MATHS

BOOKS - NEW JYOTHI MATHS (TAMIL ENGLISH)

CONIC SECTIONS

Examples

1. Find the equation of the circle with centre at (-1,0) and radius 2.

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2. Find the equation of circle central at (-5,0) and passing through the origin.

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

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4. If $A(-2, 3), B(3, -5)$, find the equation of the circle with AB as diameter.

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5. Find the equation of circle centred at (3,3) and touches the coordinate axes.

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

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7. The circle whose equation is $x^2 + (y-1)^2 = 2$ has the centre.....

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8. Find the centre and radius of the circle

$3x^2 + (a+1)y^2 + 6x - 9y + a + 4 = 0.$

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9. Find the centre and radius of the circle

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

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10. Find the equation of the circle passing through the point (4,1) and (6,5) and whose centre is on the line $4x + y = 16$.

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11. Does the point $(-2, 5, 3.5)$ lie inside, outside or on the circle $x^2 + y^2 = 25$?

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12. Consider the circle

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

(i) Find its radius of the circle

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

(ii) Find the equation of the circle with centre at C and passing through (1,2).

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

whose centre is on the line x-3y-11=0.

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14. Find the equation of a circle of radius 5 whose centre lies on x-axis and which passes through the point (2,3) .

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15. Find equation of the circle passing through $(0, 0)$ and making intercepts a and b on the

coordinate axes.

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16. For the parabola $y^2 = 8x$, write its focus and the equation of the directrix.

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17. Find the coordinates of the focus, the axis, the equation of the directrix and the lengths of the latus rectum of the following parabolas

$i.\ x^2 = 6y$ $ii.\ x^2 + 16y = 0$

$iii.\ y^2 = 10x$ $iv.\ y^2 = -8x.$

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18. Find the equation of the parabola with vertex (0,0), focus (-2,0).

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19. Find the equation of the parabola with vertex (0,0), passing through (5,2) and

symmetric with respect to y-axis.

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20. Find the equation of the parabola with vertex at (0,0) and focus at (0,3).

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21. The focus of a parabolic mirror as shown in figure is at a distance of 5 cm from its vertex. If

the mirror is 45 cm deep, find the distance of AB.

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22. Consider the equation $\frac{x^2}{100} + \frac{y^2}{25} = 1$.

i. The above curve is ..... .

ii. Find the eccentricity of the above conic.

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23. Find the coordinates of the foci, the vertices, the length of major axis, the minor axis, the eccentricity and the latus rectum of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$

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24. Find the equation of the ellipse whose

i. Vertices $(\pm 5, 0)$, foci $(\pm 4, 0)$ ii. Vertices $(0, \pm 13)$, foci $(0, \pm 5)$.

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25. Find the equation of the ellipse in the following case: ends of major axis $(\pm 3, 0)$ ends of minor axis $(0, \pm 2)$

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26. Find the equation of the ellipse whose length of minor axis is 16 and foci are $(0, \pm 6)$

.

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27. In each of the following find the equation fot the ellipse that satisfies the given conditions :

Centre at $(0, 0)$, major axis on the y-axis and passes through the points $(3, 2)$ and $(1, 6)$.

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28. An ellipse has its centre at origin, whose vertical major axis is 5 and the minor axis is 4.

i. Write its equation.

ii. What is its eccentricity ?

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29. An ellipse whose whose axis as x-axis and the centre (0,0) passes through (4,3) and (-1, 4).

i. Find the equation of the ellipse.

ii. Find its eccentricity.

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30. A rod AB of length 15 cm rests in between two coordinate axes is such a way that the end point A lies on x-axis and end Point B lies on y-axis. A point P (x,y) is taken on the rod in such a way that $AP = 6cm$. Show that the locus of P is an ellipse.

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31. An arch on a road is in the shape of semi-ellipse. The breadth of the road is 30 feet. A man 6 feet tall just touches the arch when he

stands 2 feet the side .

i. Assuming the road level as x-axis (major axis). Find the point C.

ii. What is the maximum height of arch (minor axis)?

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32. Find the coordinates of the foci, the vertices, the eccentricity and the length of the latus rectum of the hyperbola.

$9x^2 - 16y^2 = 144$

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33. Find the equation of the hyperbola whose

i. vertices are $(\pm 5, 0)$ and foci $(\pm 8, 0)$

ii. Vertices $(0, \pm 5)$ and foci $(0, \pm 8)$.

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34. Find the equation of the hyperbola with foci on $\left(\pm 3\sqrt{5}, 0\right)$ and the latus rectum is of length 8.

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35. Find the equation of the hyperbola whose foci are $(\pm 5, 0)$ and the length of the transverse axis is 8.

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36. A hyperbola whose transverse axis , centre (0,0) and foci $\left(\pm \sqrt{10}, 0\right)$ passes thorugh the point (3,2).

i. Find the equation of the hyperbola.

ii. Find its eccentricity .

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37. Find the equation of the hyperbola whose foci are $(0, \pm\sqrt{10})$ and is passing through the point $(2, 3)$.

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38. If a parabolic reflector is 20 cm in diameter and 5 cm deep, then its focus is

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39. 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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40. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ whose vertex is at the vertex of the parabola. Find the length of its side.

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Exercise Circle

1. The centre of the circle $x^2 + y^2 + x + y - 15 = 0$ is

A. $(0, 0)$

B. $(1, 1)$

C. $(-1, -1)$

D. $\left(\frac{-1}{2}, \frac{-1}{2}\right)$

Answer: D

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2. If one end of a diameter of a circle is $(3, 5)$ and the centre is (2,3) then the other end of the diameter is

A. $(1, 1)$

B. $(2, 1)$

C. $(3, 1)$

D. $(1, 2)$

Answer: A

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3. If one end of a diameter of a circle $2x^2 + 2y^2 - 4x - 8y + 2 = 0$ is (3,2), then the other end is

A. $(2, 3)$

B. $(4, -2)$

C. $(2, -1)$

D. $(-1, 2)$

Answer: D

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4. The circle $x^2 + y^2 - 3x - 4y + 2 = 0$ cuts the x axis at the points

A. $(1, 0), (2, 0)$

B. $(1, 0), (-1, 0)$

C. $(3, 0), (4, 0)$

D. $(2, 0), (-3, 0)$

Answer: A

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5. The ends of diameter of a circle are $(2, 3)$ and $(6, 5)$. The centre of the circle is

A. $(3, 0)$

B. $(8, 8)$

C. $(4, 4)$

D. $(2, 2)$

Answer: C

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6. The circle $x^2 + y^2 - 4x + 6y + c = 0$ touches x axis if

A. $c = 4$

B. $c^2 = 4$

C. $c^2 = 16$

D. $c^2 = 9$

Answer: A

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7. The circle $x^2 + y^2 - 4x + 6y + c = 0$ touches x axis if

A. $c = 3$

B. $c = 9$

C. $c^2 = 3$

D. $c = 5$

Answer: B

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8. The circle $x^2 + y^2 - 8x + 4y + 4 = 0$ toches

A. $c = 4$

B. $c^2 = 4$

C. $c = 16$

D. $c = 5$

Answer: A

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9. The equation of a circle of radius r and touching both the axes is

A. $x^2 + y^2 - 2rx = 0$

B. $x^2 + y^2 - 2ry = 0$

C. $x^2 + y^2 + 2rx + 2ry + c = 0$

D. $x^2 + y^2 - 2rx - 2ry + r^2 = 0$

Answer: D

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10. If (α, β) is the centre of a circle passing through the origin then its equation is

A. $x^2 + y^2 - \alpha x + \beta y = 0$

B. $x^2 + y^2 + 2\alpha x + 2\beta y = 0$

C. $x^2 + y^2 - 2\alpha x - 2\beta y = 0$

D. $x^2 + y^2 - 2\alpha x + 2\beta y + \alpha^2 + \beta^2 = 0$

Answer: C

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11. The circle $x^2 + y^2 - 8x + 4y + 4 = 0$

toches

A. x axis

B. y axis

C. Both x and y axis

D. Dose not touches the axes

Answer: B

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12. The intercept on the line $y = x$ by the circel $x^2 + y^2 - 2x = 0$ is AB. Equation of the circle with AB as a diameter is

A. $x^2 + y^2 + x + y = 0$

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

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

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

Answer: D

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13. Two vertices of an equilateral triangle are $(-1, 0)$ and $(1, 0)$ then its circumcircle is

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

B. $x^2 + \left(y + \frac{1}{\sqrt{3}}\right)^2 = \frac{1}{3}$

C. $x^2 + \left(y - \frac{1}{\sqrt{3}}\right)^2 + \frac{4}{9} = 0$

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

Answer: A

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14. A circle touches the y axis at $(0, 2)$ and its x intercept equal to 3 units, then the equation

of the circle is

A. $x^2 + y^2 \pm 4x - 5y + 4 = 0$

B. $x^2 + y^2 \pm 5x - 4y + 4 = 0$

C. $x^2 + y^2 + 5x \pm 4y + 4 = 0$

D. $x^2 + y^2 \pm 5x + 4y + 4 = 0$

Answer: B

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15. The lines $2x + 3y + 1 = 0$ and $3x - y - 4 = 0$ lie along the diameters of a circle of circumference 10π unit then the equation of the circle is

A. $x^2 + y^2 + 2x + 2y - 23 = 0$

B. $x^2 + y^2 - 2x - 2y - 23 = 0$

C. $x^2 + y^2 - 2x + 2y - 23 = 0$

D. $x^2 + y^2 + 2x - 2y - 23 = 0$

Answer: C

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

A. 4

B. 6

C. 20

D. $\sqrt{20}$

Answer: D

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17. The radius of the circle having centre at $(2, 1)$ whose one of the chords is diameter of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ is

A. 1

B. 2

C. 3

D. $\sqrt{3}$

Answer: C

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18. The circle $x^2 + y^2 - 8x + 4y + 4 = 0$ toches

A. $(2, -1)$

B. $(2, 1)$

C. none of these

D. $(\sqrt{2}, 1)$

Answer: A

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Exercise Parabola

1. The vertex of the parabola $y^2 + 4x = 0$ is

A. $(4, 0)$

B. $(-4, 0)$

C. $(-1, 0)$

D. $(0, 0)$

Answer: D

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2. The focus of the parabola $y^2 = 20x$ is

A. $(0, 5)$

B. $(0, 20)$

C. $(5, 0)$

D. $(4, 0)$

Answer: C

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3. The axis of the parabola $y^2 = x$ is the line

A. $x = 0$

B. $y = 0$

C. $x = 1$

D. $y = 1$

Answer: B

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4. The latus rectum of the parabola $y^2 = 11x$ is of length

A. 11

B. $\frac{11}{4}$

C. 22

D. 44

Answer: A

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5. If $(3, 0)$ is the focus and y axis is the tangent at vertex. Then the equation of the parabola is

A. $x^2 = 12x$

B. $y^2 = 12x$

C. $y^2 = 3x$

D. $x^2 = 3x$

Answer: B

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6. If the parabola $y^2 = ax$ passes through (3,2) then the focus is

A. $\left(\frac{4}{3}, 0\right)$

B. $\left(0, \frac{4}{3}\right)$

C. $\left(\frac{1}{3}, 0\right)$

D. $\left(0, \frac{1}{3}\right)$

Answer: C

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7. Equation of the parabola with focus (-4,0) and vertex at the origin is

A. $y^2 = 16x$

B. $y^2 = 16x = 0$

C. $x^2 = 16y$

D. $x^2 + 16y = 0$

Answer: B

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8. The equation of the directrix of the parabola $x^2 = 28y = 0$ is

A. $y - 7 = 0$

B. $y + 7 = 0$

C. $x - 7 = 0$

D. $x + 7 = 0$

Answer: A

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9. The vertex of the parabola $y^2 = 4x + 4y$ is

A. $(1, -2)$

B. $(-1, 2)$

C. $(2, 1)$

D. $(-2, 1)$

Answer: B

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10. The focus of the parabola $4y^2 + 12x - 12y + 39 = 0$ is

A. $\left(\frac{13}{4}, \frac{-3}{2}\right)$

B. $\left(\frac{-13}{4}, \frac{3}{2}\right)$

C. $\left(\frac{3}{2}, \frac{-13}{4}\right)$

D. $\left(\frac{-3}{2}, \frac{13}{4}\right)$

Answer: B

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11. Axis of the parabola $x^2 - 3y - 6x + 6 = 0$ is

A. $x = -3$

B. $y = -1$

C. $x = 3$

D. $y = 1$

Answer: C

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12. The equation of the parabola with vertex at (0,0) , axis along y axis and passing through the point $(6, -3)$ is

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

B. $x^2 + 8y = 0$

C. $x^2 + 12y = 0$

D. $x^2 + 6y = 0$

Answer: C

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13. The length of latus rectum of the parabola $4y^2 + 2x - 20y + 17 = 0$ is

A. 3

B. 6

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

D. 0

Answer: C

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14. The length of the latus rectum of the parabola $x^2 - 4x - 8y + 12 = 0$ is

A. 4

B. 6

C. 8

D. 10

Answer: C

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15. The equation of the directrix of the parabola $y^2 + 4y + 4x + 2 = 0$ is

A. $x = -1$

B. $x = 1$

C. $x = \frac{-3}{2}$

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

Answer: D

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16. The equation of the parabola with its vertex at (1,1) and focus at (3,1) is

A. $(x-3)^2 = 8(y-1)$

B. $(y-1)^2 = 8(x-1)$

C. $(y-1)^2 = 8(x-3)$

D. $(x-1)^2 = 8(y-1)$

Answer: B

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17. Equation of the parabola with focus (3,0) and the directrix $x + 3 = 0$ is

A. $y^2 = 3x$

B. $y^2 = 2x$

C. $y^2 = 12x$

D. $y^2 = 6x$

Answer: C

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18. If $(0, 6)$ and $(0, 3)$ are respectively the vertex and focus of a parabola then its equation is

A. $x^2 + 12y = 72$

B. $x^2 - 12y = 72$

C. $y^2 - 12x = 72$

D. $y^2 + 12x = 72$

Answer: A

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19. The line $x - y + 2 = 0$ touches the parabola $y^2 = 8x$ at the point

A. $(2, -4)$

B. $(1, 2\sqrt{2})$

C. $(4, -4\sqrt{2})$

D. None of these

Answer: D

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Exercise Ellipse

1. The eccentricity of the ellipse $16x^2 + 25y^2 = 400$ is

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

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

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

D. $\frac{9}{25}$

Answer: A

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

A. $25x^2 + 9y^2 = 900$

B. $9x^2 + 25y^2 = 900$

C. $5x^2 + 3y^2 = 90$

D. $3x^2 + 5y^2 = 90$

Answer: A

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3. The foci of an ellipse are $(\pm 2, 0)$ and its eccentricity is $\frac{1}{2}$ then the equation is

A. $4x^2 + 3y^2 = 48$

B. $3x^2 + 4y^2 = 48$

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

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

Answer: D

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4. If the length of latus rectum is $\frac{5}{2}$ and eccentricity is $\frac{1}{2}$, then the equation of the ellipse is

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

B. $\frac{9x^2}{25} + \frac{12y^2}{25} = 1$

C. $\frac{9x^2}{25} + \frac{4^2}{25} = 1$

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

Answer: B

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5. The line $y = 2x + c$ touches the ellipse $\frac{x^2}{16} + \frac{y^2}{4} = 1$ if c is equal to

A. 0

B. $\pm 2\sqrt{17}$

C. $\pm \sqrt{15}$

D. $\pm \sqrt{17}$

Answer: B

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6. The sum of distance of any point on the ellipse $3x^2 + 4y^2 = 24$ from its foci is

A. $8\sqrt{2}$

B. $4\sqrt{2}$

C. $6\sqrt{2}$

D. $16\sqrt{2}$

Answer: B

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7. The equation $\frac{x^2}{2-r} + \frac{y^2}{r-5} + 1 = 0$ represent an ellipse iff

A. $r > 2$

B. $r > 5$

C. $2 > r > 5$

D. $r > 5$

Answer: C

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8. Sum of the focal distance of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

A. 2b

B. 2a

C. 2ab

D. a+b

Answer: B

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9. The radius of the circle passing throgh the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ and haivng centre (0,3) is

A. 4

B. 3

C. $\sqrt{12}$

D. $\frac{7}{2}$

Answer: A

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10. The eccentricity of an ellipse with its centre at the origin is $\frac{1}{2}$. If one of the directices is $x = 4$, then the equation of the ellipse is

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

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

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

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

Answer: B

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

A. $\sqrt{3}ab$

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

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

D. ab

Answer: D

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12. The ellipse with foci at (0,1) , (0,4) and one vertex at the origin is

A. $25x^2 + 16y^2 = 1$

B. $16x^2 + 25y^2 = 1$

C. $25x^2 + 16y^2 + 80y = 0$

D. $25x^2 + 16y^2 - 80y = 0$

Answer: D

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13. The euqaiton of the conic with focus $(2, -1)$ directrix $x - y = 0$ and eccentricity $\frac{1}{2}$ is

A.

$$7(x^2 + y^2) + 2xy - 32x + 16y + 40 = 0$$

B.

$$5(x^2 + y^2) + 2xy + 32x - 16y + 20 = 0$$

C.

$$7(x^2 + y^2) - 4xy - 16x + 32y + 20 = 0$$

D.

$$7(x^2 + y^2) + 2xy - 16x + 8y + 20 = 0$$

Answer: A

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14. 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. $(-1, 4)$ and $(-1, -4)$

Answer: A

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15. Find the vertices, foci for the hyperbola $9x^2 - 16y^2 = 144$.

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

B. 3

C. 4

D. 2

Answer: C

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16. S and T are the foci of an ellipse and B is an end point of the minor axis . IF $\triangle STB$ is equilateral then e =

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

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

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

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

Answer: C

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17. The angle between the lines joining the foci of an ellipse to an extremity of its minor axis is 90°. The eccentricity is

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

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

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

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

Answer: D

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18. The centre of the ellipse

$$8x^2 + 6y^2 - 16x + 12y + 13 = 0$$

A. $(1, 1)$

B. $(-1, 1)$

C. $(1, -1)$

D. $(-1, -1)$

Answer: C

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Exercise Hyperbola

1. The vertices of the hyperbola $9x^2 - 16y^2 = 144$

A. $(\pm 5, 0)$

B. $(\pm 4, 0)$

C. $\left(\pm \frac{5}{4}, 0\right)$

D. $\left(\pm \frac{3}{4}, 0\right)$

Answer: B

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2. The eccentricity of the hyperbola $3x^2 - 4y^2 = -12$ is

A. $\sqrt{\frac{7}{3}}$

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

C. $\frac{\sqrt{7}}{2}$

D. $\sqrt{\frac{7}{2}}$

Answer: A

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3. Equation of a hyperbola such that the distance between the foci is 16 and eccentricity is $\sqrt{2}$ is

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

B. $x^2 - y^2 = 32$

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

D. $2x^2 - y^2 = 27$

Answer: B

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4. The eccentricity of the hyperbola 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. $\frac{3}{2}$

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

Answer: D

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5. The equation $\frac{x^2}{12-k}+\frac{y^2}{8-k}=1$ represents a hyperbola whose transverse axis is along the x axis if

A. $k=8$

B. $k<12$

C. $k>8$

D. $8<k<12$

Answer: D

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6. The hyperbola with foci are at $(\pm 4, 0)$, and vertices at $(\pm 2, 0)$ is

A. $\frac{x^2}{4} - \frac{y^2}{12} = 1$

B. $\frac{x^2}{12} - \frac{y^2}{4} = 1$

C. $\frac{x^2}{16} - \frac{y^2}{4} = 1$

D. $\frac{x^2}{4} - \frac{y^2}{16} = 1$

Answer: A

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7. The foci a hyperbola coincides with the foci of the ellispe $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Find the equation of the hyperbola if its eccentricity is 2.

A. $3x^2 - y^2 = 12$

B. $x^2 - 3y^2 = 12$

C. $y^2 - 3x = 12$

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

Answer: A

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8. A hyperbola with foci at (0,-1), (0,3)and the vertex at the origin is

A. $3y^2 - x^2 - 6y = 0$

B. $3x^2 - y^2 + 6 = 0$

C. $3x^2 - y^2 + 6y = 0$

D. $3x^2 - y^2 - 6x = 0$

Answer: A

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

A. $(1, 2)$

B. $(1, -2)$

C. $(-1, 2)$

D. $(-1, -2)$

Answer: B

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