MATHS

BOOKS - BITSAT GUIDE

CONIC SECTIONS

Practice Exercise

1. The curve described parametrically by $x = t^2 + t + 1, y = t^2 - t + 1$ represents

A. a pair of straight lines

B. an ellipse

C. a parabola

D. a hyperbola

Answer: c

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2. Consider a circle with its centre lying on the focus of the parabola $y^2 = 2px$ such that it touches the directrix of the parabola. Then,

the point of intersection of the circle and the parabola is

A. $\left(\frac{p}{2}, p\right)$ or $\left(\frac{p}{2}, -p\right)$

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

C. $\left(\frac{-p}{2}, p\right)$

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

Answer: a

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3. Find the equation of the parabola with vertex (0,0) and passing through (2,3) and axis is along the x-axis.

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

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

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

D. $x^2 = -\frac{9}{2}y$

Answer: b

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4. If $(0, 4)$ and $(0, 2)$ are respectively the vertex and focus of a parabola, then its equation is

A. $x^2 + 8y = 16$

B. $x^2 + 8y = 32$

C. $x^2 + 16y = 30$

D. $x^2 - 8y = 32$

Answer: b

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5. Find the equation of the parabola whose axis is parallel to X-axis and which passes through the point (0,4),(1,9) and (-2,6) . Also, find its latusrectum.

A. $y = 2\left(x + \frac{3}{4}\right)^2 + \frac{23}{8}$

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

C. $y = 2\left(x + \frac{3}{5}\right)^2 + \frac{1}{2}$

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

Answer: a

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6. PQ is a double ordinate of a parabola $y^2 = 4ax$. Find the locus of its points of trisection.

A. $9y^2 = 8ax$

B. $9y^2 = 4ax$

C. $25y^2y^2 = 16ax$

D. $3y^2 = 4ax$

Answer: b

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7. A parabola has the origin as its focus and the line x = 2 as the directrix. Then the vertex of the parabola is at

A. $(2, 0)$

B. $(0, 2)$

C. $(1, 0)$

D. $(0, 1)$

Answer: c

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8. If the tangent at the point P $(2, 4)$ to the parabola $y^2 = 8x$ meets the parabola $y^2 = 8x + 5$ at Q and R then the mid-point of QR is

A. $\sqrt{3y} = 3x + 1$

B. $\sqrt{3y} = -(x + 3)$

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

D. $\sqrt{3y} = -(3x + 1)$

Answer: a

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9. The equation of the common tangents touching the circle $(x-3)^2+y^2=9$ and the parabola $y^2=4x$ above X-axis, is

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

B. $x+y=3, x-y=2$

C. $x+y=1, 4x-2y=1$

D. $x+2y=1, x+y-3$

Answer: c

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10. Find the equation (s) of the common tangent(s) to the parabola $y^2 - 4x - 2y + 5 = 0$ and $y^2 = -4x$.

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

B. $x + y = 3, x - y = 2$

C. $x + y = 1, 4x - 2y = 1$

D. $x + 2y = 1, x + y = -3$

Answer: c

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11. The locus of the mid-point of the chords of the parabola $y^2 = 4ax$ which subtend a right angle at the vertex of the parabola, is

A. $y^2 - 2ax + 8a^2 = 0$

B. $y^2 + 2ax + 8a^2 = 0$

C. $y^2 - 2ax - 8a^2 = 0$

D. $y^2 - ax + 8a^2 = 0$

Answer: a

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12. The equation to the line touching both the parabolas $y^2 = 4x$ and $x^2 = -32y$ is

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

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

C. $\frac{1}{8}$

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

Answer: a

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13. Tangents are drawn from (-2,0) to $y^2 = 8x$, radius of circle(s) that would touch these tangents and the corresponding chord of contact, can be equal to

A. $4\left(\sqrt{2}+1\right)$

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

C. $8\sqrt{3}$

D. $9\sqrt{2}$

Answer: a

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14. The number of distinct normals that can be drawn to the parabola $y^2 = 4x$ from the point $\left(\frac{11}{4}, \frac{1}{4}\right)$ is

A. 3

B. 2

C. 1

D. 4

Answer: a

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15. Find the locus of the middle points of the chords of the parabola $y^2 = 4x$ which touch the parabola $x^2 = -8y$.

A. $y^3 - 2xy - 8 = 0$

B. $y^3 + 2xy - 8 = 0$

C. $y^3 - 2xy + 8 = 0$

D. $y^3 - xy - 8 = 0$

Answer: a

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16. Let P be the point $(1, 0)$ and Q a point on the locus $y^2 = 8x$. The locus of mid-point of PQ is :

A. $x^2 - 2xy - 8 = 0$

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

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

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

Answer: d

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17. If $a \neq 0$ and the line $2bx + 3cy + 4d = 0$ passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ then :

A. $d^2 + (2b + 3c)^2 = 0$

B. $d^2 + (3b + 2c)^2 = 0$

C. $d^2 + (2b - 3c)^2 = 0$

D. $d^2 + (3b - 2c)^2 = 0$

Answer: a

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18. The length of the chord of the parabola $x^2 = 4ay$ passing through the vertex and having slope tan a, is

A. $4a \cos ec\alpha \cot \alpha$

B. $4a \tan \alpha \sec \alpha$

C. $4a \cos \alpha \cot \alpha$

D. $4a \sin \alpha \tan \alpha$

Answer: b

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19. If P is a point on the ellipse $\frac{x^2}{16} + \frac{y^2}{25} = 1$ whose foci are S and S', then

$PS + PS' = 8.$

A. 8

B. 7

C. 5

D. 10

Answer: d

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20. The equation of the ellipse whose focus is (1,-1), directrix $x - y - 3 = 0$ and eccentricity equals $\frac{1}{2}$ 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. $7x^2 + 2xy + 7y^2 + 10x - 10y - 7 = 0$

Answer: a

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21. The number of points outside the ellipse on major axis from which a normal (other than X-axis) can be drawn to the ellipse, is

A. 0

B. 3

C. 5

D. none of these

Answer: a

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

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

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

D. $\frac{\sqrt{5}}{7}$

Answer: b

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23. If tangent at any point P on the ellipse $7x^2 + 16y^2 = 12$ cuts the tangent at the end points of the major axis at the points A and B, then the circle with AB as diameter passes through a fixed point whose coordinates are

A. $\left(\pm \sqrt{a^2 - b^2}, 0 \right)$

B. $\left(\pm \sqrt{a^2 + b^2}, 0 \right)$

C. $\left(0, \pm \sqrt{a^2 - b^2} \right)$

D. $\left(0, \sqrt{a^2 + b^2}\right)$

Answer: a

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24. The muinimum area of the triangle formed by the tangent to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the coordinate axes is

A. ab

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

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

D. $\frac{a^2+ab+b^2}{3}$

Answer: a

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25. If the angle between the lines joining the end points of minor axis of an ellipse with its foci is $\frac{\pi}{2}$ then the eccentricity of the ellipse is

A. $1/2$

B. $1/\sqrt{2}$

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

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

Answer: b

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26. PQ is a chord of the ellipse through the centre. If the square of its length is the HM of the squares of major and minor axes, then find its inclination with X-axis.

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

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

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

D. none of these

Answer: a

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27. The locus of the foot of prependicular drawn from the center of the ellipse $x^2 + 3y^2 = 6$ on any tangent to it 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: c

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28. Equation of tangent to the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$ which cut-off equal intercepts on

the axis, is

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

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

C. $y = -x - \sqrt{13}$

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

Answer: c

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29. The equation of tangent to the ellipse $x^2 + 3y^2 = 3$ which is perpendicular to the line 4y = x - 5, is

A. $4x + y + 7 = 0$

B. $4x + y - 23 = 0$

C. $4x + 2y + 5 = 0$

D. $4x + y + 23 = 0$

Answer: a

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30. If the line $x\cos\alpha + y\sin\alpha = p$, is tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, then the value of $a^2\cos^2\alpha + b^2\sin^2\alpha$ is

A. p

B. p^2

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

D. none of these

Answer: b

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31. The length of the common tangent to the ellipse $\frac{x^2}{25} + \frac{y^2}{4} = 1$ and the circle $x^2 + y^2 = 16$ intercepted by

A. 5

B. $2\sqrt{7}$

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

D. $\frac{14}{\sqrt{3}}$

Answer: d

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32. The distance of the centre of the ellipse $x^2 + 2y^2 - 2 = 0$ to those tangents of the ellipse which are equally inclined to both the axes is

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

B. $\sqrt{3/2}$

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

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

Answer: d

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

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

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

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

Answer: a

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34. If the chords of contact of tangents from two poinst (x_1, y_1) and (x_2, y_2) to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ are at right angles, then find the value of $\frac{x_1 x_2}{y_1 y_2}$.

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

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35. If the line 3y = 3x + 1 is a normal to the ellipse $\frac{x^2}{5}+\frac{y^2}{b^2}=1$ then the length of the

minor axis of the 5 b2 a ellipse is

A. $4 \text{ or } \frac{2}{2}\sqrt{55}$

B. $2 \text{ or } \frac{2}{5}\sqrt{55}$

C. $3 \text{ or } \sqrt{5}$

D. $11 \text{ or } \sqrt{13}$

Answer: a

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36. If θ and ϕ are eccentric angles of the end 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. $\pm\frac{\pi}{2}$

B. $\pm\pi$

C. 0

D. none

Answer: a

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37. If the chords of contact of tangents from two points (x_1, y_1) and (x_(2),y_(2))

$\rightarrow theellipse$(x^(2))/(5^(2))+(y^(2))/(6)^(2)

$= 1areatright\angle sthen$(x^(1),x_(2))/(y_(1)y_(2))`

is equal to

A. $-\left(\frac{5}{6}\right)^4$

B. $\left(\frac{6}{5}\right)^4$

C. $-\left(\frac{6}{5}\right)^4$

D. $\left(\frac{5}{6}\right)^4$

Answer: a

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38. The equation $16x^2 - 3y^2 - 32x - 12y - 44 = 0$ represents a hyperbola, which one of the following is /are correct

A. the length of whose transverse axis is $4\sqrt{3}$

B. the length of whose conjugate axis is 4

C. whose centre is (-1,2)

D. whose eccentricity is $\sqrt{19/3}$

Answer: d

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39. Let $P(a\sec\theta, b\tan\theta)$ and $Q(a\sec\phi, b\tan\phi)$, where $\theta + \phi = \frac{\pi}{2}$, be two points on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.

If (h, k) is the point of intersection of the normals at P and Q, then k is equal to

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

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

C. `(a^(2)+b^(2))/(b)

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

Answer: d

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40. If the foci of the ellipse $\frac{x^2}{16}+\frac{y^2}{b^2}=1$ and the hyperbola $\frac{x^2}{144}-\frac{y^2}{81}=\frac{1}{25}$ coincide write the value of b^2.

A. 1

B. 5

C. 7

D. 9

Answer: c

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41. If two points P and Q on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ whose centre c is such that CP

is perpendicualr to CQ a $<$ b then

A. $\frac{1}{CP^2}+\frac{1}{CQ^2}=\frac{1}{b^2}-\frac{1}{a^2}$

B. $\frac{1}{CP^2}+\frac{1}{CQ^2}=\frac{1}{a^2}-\frac{1}{b^2}$

C. $\frac{1}{CP^2}+\frac{1}{CQ^2}=\frac{1}{4a^2}-\frac{1}{b^2}$

D. $\frac{1}{CP^2}+\frac{1}{CQ^2}=\frac{1}{a^2}-\frac{1}{2b^2}$

Answer: b

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42. A hyperbola, having the transverse axis of length $2\sin\theta$, is confocal with the ellipse $3x^2 + 4y^2 = 12$. Then its equation is

A. $x^2\cos ec^2\theta - y^2\sec^2\theta = 1$

B. $x^2\sec^2\theta - y^2\cos ec^2\theta = 1$

C. $x^2\sin^2\theta - y^2\cos^2\theta = 1$

D. $x^2\cos^2\theta - y^2\sin^2\theta = 1$

Answer: a

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43. If e_1 is the eccentricity of the ellipse $\frac{x^2}{16}+\frac{y^2}{25}$ =1 and e_2 is the eccentricity of the hyperbola passing through the foci of the ellipse and $e_1e_2=1$ then equation of the hyperbola is

A. $\frac{x^2}{9}-\frac{uy^2}{16}=1$

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

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

D. none of these

Answer: b

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44. Let m_1 and m_2 be slopes of tengents from a point $(1, 4)$ on the hyperbola $\frac{x^2}{25} - \frac{y^2}{16} = 1$. Find the point from which the tengents drawn on the hyperbola have slopes $|m_1|$ and $|m_2|$ and positive intercepts on y-axis.

A. $(-7, 2)$

B. $(-7, -3)$

C. $(-7, -4)$

D. $(3, -7)$

Answer: c

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45. The area of triangle formed by the lines x-y =0 x+y=0 and any tangent to the hyperbola $x^2 - y^2 = a^2$ is

A. $2a^2$

B. $6a^2$

C. a^2

D. $4a^2$

Answer: c

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46. $2x + \sqrt{6}y = 2$ touches the hyperbola $x^2 - 2y^2 = 4$, then the point of contact is

A. $\left(-2\sqrt{6}\right)$

B. $(-5, 2\sqrt{6})$

C. $\left(\frac{1}{2}, \frac{1}{\sqrt{6}}\right)2$

D. $(4, -\sqrt{6}$

Answer: d

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47. The common tangent to $9x^2 - 4y^2 = 36$ and $x^2 + y^2 = 3$ is

A. $y - 2\sqrt{3x} - \sqrt{39} = 0$

B. $y + 2\sqrt{3x} + \sqrt{39} = 0$

C. $y - 2\sqrt{3x} + \sqrt{39} = 0$

D. none of these

Answer: a

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48. The locus of the points of intersection of perpendicualr tangents to $\frac{x^2}{16} - \frac{y^2}{9} = 1$ is

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

B. $x^2 - y^2 = 25$

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

D. $x^2 + y^2 = 7$

Answer: d

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49. A tangent to the hyperbola $x^2 - 2y^2 = 4$ meets x-axis at P and y-aixs at Q. Lines PR and QR are drawn such that OPRQ is a rectangle (where O is origin).Find the locus of R.

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

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

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

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

Answer: d

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50. P is a point on the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$, N is the foot of the

perpendicular from P on the transverse axis. The tangent to the hyperbola at P meets the transverse axis at T. If O is the centre of the hyperbola, then $OT.ON$ is equal to

A. 9

B. 4

C. e^2

D. none

Answer: a

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51. Tangents are drawn from points on the hyperbola $\frac{x^2}{9} - \frac{y^2}{4}$ =1 to the circle $x^2 + y^2 = 9$ the locus of the mid point of the chord of contact is

A. $x^2 + y^2 = \frac{x^2}{9} - \frac{y^2}{4}$

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

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

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

Answer: c

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52. The equation of a tangent to the hyperbola $3x^2 - y^2 = 3$, parallel to the line $y = 2x + 4$ is

A. $y = 3x + 4$

B. $y = 2x + 1$

C. $y = 2x - 2$

D. $y = 3x + 5$

Answer: b

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53. Chords of the hyperbola $x^2 - y^2 = a^2$ touch the parabola $y^2 = 4ax$. The locus of their middle point is the curve .....

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

B. $y^2(x - a) = x^3$

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

D. $y^2(x + a) = x^3$

Answer: b

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54. Find the product of the length of perpendiculars drawn from any point on the hyperbola $x^2 - 2y^2 - 2 = 0$ to its asymptotes.

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

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

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

D. 2

Answer: b

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55. If x=9 is the chord of contact of tangents of $x^2 - y^2 = 9$ then the equation of the corresponding tangents is

A. $9x^2 - 8y^2 + 18x + 9 = 0$

B. $9x^2 - 8y^2 - 18x + 9 = 0$

C. $9x^2 - 8y^2 - 18x - 9 = 0$

D. $9x^2 - 8y^2 + 18x - 9 = 0$

Answer: b

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1. The locus of the points of intersectino of the tangents at the extremites of the chords of the ellipse $x^2 + 2y^2 = 6$ which touches the ellipse $x^2 + 4y^2 = 4$ is

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

B. $x^2 + y^2 = 6$

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

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

Answer: c

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2. A variable chord PQ of the parabola $y^2 = 4ax$ subtends a right angle at the vertex. The locus of the points of intersection of the normals at P and Q is the parabola

A. a parabola

B. a hyperbola

C. a circle

D. none of the above

Answer: a

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

A. (0 ± 3)

B. (0 ± 2)

C. (3 ± 3)

D. (0 ± 1)

Answer: c

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4. The radius of the circle passing through the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ and having

its centre (0, 3) is

A. 4

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

C. $\sqrt{12}$

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

Answer: a

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5. If OAB is an equilateral triangle inscribed in the parabola $y^2 = 4ax$ with O as the vertex, then the length of the side of $\triangle$ OAB is

A. $8a\sqrt{3}$

B. $4a\sqrt{3}$

C. $2a\sqrt{3}$

D. $a\sqrt{3}$

Answer: a

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6. If the length of the major axis of the ellipse $\left(\frac{x^2}{a^2}\right)+\left(\frac{y^2}{b^2}\right)=1$ is three times the length of minor axis, its accentricity is

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

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

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

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

Answer: d

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7. Let S and T be the foci of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{bh^2}=1$ and be an end of the minor axis. If STB is an equilateral triangle, then eccentricity of the ellipse is

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

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

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

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

Answer: c

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8. The difference of the focal distances of any point on the hyperbola is equal to its

A. latusrectum

B. eccentricity

C. length of the transverse axis

D. half the length of the tranverse axis

Answer: c

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9. If the focus of a parabola is at (0, -3) and its directrix is y = 3, then its equation is

A. $x^2 = -12y$

B. $x^2 = 12y$

C. $y^2 = -12y$

D. $y^2 = 12x$

Answer: a

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10. The length of tangent from (5,1) to the circle $x^2 + y^2 + 6x - 4y - 3 = 0$ is

A. 81

B. 29

C. 7

D. 21

Answer: c

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11. The length of the latus rectum of the parabola

$$169\left\{(x-1)^2+(y-3)^2\right\}=(5x-12y+17)^2$$

is

A. $\frac{14}{13}$

B. $\frac{12}{13}$

C. $\frac{28}{13}$

D. none

Answer: c

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12. If the centre, one of the foci and semi-major axis of an ellipse are (0,0), (0,3) and 5, then its equation is

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

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

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

D. none of these

Answer: a

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13. The radius of the director circle of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

A. $(a - b)$

B. $\sqrt{a - b}$

C. $\sqrt{a^2 - b^2}$

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

Answer: c

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14. The equation of the chord of $y^2 = 8x$ which is bisected at (2, - 3), is

A. $4x + 3y = 1$

B. $4x - 3y = 1$

C. $4x + 3y = 9$

D. none of these

Answer: d

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15. Show that all chords of the curve $3x^2 - y^2 - 2x + 4y = 0$, which subtend a right angle at the origin, pass through a fixed point. Find the coordinates of the point.

A. $(1, 2)$

B. $(1, -2)$

C. $(-1, 2)$

D. $(-1, 2)$

Answer: b

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16. The line $y = bt$ meets the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ in real points if

A. $|t| \leq 1$

B. $|t| > 1$

C. $|t| < 3$

D. $|t| < 4$

Answer: a

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17. The distance between the foci of the hyperbola $x^2 - 3y^2 - 4x - 6y - 11 = 0$ is

A. 4

B. 6

C. 8

D. 10

Answer: c

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18. The length of the common chord of the ellipse $\frac{(x-1)^2}{9}+\frac{(y-2)^2}{4}=1$ and the circle $(x-1)^2+(y-2)^2=1$is .....

A. 0

B. $\sqrt{3}$

C. 4

D. 5

Answer: a

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19. For hyperbola $\frac{x^2}{\cos^2\alpha} - \frac{y^2}{\sin^2\alpha} = 1$which of the following remains constant with change in α

A. abscissae of veritces

B. abscisae of foci

C. eccentricity

D. directrix

Answer: b

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

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

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

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

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

Answer: c

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21. The ends of the latusrectum of the conic $x^2 + 10x - 16y + 25 = 0$ are

A. $3, -4), (13, 4)$

B. $(-3, -4), (13, -4)$

C. $(3, 4), (-13, 4)$

D. $(5, -8), (-5, 8)$

Answer: c

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22. The equation to the hyperbola having its eccentricity 2 and the distance between its foci is 8 is

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

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

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

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

Answer: b

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23. The sum of the focal distances of any point on the conic $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is

A. 10

B. 9

C. 41

D. 18

Answer: a

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24. The equation of a parabola which passes through the point of intersection of a straight line $x + y = 0$ and the circel $x^2 + y^2 + 4y = 0$ is

A. $y^2 = 4x$

B. $y^2 = x$

C. $y^2 = 2x$

D. none of these

Answer: c

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25. The point (4, -3) with respect to the ellipse

$4x^2 + 5y^2 = 1$

A. lies on the cureve

B. is inside the curve

C. is outside the curve

D. is focus of the curve

Answer: c

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26. The tangents from a point $\left(2\sqrt{2}, 1\right)$ to the hyperbola $16x^2 - 25y^2 = 400$ inculde an angle equal to

A. $\pi/2$

B. $\pi/4$

C. π

D. $\pi/3$

Answer: a

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27. The equation of a straight line drawn through the focus of the parabola $y^2 = -4x$ at an angle of 120° to x axis is

A. $y + \sqrt{3}(x - 1) = 0$

B. $y - \sqrt{3}(x - 1) = 1$

C. $y + \sqrt{3}(x + 1) = 0$

D. $y - \sqrt{3}(x + 1) = 0$

Answer: c

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