MATHS

BOOKS - JBD PUBLICATION

CONIC SECTIONS

Exercise

1. Latus rectum of the parabola $x^2 = 4ay$ is:

A. a

B. 4a

C. 2a

D. None of these

Answer:

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2. The centre of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$ is:

A. (4,5)

B. (-4,-5)

C. (5,4)

D. (-5,-4)

Answer:

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3. The focus of the parabola $y^2 - x - 2y + 2 = 0$ is:

A. $\left(\frac{1}{4}, 0\right)$

B. (1,2)

C. $\left(\frac{5}{4}, 1\right)$

D. $\left(\frac{3}{4}, \frac{5}{2}\right)$

Answer:

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4. The vertex of the parabola $y^2 = 4a(x + a)$ is:

A. (0,0)

B. (-a,0)

C. (a,0)

D. (0,a)

Answer:

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5. The equation of the parabola with the focus (3,0) and directrix x+3=0 is

A. $y^2 = 6x$

B. $y^2 = -3x$

C. $y^2 = 12x$

D. $y^2 = 2x$

Answer:

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6. The equation of the parabola with focus at (0, 3) and the directrix y + 3 = 0 is

A. $y^2 = 12x$

B. $x^2 = 12y$

C. $x^2 = -12y$

D. $y^2 = -12x$

Answer:

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7. If the parabola $y^2 = 4ax$ passes through (3, 2), then the length of its latus rectum is

A. 4

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

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

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

Answer:

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8. The foci of the ellipse $9x^2 + 4y^2 = 36$ are

A. $(\pm 5, 0)$

B. $(0, -5)$

C. $(-5, 0)$

D. $(0, \pm 5)$

Answer:

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9. The foci of the hyperbola $9x^2 - 16y^2 = 144$ are

A. $(\pm 5, 0)$

B. $(\pm 4, 0)$

C. $(0, \pm 4)$

D. $(0, \pm 5)$

Answer:

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10. The equation of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$, and having center at (0,3) is

A. 2

B. 4

C. 3

D. None of these

Answer:

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

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

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

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

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

Answer:

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12. The general equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a circle if

A. a=b, h=0

B. a=b=0, h ne 0

C. $a \neq b, h = 0$

D. None of these

Answer:

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13. The centre of the circle $(x-1)^2 + y^2 = 4$ is

A. (-1,0)

B. (0,1)

C. (1,0)

D. None of these

Answer:

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14. The equation of circle having centre (0,0) and area 154 sq. units.

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

B. $x^2 + y^2 = 49$

C. $x^2 + y^2 = 20$

D. None of these

Answer:

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15. The eccentricity of the ellipse, if the minor axis is equal to the distance between the foci is:

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

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

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

D. None of these

Answer:

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16. The eccentricity of the hyperbola whose latus rectum is half of its transverse axis is:

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

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

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

D. None of these

Answer:

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17. The length of the major axis of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, is three times the length of minor axis, it eccentricity is

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

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

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

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

Answer:

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18. If (2,4) and (10,10) are the ends of a latus rectum of an ellipse with the eccentricity $\frac{1}{2}$, then the length of semi-major axis is:

A. $\frac{20}{3}$

B. $\frac{15}{3}$

C. $\frac{40}{3}$

D. None of these

Answer:

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19. If the circles $x^2 + y^2 = 9$ and $x^2 + y^2 + 8y + c = 0$ touch each other, then c is equal to:

A. -15

B. 15

C. 16

D. None of these

Answer:

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20. If the circle $x^2 + y^2 + 2ax + 8y + 16 = 0$ touches x axis, then the vlaue of a is:

A. ± 1

B. ± 4

C. ± 8

D. None of these

Answer:

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21. If $(x,3)$ and $(3,5)$ are the extremities of a diameter of a circle with centre at $(2,y)$ then the values of x and y are:

A. $x=1, y=4$

B. $x=4, y=1$

C. $x=3, y=1$

D. None of these

Answer:

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22. If (-3,2) lies on the circle $x^2 + y^2 + 2gx + 2fy + c = 0,$ which is concentric with the circle $x^2 + y^2 + 6x + 8y - 5 = 0$ then c is equal to:

A. 11

B. -11

C. 20

D. None of these

Answer:

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23. The equation $\frac{x^2}{2-\lambda}+\frac{y^2}{\lambda-5}+1=0$ represents an ellipse if:

A. $\lambda > 5$

B. $2 < \lambda < 5$

C. $\lambda > 2$

D. None of these

Answer:

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24. The equation $16x^2 + y^2 + 8xy - 74x - 78y + 212 = 0$ represents:

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer:

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25. The latus rectum of parabola $9x^2 - 6x + 36y + 19 = 0$ is:

A. 2

B. 4

C. 6

D. None of these

Answer:

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26. The latus rectum of the ellipse $16x^2 + y^2 = 16$ is:

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

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

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

D. None of these

Answer:

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27. The distance between the directrices of the ellipse $\frac{x^2}{4}+\frac{y^2}{9}=1$ is:

A. $\frac{16}{\sqrt{3}}$

B. $\frac{21}{\sqrt{5}}$

C. $\frac{18}{\sqrt{5}}$

D. None of these

Answer:

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28. The length of the latus rectum of hyperbla $\frac{x^2}{9} - \frac{y^2}{16} = 1$ is:

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

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

C. $\frac{32}{3}$

D. None of these

Answer:

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29. The eccentricity of the conic $9x^2 - 16y^2 = 144$ is:

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

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

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

D. None of these

Answer:

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30. The foci of the hyperbola $9x^2 - 16y^2 = 144$ are

A. $(\pm 4, 0)$

B. $(0, \pm 4)$

C. $(\pm 5, 0)$

D. None of these

Answer:

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Example

1. In each of the following find the equation of the circle with centre $\left(\frac{1}{2}, \frac{1}{4}\right)$ and radius $\frac{1}{12}$.

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2. Find the equation of the circle with centre (2, 2) and passes through the point (4, 5).

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3. Find the equation of a circle whose centre is (3,-2) and has an area of 154 squares units.

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4. Find the equation of a circle having centre at point C(-2,3) and touching the straigth line $3x-4y-2=0$

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5. In each of the following find the centre and radius of the circles

$$\left(x+\frac{3}{2}\right)^2+\left(Y-\frac{5}{2}\right)^2=\frac{289}{4}.$$

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6. In each of the following circles, find the centre and radius.

$$x^2+y^2-8x+10y-12=0$$

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7. Does the point (-2.5, 3.5) lie inside, outside or on the circle $x^2 + y^2 = 25$?

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8. In each of the following find the coordinates of the focus , axis of the parabola , the equation of directrix and the length of the latus rectum .

$y^2 = -8x$

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9. Find the equation of the parabola that satisfies given conditions :

Vertex (0, 0), focus (-2,0)

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10. Find the coordinates of a point on the parabola $y^2 = 18x$, where the ordinate is 3 times the abscissa.

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11. Find the equation for ellipse that satisfies the given conditions

Vertices $(0, \pm 13)$, foci $(0, \pm 5)$

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12. Find the eqation for the ellipse that satisfies the given conditions :

Length of major axis 26 , foci $(\pm 5, 0)$

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13. Find the equation for the elllipse that satisfy the given conditions:

$Foci(\pm 3, 0)$, a=4.

.

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14. Find the equations of the hyperbola satisfying the given conditions.

Vertices $(0, \pm 3)$ foci $(0, \pm 5)$

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15. Find the equations of a circle having radius 5 units and the centre as the point of intersection of the straight lines 2x-y-5=0 and 3x+2y=4.

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16. LL' is the latus rectum of a parabola $x^2 = -8y$. Find the coordinates of points L and L'.

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17. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum.

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18. Find the equation of a hyperbola whose vertices lie on y-axis, centre is at the origin, the distance between the foci is 16 and eccentricity is $\sqrt{2}$.

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19. Find the equation of the hyperbola satisfying the given conditions. Foci $(\pm 3\sqrt{5}, 0)$ the latus rectum is of length 8.

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20. In each of the following, find the equations of the hyperbola satisfying the given conditions.

vertices are $(0, \pm 5)$, e=$\frac{5}{2}$.

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21. The straight line y=mx+1 is a tangent to the parabola $y^2 = 4x$, the find the value of m.

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22. Find the length of the line segment joining the vertex of the parabola $y^2 = 4ax$ and a point on the parabola that makes an angle θ with x-axis.

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23. Find the equation of the ellipse with vertices at $(\pm 5, 0)$, foci at $(\pm 4, 0)$ and centre at (0,0).

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24. Find the equations of the ellipse whose length of the major axis is 20 and foci are $(0, \pm 5)$.

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25. Find the coordinates of the foci and the vertices, the eccentricity, the length of the latus rectum of the hyperbola: $y^2 - 16x^2 = 16$.

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26. Find the coordinates of foci, vertices, eccentricity, latus rectum and major and minor axis of the ellipse $\frac{x^2}{100} + \frac{y^2}{25} = 1$.

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27. Verify that the locus of a point P which moves so that the sum of its distance from the points $S_1(-4, 0)$ and $S_2(4, 0)$ is 10, is an ellipse.

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28. Find the equation of an ellipse whose major axis is along the y-axis and which passes through the points (2,2) and (1,4).

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29. Find the equation of the locus of all points such that the difference of their distances from (4, 0) and (-4, 0) is always equal to 2.

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30. Find the coordinates of the foci and the vertices, the ecentricity and the length of the latus rectum of the hyperbolas :

$5y^2 - 9x^2 = 36$

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31. Find the length of latus rectum of the ellipse.

$$\frac{x^2}{16} + \frac{y^2}{9} = 1.$$

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32. Find the eccentricity, the coordinates of the foci, the lengths of transverse and conjugate axes and the equations of

directrices of the hyperbola.

$$\frac{y^2}{36} - \frac{x^2}{64} = 1.$$

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33. Show that a conic whose foci are $(\pm 5, 0)$ and one of the directrix has equations $x = \frac{36}{5}$ is an ellipse. Hence, find the equations.

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34. Find the equation of the circle which passes through points (2,-2) and (3,4) and whose centre lies on the line x + y = 2.

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35. If S and S' are the foci of $\frac{x^2}{16}+\frac{y^2}{25}=1$, then show that PS+PS'=10, where P is any point on the ellipse.

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