of the perpendicular on any tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ from two points on the mirror axis, each at a distance $\sqrt{a^2-b^2}$ from the centre, is

A. $2a^2$

B. $2b^2$

C. a^2+b^2

D. a^2-b^2

Answer: A

Watch Video Solution

8. The eccentric angle of a point on the ellipse $\frac{x^2}{6}+\frac{y^2}{2}=1$ whose distance from the centre of the ellipse is 2, is

A. $\pi/4$

B. $3\pi/2$

C. $5\pi/3$

D. $7\pi/6$

Answer: A

Watch Video Solution

9. If any tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ intercepts equal lengths l on the axes, then find l.

A. a^2+b^2

B. $\sqrt{a^2+b^2}$

C. $\left(a^2+b^2\right)^2$

D. none of these

Answer: B

Watch Video Solution

10. 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) $4x^2 + 64y^2 = 48$

A. $x^2 + 16y^2 = 16$

B. $x^2 + 12y^2 = 16$

C. $4x^2 + 48y^2 = 48$

D. $4x^2 + 64y^2 = 48$

Answer: B

Watch Video Solution

11. 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

A. $4/3$

B. $5/3$

C. $8/3$

D. $2/3$

Answer: C

Watch Video Solution

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

A. $1/2$

B. $4/5$

C. $\frac{1}{\sqrt{5}}$

D. $3/5$

Answer: D

Watch Video Solution

13. The tangent at a point $P(a\cos\theta, b\sin\theta)$ of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets its auxiliary circle at two points, the chord joining which subtends a right angle at the center. Find the eccentricity of the ellipse.

A. $\left(1+\sin^2\theta\right)^{-1/2}$

B. $\left(1+\cos^2\theta\right)^{-1/2}$

C. $\left(1+\sin^2\theta\right)$

D. $\left(1+\cos^2\theta\right)^{1/2}$

Answer: A

Watch Video Solution

14. if F_1 and F_2 be the feet of the perpendicular from the foci S_1 and S_2 of an ellipse $\frac{x^2}{5}+\frac{y^2}{3}=1$ on the tengent at any point P on the ellispe, then $(S_1F_1)(S_2F_2)$ is equal to

A. 2

B. 3

C. 4

D. 5

Answer: B

Watch Video Solution

15. The area of the rectangle formed by the perpendiculars form the centre of the ellipse to the tangent and normal at the point - whose eccentric angle is $\pi/4$, is

A. $\left(\frac{a^2-b^2}{a^2+b^2}\right)ab$

B. $\left(\frac{a^2+b^2}{a^2-b^2}\right)ab$

C. $\frac{a^2-b^2}{a^2+b^2}$

D. $\frac{a^2+b^2}{a^2}-b^2\Big)$

Answer: A

Watch Video Solution

16. Find the slope of a common tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and a concentric circle of radius r.

A. $\tan^{-1}\sqrt{\frac{r^2-b^2}{a^2-r^2}}$

B. $\sqrt{\frac{r^2-b^2}{a^2-r^2}}$

C. $\frac{r^2-b^2}{a^2-r^2}$

D. $\sqrt{\frac{a^2-r^2}{r^2-b^2}}$

Answer: B

Watch Video Solution

17. P is a variable on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with $\forall$ ' as the major axis. Find the maximum area of triangle APA'

A. ab

B. 2 ab

C. ab/2

D. none of these

Answer: A

Watch Video Solution

18. Find the equation of an ellipse the distance between the foci is 8 units and the distance between the directrices is 18 units.

A. $5x^2 - 9y^2 = 180$

B. $9x^2 + 5y^2 = 180$

C. $x^2 + 9y^2 = 180$

D. $5x^2 + 9y^2 = 180$

Answer: D

Watch Video Solution

19. The line $x = at^2$ meets the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ in the real points iff

A. $|t| < 2$

B. $|t| \leq 1$

C. $|t| > t$

D. none of these

Answer: B

Watch Video Solution

20. On the ellipse $4x^2 + 9y^2 = 1$, the points at which the tangents are parallel to the line $8x = 9y$ are $\left(\frac{2}{5}, \frac{1}{5}\right)$ (b) $\left(-\frac{2}{5}, \frac{1}{5}\right)$ $\left(-\frac{2}{5}, -\frac{1}{5}\right)$ (d) $\left(\frac{2}{5}, -\frac{1}{5}\right)$

A. $(2/5, 1/5)$

B. $(\pm 2/5, \pm 1/5)$

C. $(-2/5, -1/5)$

D. $\left(\pm \frac{2}{5}, \pm 1/5\right)$

Answer: B

Watch Video Solution

21. If circumcentre of an equilateral triangle inscribed in $\frac{x^2}{a^2} + y^2b^2 = 1$, with vertices having eccentric angles $alpna, \beta, \gamma,$ respectively is (x_1, y_1) then $\sum \cos\alpha \cos\beta + \sum \sin\alpha \sin\beta =$

A. $\frac{9x_1^2}{a^2} + \frac{9y_1^2}{b^2} + \frac{3}{2}$

B. $9x_1^2 - 9y_1^2 + a^2b^2$

C. $\frac{9x_1^2}{a} + \frac{9y_1^2}{b} + 3$

D. $\frac{9x_1^2}{2a^2} + \frac{9y_1^2}{2b^2} - \frac{3}{2}$

Answer: D

Watch Video Solution

22. Find the locus of the middle points of all chords of $\frac{x^2}{4} + \frac{y^2}{9} = 1$ which are at a distance of 2 units from the vertex of parabola $y^2 = -8ax$.

A. $\left(\frac{x^2}{4} + \frac{y^2}{9}\right)^2 = \frac{xy}{6}$

B. $\left(\frac{x^2}{4} + \frac{y^2}{9}\right)^2 = 4\left(\frac{x^2}{16} + \frac{y^2}{81}\right)$

C. $\left(\frac{x^2}{4} + \frac{y^2}{9}\right)^2 = \frac{x^2}{9} + \frac{y^2}{4}$

D. none of these

Answer: B

Watch Video Solution

23. A point on the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ at a distance equal to the mean of lengths of the semi - major and semi-minor axis from the centre, is

A. $\left(\frac{2\sqrt{91}}{7}, \frac{3\sqrt{105}}{14}\right)$

B. $\left(\frac{2\sqrt{91}}{7}, \frac{-3\sqrt{91}}{14}\right)$

C. $\left(\frac{-2\sqrt{105}}{7}, \frac{-3\sqrt{91}}{14}\right)$

D. $\left(\frac{-2\sqrt{105}}{7}, \frac{\sqrt{91}}{14}\right)$

Answer: A

Watch Video Solution

24. A tangent to the ellipse $4x^2 + 9y^2 = 36$ is cut by the tangent at the extremities of the major axis at T and T^1, the circle on TT^1 as diameter passes through the point

A. $\left(-\sqrt{5}, 0\right)$

B. $\left(\sqrt{5}, 1\right)$

C. $(0, 0)$

D. $(3, 2)$

Answer: C

Watch Video Solution

25. If C is the center and A, B are two points on the conic $4x^2 + 9y^2 - 8x - 36y + 4 = 0$ such that $\angle ACB = \frac{\pi}{2}$, then find the value of $\frac{1}{CA^2} + \frac{1}{CB^2}$

A. $\frac{13}{36}$

B. $\frac{36}{13}$

C. $\frac{16}{33}$

D. $\frac{33}{16}$

Answer: A

Watch Video Solution

26. Ellipses which are drawn with the same two perpendicular lines as axes and with the sum of the reciprocals of squares of the lengths of their semi-major axis and semi-minor axis equal to a constant have only

A. two points in common

B. four points in common

C. six points in common

D. eight points in common

Answer: B

Watch Video Solution

27. The eccentricity of the ellipse with centre at the origin which meets the straight line $\frac{x}{7}+\frac{y}{2}=1$ on the axis of x and the straight line $\frac{x}{3}-\frac{y}{5}=1$ on the axis of y and whose axes lie along the axes of coordinates, is

A. $\frac{2\sqrt{6}}{7}$

B. $\frac{3\sqrt{2}}{7}$

C. $\frac{\sqrt{6}}{7}$

D. none of these

Answer: A

Watch Video Solution

28. The radius of the circle passing through the foci of the ellipse $9x^2+16y^2=144$ and having its centre at (0, 3), is

A. 4

B. 3

C. $\sqrt{12}$

D. $7/2$

Answer: A

Watch Video Solution

29. An ellipse has OB as the semi-minor axis, $FandF'$ as its foci, and $\angle FBF'$ a right angle. Then, find the eccentricity of the ellipse.

A. $\frac{1}{\sqrt{2}}$

B. $\frac{1}{2}$

C. $\frac{\sqrt{3}}{2}$

D. none of these

Answer: A

Watch Video Solution

30. The focus of an ellipse is (-1, -1) and the corresponding directrix is $x - y + 3 = 0$. If the eccentricity of the ellipse is 1/2, then the coordinates of the centre of the ellipse, are

A. (1/2, 3/2)

B. (-1/2, 3/2)

C. (-1/2, -3/2)

D. none of these

Answer: C

Watch Video Solution

31. The equation of the ellipse with its centre at $(1, 2)$, one focus at $(6, 2)$ and passing through the point $(4, 6)$ is-

A. $\frac{(x-1)^2}{45} + \frac{(y-2)^2}{20} = 1$

B. $\frac{(x-1)^2}{20}+\frac{(y-2)^2}{45}=1$

C. $\frac{(x+1)^2}{45}+\frac{(y+2)^2}{20}=1$

D. none of these

Answer: A

Watch Video Solution

32. Tangents are drawn to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,(a>b)$, and the circle $x^2+y^2=a^2$ at the points where a common ordinate cuts them (on the same side of the x-axis). Then the greatest acute angle between these tangents is given by $\tan^{-1}\left(\frac{a-b}{2\sqrt{ab}}\right)$ (b) $\tan^{-1}\left(\frac{a+b}{2\sqrt{ab}}\right)$ $\tan^{-1}\left(\frac{2ab}{\sqrt{a-b}}\right)$ (d) $\tan^{-1}\left(\frac{2ab}{\sqrt{a+b}}\right)$

A. $\tan^{-1}\left(\frac{a-b}{2\sqrt{ab}}\right)$

B. $\tan^{-1}\left(\frac{a+b}{2\sqrt{ab}}\right)$

C. $\tan^{-1}\left(\frac{2ab}{\sqrt{a-b}}\right)$

D. $\tan^{-1}\left(\frac{2ab}{\sqrt{a+b}}\right)$

Answer: A

Watch Video Solution

33. 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) $\frac{27}{4}$ (2) 18 (3) $\frac{27}{2}$ (4) 27

A. $\frac{27}{4}$

B. 9

C. $\frac{27}{2}$

D. 27

Answer: D

Watch Video Solution

34. If $\alpha - \beta =$ constant, then the locus of the point of intersection of tangents at $P(a\cos\alpha, b\sin\alpha)$ and $Q(a\cos\beta, b\sin\beta)$ to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is a circle (b) a straight line an ellipse (d) a parabola

A. a circle

B. a straight line

C. an ellipse

D. a parabola

Answer: C

Watch Video Solution

35. Let S=(3,4) and S'=(9,12) be two foci of an ellipse. If the coordinates of the foot of the perpendicular from focus S to a tangent of the ellipse is (1, -4) then the eccentricity of the ellipse is

A. $4/5$

B. $5/7$

C. $7/13$

D. $5/13$

Answer: D

Watch Video Solution

36. Let $SandS'$ be two foci of the ellipse $\frac{x^2}{a^3}+\frac{y^2}{b^2}=1$. If a circle described on SS' as diameter intersects the ellipse at real and distinct points, then the eccentricity$e$ of the ellipse satisfies $c=\frac{1}{\sqrt{2}}$ (b) $e\in\left(\frac{1}{\sqrt{2}},1\right)$ $e\in\left(0,\frac{1}{\sqrt{2}}\right)$ (d) none of these

A. $e=1\sqrt{2}$

B. $e\in\left(1/\sqrt{2},1\right)$

C. $e\in\left(0,1/\sqrt{2}\right)$

D. none of these

Answer: B

Watch Video Solution

37. The locus of the foot of the perpendicular from the foci an any tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is

A. $x^2+y^2=b^2$

B. $x^2+y^2=a^2$

C. $x^2+y^2=a^2+b^2$

D. none of these

Answer: B

Watch Video Solution

38. The locus of the point of intersection of tangents to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ at the points whose eccentric angles differ by $\pi/2$, is

A. $x^2 + y^2 = a^2$

B. $x^2 + y^2 = b^2$

C. $x^2 + y^2 = a^2 + b^2$

D. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$

Answer: D

Watch Video Solution

39. The locus of the point of intersection of tangents to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, which make complementary angles with x - axis, is

A. $x^2 + y^2 = a^2 + b^2$

B. $x^2 + y^2 = a^2 - b^2$

C. $x^2 - y^2 = a^2 + b^2$

D. $x^2 - y^2 = a^2 - b^2$

Answer: D

Watch Video Solution

40. Find the locus of the foot of the perpendicular drawn from the center upon any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

A. $\left(x^2 - y^2\right)^2 = a^2x^2 + b^2y^2$

B. $\left(x^2 - y^2\right)^2 = a^2x^2 - b^2y^2$

C. $\left(x^2 + y^2\right)^2 = a^2x^2 + b^2y^2$

D. $\left(x^2 + b^2\right)^2 = a^2x^2 - b^2y^2$

Answer: C

Watch Video Solution

41. Let $P(x_1, y_1)$ and $Q(x_2, y_2), y_1 < 0, y_2 < 0$, be the end points of the latus rectum of the ellipse $x^2 + 4y^2 = 4$. The equations of parabolas with latus rectum PQ are

A. $x^2 + 2\sqrt{3}y = \pm 3\sqrt{3}$

B. $x^2 \pm 2\sqrt{3}y = 3 \pm \sqrt{3}$

C. $x^2 + 2\sqrt{3}y = \sqrt{3} \pm 3$

D. $x^2 - 2\sqrt{3}y = \pm 3\sqrt{3}$

Answer: B

Watch Video Solution

42. The locus of the point of intersection of perpendicular tangents to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and $\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1$, is

A. $x^2 + y^2 = a^2 + \lambda$

B. $x^2 + y^2 = b^2 + \lambda$

C. $x^2 + y^2 = a^2 + b^2 + \lambda$

D. $x^2 + y^2 = a^2 + b^2$

Answer: C

Watch Video Solution

43. Let S=(3,4) and S'=(9,12) be two foci of an ellipse. If the coordinates of the foot of the perpendicular from focus S to a tangent of the ellipse is (1, -4) then the eccentricity of the ellipse is

A. $3/13$

B. $4/13$

C. $5/13$

D. none of these

Answer: C

Watch Video Solution

44. The tangent at a point $P(a\cos\varphi, b\sin\varphi)$ of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets its auxiliary circle at two points, the chord joining

which subtends a right angle at the center. Find the eccentricity of the ellipse.

A. $\frac{1}{\sqrt{1+\cos^2\theta}}$

B. $\frac{1}{\sqrt{1+\sin^2\theta}}$

C. $\sqrt{1+\cos^2\theta}$

D. $\sqrt{1+\sin^2\theta}$

Answer: B

Watch Video Solution

45. Let $d_1 and d_2$ be the length of the perpendiculars drawn from the foci $S and S'$ of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ to the tangent at any point P on the ellipse. Then, $SP: S'P =$ $d_1 : d_2$ (b) $d_2 : d_1$ $d12 : d22$ (d) $\sqrt{d_1} : \sqrt{d_2}$

A. $d_1 : d_2$

B. $d_2 : d_1$

C. d_1^2

D. none of these

Answer: A

Watch Video Solution

46. A bar of given length moves with its extremities on two fixed straight lines at right angles. Show that any point on the bar describes an ellipse.

A. circle

B. parabola

C. ellipse

D. hyperbola

Answer: C

Watch Video Solution

47. The normal at a point P on the ellipse $x^2 + 4y^2 = 16$ meets the x-axis at Q. If M is the midpoint of the line segment PQ, then the locus of M intersects the latus rectums of the given ellipse at points.

$\left(\pm \frac{\left(3\sqrt{5}\right)}{2} \pm \frac{2}{7} \right)$ (b) $\left(\pm \frac{\left(3\sqrt{5}\right)}{2} \pm \frac{\sqrt{19}}{7} \right)$ $\left(\pm 2\sqrt{3}, \pm \frac{1}{7} \right)$ (d) $\left(\pm 2\sqrt{3} \pm \frac{4\sqrt{3}}{7} \right)$

A. $\left(\pm \frac{3\sqrt{5}}{2}, \pm \frac{2}{7} \right)$

B. $\left(\pm \frac{3\sqrt{5}}{2}, \pm \frac{\sqrt{19}}{4} \right)$

C. $\left(\pm 2\sqrt{3}, \pm \frac{1}{7} \right)$

D. $\left(\pm 2\sqrt{3}, \pm \frac{4\sqrt{3}}{7} \right)$

Answer: C

Watch Video Solution

48. From a point P perpendicular tangents PQ and PR are drawn to ellipse $x^2 + 4y^2 = 4$, then locus of circumcentre of triangle PQR is

A. $x^2 + y^2 = \frac{16}{5}\left(x^2 + 4y^2\right)^2$

B. $x^2 + y^2 = \frac{5}{16}\left(x^2 + 4y^2\right)^2$

C. $x^2 + 4y^2 = \frac{16}{5}\left(x^2 + 4y^2\right)^2$

D. $x^2 + 4y^2 = \frac{5}{16}\left(x^2 + 4y^2\right)^2$

Answer: B

Watch Video Solution

49. Tangents are drawn from the point P(3, 4) to the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ touching the ellipse at points A and B.

A. (3, 0) and (0, 2)

B. $\left(\frac{-8}{5}, \frac{2\sqrt{161}}{15}\right)$ and $\left(-\frac{9}{5}, \frac{8}{5}\right)$

C. $\left(-\frac{8}{5}, \frac{2\sqrt{161}}{15}\right)$ and $(0, 2)$

D. $(3, 0)$ and $\left(-\frac{9}{5}, \frac{8}{5}\right)$

Answer: D

Watch Video Solution

50. Tangents are drawn from the point P(3,4) to the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ touching the ellipse at points A and B. The orthocentre of ΔPAB, is

A. $\left(5, \frac{8}{7}\right)$

B. $\left(\frac{7}{5}, \frac{25}{8}\right)$

C. $\left(\frac{11}{5}, \frac{8}{5}\right)$

D. $\left(\frac{8}{25}, \frac{7}{5}\right)$

Answer: C

View Text Solution

51. Tangents are drawn from the point P(3,4) to the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ touching the ellipse at the point A and B then the equation of the locus of the point whose distance from the point P and the line AB are equal, is

A. $9x^2 + y^2 - 6xy - 54x - 62y + 241 = 0$

B. $x^2 + 9y^2 + 6xy - 54x + 62y - 241 = 0$

C. $9x^2 + 9y^2 - 6xy - 54x - 62y - 241 = 0$

D. $x^2 + y^2 - 2xy + 27x + 31y - 120 = 0$

Answer: A

Watch Video Solution

52. A vertical line passing through the point (h, 0) intersects the ellipse $\frac{x^2}{4} + \frac{y^2}{3} = 1$ at the point P and Q. Let the tangents to the ellipse at P and Q meet at the point R.

If $\Delta(h) =$ Area of the $\Delta PQR, \Delta_1(h) = \max_{1/2 \le h \le 1} \Delta(h)$ and $\Delta_2(h) = \min_{1/2 \le h \le 1} \Delta(h), then \frac{8}{\sqrt{5}}\Delta_1 - 8\Delta_2 =$

A. $\frac{36}{8}$

B. $\frac{45\sqrt{5}}{8}$

C. 9

D. 8

Answer: D

Watch Video Solution

53. If the normal from the point P(h,1) on the ellipse $\frac{x^2}{6} + \frac{y^2}{3} = 1$ is perpendicular to the line $x + y = 8$, then the value of h is

A. 1

B. 2

C. 8

D. 9

Answer: B

Watch Video Solution

54. the locus of the foot of perpendicular drawn from the centre of the ellipse $x^2 + 3y^2 = 6$ on any tangent is

A. $\left(x^2 + y^2\right)^2 = 6x^2 + 2y^2$

B. $\left(x^2 + y^2\right)^2 = 6x^2 - 2y^2$

C. $\left(x^2 - y^2\right)^2 = 6x^2 + 2y^2$

D. $\left(x^2 - y^2\right)^2 = 6x^2 - 2y^2$

Answer: A

Watch Video Solution

55. Let E_1 and E_2 two ellipse whose centres are at the orgin. Then major axes of E_1 and E_2 lie along the x-axis and the y-axis, respectively. Let S be the circle $x^2 + (y-1)^2 = 2$ the straight line x + y = 3 touches the curves S, E_1 and E_2 at P, Q and R, respectively. Suppose that $PQ = PR = \frac{2\sqrt{2}}{3}$, if e_1 and e_2 are the eccentricities of E_1 and E_2, respectively, then the correct expression(s) is (are)

A. $e_1^2 + e_2^2 = \frac{43}{40}$

B. $e_1 e_2 = \frac{\sqrt{7}}{2\sqrt{10}}$

C. $\left|e_1^2 - e_2^2\right| = \frac{5}{8}$

D. $e_1 e_2 = \frac{\sqrt{3}}{4}$

Answer: A::B

View Text Solution

56. Suppose that the foci of the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ are $(f_1, 0)$ and $(f_2, 0)$ where $f_1 > 0$ and $f_2 < 0$ Let P_1 and P_2 be two parabola with a c ommon vertex at (0, 0) and with foci at $(f_1, 0)$ and $(2f_z, 0)$ and T_2 be a tangent to P_2 which passes through $(f_1, 0)$. If m_1 is the slope of T_1 and m_2 is the slope of T_2, then the value of $\left(\frac{1}{m_1^2} + m_2^2\right)$, is

A. 2

B. 4

C. 6

D. 8

Answer: B

Watch Video Solution

57. A line intesects the ellipse $\frac{x^2}{4a^2} + \frac{y^2}{a^2} = 1$ at A and B and the parabola $y^2 = 4a(x + 2a)$ at C and D. The line segment AB substends a right angle at the centre of the ellipse. Then, the locus of the point of intersection of tangents to the parabola at C and D, is

A. $y^2 - a^2 = \frac{5}{4}(x - 4a)^2$

B. $y^2 - 2a^2 = 10(x - 4a)^2$

C. $y^2 + a^2 = \frac{5}{2}(x - 4a)^2$

D. $y^2 + 4a^2 = 5(x + 4a)^2$

Answer: D

Watch Video Solution

58. Let $F_1(x_1, 0)$ and $F_2(x_2, 0)$ for $x_1 < 0$ and $x_2 > 0$ the foci of the ellipse $\frac{x^2}{9} + \frac{y^2}{8} = 1$. Suppose a parabola having vertex at the origin and focus at F_2 intersects the ellipse at point M in the first quadrant and at a point N in the fourth quardant. The orthocentre of the triangle F_1MN, is

A. $\left(-\frac{9}{10}, 0\right)$

B. $\left(\frac{2}{3}, 0\right)$

C. $\left(\frac{9}{10}, 0\right)$

D. $\left(\frac{9}{10}, 0\right)$

Answer: A

View Text Solution

59. If the tangents to the ellipse at M and N meet at R and the normal to the parabola at M meets the x-axis at Q, then the ratio of area of the

triangle MQR to area of the quadrilateral MF1NF2 is

A. $3:4$

B. $4:5$

C. $5:8$

D. $2:3$

Answer: C

Watch Video Solution

Section Ii Assertion Reason Type

1. Statement-1: Tangents drawn from any point on the circle $x^2+y^2=25$ to the ellipse $\frac{x^2}{16}+\frac{y^2}{9}=1$ are at right angle Statement-2: The locus of the point of intersection of perpendicular tangents to an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is its director circle $x^2+y^2=a^2+b^2$.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: A

Watch Video Solution

2. Statement-1: Tangents drawn from any point on the circle $x^2 + y^2 = 225$ to the ellipse $\frac{x^2}{144} + \frac{y^2}{81} = 1$ are at a right angle.

Statement -2 : Equation of the auxiliary circle of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $x^2 + y^2 = a^2$.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: B

Watch Video Solution

3. Condider the lines $L_1 : 3x + 4y = k - 12$, $L_2 : 3x + 4y = \sqrt{2}k$ and the ellipse C : $\frac{x^2}{16} + \frac{y^2}{9} = 1$ where k is any real number

Statement-1: If line L_1 is a diameter of ellipse C, then line L_2 is not a tangent to the ellipse C.

Statement-2: If L_2 is a diameter of ellipse C, L_1 is the chord joining the negative end points of the major and minor axes of C.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: D

Watch Video Solution

4. Consider the following curves:

$C_1 : x^2 + y^2 = 4, \quad C_2 : x^2 - 2\sqrt{3}y = 3, \quad C_3 + \sqrt{3}, \quad C_3 : x^2 + 2\sqrt{3}y =$

Statement-1: Parabolas C_2 and C_3 have the same latusrectum, the line joining the end -points oflatusrecla of the ellipse C_1 with negative ordinates.

Statement-2: Common chord of C_2 and C_3 is a laturectum of C_1.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: C

View Text Solution

5. Consider the ellipse $C: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ having its centre at the origin O and eccentricity e.

Statement-1: If the normal at an end L of a Latusrectum of the ellipse C meets the major axis at G, then $OG = ae^3$

Statement-2 : the normal at a point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ never passes through its foci.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: A

View Text Solution

6. The tangent at a point P on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, which in not an extremely of major axis meets a directrix at T. Statement-1: The circle on PT as diameter passes through the focus of the ellipse corresponding to the directrix on which T lies.

Statement-2: Pt substends is a right angle at the focus of the ellipse corresponding to the directrix on which T lies.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: A

View Text Solution

7. Let C be the locus of a point the sum of whose distances from the points $S(\sqrt{3}, 0)$ and $S'(-\sqrt{3}, 0)$ is 4.

Statement-1: The curve C cuts off intercept $2\sqrt{3}$ from the line 2y-1=0

Statement-2: The equation of the centre C is $x^2 + 8y^2 = 5$

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1

B. Statement-1 is True, Statement-2 is True, Statement -2 is not a correct explanation for Statement-1

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is False, Statement-2 is True

Answer: C

Watch Video Solution

Exercise

1. the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents an ellipse , if

A. $\Delta = 0, h^2 < ab$

B. $\Delta \neq 0, h^2 < ab$

C. $\Delta \neq 0, h^2 > ab$

D. $\Delta \neq 0, h^2 = ab$

Answer: B

Watch Video Solution

2. the equation of the ellipse whose foucs is S(1,-1) directrix the line $x - y - 3 = 0$ and eccentricity$1/2$, is

A. $7x^2 + 2xy + 7y^2 - 10x + 10y + 7 = 0$

B. $7x^2 + 2xy + 7y^2 + 7 = 0$

C. $7x^2 + 2xy + 7y^2 + 10x - 10y - 7 - 0$

D. none of these

Answer: A

Watch Video Solution

3. Find the equation of the ellipse (referred to its axes as the axes of $xandy$, respectively) whose foci are $(\pm 2, 0)$ and eccentricity is $\frac{1}{2}$

A. $\frac{x^2}{12} + \frac{y^2}{16} = 1$

B. $\frac{x^2}{16} + \frac{y^2}{12} = 1$

C. $\frac{x^2}{16} + \frac{y^2}{8} = 1$

D. none of these

Answer: B

Watch Video Solution

4. Find the equation to the ellipse (referred to its axes as the axes of $x \; and \; y$ respectively) which passes through the point (-3,1) and has eccentricity $\sqrt{\frac{2}{5}}$

A. $3x^2 \mid 6y^2 = 33$

B. $5x^2 + 3y^2 = 48$

C. $3x^2 + 5y^2 = 32$

D. none of these

Answer: C

Watch Video Solution

5. The eccentricity of the ellipse $9x^2 + 5y^2 - 30y = 0$ is

A. $1/3$

B. $2/3$

C. $3/4$

D. none of these

Answer: B

Watch Video Solution

6. if the tangent at the ends B and B' of minor axis at L and L' respectively , then B:.B'.L'=

A. a^2

B. b^2

C. $a^2 + b^2$

D. $A^2 = b^2$

Answer: A

View Text Solution

7. If A and B are two fixed points and P is a variable point such that $PA + PB = 4$, the locus of P is

A. A parabola

B. An ellipse

C. hy hyperbola

D. none of these

Answer: B

Watch Video Solution

8. the length of the latusrectum of the ellipse $3x^2 + y^2 = 12$. Is

A. 4

B. 3

C. 8

D. $4/\sqrt{3}$

Answer: D

Watch Video Solution

9. Find the eccentricity of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ whose latus rectum is half of its major axis.

A. $1\sqrt{2}$

B. $\sqrt{2/3}$

C. $\sqrt{3}/2$

D. none of these

Answer: A

Watch Video Solution

10. the eccentricity of an ellipse $\frac{x^2}{a^2} + \left(y^2\right) = 1$ whose latus rectum is half of its minor axes , is

A. $1/\sqrt{2}$

B. $\sqrt{2/3}$

C. $\sqrt{3}/2$

D. none of these

Answer: C

Watch Video Solution

11. If the focal distance of an end of the minor axis of an ellipse (referred to its axes as the axes of $xandy$, respectively) is k and the distance

between its foci is $2h$, them find its equation.

A. $\frac{x^2}{k^2}+\frac{y^2}{h^2}=1$

B. $\frac{x^2}{k^2}+\frac{y^2}{k^2-h^2}=1$

C. $\frac{x^2}{k^2}+\frac{y^2}{h^2-k^2}=1$

D. $\frac{x^2}{k^2}+\frac{y^2}{k^2+h^2}=1$

Answer: B

Watch Video Solution

12. if $2y=x$ and $3y+4x=0$ are the equations of a pair of conjugate diameters of an ellipse , then the eccentricity of the ellipse , is

A. $\sqrt{2/3}$

B. $\sqrt{2/5}$

C. $\sqrt{1/3}$

D. $\sqrt{1/2}$

Answer: C

Watch Video Solution

13. if θ is a parameter then $x = a(\sin\theta + \cos\theta)$,

$y = b(\sin\theta - \cos\theta)$ respresents

A. an ellipse

B. a circle

C. a pair of stright lines

D. a hyperbola

Answer: A

Watch Video Solution

14. The distance from the foci of $P(a, b)$ on the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$ are

A. $4 \pm \frac{5}{4} y_1$

B. $5 \pm \frac{4}{5} x_1$

C. $5 \pm \frac{5}{4} y_1$

D. none of these

Answer: C

Watch Video Solution

15. Find the equation for the ellipse that satisfies the given conditions:Vertices $(\pm 5, 0)$, foci $(\pm 4, 0)$

A. $\frac{x^2}{25} + \frac{y^2}{16} = 1$

B. $9x^2 + 25y^2 = 225$

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

D. $4x^2 + 5y^2 = 20$

Answer: B

Watch Video Solution

16. The eccentricity of the curve $x^2 - 4x + 4y^2 = 12$ is

A. $\sqrt{3}/2$

B. $2/\sqrt{3}$

C. $\sqrt{3}$

D. none of these

Answer: A

Watch Video Solution

17. The parametric representation of a point on the ellipse whose foci are (-1, 0) and (7, 0) and eccentricity 1/2, is

A. $\left(3 + 8\cos\theta, 4\sqrt{3}\sin\theta\right)$

B. $\left(8\cos\theta, 4\sqrt{3}\right)\sin\theta\right)$

C. $\left(3+4\sqrt{3}\cos\theta, 8\sin\theta\right)$

D. none of these

Answer: A

Watch Video Solution

18. if S and S are two foci of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ $(a<b)$ and $P(x_1, y_1)$ a point on it then SP+ S'P is equal to

A. 2a

B. 2b

C. $a+ex_1$

D. $b+ey_1$

Answer: B

Watch Video Solution

19. The eccentricity of the ellipse represented by $25x^2 + 16y^2 - 150x - 175 = 0$ is

A. $2/5$

B. $3/5$

C. $4/5$

D. none of these

Answer: B

Watch Video Solution

20. the length of the latusrectum of the ellipse $5x^2 + 9x^2 = 45,$ is

A. $5/3$

B. $10/3$

C. $2\sqrt{5}/5$

D. $\sqrt{5}/3$

Answer: B

Watch Video Solution

21. The radius of the circle passing through the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}$ and having its center (0, 3) is 4 (b) 3 (c) $\sqrt{12}$ (d) $\frac{7}{2}$

A. 4

B. 3

C. $\sqrt{12}$

D. $7/2$

Answer: A

Watch Video Solution

22. the eccentricity to the conic $4x^2+16y^2-24x-32y=1$ is

A. $1/2$

B. $\sqrt{3}$

C. $\sqrt{3}/2$

D. $\sqrt{3}/4$

Answer: C

Watch Video Solution

23. A set of points is such that each point is three times as far away from the y-axis as it is from the point (4,0).Then locus of the points is:

A. hyperbola

B. parabola

C. ellipse

D. circle

Answer: C

Watch Video Solution

24. the foci of an ellipse are (0 ± 6) and the equation of the directrces are $y = \pm 9$. the equation of the ellipse is

A. $5x^2 + 9x^2 = 4$

B. $2x^2 - 6y = 28$

C. $6x^2 + 3y^2 = 45$

D. $9x^2 + 5y^2 = 180$

Answer: D

Watch Video Solution

25. An ellipse has its centre at (1,-1) and semi major axis =8 and it passes through the point (1,3). The equation of the ellipse is

$\frac{(x+1)^2}{64} + \frac{(y+1)^2}{16} = 1$ b. $\frac{(x-1)^2}{64} + \frac{(y-1)^2}{16} = 1$ c. $\frac{(x-1)^2}{64} + \frac{(y+1)^2}{16} = 1$ d. $\frac{(x+1)^2}{64} + \frac{(y-1)^2}{16} = 1$

A. $\frac{(x+1)^2}{64}+\frac{(y+1)^2}{16}=1$

B. $\frac{(x-1)^2}{64}+\frac{(y+1)^2}{16}=1$

C. $\frac{(x-1)^2}{16}+\frac{(y+1)^2}{64}=1$

D. $\frac{(x+1)^2}{64}+\frac{(y-1)^2}{16}=1$

Answer: B

Watch Video Solution

26. Let L L ' be the latusrectum and S be a focus of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ if $\Delta SLL'$ is equilaterial ,then the eccentricity of the ellispe ,is

A. $1/\sqrt{5})$

B. $1/\sqrt{3}$

C. $1/\sqrt{2}$

D. $\sqrt{2}/3$

Answer: B

Watch Video Solution

27. the equation of the axes of the ellispe $3x^2 + 4y^2 + 6x - 8y - 5 = 0$ are

A. $x - 3, y = 5$

B. $x + 3 = 0, y - 5 = 0$

C. $x - 1 = 0, y = 0$

D. $x + 1 = 0, y - 1 = 0$

Answer: D

Watch Video Solution

28. the equations to the directrices of the ellipse $4(x-3)^2 + 9(y+2)^2 = 144,$ are

A. $5x - 15 \pm 18\sqrt{5} = 0$

B. $5x + 15 \pm 2\sqrt{5} = 0$

C. $15x \pm 2\sqrt{5} = 0$

D. $15x - 5 \pm 18\sqrt{5} = 0$

Answer: A

Watch Video Solution

29. if the vertices of an ellipse are $(-12, 4)$ and $(14, 4)$ and eccentricity 12/13 , then the equation of the ellipse ,is

A. $\frac{(x+4)^2}{25} + \frac{(y-1)^2}{169} = 1$

B. $\frac{(x-4)^2}{169} + \frac{(y-1)^2}{25} = 1$

C. $\frac{(x-1)^2}{169} + \frac{(y-4)^2}{25} = 1$

D. $\frac{(x+1)^2}{169} + \frac{(y+4)^2}{25} = 1$

Answer: C

Watch Video Solution

30. if the coordinates of the vertices of an ellipse are (-6,1) and (4,1) and the equation of a focal chord passing through the focus on the right side of the centre is $2x - y - 5 = 0$ the equation of the elipse , is

A. $\frac{(x+1)^2}{25} + \frac{(y+1)^2}{16} = 1$

B. $\frac{(x+1)^2}{25} + \frac{(y-1)^2}{16} = 1$

C. $\frac{(x-1)^2}{25} + \frac{(y+1)^2}{16} = 1$

D. none of these

Answer: B

Watch Video Solution

31. if the tangent at the point $\left(4\cos\phi, \frac{16}{\sqrt{11}}\sin\phi\right)$ to the ellipse $16x^2 + 11y^2 = 256$ Is also a tangent to the circle $x^2 + y^2 - 2x = 15$,

then the value of ϕ is

A. $\pm\pi/2$

B. $\pm\pi/4$

C. $\pm\pi/3$

D. $\pm\pi/6$

Answer: C

Watch Video Solution

32. A man running around a race course notes that the sum of the distances of two flagposts from him a always 10m and the distance between the flag posts is 8m. Then the area of the path he encloses in square meters is 15π (b) 20π (c) 27π (d) 30π

A. 15π

B. 12π

C. 18π

D. 8π

Answer: A

Watch Video Solution

33. Find the angle between the pair of tangents from the point (1,2) to the ellipse $3x^2 + 2y^2 = 5$.

A. $\tan^{-1}\left(\frac{12}{5}\right)$

B. $\tan^{-1}\left(\frac{6}{\sqrt{5}}\right)$

C. $\tan^{-1}\left(\frac{12}{\sqrt{5}}\right)$

D. $\tan^{-1}\left(12\sqrt{5}\right)$

Answer: C

Watch Video Solution

34. Find the foci of the ellipse $25(x+1)^2+9(y+2)^2=225$.

A. $(-1,2)$ and $(-1,-6)$

B. $(-2,1)$ and $(-2,6)$

C. $(-1,-2)$ and $(-2,-1)$

D. $(-1,-2)$ and $(-1,-6)$

Answer: A

Watch Video Solution

35. if the coordinates of the centre , a foucs and adjacent vertex are $(2,-3),(3,-3)$ and $(4,-3)$ respectively , then the equation of the ellipse Is

A. $\frac{(x-2)^2}{4}+\frac{(y-3)^2}{3}=1$

B. $\frac{(x-3)^2}{4}+\frac{(y-2)^2}{3}=1$

C. $\frac{(x-2)^2}{8}+\frac{(y+3)^2}{6}=1$

D. $\frac{(x+2)^2}{4}+\frac{(y+3)^2}{3}=1$

Answer: A

Watch Video Solution

36. If $\frac{x}{a}+\frac{y}{b}=\sqrt{2}$ touches the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, then find the eccentric angle θ of point of contact.

A. 0

B. $\pi/3$

C. $\pi/4$

D. $\pi/4$

Answer: B

Watch Video Solution

37. A tangent having slope of $-\frac{4}{3}$ to the ellipse $\frac{x^2}{18}+\frac{y^2}{32}=1$ intersects the major and minor axes at points $AandB,$ respectively. If C is the center of the ellipse, then find area of triangle $ABC.$

A. 12sq, units

B. 48 units

C. 64 sq units

D. 24 sq.units

Answer: D

Watch Video Solution

38. The equation of the chord of the ellipse $2x^2+5y^2=20$ which is bisected at the point $(2,1)$ is

A. $4x+5y+13=0$

B. $4x+5y=13$

C. $5x + 4y + 13 = 0$

D. none of these

Answer: B

Watch Video Solution

39. AB is a diameter of $x^2 + 9y^2 = 25$. The eccentric angle of A is $\frac{\pi}{6}$. Then the eccentric angle of B is

A. $5\pi/6$

B. $-5\pi/6$

C. $-2\pi/3$

D. none of these

Answer: B

Watch Video Solution

40. if one end of a diameter of the ellipse $4x^2 + y^2 = 16$ is $\left(\sqrt{3}, 2\right)$ then the other end ,is

A. $\left(-\sqrt{3}, 2\right)$

B. $\left(\sqrt{3}, -2\right)$

C. $\left(-\sqrt{3}, -\sqrt{2}\right)$

D. $(0, 0)$

Answer: C

Watch Video Solution

41. the equation of a diameter conjugate to a diameter $y = \frac{b}{a}x$ of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

A. $y = -\frac{b}{a}x$

B. $y = -\frac{a}{b}x$

C. $y = \frac{a}{b}x$

D. none of these

Answer: A

Watch Video Solution

42. if θ and ϕ are eccentric angles of the ends of a pair of conjugate diameters of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ then $(\theta-\phi)$ is equal to

A. $\pm\pi/2$

B. $\pm\pi$

C. 0

D. none of these

Answer: A

Watch Video Solution

43. If A,A' are the vertices S,S' are the foci and Z,Z' are the feet of the directrices of an ellipse with centre C, then CS CA ,CZ are in

A. A.P

B. G.P

C. H.P

D. none of these

Answer: B

Watch Video Solution

44. The eccentricity of an ellipse whose pair of a conjugate diameter are $y = x$ and $3y = -2x$ is (A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{1}{\sqrt{3}}$ (D) none

A. $2/3$

B. $1/3$

C. $1/\sqrt{3}$

D. none of these

Answer: C

Watch Video Solution

45. the locus of the point of intersection of tangents to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ which meet at right , is

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: A

Watch Video Solution

46. The number of maximum normals that can be drawn from any point to an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is

A. 2

B. 3

C. 4

D. 1

Answer: C

Watch Video Solution

47. the sum of the squares of the perpendiculars on any tangent axis each at a distance ae from the centre , is

A. $2a^2$

B. $2b^2$

C. a^2+b^2

D. $a^2 - b^2$

Answer: A

Watch Video Solution

48. If the polar with respect to $y^2 = 4ax$ touches the ellipse $\frac{x^2}{\alpha^2} + \frac{y^2}{\beta^2} = 1$, the locus of its pole is

A. $\frac{x^2}{\alpha^2} - \frac{y^2}{(4a^2\alpha^2/\beta^2)} = 1$

B. $\frac{x^2}{\alpha^2} - \frac{\beta^2 y^2}{4a^2} = 1$

C. $\alpha^2 x^2 + \beta^2 y^2 = 1$

D. none of these

Answer: A

Watch Video Solution

49. If p and q are the segments of a focal chord of an ellipse $b^2x^2 + a^2y^2 = a^2b^2$ then

A. $a^2(p+q) = 2bpq$

B. $b^2(p+q) = 2apq$

C. $a(p+q) = 2b^2pq$

D. $b(p+q) = 2a^2pq$

Answer: B

Watch Video Solution

50. If $\frac{x}{a} + \frac{y}{b} = \sqrt{2}$ touches the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then find the eccentric angle θ of point of contact.

A. 0°

B. 90°

C. 45°

D. 60°

Answer: C

Watch Video Solution

51. Let P be a point on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ of eccentricity e. If A, A' are the vertices and S, S are the foci of the ellipse, then find the ratio area PSS'' : area APA'.

A. $e^3:1$

B. $e^2:1$

C. $e:1$

D. $1/e:1$

Answer: C

Watch Video Solution

52. iger $P(\theta)$ and $Q\left(\frac{\pi}{2}+\theta\right)$ are two points on the ellipse $\frac{x^2}{a^2}+\frac{y^\circ}{b^2}=1$, locus ofmid point of PQ is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{2}$

B. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=4$

C. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=2$

D. none of these

Answer: A

Watch Video Solution

53. 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

A. 4

B. 3

C. $\sqrt{12}$

D. $7/2$

Answer: A

Watch Video Solution

54. the centre of the ellipse $\frac{(x+y-2)^2}{9}+\frac{(x-y)^2}{16}=1$, is

A. $(0, 0)$

B. $(1, 1)$

C. $(1, 0)$

D. $(0, 1)$

Answer: B

Watch Video Solution

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

A. $4/5$

B. $1/\sqrt{52}$

C. $3/5$

D. $1/2$

Answer: C

Watch Video Solution

56. S and T are foci of an ellipse and B is an end of the minor axis , if STB is an equilateral triangle , the eccentricity of the ellipse , is

A. $1/4$

B. $1/3$

C. $1/2$

D. $2/3$

Answer: C

Watch Video Solution

57. the length of the latusrectum of an ellipse is one thrid of its major axis , its eccentricity would be

A. $2/3$

B. $\sqrt{2/3}$

C. $1/\sqrt{3}$

D. $1/\sqrt{2}$

Answer: B

Watch Video Solution

58. if the major axis of an ellipse is three times the length of its minor axis , its eccentricity , is

A. $1/3$

B. $1/\sqrt{3}$

C. $1/\sqrt{2}$

D. $2\sqrt{2}/3$

Answer: D

Watch Video Solution

59. the distance between the foci of the ellipse $5x^2 + 9y^2 = 45,$ is

A. $2\sqrt{2}$

B. 4

C. $4\sqrt{2}$

D. 2

Answer: B

Watch Video Solution

60. the length of the latusrectum of the ellipse $\frac{x^2}{36} + \frac{y^2}{49} = 1$, is

A. $98/6$

B. $72/7$

C. $72/14$

D. $98/12$

Answer: B

Watch Video Solution

61. The co-ordinates of a focus of an ellipse is (4,0) and its eccentricity is $\frac{4}{5}$ Its equation is :

A. $\frac{x^2}{3^2}+\frac{y^2}{5^2}=1$

B. $\frac{x^2}{5^2}+\frac{y^2}{3^2}=1$

C. $\frac{x^2}{5^2}+\frac{y^2}{4^2}=1$

D. $\frac{x^2}{4^2}+\frac{y^2}{5^2}=1$

Answer: B

Watch Video Solution

62. the equation of the ellipse passing through (2,1) having e=1/2 , is

A. $3x^2+4y^2=16$

B. $3x^2+5y^2=17$

C. $5x^2+3y^2=23$

D. none of these

Answer: A

Watch Video Solution

63. If C is the centre of the ellipse $9x^2 + 16y^2 = 144$ and S is one focus. The ratio of CS to major axis, is

A. $\sqrt{7}:16$

B. $\sqrt{7}:4$

C. $\sqrt{5}:\sqrt{7}$

D. none of these

Answer: D

Watch Video Solution

64. In an ellipse the distance between the foci is 8 and the distance between the directrices is 25. The length of major axis, is

A. $10\sqrt{2}$

B. $20\sqrt{2}$

C. $30\sqrt{2}$

D. none of these

Answer: A

Watch Video Solution

65. The centre of the ellipse $4x^2 + 9y^2 + 16x - 18y - 11 = 0$ is

A. (-2, -1)

B. (-2, 1)

C. (2, -1)

D. none of these

Answer: B

Watch Video Solution

66. If P is any point on the ellipse $9x^2 + 36y^2 = 324$ whose foci are S and S'. Then, SP + S' P equals

A. 3

B. 12

C. 36

D. 324

Answer: B

Watch Video Solution

67. An ellipse is described by using an endless string which is passed over two pins. If the axes are $6cm$ and $4cm$, the length of the string and distance between the pins are .....

A. $6, 2\sqrt{5}$

B. $6, \sqrt{5}$

C. $4, 2\sqrt{5}$

D. none of these

Answer: D

Watch Video Solution

68. Two perpendicular tangents drawn to the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ intersect on the curve.

A. x = a/e

B. $x^2 + y^2 = 41$

C. $x^2 + y^2 = 9$

D. $x^2 - y^2 = 41$

Answer: B

Watch Video Solution

69. The distance of the point $'\theta'$ on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ from a focus, is

A. $a(e+\cos\theta)$

B. $a(e-\cos\theta)$

C. $a(1+e\cos\theta)$

D. $a(1+2e\cos\theta)$

Answer: C

Watch Video Solution

70. If y = mx + c is a tangent to the ellipse $x^2+2y^2=6$, them $c^2=$

A. $36/m^2$

B. $6m^2-3$

C. $3m^2+6$

D. $6m^2+3$

Answer: D

Watch Video Solution

71. Let P be a variable point on the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ with foci at S and S'. If A be the area of triangle PSS' then the maximum value of A, is

A. 24 sq. units

B. 12 sq. units

C. 36 sq. units

D. none of these

Answer: B

Watch Video Solution

72. The ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the straight line $y = mx + c$ intersect in real points only if:

A. $a^2m^2 < c^2 - b^2$

B. $a^2m^2 > c^2 - b^2$

C. $a^2m^2 \geq c^2 - b^2$

D. $c \geq b$

Answer: C

Watch Video Solution

73. Let E be the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and C be the circle $x^2 + y^2 = 9$. Let P and Q be the points (1, 2) and (2, 1) respectively. Then,

A. Q lies inside C but outside E

B. Q lies outside both C and E

C. P lies inside both C and E

D. P lies inside C but outside E

Answer: D

Watch Video Solution

74. Equation of the ellipse with accentricity 1/2 and foci at $(\pm 1, 0)$, is

A. $\frac{x^2}{3} + \frac{y^2}{4} = 1$

B. $\frac{x^2}{4} + \frac{y^2}{3} = 1$

C. $\frac{x^2}{4} + \frac{y^2}{3} = \frac{4}{3}$

D. none of these

Answer: B

Watch Video Solution

75. If B and B' are the ends of minor axis and S and S' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$, then area of the rhombus SBS' B', in square units, will be

A. 12

B. 48

C. 24

D. 36

Answer: C

Watch Video Solution

76. The length of the axes of the conic $9x^2 + 4y^2 - 6x + 4y + 1 = 0$, are

A. $1/2, 9$

B. $3, 2/5$

C. $1, 2/3$

D. 3, 2

Answer: C

Watch Video Solution

77. If the normal at any given point P on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets its auxiliary circlet at Q and R such that $\angle QOR=90^\circ$, where O is the centre of the ellispe, then

A. $a^4+2b^4\geq 3a^2b^2$

B. $a^4+2b^4\geq 5a^2b^2+2a^3b$

C. $a^4+2b^4\geq 3a^2b^2+ab$

D. none of these

Answer: B

Watch Video Solution

78. If the curves $x^2+4y^2=4, x^2+a^2y^2=a^2$ for suitable value of a cut on four concylclic points, the equation of the circle passing through the four points, is

A. $x^2+y^2=2$

B. $x^2 + y^2 = 1$

C. $x^2 + y^2 = 4$

D. $x^2 + y^2 = 3$

Answer: B

Watch Video Solution

79. If $P(\theta), Q\left(\theta + \frac{\pi}{2}\right)$ are two points on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and a is the angle between normals at P and Q, then

A. $2\sqrt{1 - e^2} = e \sin^2 2\theta \tan \alpha$

B. $2\sqrt{1 - e^2} = e \sin^2 \theta \tan 2\alpha$

C. $\sqrt{1 - e^2} = 2e^2 \sin^2 2\theta \tan \alpha$

D. $2\sqrt{1 - e^2} = e^2 \sin 2\theta \tan \alpha$

Answer: D

Watch Video Solution

80. An ellipse has point $(1, -1) and (2, -1)$ as its foci and $x + y - 5 = 0$ as one of its tangents. Then the point where this line touches the ellipse is $\left(\frac{32}{9}, \frac{22}{9}\right)$ (b) $\left(\frac{23}{9}, \frac{2}{9}\right)$ $\left(\frac{34}{9}, \frac{11}{9}\right)$ (d) none of these

A. $\left(\frac{34}{9}, \frac{11}{9}\right)$

B. $\left(\frac{32}{9}, \frac{13}{9}\right)$

C. $\left(-\frac{34}{9}, \frac{79}{9}\right)$

D. $\left(-\frac{32}{9}, \frac{77}{9}\right)$

Answer: A

Watch Video Solution

81. If the length of the semi-major axis of an ellipse is 68 and e = 1/2, then the area of the rectangle formed by joining the vertices of latusrecta of the ellipse is equal to

A. 69930

B. 6935

C. 6936

D. 3696

Answer: C

Watch Video Solution

82. If the tangent at the point $\left(4\cos\theta, \frac{16}{\sqrt{11}}\sin\theta\right)$ to the ellipse $16x^2 + 11y^2 = 256$ is also a tangent to the circle $x^2 + y^2 - 2x - 15 = 0$, then the value of θ, is

A. $\pm\pi/2$

B. $\pm\pi/4$

C. $\pm\pi/3$

D. $\pm\pi/6$

Answer: C

Watch Video Solution

Chapter Test

1. Find the maximum area of an isosceles triangle inscribed in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$with its vertex at one end of the major axis.

A. $\sqrt{3}ab$

B. $\frac{3\sqrt{3}}{4}ab$

C. $\frac{5\sqrt{3}}{4}$

D. none of these

Answer: B

Watch Video Solution

2. A tangent to the ellipse $x^2 + 4y^2 = 4$ meets the ellipse $x^2 + 2y^2 = 6$ at P&Q.

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer: A

Watch Video Solution

3. If the distance of a point on the ellipse $\frac{x^2}{6} + \frac{y^2}{2} = 1$ from the centre is 2, then the eccentric angle of the point, is

A. $\frac{\pi}{4}, \frac{3\pi}{4}$

B. $\frac{\pi}{3}, \frac{2\pi}{3}$

C. $\pi/2$

D. none of these

Answer: A

Watch Video Solution

4. If the minor axis of an ellipse subtends an angle of 60° at each focus of the ellipse, then its eccentricity, is

A. $\sqrt{3}/2$

B. $1/\sqrt{2}$

C. $2/\sqrt{3}$

D. none of these

Answer: A

Watch Video Solution

5. Let $SandS'$ be two foci of the ellipse $\frac{x^2}{a^3}+\frac{y^2}{b^2}=1$. If a circle described on SS' as diameter intersects the ellipse at real and distinct points, then the eccentricity$e$ of the ellipse satisfies $c=\frac{1}{\sqrt{2}}$ (b) $e\in\left(\frac{1}{\sqrt{2}},1\right)$ $e\in\left(0,\frac{1}{\sqrt{2}}\right)$ (d) none of these

A. $2/\sqrt{3}$

B. $\sqrt{3}/2$

C. $1/\sqrt{2}$

D. $1/\sqrt{3}$

Answer: C

Watch Video Solution

6. The equation of the normal at the point P (2, 3) on the ellipse $9x^2+16y^2=180$, is

A. $3y=8x-10$

B. $3y - 8x + 7 = 0$

C. $8y + 3x + 7 = 0$

D. $3x + 2y + 7 = 0$

Answer: B

Watch Video Solution

7. For the ellipse $3x^2 + 4y^2 + 6x - 8y - 5 = 0$ the eccentrically, is

A. $1/3$

B. $1/2$

C. $1/4$

D. $1/5$

Answer: B

Watch Video Solution

8. Let S, S' be the focil and BB' be the minor axis of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. If $\angle BSS'=\theta$, then the eccentricity e of the ellipse is equal to

A. $\sin\theta$

B. $\cos\theta$

C. $\tan\theta$

D. $\cot\theta$

Answer: B

Watch Video Solution

9. If the length of the latusrectum of the ellipse $x^2\tan^2\theta+y^2\sec^2\theta=1$ is 1/2, then $\theta=$

A. $\pi/12, 5\pi/12$

B. $\pi/6, 5\pi/6$

C. $7\pi/12$

D. none of these

Answer: A

Watch Video Solution

10. if vertices of an ellipse are $(-4, 1), (6, 1)$ and $x - 2y = 2$ is focal chord then the equation of the ellipse is

A. $\frac{(x-1)^2}{25} + \frac{(y-1)^2}{9} = 1$

B. $\frac{(x+1)^2}{25} + \frac{(y+1)^2}{9} = 1$

C. $\frac{(x-1)^2}{16} + \frac{(y-1)^2}{25} = 1$

D. $\frac{(x+1)^2}{16} + \frac{(y+1)^2}{25} = 1$

Answer: A

Watch Video Solution

11. If (-4, 3) and (8, 3) are the vertices of an ellipse whose eccentricity is 5/6 then the equation of the ellipse is

A. $\frac{(x-2)^2}{11}+\frac{(y-3)^2}{36}=1$

B. $\frac{(x-2)^2}{36}+\frac{(y-3)^2}{11}=1$

C. $\frac{(x-3)^2}{36}+\frac{(y-2)^2}{11}=1$

D. none of these

Answer: B

Watch Video Solution

12. The area of the triangle formed by three points on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ whose eccentric angles are α, β and γ is

A. $2ab\ \sin\frac{\alpha-\beta}{2}\ \cos\frac{\beta-\gamma}{2}\ \cos\frac{\gamma-\alpha}{2}$

B. $2ab\ \sin\frac{\alpha-\beta}{2}\ \sin\frac{\beta-\gamma}{2}\ \cos\frac{\gamma-\alpha}{2}$

C. $2ab\ \sin\frac{\alpha-\beta}{2}\ \sin\frac{\beta-\gamma}{2}\ \sin\frac{\gamma-\alpha}{2}$

D. $2ab\ \cos\frac{\alpha-\beta}{2}\ \cos\ \frac{\beta-\gamma}{2}\ \cos\ \frac{\gamma-\alpha}{2}$

Answer: C

Watch Video Solution

13. If the chord joining points $P(\alpha) and Q(\beta)$ on the ellipse $\left(\frac{x^2}{a^2}\right)+\left(\frac{y^2}{b^2}\right)=1$ subtends a right angle at the vertex $A(a,0)$, then prove that $\tan\left(\frac{a}{2}\right)\tan\left(\frac{\beta}{2}\right)=-\frac{b^2}{a^2}$.

A. a^2/b^2

B. $-a^2/b^2$

C. b^2/a^2

D. $-b^2/a^2$

Answer: D

Watch Video Solution

14. If $P(\alpha, \beta)$ is appoint on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with foci $SandS'$ and eccentricity $e,$ then prove that the area of SPS' is be $\sqrt{a^2 - \alpha^2}$

A. $ae\sqrt{a^2 - \alpha^2}$

B. $be\sqrt{b^2 - \alpha^2}$

C. $ae\sqrt{b^2 - \alpha^2}$

D. $be\sqrt{a^2 - \alpha^2}$

Answer: D

Watch Video Solution

15. The tangent at any point P on the ellipse meets the tangents at the vertices A & A^1 of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at L and M respectively. Then $AL.\ A^1M =$

A. $a + b$

B. $a^2 + b^2$

C. a^2

D. b^2

Answer: D

Watch Video Solution

16. P is a point on the circle $x^2 + y^2 = c^2$. The locus of the mid-points of chords of contact of P with respect to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, is

A. $c^2\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right) = x^2 + y^2$

B. $c^2\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right)^2 = x^2 + y^2$

C. $c^2\left(\frac{x^2}{a^2} + \frac{y^2}{b^2}\right) = \left(x^2 + y^2\right)^2$

D. none of these

Answer: A

Watch Video Solution

17. The locus of the poles of normal chords of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is

A. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=a^2+b^2$

B. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=a^2-b^2$

C. $\frac{a^6}{x^2}+\frac{b^6}{y^2}=\left(a^2-b^2\right)^2$

D. $\frac{a^4}{x^2}+\frac{b^4}{y^2}=\left(a^2-b^2\right)^2$

Answer: C

Watch Video Solution

18. The locus of mid-points of a focal chord of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x}{a^2}$

B. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{ex}{a^2}$

C. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{x^2}{a^4}$

D. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{ex}{a}$

Answer: B

Watch Video Solution

19. The locus of points whose polars with respect to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ are at a distance d from the centre of the ellipse, is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{d^2}$

B. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\frac{1}{d^2}$

C. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{d^4}$

D. none of these

Answer: B

Watch Video Solution

20. if the chord of contact of tangents from a point P to the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ subtends a right angle at the centre, then the locus of P is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{a^2}+\frac{1}{b^2}$

B. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\left(\frac{1}{a}+\frac{1}{b}\right)^2$

C. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{a^4}+\frac{1}{b^4}$

D. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\frac{1}{a^2}+\frac{1}{b^2}$

Answer: D

Watch Video Solution

21. The locus of the poles of tangents to the auxiliary circle with respect to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{a^2}$

B. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\frac{1}{b^2}$

C. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\frac{1}{a^2}$

D. none of these

Answer: C

Watch Video Solution

22. The locus of the poles of tangents to the director circle of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ with respect to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

A. $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{a^2+b^2}$

B. $\frac{x^2}{a^4}+\frac{y^2}{b^4}=\frac{1}{a^2+b^2}$

C. $\frac{x^2}{a^6}+\frac{y^2}{b^6}=\frac{1}{a^2+b^2}$

D. none of these

Answer: B

Watch Video Solution

23. P is a point on the circle $x^2+y^2=c^2$. The locus of the mid-points of chords of contact of P with respect to $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1,$ is

A. $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)^2=\frac{x^2}{a^4}+\frac{y^2}{b^4}$

B. $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)^2=b^2\left(\frac{x^2}{a^4}+\frac{y^2}{b^4}\right)$

C. $\left(\frac{x^2}{a^2}+\frac{y^2}{b^2}\right)^2=a^2\left(\frac{x^2}{a^4}+\frac{y^2}{b^4}\right)$

D. none of these

Answer: B

Watch Video Solution

24. If the tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ makes intercepts p and q on the coordinate axes, then $\frac{a^2}{p^2}+\frac{b^2}{q^2}=$

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

25. If the tangents to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ make angles $\alpha and \beta$ with the major axis such that $\tan\alpha+\tan\beta=\gamma,$ then the locus of their point of intersection is $x^2+y^2=a^2$ (b) $x^2+y^2=b^2$ $x^2-a^2=2\lambda xy$ (d) $\lambda\left(x^2-a^2\right)=2xy$

A. $x^2+y^2=a^2$

B. $x^2+y^2=b^2$

C. $x^2-a^2=2\lambda xy$

D. $\lambda\left(x^2-a^2\right)=2xy$

Answer: D

Watch Video Solution

26. If C is centre of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and the normal at an end of a latusrectum cuts the major axis in G, then CG =

A. ae

B. a^2e^2

C. ae^3

D. a^2e^3

Answer: C

Watch Video Solution

27. If the normals at $P(\theta)$ and $Q\left(\frac{\pi}{2}+\theta\right)$ to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meet the major axis at $Gandg$, respectively, then $PG^2+Qg^2=$

$b^2(1-e^2)(2-e)^2$ $a^2(e^4-e^2+2)$ $a^2(1+e^2)(2+e^2)$

$b^2(1+e^2)(2+e^2)$

A. $b^2(1-e^2)(2-e^2)$

B. $a^2(1-e^2)(2-e^2)$

C. $a^2(1+e^2)(2+e^2)$

D. $b^2(1+e^2)(2+e^2)$

Answer: B

Watch Video Solution

28. If a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, whose centre is C, meets the major and the minor axes at P and Q respectively then $\frac{a^2}{CP^2}+\frac{b^2}{CQ^2}$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

29. The tangent at point P on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ cuts the minor axis in Q and PR is drawn perpendicular to the minor axis. If C is the centre of the ellipse, then $CQ \cdot CR =$

A. b^2

B. $2b^2$

C. a^2

D. $2a^2$

Answer: A

Watch Video Solution

30. If the lengths of major and semi-minor axes of an ellipse are 4 and $\sqrt{3}$ and their corresponding equations are y - 5 = 0 and x + 3 = 0, then the equation of the ellipse, is

A. $3x^2 + 4y^2 + 18x - 40y + 115 = 0$

B. $4x^2 - 3y^2 - 24x + 30y + 99 = 0$

C. $3x^2 - 4y^2 - 18x + 40y + 115 = 0$

D. $4x^2 + 3y^2 + 24x - 30y + 99 = 0$

Answer: A

Watch Video Solution