MATHS

BOOKS - PREMIERS PUBLISHERS

TWO DIMENSIONAL ANALYTICAL GEOMETRY - II

Worked Examples

1. Find the equation of circle with centre at $(-3, 2)$ and radius 4 units.

Watch Video Solution

2. Check whether the line $2x + y - 2 = 0$ can be diameter of the circle $x^2 + y^2 - 6x + 8y - 11 = 0.$

Watch Video Solution

3. Find the equation of the circle on the line joining the points $(-2, 3)$ and $(1, -2)$ as diameter.

Watch Video Solution

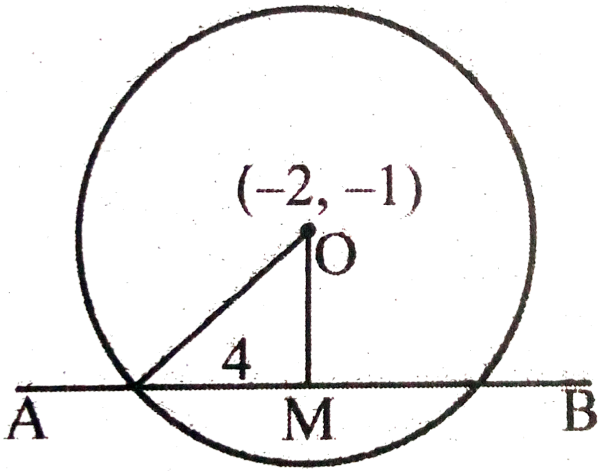
4. Examine the position of the point $(-2, -3)$ with respect to the circle $x^2 + y^2 - x - y - 7 = 0$.

Watch Video Solution

5. The line $5x + 3y - 15 = 0$ meets the coordinate axes at A and B. Find the equation of the circle drawn on AB as diameter.

Watch Video Solution

6. A line $4x - 3y + 20 = 0$ cuts a chord of length 8 units on a circle with centre at $(-2, -1)$. Find the equation of the circle.



Watch Video Solution

7. Find the centre and radius of the circle $5x^2 + (2a+1)y^2 + 10x - 20y + (a+3) = 0$.

Watch Video Solution

8. Find the equation of the circle passing through the points $(1, -2), (2, -1), (3, 1)$.

Watch Video Solution

9. Find the equations of the tangent and normal to the circle $x^2 + y^2 = 169$ at the point $(5, 12)$.

Watch Video Solution

10. If $y = 2x + c$ is tangent to the circle $x^2 + y^2 = 16$ find c.

Watch Video Solution

11. Find the equation of the circle with the line joining (2,3) and $(-2, -1)$ as diameter. Find the equation of the tangent at the point (2,3) to this circle.

Watch Video Solution

12. Find the length of the Latus rectum of the parabola $y^2 = 4ax$.

Watch Video Solution

13. Find the length of Latus rectum of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$

Watch Video Solution

14. Find the equation of the parabola with focus (-1,0) and directrix x = 1.

Watch Video Solution

15. Find the equation of the parabola whose vertex is (4, -2) and focus is (1, -2).

Watch Video Solution

16. Find the equation of the parabola whose vertex is (4,1) and focus is (4,-3).

Watch Video Solution

17. Find the equation of the parabola with vertex (2,1) open right ward and passing through (6,5).

Watch Video Solution

18. Find the eqution of the ellipse with focii $(\pm 3, 0)$ and vertices $(\pm 4, 0)$.

Watch Video Solution

19. Find the equation of the ellipse whose one of the foci is (2,0) and the corresponding directrix is x = 8 and eccentricity is $\frac{1}{2}$.

Watch Video Solution

20. Find the foci, vertices, length of major axis and minor axis of the ellipse.

$6x^2 + 9y^2 + 12x - 36y - 12 = 0$

Watch Video Solution

21. For the ellipse $4x^2 + 3y^2 + 8x + 12y + 4 = 0$. Find the centre, vertices, foci and latus rectum.

Watch Video Solution

22. Find the equation of the hyperbola with vertices $(0, \pm 3)$ and focii $(0, \pm 5)$.

Watch Video Solution

23. Find the eccentricity, centre, foci and vertices of the hyperbola $5x^2 - 4y^2 = 20$.

Watch Video Solution

24. Find the eccentricity, centre, foci and vertices of the hyperbola $9x^2 - 16y^2 - 18x - 64y - 199 = 0$.

Watch Video Solution

25. The orbit of Halley's comet is an ellipse 36.18 astronomical units long and 9.12 astronomical units wide. Find its eccentricity.

Watch Video Solution

26. Identify the type of conic for the following equation.

$8y^2 = -3x^2 + 48$

Watch Video Solution

27. Identify the type of conic for the following equation.

$$x^2 + y^2 + 12x - 3y + 6 = 0$$

Watch Video Solution

28. Identify the type of conic for the following equation.

$$y^2 - 2x - y - 3 = 0$$

Watch Video Solution

29. Identify the type of conic for the following equation.

$9x^2 - 4y^2 - 18x + 8y - 25 = 0$

Watch Video Solution

30. Find the equations of tangent and normal to the parabola $y^2 + 6y + 4x + 5$ at $(-3, 1)$.

Watch Video Solution

31. Find the equation of tangent nad normal to the ellipse $4x^2 + y^2 = 32$ at $\theta = \frac{\pi}{4}$.

Watch Video Solution

32. The focus of a parabolic mirror is at a distance of 50 cm from its centre (vertex). If the mirror is 75 cm deep. Find diameter of the mirror.

Watch Video Solution

33. The maximum and minimum distances of the Earth from the Sun respectively are 152×10^6 km and 94.5×10^6 km. the Sun is at one focus of the elliptical orbit. Find the distance from the sun to the other focus.

Watch Video Solution

34. A cable of a suspension bridge is in the form of a parabola whose span is 40m. The road way is 5m below the lowest point of the cable. If an extra support is provided across

the cable 30m above the ground level. Find the length of the support if the height of the pillars are 55 mts.

Watch Video Solution

35. A concrete bridge is designed as a parabolic arch. The road over bridge is 60 m long and the maximum height of the arch is 15m. What is the equation of the parabola.

Watch Video Solution

36. The parabolic communication antenna has a focus at 3m distance from the vertex of the antenna. Find the width of the antenna 8m from the vertex.

Watch Video Solution

37. The parabolic mirrors that are used for solar energy has the equation $y = \frac{1}{36}x^2$. There is a heating tube located at the focus of each parabola. How high is this tube located above the vertex of the parabola.

Watch Video Solution

38. The arch of a bridge is the shape of a semi ellipse having a horizontal span of 40 m and 16 m highest the centre. How high is the arch, 10m from the right/ left of the centre.

Watch Video Solution

39. The maximum and minimum distance of a satellite moving around the earth is an elliptic

orbit having the earth at a focus are 82000 km and 24000 km. Find the distance of earth from other focus.

View Text Solution

40. An equation of the elliptical part of an optical lens system is $\frac{x^2}{25} + \frac{y^2}{9} = 1$. The parabolic part of the system has a focus in common with right focus of the ellipse. The vertex of the parabola is at the orgin and the

prabola opens to the right. Find the equation of the parabola.

Watch Video Solution

Solution To Exercise 5 1

1. Obtain the equation of the circles with radius 5 cm and touching x-axis at the origin in general form.

Watch Video Solution

2. Find the equation of the circlue with centre (2,-1) and passing through the point (3,6) in standard form.

3. find the equation of the circle with centre (2,3) and passing through the intersection of the lines 3x -2y -1=0 and 4x + y -27 =0 ..

4. Obtain the equation of the circle for which (3,4) and (2,-7) are the ends of a diameter.

Watch Video Solution

5. Find the equation of the circle through the points (1 ,0), (-1,0) and (0,1)

Watch Video Solution

6. A circle of area 9π square units has two of its diameters along the lines x + y =5 and x-y =1

. Find the equation of the circle.

Watch Video Solution

7. If $y = 2\sqrt{2}x + c$ is a tangent to the circle $x^2 + y^2 = 16$, find the value of c.

Watch Video Solution

8. Find the equation of the tengent and normal to the circle $x^2 + y^2 - 6x + 6y - 8 = 0at(2, 2)$

Watch Video Solution

9. Determine whether the points (-2,1) ,(0,0) and (-4,-3) lie outside, on or inside the circle $x^2 + y^2 - 5x + 2y - 5 = 0$

Watch Video Solution

10. Find centre and radius of the following circles.

(i) $x^2 + (y + 2)^2 = 0$

(ii) $x^2 + y^2 + 6x - 4y + 4 = 0$

(iii) $x^2 + y^2 - x + 2y - 3 = 0$

(iv) $2x^2 + 2y^2 - 6x + 4y + 2 = 0$

Watch Video Solution

11. Find centre and radius of the following circles.

(i) $x^2 + (y + 2)^2 = 0$

(ii) $x^2 + y^2 + 6x - 4y + 4 = 0$

(iii) $x^2 + y^2 - x + 2y - 3 = 0$

(iv) $2x^2 + 2y^2 - 6x + 4y + 2 = 0$

Watch Video Solution

12. Find centre and radius of the following circles.

(i) $x^2 + (y + 2)^2 = 0$

(ii) $x^2 + y^2 + 6x - 4y + 4 = 0$

(iii) $x^2 + y^2 - x + 2y - 3 = 0$

(iv) $2x^2 + 2y^2 - 6x + 4y + 2 = 0$

Watch Video Solution

13. Find centre and radius of the following circles.

(i) $x^2 + (y+2)^2 = 0$

(ii) $x^2 + y^2 + 6x - 4y + 4 = 0$

(iii) $x^2 + y^2 - x + 2y - 3 = 0$

(iv) $2x^2 + 2y^2 - 6x + 4y + 2 = 0$

Watch Video Solution

14. If the equation $3x^2 + (3-p)xy + qy^2 - 2px = 8pq$

represents a circle, find p and q. Also determine the centre and radius of the centre.

Watch Video Solution

Solution To Exercise 5 2

1. Find the equation of the parabola in each of the case given below :

(i) Focus (4,0) and direction x = -4.

(ii) passes through (2,-3) and symmetric about y-axis.

(iii) vertex (1,-2) and forus (4,-2)

(iv) end points of latus rectun (4,-8) and (4,8)

Watch Video Solution

2. Find the equation of the parabola with vertex at the origin , passing through (2,-3) and symmetric about x-axis.

Watch Video Solution

3. Find the equation of the parabola in each of the case given below :

(i) Focus (4,0) and direction x = -4.

(ii) passes through (2,-3) and symmetric about y-axis.

(iii) vertex (1,-2) and forus (4,-2)

(iv) end points of latus rectun (4,-8) and (4,8)

 Watch Video Solution

4. Find the equation of the parabola in each of the case given below :

(i) Focus (4,0) and direction x = -4.

(ii) passes through (2,-3) and symmetric about y-axis.

(iii) vertex (1,-2) and forus (4,-2)

(iv) end points of latus rectun (4,-8) and (4,8)

 Watch Video Solution

5. Find the equation of the ellipse in each of the cases given below :

(i) foci $(- + 3, 0), e = \frac{1}{2}$

(ii) foci $(0, - + 4)$ and end points of major axis are $(0 - + 5)$

(iii) length of lagtus rectum 8, eccentricity $= \frac{3}{5}$ and major axis on x-axis .

(iv) length of latus rectum 4, distance between foci $4\sqrt{2}$ and major axis as y -axis.

Watch Video Solution

6. Find the equation of the ellipse in each of the cases given below :

(i) foci $(- + 3, 0), e = \frac{1}{2}$

(ii) foci $(0, - + 4)$ and end points of major axis are $(0 - + 5)$

(iii) length of lagtus rectum 8, eccentricity $= \frac{3}{5}$ and major axis on x-axis .

(iv) length of latus rectum 4, distance between foci $4\sqrt{2}$ and major axis as y -axis.

Watch Video Solution

7. Find the equation of the ellipse in each of the cases given below :

(i) foci $(- + 3, 0), e = \frac{1}{2}$

(ii) foci $(0, - + 4)$ and end points of major axis are $(0 - + 5)$

(iii) length of lagtus rectum 8, eccentricity $= \frac{3}{5}$ and major axis on x-axis .

(iv) length of latus rectum 4, distance between foci $4\sqrt{2}$ and major axis as y -axis.

Watch Video Solution

8. Find the equation of the ellipse in each of the cases given below :

(i) foci $(- + 3, 0), e = \frac{1}{2}$

(ii) foci $(0, - + 4)$ and end points of major axis are $(0 - + 5)$

(iii) length of lagtus rectum 8, eccentricity $= \frac{3}{5}$ and major axis on x-axis .

(iv) length of latus rectum 4, distance between foci $4\sqrt{2}$ and major axis as y -axis.

Watch Video Solution

9. Find the equation of the hyperbola in each of the cases given below :

(i) foci $(- \ + 2, 0)$ eccentricity = $\frac{3}{2}$

(ii) Centre (2, 1) one of the foci (8,1) and corresponding directrix x = 4.

(iii) Passing through (5,-2) and length of the transverse axis along x axis and of length 8 units.

Watch Video Solution

10. Find the equation of the hyperbola in each of the cases given below :

(i) foci $(- \ + 2, 0)$ eccentricity = $\frac{3}{2}$

(ii) Centre (2, 1) one of the foci (8,1) and corresponding directrix x = 4.

(iii) Passing through (5,-2) and length of the transverse axis along x axis and of length 8 units.

Watch Video Solution

11. Find the equation of the hyperbola in each of the cases given below :

(i) foci $(- \ + 2, 0)$ eccentricity = $\frac{3}{2}$

(ii) Centre (2, 1) one of the foci (8,1) and corresponding directrix x = 4.

(iii) Passing through (5,-2) and length of the transverse axis along x axis and of length 8 units.

Watch Video Solution

12. Find the vertex ,focus , equation of directrix , and length of latus rectam of the following :

$(i) y^2 = 16x$ (ii) $x^2 = 24y$

(iii) $y^2 = -8x$ (iv) $x^2 - 2x + 8y + 17 = 0$

(v) $y^2 - 4y - 8x + 12 = 0$

Watch Video Solution

13. Find the vertex ,focus , equation of directrix , and length of latus rectam of the following :

$(i) y^2 = 16x$ (ii) $x^2 = 24y$

(iii) $y^2 = -8x$ (iv) $x^2 - 2x + 8y + 17 = 0$

(v) $y^2 - 4y - 8x + 12 = 0$

Watch Video Solution

14. Find the vertex ,focus , equation of directrix , and length of latus rectam of the following :

$(i) y^2 = 16x$ (ii) $x^2 = 24y$

(iii) $y^2 = -8x$ (iv) $x^2 - 2x + 8y + 17 = 0$

(v) $y^2 - 4y - 8x + 12 = 0$

Watch Video Solution

15. Find the vertex ,focus , equation of directrix , and length of latus rectam of the following :

$(i) y^2 = 16x$ (ii) $x^2 = 24y$

(iii) $y^2 = -8x$ (iv) $x^2 - 2x + 8y + 17 = 0$

(v) $y^2 - 4y - 8x + 12 = 0$

Watch Video Solution

16. Find the vertex ,focus , equation of directrix , and length of latus rectam of the following :

$(i) y^2 = 16x$ (ii) $x^2 = 24y$

(iii) $y^2 = -8x$ (iv) $x^2 - 2x + 8y + 17 = 0$

(v) $y^2 - 4y - 8x + 12 = 0$

Watch Video Solution

17. Identify the type of conic and find centre, foci, vertices and directries of each of the following :

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

(ii) $\frac{x^2}{3} + \frac{y^2}{10} = 1$

(iii) $\frac{x^2}{25} - \frac{y^2}{144} = 1$

(iv) $\frac{y^2}{16} - \frac{x^2}{9} = 1$

Watch Video Solution

18. Identify the type of conic and find centre, foci, vertices and directries of each of the following :

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

(ii) $\frac{x^2}{3} + \frac{y^2}{10} = 1$

(iii) $\frac{x^2}{25} - \frac{y^2}{144} = 1$

(iv) $\frac{y^2}{16} - \frac{x^2}{9} = 1$

Watch Video Solution

19. Identify the type of conic and find centre, foci, vertices and directries of each of the following :

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

(ii) $\frac{x^2}{3} + \frac{y^2}{10} = 1$

(iii) $\frac{x^2}{25} - \frac{y^2}{144} = 1$

(iv) $\frac{y^2}{16} - \frac{x^2}{9} = 1$

Watch Video Solution

20. Identify the type of conic and find centre, foci, vertices and directries of each of the following :

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

(ii) $\frac{x^2}{3} + \frac{y^2}{10} = 1$

(iii) $\frac{x^2}{25} - \frac{y^2}{144} = 1$

(iv) $\frac{y^2}{16} - \frac{x^2}{9} = 1$

Watch Video Solution

21. Prove that the length of the latusrection of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is $\frac{2b^2}{a}$

Watch Video Solution

22. show that the absolute value of the focal distances of any point P on the hyperbola in the length of its transverse axis.

Watch Video Solution

23. Identify the type of conic and find centre, foci, vertices, and directices of each of the following:

$$\frac{(x-3)^2}{225}+\frac{(y-4)^2}{289}=1$$

View Text Solution

24. Identify the type of conic and find centre, foci, vertices, and directices of each of the following:

$$\frac{(x+1)^2}{100}+\frac{(y-2)^2}{64}=1$$

Watch Video Solution

25. Identify the type of conic and find centre, foci, vertices, and directices of each of the following:

$$\frac{(x+3)^2}{225} - \frac{(y-4)^2}{64} = 1$$

Watch Video Solution

26. Identify the type of conic and find centre, foci, vertices, and directices of each of the

following:

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

Watch Video Solution

27. Identify the type of conic and find centre, foci, vertices, and directices of each of the following:

$$18x^2 + 12y^2 - 144x + 48y + 120 = 0$$

Watch Video Solution

28. Identify the type of conic and find centre, foci, vertices, and directices of each of the following:

$9x^2 - y^2 - 36x - 6y + 18 = 0$

Watch Video Solution

Solution To Exercise 5 3

1. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

2. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

3. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

4. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

5. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

6. Identify the type of conic section for each of the equations

1. $2x^2 - y^2 = 7$

2. $3x^2 + 3y^2 - 4x + 3y + 10 = 0$

3. $3x^2 + 2y^2 = 14$

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

5. $11x^2 - 25y^2 - 44x + 50y - 256 = 0$

6. $y^2 + 4x + 3y + 4 = 0$

Watch Video Solution

Solution To Exercise 5 4

1. Find the equations of the two tangents that can be drawn from (5,2) to the ellispse $2x^2 + 7y^2 = 14$

Watch Video Solution

2. Find the equations of tangents to the hyperbola $\frac{x^2}{16} - \frac{y^2}{64} = 1$ which are parallelto $10x - 3y + 9 = 0$

Watch Video Solution

3. Show that the line x-y + 4 =0 is a tangents to the ellipse $x^2 + 3y^2 = 12$. Also find the coordinates of the points of contact.

Watch Video Solution

4. Find the equation of th tangen to the parabola $y^2 = 16x$ perpendicular to $2x + 2y + 3 = 0$

Watch Video Solution

5. Find the equation of the tangent at t =2 to the parabola $y^2 = 8x$.

Watch Video Solution

6. Find the equations of the tangent and normal to hyperbola $12x^2 - 9y^2 = 108 \ \text{at}\theta = \frac{\pi}{3}.$

Watch Video Solution

7. Prove that the point of intersection of the tangents at t_1 and t_2 on the parabola $y^2 = 4ax$ is (at1t2,a(t1+t2))

Watch Video Solution

8. if the normal at the point t_1 on the parabola $y^2 = 4ax$ meets the parabola again in the point t_2 then prove that $t_2 = -\left(t_1 + \frac{2}{t_1}\right)$

Watch Video Solution

Solution To Exercise 5 5

1. A bridge has a parabolic arch that is 10 m high in the centre and 30 m wide at the bottom. Find the height of the arch 6m from the centre, on either sides.

Watch Video Solution

2. A tunnel through a mountain for a four lane highway is to have a elliptical opening. The total width of the highway (not the opening) is to be 16m , and the height at the edge of the road must be sufficient for a truck 4m high to clear if the highest point of the opening is to be 5m approximately. How wide must the opening be ?

Watch Video Solution

3. At a water fountain , water attains a maximum height of 4m at horizontal distance of 0.5 m from its origin. If the path of water is a parabola, find the height of water at a horizontal distance of 0.75 m from the point or origin.

Watch Video Solution

4. An engineer designs a satellite dish with a parabolic cross section . The dish is 5m wide at

the opening, and the focus is placed 1.2 m from the vertex.

(a) Position a coordinate system with the origin at the vertex and the x-axis on the parabola 's axis of symmetry and find an equation of the parabola.

(b) find the depth of the satellite dish at the vertex.

Watch Video Solution

5. An engineer designs a satellite dish with a parabolic cross section . The dish is 5m wide at the opening, and the focus is placed 1.2 m from the vertex.

(a) Position a coordinate system with the origin at the vertex and the x-axis on the parabola 's axis of symmetry and find an equation of the parabola.

(b) find the depth of the satellite dish at the vertex.

Watch Video Solution

6. Parabolic cable of a 60m portion of the roadbed of a suspension bridge are positioned as shown below. Vertical Cables are to be spaced every 6m along this portion of the roadbed. Calculate the lengths of first two of these vertical cables from the vertex.

Watch Video Solution

7. Cross section of a Nuclear cooling towar is in the shape of a hyperbola with equation

$\frac{x^2}{30^2} - \frac{y^2}{44^2} = 1$. The towar is 150 m tall and the distance from the top of the towar to the centre of the hyperbola is half the distance from the base of the towar to the centre of the hyperbola. Find the diameter of the top and base of the tower.

Watch Video Solution

8. A rod of length 1.2 m moves with its ends always touching the coordinate axes. The locus of a point Pon the rod, which is 0.3 m

from the end in contact with x-axis is an ellipse. Find the eccentricity.

Watch Video Solution

9. Assume that water issuing from the end of a horizontal pipe. 7.5 m above the ground describes a parabolic path. The vertex of the parabolic path . The vertex of the parabolic path is at the end of the pipe. At a position 2.5 m below the line of the pipe . At a position 2.5 m below the line of the pipe , the flow of water

has curved outward 3m beyond the vertical line through the end of the pipe. How far beyond this vertical line will the water strike the ground ?

Watch Video Solution

10. On lighting a rocket cracker it gets projected in a parabolic path and reaches a maximum height of 4m when it is 6 m away from the point of projection. Finally it reaches

the ground 12 m away from the starting point. Find the angle of projection.

Watch Video Solution

11. Points A and B are 10 km apart and it is determined from the sound of an explosion heard at those points at different times that the location of the explosion is 6 km closer to A than B. Show that the location of the explosion is restricted to a particular curve and find an equation of it.

Watch Video Solution

Solution To Exercise 5 6

1. The equation of the circle passing through (1,5) and (4,1) and touching y-axis is $x^2 + y^2 - 5x - 6y + 9 + \lambda(4x + 3y - 19) = 0$ where λ is equal to

A. $0, -\frac{40}{9}$

B. 0

C. $\frac{40}{9}$

D. $-\frac{40}{9}$

Answer: A

Watch Video Solution

2. The eccentricity of the yhyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is

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

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

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

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

Answer: C

Watch Video Solution

3. The circle $x^2 + y^2 = 4x + 8y + 5$ intersects the line 3x -4y =m at two distinct points if

A. $15 < m < 65$

B. $35 < m < 85$

C. $-85 < m < -35$

D. $-35 < m < 15$

Answer: D

Watch Video Solution

4. The length of the diameter of the circle which touches the x-axis at the point (1,0) and passes through the point (2,3)

A. $\frac{6}{5}$

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

C. $\frac{10}{3}$

D. $\frac{3}{5}$

Answer: C

Watch Video Solution

5. The radius of the circle

$3x^2 + by^2 + 4bx - 6by + b^2 = 0$

A. 1

B. 3

C. $\sqrt{10}$

D. $\sqrt{11}$

Answer: C

Watch Video Solution

6. The centre of the circle inscribed in a square formed by the lines $x^2 - 8x + 12 = 0$ and $y^2 - 14 + 45 = 0$ is

A. $(4, 7)$

B. $(7, 4)$

C. $(9, 4)$

D. $(4, 9)$

Answer: A

 Watch Video Solution

7. The equation of the normal to the circle $x^2 + y^2 - 2x - 2y + 1 = 0$ which is parallel to the lines 2x + 4y =3 is

A. $x + 2y = 3$

B. $x + 2y + 3 = 0$

C. $2x + 4y + 3 = 0$

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

Answer: A

Watch Video Solution

8. If P (x,y) be any point on $16x^2 + 25y^2 = 400$ with foci $F_1(3, 0)$ and $F_2(-3, 0)$ then $PF_1 + PF_2$ is

A. 8

B. 6

C. 10

D. 12

Answer: C

Watch Video Solution

9. The radius of the circle passing through the point (6,2) two of whose diameter are x+y =6 and x + 2y =4 is

A. 10

B. $2\sqrt{5}$

C. 6

D. 4

Answer: B

Watch Video Solution

10. The area of quardrilateral formed with foci of the hyperbolas

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and $\frac{x^2}{a^2} - \frac{y^2}{b^2} = -1$ is

A. $4(a^2 + b^2)$

B. $2(a^2 + b^2)$

C. $a^2 + b^2$

D. $\frac{1}{2}(a^2 + b^2)$

Answer: B

Watch Video Solution

11. If the normals of the paralbola $y^2=4x$ drawn at the end points of its latus rectum are tangents to the circle $(x-3)^2 + (y+2)^2 = r^2$ then the value of r^2 is

A. 2

B. 3

C. 1

D. 4

Answer: A

Watch Video Solution

Watch Video Solution

12. If x + y = k is a normal to the parabola $y^2 = 12x$ then the value of k is

A. 3

B. -1

C. 1

D. 9

Answer: D

Watch Video Solution

13. 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 ellispe is

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

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

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

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

Answer: C

Watch Video Solution

14. Tangents are drawn to the hyperbola $\frac{x^2}{9} - \frac{y^2}{4}$ parallel to the straight line 2x - y= 1 . One of the points of contact of tangents on the hyperbola is `

A. $\left(\frac{9}{2\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)$

B. $\left(\frac{-9}{2\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

C. $\left(\frac{9}{2\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

D. $(3\sqrt{3}, -2\sqrt{2})$

Answer: C

Watch Video Solution

15. The equation of the circle passing through the foci ellispe $\frac{x^2}{16} + \frac{y^2}{9} = 1$ 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

16. Let C be the circle with centre at (1,1) and radius =1 . If T is the circle centered at (0,y) passing through the origin and touching the

circle C externally. Then the radius of T is equal to

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

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

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

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

Answer: D

Watch Video Solution

17. Consider an ellispe whose centre is of the origin and its major axis is along x-axis. If its eccentiricity is $\frac{3}{5}$ and the distance between its foci is 6, then the area of the quadrilateral insricbed in the ellipse with diagonals as major and minor axis of the ellipse is

A. 8

B. 32

C. 80

D. 40

Answer: D

Watch Video Solution

18. Area of the greatest rectangle inscribed in the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

A. $2ab$

B. ab

C. $\sqrt{ab}$

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

Answer: A

Watch Video Solution

19. 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 :

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

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

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

D. $\frac{1}{\sqrt{3}}$

Answer: A

Watch Video Solution

20. The eccentricity of the ellispse $(x-3)^2+(y-4)^2=\frac{y^2}{9}$ is

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

B. $\frac{1}{3}$

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

D. $\frac{1}{\sqrt{3}}$

Answer: B

Watch Video Solution

21. If the two tangents drawn from a point P to the parabola $y^2 = 4x$ are at right angles then the locus of P is

A. $2x + 1 = 0$

B. $x = -1$

C. $2x - 1 = 0$

D. $x = 1$

Answer: B

Watch Video Solution

22. The circle passing through (1,-2) and touching the axis of x at (3,0) passing through the point

A. $(-5, 2)$

B. $(2, -5)$

C. $(5, -2)$

D. $(-2, 5)$

Answer: C

Watch Video Solution

23. The locus of a point whose distance from $(-2, 0)$ is $\frac{2}{3}$ times its distance from the line $x = \frac{-9}{2}$ is

A. a parabola

B. a hyperbola

C. an ellipse

D. a circle

Answer: C

Watch Video Solution

24. The values of m for which the lines y = mx + $2\sqrt{5}$ touches the hyperbola $16x^2 - 9y^2 = 144$ are the roots of $x^2 - (a+b)x - 4 = 0$ then the value of (a+b) is

A. 2

B. 4

C. 0

D. -2

Answer: C

Watch Video Solution

25. If the coordinates at one end of a diameter of the circle $x^2 + y^2 - 8x - 4y + c = 0$ are (11,2) the coordinates of the other end are

A. $(-5, 2)$

B. $(2, -5)$

C. $(5, -2)$

D. $(-2, 5)$

Answer: C

Watch Video Solution

Problems For Practice

1. The point of intersection of the tangent at $'t_1'$ and $'t_2'$ to the parabola $y^2 = 4x$ is:

A. $(3t^2, 4t)$

B. $(4t^2, 3t)$

C. $(8t^2, 6t)$

D. $(6t^2, 8t)$

Answer: D

View Text Solution

2. The latus rectum of the parabola $y^2 - 4x + 4y + 8 = 0$ is:

A. 12

B. 2

C. 4

D. 8

Answer: C

Watch Video Solution

3. The point of contact of the tangent $2x + 3y + 9 = 0$ to the parabola $y^2 = 8x$ is:

A. $\left(-6, \frac{9}{2}\right)$

B. $\left(\frac{9}{2}, -6\right)$

C. $\left(\frac{9}{2}, 6\right)$

D. $\left(6, \frac{9}{2}\right)$

Answer: B

Watch Video Solution

4. The eccentricity of the ellipse $9x^2 + 5y^2 - 54x - 40y + 116 = 0$ is:

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

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

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

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

Answer: A

Watch Video Solution

5. The area of the directrix circle of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is:

A. 25π

B. 10π

C. 15π

D. 5π

Answer: A

View Text Solution

6. If the length of the latus rectum is half the length of the conjucate axes of a hyperbola then its eccentricity is:

A. $\sqrt{5}$

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

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

D. $2\sqrt{5}$

Answer: B

View Text Solution

7. The locus of the point of intersection of perpendicular tangents to the hyperbola

$\frac{x^2}{25} - \frac{y^2}{9}$ is:

A. $x^2 + y^2 = 34$

B. $x^2 + y^2 = 13$

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

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

Answer: C

Watch Video Solution

8. The equation of the tangent to the parabola $y^2 = 16x$ inclined at 60° to x axis is:

A. $3x + \sqrt{3}y - 4 = 0$

B. $3x + \sqrt{3}y + 4 = 0$

C. $3x - \sqrt{3}y - 4 = 0$

D. $3x - \sqrt{3}y + 4 = 0$

Answer: D

Watch Video Solution

9. The equation of conic with focus $(-2, 1)$ and directrix $3x - y + 2 = 0$ is:

A. $x^2 + 6xy + 9y^2 + 28x - 16y + 46 = 0$

B. $x^2 - 6xy + 9y^2 + 28x - 16y + 46 = 0$

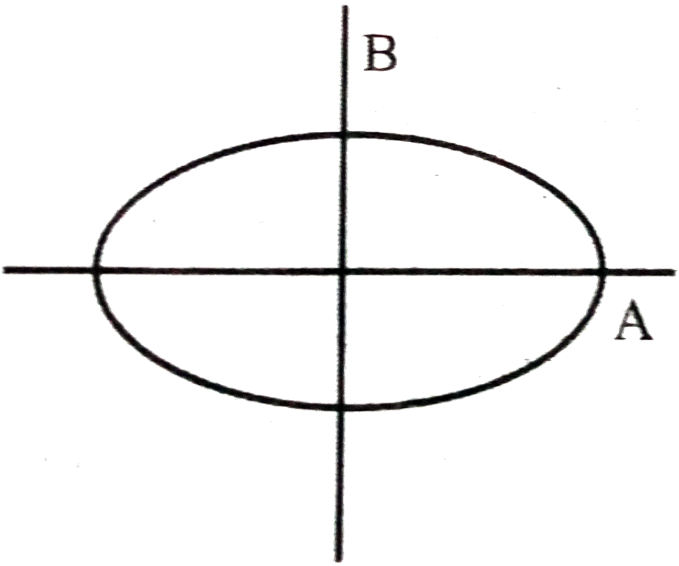
C. $x^2 - 6xy + 9y^2 + 28x + 16y + 46 = 0$

D. $x^2 + 6xy + 9y^2 + 28y - 16x - 46 = 0$

Answer: A

View Text Solution

10. The ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ has the points A and B as shown here. Find the equation of the circle on AB as diameter.



A. $x^2 + y^2 - 2ax - 2by = 0$

B. $x^2 + y^2 - ax - by = 0$

C. $x^2 + y^2 + ax + by = 0$

D. $x^2 + y^2 + 2ax + 2by = 0$

Answer: B

View Text Solution

11. The point of contact of the line $2x - y + 2 = 0$ with the parabola $y^2 = 16x$ is:

A. $(2, 4)$

B. $(3, 4)$

C. $(1, 4)$

D. $(-2, 1)$

Answer: C

Watch Video Solution

12. The radius of the director circle of the hyperbola $\frac{x^2}{25} - \frac{y^2}{9} = 1$ is:

A. $\sqrt{34}$

B. 34

C. 16

D. 4

Answer: D

Watch Video Solution

13. If $4x + y + k = 0$ is a tangent to the ellipse $x^2 + 3y^2 = 3$ then k = ?

A. 7

B. ± 6

C. ± 5

D. ± 7

Answer: D

Watch Video Solution

14. The tangent to the hyperbola $3x^2 - y^2 = 3$ parallel to $2x - y + 4 = 0$ is:

A. $2x - y - 3 = 0$

B. $2x - y + 1 = 0$

C. $2x + y \pm 1 = 0$

D. $2x - y - 1 = 0$

Answer: C

Watch Video Solution

15. The eccentricity of the ellipse for which the distance between the directrix is equal to 3 times the distance between the focii is:

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

B. $\frac{1}{\sqrt{3}}$

C. $\frac{1}{\sqrt{7}}$

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

Answer: B

Watch Video Solution

16. The radius of the director circle of the hyperbola $\frac{x^2}{25} - \frac{y^2}{9} = 1$ is:

A. 5

B. 3

C. 8

D. 25

Answer: A

 Watch Video Solution

17. In are ellispe , the distance between its foci is 6 and its minor axis is 8 , then e is

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

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

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

D. $\frac{1}{\sqrt{52}}$

Answer: B

Watch Video Solution

18. The tangents at the points t_1 and t_2 on the parabola $y^2 = 4ax$ are at right angles then:

A. $t_1 t_2 = -2$

B. $t_1 t_2 = 2$

C. $t_1 t_2 = -1$

D. $t_1 t_2 = 1$

Answer: C

View Text Solution

19. The equation of normal at $(-3, 4)$ to the circle $x^2 + y^2 = 25$ is $4x + 3y = k$ then k is:

A. 3

B. 2

C. 1

D. 0

Answer: D

View Text Solution

20. The equation of the ellipse with foci $(\pm 2, 0)$ vertices $(\pm 3, 0)$ is:

A. $\frac{x^2}{5} + \frac{y^2}{6} = 0$

B. $\frac{x^2}{5} + \frac{y^2}{9} = 0$

C. $\frac{x^2}{6} + \frac{y^2}{5} = 0$

D. $\frac{x^2}{9} + \frac{y^2}{5} = 0$

Answer: D

Watch Video Solution

21. Identify the type of the conic

$3x^2 - 8y^2 - 15x - 18y - 29 = 0$

A. parabola

B. ellipse

C. hyperbola

D. circle

Answer: c

Watch Video Solution

22. Area of the greatest rectangle inscribed in the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is:

A. 24

B. 12

C. 144

D. $\sqrt{24}$

Answer: B

Watch Video Solution

23.	$x + y = k$ is a normal to $y^2 = 12x$ then k is:	*(a)* 10
24.	The radius of the circle through (10, –2) two of whose diameters are $x + y = 6$, $x + 2y = 2$ is:	*(b)* –1
25.	For the ellipse $16x^2 + 25y^2 = 400$ foci are $(\pm 3, 0)$. Then the sum of distance from any point on the ellipse for the focii is:	*(c)* 2
26.	If the tangents form P to $y^2 = 4ax$ are at right angles then the locus of P is $x = k$, then k is:	*(d)* $\frac{2\sqrt{2}}{3}$
27.	The length of the major axis of an ellipse is three times the length of minor axis. Its eccentricity is:	*(e)* 9

23.

Watch Video Solution

24. Find the odd man one with respect to the eccentricity of the following:

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

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

C. 7

D. 2.5

Answer: D

View Text Solution

25. Find the position of the point (0,-1) with respect to the circle $x^2 + y^2 + 2x + 5y + 16 = 0$

A. inside the circle

B. outside the circle

C. on the circle

D. none of these

Answer: A

Watch Video Solution

26. Find the correct statement:

A. A line can intersect a circle at most three points

B. Three normals can be drawn to a parabola

C. eccentricity of the parabola $e > 1$

D. For a point outside the parabola, two or more tangents can be drawn

Answer: B

View Text Solution

27. Find the incorrect statement:

A. A point $P(x_1, y_1)$ is on the circle

$$x^2 + y^2 + 2gx + 2fy + c = 0$$

if $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c = 0$

B. $y = mx + c$ may be a tangent to the parabola $y^2 = 4ax$ if $c = \frac{a}{m}$

C. The length of focal chord perpendicular to the axis is called latus rectum

D. $x^2 = -4ay$ is a parabola open upwards

Answer: D

View Text Solution

28. Find the correct statement:

A. In the ellipse $\frac{x^2}{a^2} + \frac{y^2}{a^2} = 1$, the eccentricity is zero

B. The directricies of $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

$$y = \pm \frac{a}{e}$$

C. The length of the minor axis of the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ is 5 units.

D. Any point on the hyperbola is

$$(a\cos\theta, b\sin\theta)$$

Answer: A

View Text Solution

29. Find out the incorrect statement:

A. The equation of tangent at 't' to the parabola $y^2 = 4ax$

B. Atleast one normal to the parabola must be real

C. $x^2 + y^2 = a^2 - b^2$ is called directrix circle of the hyperbola

D. $y = mx + \sqrt{a^2 + bm^2}$ is a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

Answer: D

View Text Solution

30. Find the correct pair of statements:

(i) The point of intersection of tangents at $'t_1'$ and $'t_2$ on the parabola $y^2 = 4x$ is $(t_1t_2, t_1 + t_2)$

(ii) $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ represents an ellipse if $B^2 - 4AC > 0$

(iii) The equation of tangent at (1,-3) to the parabola $x^2 + 6x + 4y + 5 = 0$ is

$2x + y + 1 = 0$

(iv) Parametric representation of a conic is unique.

A. (i) and (iii) are correct

B. (i) and (ii) are correct

C. (iii) and (iv) are correct

D. (ii) and (iv) are correct

Answer: A

View Text Solution