MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

ELLIPSE

Solved Examples

1. The centre of the ellipse $\frac{(2x-3y-1)^2}{16}+\frac{(3x+2y-8)^2}{9}=1$ is

A. (1, 1)

B. (1, -2)

C. (2, 1)

D. (2, -1)

Answer: C

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2. If the length of the major axis of an ellipse is four times the length of its minor axis, then it's eccentricity is

A. $1/3$

B. $\sqrt{15}/4$

C. $1/\sqrt{2}$

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

Answer: B

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3. If the minor axis of an ellipse subtends an angle 90° at each focus then the eccentricity of the ellipse is

A. $\sqrt{3}/2$

B. $1/\sqrt{2}$

C. $2/\sqrt{3}$

D. none

Answer: B

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4. The pole of the line $2x - y + 2 = 0$ w.r.t the ellipse $3x^2 + 5y^2 = 15$ is

A. $(-5/3, 2)$

B. (9/2, 2)

C. (6, 6)

D. (-5, 3/2)

Answer: D

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5. Area of the quadrilateral formed by the extremities of major axis and minor axis is $8\sqrt{3}$. The distance between foci is $4\sqrt{2}$. Then eccentricity of the ellipse is

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

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

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

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

Answer: C

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6. The normal at a point P on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ meets the axis in M and N so that $\frac{PM}{PN}=\frac{2}{3}$. Then the value of eccentricity is

A. $1-e^2$

B. e^2-1

C. $1 + e^2$

D. e^2

Answer: A

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7. Tangents are drawn to the ellipse $\frac{x^2}{9} + \frac{y^2}{5} = 1$ at the ends of latus rectum. The area of the quadrilateral formed, is

A. $27/55$

B. $27/4$

C. $27/2$

D. 27

Answer: D

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8. The normal at a point P on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ meets the axis in M and N so that $\frac{PM}{PN}=\frac{2}{3}$. Then the value of eccentricity is

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

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

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

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

Answer: C

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9. If α, β are the eccentric angles of the extremities of a focal chord of the ellipse $\frac{x^2}{16}+\frac{y^2}{9}$, then $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}=$

A. $\frac{\sqrt{5}+4}{\sqrt{5}-4}$

B. $\frac{9}{23}$

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

D. $\frac{8\sqrt{7}-23}{9}$

Answer: D

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Exercise 1 A

1. An ellipse with the eccentricity e = 1/2 has a focus at (0, 0) and the corresponding directix is x+6=0. The equation of the ellipse is

A. $3x^2+4y^2+12x-36=0$

B. $3x^2+4y^2-12x+36=0$

C. $3x^2+4y^2-12x-36=0$

D. none

Answer:

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2. The equation of the ellipse whose focus is at (4,0) and whose eccentricity is 4/5 is

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

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

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

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

Answer:

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3. The equation of the ellipse whose focus is (3, -2), eccentricity 3/4 an directrix $2x-y+3=0$

A. $14x^2+33xy+17y^2-255x+74y+159=0$

B. $44x^2+36xy+71y^2-588x+374y+959=0$

C. $4x^2+56xy+271y^2-188x+274y+359=0$

D. $44x^2 - 36xy - 71y^2 - 588x - 374y - 959 = 0$

Answer:

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4. The equation of ellipse whose focus is $\left(0, \sqrt{a^2 - b^2}\right)$, directrix is y = $\frac{a^2}{\sqrt{a^2 - b^2}}$ and eccentricity is $\frac{\sqrt{a^2 - b^2}}{a}$ is

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

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

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

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

Answer:

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5. The equation of the ellipse whose foci are $(\pm 3, 0)$ and eccentricity 3/4 is

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

B. $\frac{x^2}{16} + \frac{y^2}{7} = 1$

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

D. $\frac{x^2}{7} + \frac{y^2}{16} = 1$

Answer:

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6. The equation of the ellipse whose vertices are (2, 5), (2, -1) and eccentricity $\sqrt{5}/3$ is

A. $\frac{(x-2)^2}{4} + \frac{(y-2)^2}{9} = 1$

B. $\frac{(x-2)^2}{36} + \frac{(y-3)^2}{16} = 1$

C. $\frac{(x+2)^2}{16} + \frac{(y-3)^2}{36} = 1$

D. $\frac{(x+2)^2}{36}+\frac{(y+3)^2}{16}=1$

Answer:

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7. The equation of the ellipse whose centre is (5, 2) vertex is (9, 2), the length of the major axis is 8 and minor axis 6 is

A. $\frac{(x-5)^2}{16}+\frac{(y-2)^2}{9}=1$

B. $\frac{(x+5)^2}{26}+\frac{(y+2)^2}{19}=1$

C. $\frac{(2x-5)^2}{16}+\frac{(6y-12)^2}{19}=1$

D. $\frac{(x-3)^2}{45}-\frac{(y-2)^2}{9}=1$

Answer:

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8. The equation of the ellipse with it's major axis is x-axis, minor axis is y-axis, eccentricity is 2/3 and the length of major axis is 12 is

A. $\frac{x^2}{36}+\frac{y^2}{20}=1$

B. $\frac{x^2}{36}+\frac{y^2}{16}=1$

C. $\frac{x^2}{36}+\frac{y^2}{25}=1$

D. $\frac{x^2}{36}+\frac{y^2}{30}=1$

Answer:

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9. The equation of the ellipse with its axes as the coordinate axes respectively and whose latus rectum = 8 and eccentricity = $1/\sqrt{2}$ is

A. $\frac{x^2}{64}+\frac{y^2}{32}=1$

B. $\frac{x^2}{9}+\frac{y^2}{4}=1$

C. $\frac{x^2}{9}+\frac{y^2}{5}=1$

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

Answer:

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10. The equation of the ellipse with its axes as the coordinate axes respectively and whose minor axis = 6 and eccentricity = 1/2 is

A. $\frac{x^2}{64} + \frac{y^2}{32} = 1$

B. $\frac{x^2}{9} + \frac{y^2}{4} = 1$

C. $\frac{x^2}{9} + \frac{y^2}{5} = 1$

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

Answer:

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11. The equation of the ellipse with it's axes as the corrdinate axes respectively, the length of latus rectum is 15 and distance between the foci 10 is

A. $\frac{x^2}{100}+\frac{y^2}{75}=1$

B. $\frac{x^2}{75}+\frac{y^2}{100}=1$

C. $\frac{x^2}{50}+\frac{y^2}{25}=1$

D. $\frac{x^2}{25}+\frac{y^2}{50}=1$

Answer:

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12. The equation of the ellipse with its axes as the coordinate axes and whose latus rectum is 10 and distance between the foci = minor axis is

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

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

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

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

Answer:

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13. The equation of the ellipse refered to its axes as coordinate axes, which passes through the points (2, 2) and (1, 4) is

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

B. $4x^2 + y^2 = 8$

C. $4x^2 + y^2 = 16$

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

Answer:

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14. The equation of the ellipse with its major axis is parallel to x-axis, centre is (1, -1), eccentricity is 5/6 and the length of major axis is 12 is

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

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

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

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

Answer:

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15. An ellipse drawn by taking a diameter of the circle $(x-1)^2+y^2=1$ as its semiminor axis and a diameter of the circle $x^2+(y-2)^2=4$ as its semi-major axis. If the centre of the ellipse is at the origin and its axes are the coordinate axes, then the equation of the ellipse is

A. $4x^2+y^2=8$

B. $x^2 + 4y^2 = 16$

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

D. $x^2 + 4y^2 = 8$

Answer:

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16. The eccentricity of an ellipse, with its centre at the origin, is 1/2. If one of the directrices is x = 4, then the equation of the ellipse is

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

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

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

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

Answer:

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17. The equation of the ellipse whose vertices are (-4, 1), (6, 1) and one laturs rectum is x - 4 = 0 is

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

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

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

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

Answer:

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18. The equation of the ellipse whose focus is (2, 4), centre is (3, 4) and eccentricity is 1/2 is

A. $\frac{(x-3)^2}{6}+\frac{(y-4)^2}{8}=1$

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

C. $\frac{(x+3)^2}{6}+\frac{(y+4)^2}{8}=1$

D. $\frac{(x+3)^2}{8}+\frac{(y+4)^2}{6}=1$

Answer:

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19. The equation of the ellipse with its focus at (6, 2), centre at (1, 2) and which passes through the point (4, 6) is

A. $(x-1)^2/25+(y-2)^2/16=1$

B. $(x-1)^2/25+(y-2)^2/20=1$

C. $(x-1)^2/45+(y-2)^2/16=1$

D. $(x-1)^2/45+(y-2)^2/20=1$

Answer:

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20. The centre is (2, -3), focus (3, -3) and the vertex is at (4, -3). The equation of the ellipse is

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

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

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

D. none

Answer:

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21. 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

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

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

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

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

Answer:

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22. The equation of the ellipse whose vertices are (4, 1), (6, 1) whose focus lies on the line $x - 2y = 2$ is

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

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

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

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

Answer:

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23. Equation of the ellipse whose axes are the axes of coordinates and which passes through the point (-3, 1) and has eccentricity $\sqrt{2/5}$ is :

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

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

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

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

Answer:

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24. The centre of the ellipse $4x^2 + 9y^2 - 24x + 36y - 72 = 0$ is

A. (3, -2)

B. (2, -1)

C. (3, 5)

D. (5, 3)

Answer:

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

A. (0, 0)

B. (1, 1)

C. (1, 0)

D. (0, 1)

Answer:

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26. The centre of the ellipse $\frac{(x+y-3)^2}{9}+\frac{(x-y+1)^2}{16}=1$ is

A. (-1, 2)

B. (1, -2)

C. (-1, -2)

D. (1, 2)

Answer:

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27. The vertices of the ellipse $4x^2 + 9y^2 - 24x + 36y - 72 = 0$ are

A. (9, -2), (-3, -2)

B. (7, -1), (-3, -1)

C. (3, 0), (3, 10)

D. (8, 6), (-7, 5)

Answer:

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28. The vertices of the ellipse $4x^2 + 9y^2 - 24x + 36y - 72 = 0$ are

A. (9, -2), (-3, -2)

B. (7, -1), (-3, -1)

C. (3, 0), (3, 10)

D. (8, 6), (-7, 5)

Answer:

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29. The foci of the ellipse $\frac{(x-1)^2}{5} + \frac{(y-5)^2}{9} = 1$ is

A. (7, 5), (3, 2)

B. (4, 7), (2, 3)

C. (1, -7), (1, 3)

D. (1, 7), (1, 3)

Answer:

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30. The foci of the ellipse $9x^2 + 25y^2 - 36x + 50y - 164 = 0$ are

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

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

C. (-6, -1), (-2, -1)

D. (6, 1), (2, 1)

Answer:

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31. The length of the major axis of the ellipse $\frac{(x-3)^2}{4} + \frac{(y-2)^2}{9} = 1$ is

A. 10

B. 4

C. 6

D. 8

Answer:

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32. The length of the major axis of $3x^2 + 4y^2 + 6x - 8y - 5 = 0$ is

A. 2

B. $\sqrt{3}$

C. 4

D. $2\sqrt{3}$

Answer:

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33. The length of the minor axis of $9x^2 + 25y^2 - 18x - 100y - 116 = 0$ is

A. 3

B. 5

C. 6

D. 10

Answer:

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34. In an ellipse, minor axis = 8 and eccentricity = $\sqrt{5}/3$ then major axis =

A. 6

B. 12

C. 10

D. 16

Answer:

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35. A focus of an ellipse is at the origin. The directrix is the line x = 4 and the eccentricity is $\frac{1}{2}$. Then the length of the semi - major axis is

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

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

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

D. $\frac{8}{3}$

Answer:

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36. The length of the latus rectum of the ellipse $\frac{(x-1)^2}{4}+\frac{(y+2)^2}{25}=1$ is

A. $8/3$

B. $18/5$

C. $9/2$

D. $8/5$

Answer:

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37. The length of the latus rectum of the ellipse $9x^2+25y^2-18x-100y-116=0$ is

A. $8/3$

B. $18/5$

C. $9/2$

D. $8/5$

Answer:

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38. If the latus rectum of the ellipse $x^2 \tan^2 \alpha + y^2 \sec^2 \alpha = 1$ is 1/2 then $\alpha =$

A. $\pi/12$

B. $\pi/6$

C. $5\pi/12$

D. none

Answer:

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39. The distance between the focii of the ellipse $x = 3\cos\theta, y = 4\sin\theta$ is

A. $2\sqrt{7}$

B. $7\sqrt{2}$

C. $\sqrt{7}$

D. $3\sqrt{7}$

Answer:

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40. The eccentricity of the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$ is

A. $17/16$

B. $5/4$

C. $\sqrt{7}/4$

D. $\sqrt{7}/2$

Answer:

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41. The eccentricity of the ellipse $5x^2 + 9y^2 = 1$ is

A. $2/3$

B. $3/4$

C. $4/5$

D. $1/2$

Answer:

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42. The eccentricity of the ellipse $9x^2 + 4y^2 = 36$ is

A. $\sqrt{5}$

B. 5

C. $5/3$

D. $\sqrt{5}/3$

Answer:

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43. The eccentricity of the conic $36x^2 + 144y^2 - 36x - 96y - 119 = 0$ is

A. $\sqrt{3}/2$

B. $1/2$

C. $\sqrt{3}/4$

D. $1/\sqrt{3}$

Answer:

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

A. $1/3$

B. $2/3$

C. $3/4$

D. $1/2$

Answer:

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45. The eccentricity of the ellipse $x^2 + 4y^2 + 2x + 16y + 13 = 0$ is

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

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

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

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

Answer:

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46. The eccentricity of the ellipse whose latus rectum is equal to half of its minor axis is

A. $3/5$

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

C. $1/\sqrt{2}$

D. $\sqrt{7}/4$

Answer:

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47. If the length of the major axis of an ellipse is three times the length of its minor axis then find the eccentricity of the ellipse.

A. $1/3$

B. $1/\sqrt{3}$

C. $1/\sqrt{2}$

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

Answer:

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48. The eccentricity of the ellipse whose major axis is double the minor axis is

A. $1/\sqrt{3}$

B. $2/\sqrt{3}$

C. $\sqrt{3}/2$

D. $\sqrt{3}/4$

Answer:

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49. The latus rectum of an ellipse is $\frac{1}{3}$ of the major axis. It's eccentricity is

A. $2/3$

B. $\sqrt{2/3}$

C. $5 \times 4 \times 3 \times 7^3$

D. $(3/4)^3$

Answer:

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50. The major axis of an ellipse is three times the minor axis, then the eccentricity is

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

B. $2/3$

C. $\sqrt{2}/3$

D. $1/3$

Answer:

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51. In an ellipse the distance between the foci is 6 and it's minor axis is 8.

Then its eccentricity is

A. $4/5$

B. $1/\sqrt{52}$

C. $3/5$

D. $1/2$

Answer: C

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52. S and T are the foci of an ellipse and B is one end of the minor axis. IF STB is an equilateral traingle , then find the eccentricity of the ellipse.

A. $1/4$

B. $1/3$

C. $1/2$

D. $2/3$

Answer:

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53. An ellipse has OB as semiminor axis, F and F' its focii and the angle FBF' is a right angle. Then the eccentricity of the ellipse is

A. $1/\sqrt{2}$

B. $1/2$

C. $1/4$

D. $1/\sqrt{3}$

Answer:

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54. The minor axis forms an equialteral triangle with vertex at the end of the majorr axis then the eccentricity of the ellipse is

A. $1/2$

B. $1/\sqrt{3}$

C. $\sqrt{2/3}$

D. $\sqrt{3/2}$

Answer:

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55. A circle is described with minor axis of an ellipse as a diameter. If the foci lie on the circle, the eccentricity of the ellipse is

A. $1/2$

B. $1/\sqrt{2}$

C. $1/3$

D. $1/\sqrt{3}$

Answer:

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56. The circle on SS' as diameter intersects the ellipse in real points then its eccentricity

A. $2/\sqrt{3}$

B. $\sqrt{3}/2$

C. $1/\sqrt{2}$

D. $1/\sqrt{3}$

Answer:

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

A. $\sqrt{3}/2$

B. $1/\sqrt{2}$

C. $2/\sqrt{3}$

D. none

Answer:

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58. The distance between the focii is equal to the minor axis of an ellipse then its eccentricity is

A. $1/\sqrt{3}$

B. $1/\sqrt{2}$

C. $1/\sqrt{5}$

D. none

Answer:

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59. The circle on SS' as diameter intersects the ellipse in real points then its eccentricity

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

B. $e > 1/\sqrt{2}$

C. $e < 1/\sqrt{2}$

D. none

Answer:

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60. Let S, S' are the focii and BB' be the minor axis of an ellipse. If $\angle BSS' = \theta$ then its eccentricity is

A. $\tan\theta$

B. $\sin\theta$

C. $\cos\theta$

D. $\coth\eta$

Answer:

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61. LL' is the latusrectum of an ellipse and $\Delta SLL'$ is an equilateral triangle. The eccentricity of the ellipse is

A. $1/\sqrt{5}$

B. $1/\sqrt{3}$

C. $1/\sqrt{2}$

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

Answer:

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62. The latus rectum LL' subtends a right angle at the centre of the ellipse, then its eccentricity is

A. $\frac{\sqrt{3}+1}{2}$

B. $\frac{\sqrt{2}+1}{3}$

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

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

Answer:

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63. If (5, 12) and (24, 7) are the focii of conic passing through (0, 0), then the eccentricity of the ellipse is

A. $\sqrt{368}/13$

B. $\sqrt{368}/25$

C. $\sqrt{386}/38$

D. none

Answer:

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64. An ellipse passing through $\left(4\sqrt{2}, 2\sqrt{6}\right)$ has foci at (-4, 0) and (4, 0). Its eccentricity is

A. $1/2$

B. $1/\sqrt{2}$

C. $1/\sqrt{3}$

D. $\sqrt{2}$

Answer:

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65. The eccentricity of the ellipse which meets the straight line $x/7 + y/2 = 1$ on the axis of x and the straight line $x/3 - y/5 = 1$ on the axis of y and whose axes lie along the axes of coordinates, is

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

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

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

D. none

Answer:

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66. The equations of the directrices of the ellipse $25x^2 + 9y^2 - 150x - 90y + 225 = 0$

A. $4y + 5 = 0, 4y - 45 = 0$

B. $4y + 35 = 0, 4y - 15 = 0$

C. $4y + 35 = 0, 4y - 25 = 0$

D. $4x - 35 = 0, 4x + 35 = 0$

Answer:

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67. The equations of the latus recta of the ellipse $9x^2 + 25y^2 - 36x + 50y - 164 = 0$ are

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

B. $x = 6, x + 2 = 0$

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

D. $x = 4, x + 5 = 0$

Answer:

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68. Equations of the latus recta of the ellipse $9x^2 + 4y^2 - 18x - 8y - 23 = 0$ are

A. $y = \pm\sqrt{5}$

B. $x = \pm\sqrt{5}$

C. $y = 1 \pm \sqrt{5}$

D. $x = -1 \pm \sqrt{5}$

Answer:

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69. The equation of the axes of the ellipse $25x^2 + 9y^2 - 150x - 90y + 225 = 0$ are

A. $y + 2 = 0, x = 3$

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

C. $y = 5, x = 3$

D. $y + 2 = 0, x = 5$

Answer:

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

A. a

B. 2a

C. b

D. 2b

Answer:

Watch Video Solution

71. If P is a point on the ellipse $9x^2+36y^2=324$ whose foci are S and S' . Then $PS+PS'=$

A. 9

B. 12

C. 27

D. 36

Answer:

Watch Video Solution

72. If $P(x, y), S(3, 0), S'(-3, 0)$ and $16x^2 + 25y^2 = 400$, then $PS + PS' =$

A. 8

B. 6

C. 10

D. 12

Answer:

Watch Video Solution

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

A. ab

B. 2ab

C. abe

D. abe^2

Answer:

Watch Video Solution

74. If $\pi+\theta$ is the eccentric angle of a point on the ellipse $16x^2+25y^2=400$ then the corresponding point on the auxiliary circle is

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

75. If S and S'' are the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ and if PSP' is a focal chord with SP = 8 then SS'' =

A. $4 + S'P$

B. S P - 1

C. 4 + SP

D. SP - 1

Answer:

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76. A man running round a race course notes that the sum of the distances of two flag posts from him is always 10 meters and the distance between the flag posts is 8 meters. Then the area of the path he encloses (in square meters) is

A. 15π

B. 12π

C. 18π

D. 8π

Answer:

Watch Video Solution

77. P is a variable point on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with AA as the major axis. Then the maximum value of the area of $\triangle$ APA' is

A. ab

B. 2ab

C. ab/2

D. none

Answer:

Watch Video Solution

78. The sides of the rectangle of greatest area that can be inscribed in the ellipse $x^2 + 4y^2 = 64$ are

A. $\left(6\sqrt{2}, 4\sqrt{2}\right)$

B. $\left(8\sqrt{2}, 4\sqrt{2}\right)$

C. $\left(8\sqrt{2}, 8\sqrt{2}\right)$

D. $\left(16\sqrt{2}, 4\sqrt{2}\right)$

Answer:

Watch Video Solution

79. The equation $\frac{x^2}{r-2}+\frac{y^2}{5-r}=1$ represents an ellipse if

A. $r>2$

B. $r>5$

C. $2<r<5$

D. $r<2 \text{ or } r>5$

Answer:

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80. Let E be the ellipse $x^2/9+y^2/4=1$ and C be the circle $x^2+y^2=9$.

Let P and Q be the points (1, 2) and (2, 1) respectively. Then

A. Q lies inside C but outside E

B. Q lies outside both C and E

C. P lies inside both C and E

D. P lies inside C but outside E

Answer:

Watch Video Solution

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

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

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

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

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

Answer:

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82. The equation of the tangent to the ellipse $3x^2 + 2y^2 = 30$ at (-2, 3) is

A. x-y+5=0

B. 3x-5y-14=0

C. 2x-3y-12=0

D. 5x-4y-40=0

Answer:

Watch Video Solution

83. The equation of the normal to the ellipse $\frac{x^2}{4} + \frac{y^2}{1} = 1$ at (2, -1) is

A. x-y-13=0

B. 5x-y+8=0

C. 3x+3y-3=0

D. 2x+y-3=0

Answer:

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84. The equations of the tangents to the ellipse $3x^2 + 4y^2 = 12$ which are parallel to the line $2x - y + 5 = 0$ is

A. $6x - 2y \pm \sqrt{155/3}$

B. $2x - y \pm \sqrt{19} = 0$

C. $16x + 22y \pm \sqrt{155/3}$

D. $2x + 2y \pm \sqrt{39} = 1$

Answer:

Watch Video Solution

85. The equations of the tangents to the ellipse $4x^2 + 3y^2 = 5$ which are perpendicular to the line $3x - y + 7 = 0$ is

A. $2x - 2y \pm \sqrt{55} = 0$

B. $2x - 12y \pm \sqrt{55} = 0$

C. $2x + 6y \pm \sqrt{65} = 0$

D. $2x + 2y \pm \sqrt{15} = 0$

Answer:

Watch Video Solution

86. The equations of the tangents to the ellipse $9x^2 + 16y^2 = 144$ at the ends of the latus rectum are

A. $3x + 4y = \pm 12$

B. $4x - 3y = \pm 12$

C. $\sqrt{7}x \pm 4y = 16$

D. $3x \pm \sqrt{7}y = 16$

Answer:

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87. The equation of tangent to the ellipse $2x^2 + 3y^2 = 6$ which make an angle 30° with the major axis is

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

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

C. $3x - \sqrt{3}y \pm 13 = 0$

D. $x - \sqrt{5}y \pm 3 = 0$

Answer:

Watch Video Solution

88. If $x + ky - 5 = 0$ is a tangent to the ellipse $4x^2 + 9y^2 = 20$ then k =

A. 3

B. -3

C. ± 3

D. none

Answer:

Watch Video Solution

89. The values that m can take so that the straight line $y = 4x + m$ touches the curve $x^2 + 4y^2 = 4$ is

A. $\pm\sqrt{45}$

B. $\pm\sqrt{60}$

C. $\pm\sqrt{65}$

D. $\pm\sqrt{72}$

Answer:

Watch Video Solution

90. The number of values of c such that the straight line $y = 4x + c$ touches the curve $x^2/4 + y^2 = 1$ is

A. 0

B. 1

C. 2

D. infinite

Answer:

Watch Video Solution

91. The point of contact $4x - 5y + 25 = 0$ with the ellipse $9x^2 + 25y^2 = 225$ is

A. (-4, 9/5)

B. (-4, 3/5)

C. (4, -3)

D. (-5, 2)

Answer:

Watch Video Solution

92. Find the condition for the line x cos α+y sin α=p to be a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

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

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

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

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

Answer:

Watch Video Solution

93. The condition that the line $\frac{x}{p}+\frac{y}{q}=1$ to be a tangent to the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is

A. $\frac{2a^2}{p^2}+\frac{3b^2}{q^2}=1$

B. $\frac{a^2}{p^2}+\frac{b^2}{q^2}=1$

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

D. $\frac{a^2}{p^2}-\frac{b^2}{q^2}=1$

Answer:

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94. The line $x\cos\alpha+y\sin\alpha=p$ is a tangent to the ellipse $x^2/a^2+y^2/b^2=1$. The point of contact is

A. $\left(\frac{a^2}{p},\frac{b^2}{p}\right)$

B. $\left(\frac{a^2}{p\sin^2\alpha},\frac{b^2}{p\cos^2\alpha}\right)$

C. $\left(\frac{a^2\sin^2\alpha}{p},\frac{b^2\cos^2\alpha}{p}\right)$

D. $\left(\frac{a^2\cos\alpha}{p}, \frac{b^2\sin\alpha}{p}\right)$

Answer:

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95. The number of tangents to $\frac{x^2}{25}+\frac{y^2}{9}=1$ through (1,1) is

A. 0

B. 1

C. 2

D. 3

Answer:

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96. The sum of the slopes of the tangents to the ellipse $x^2/9 + y^2/4 = 1$ drawn from the point (6, -2) is

A. 0

B. $3/4$

C. $-6/7$

D. $-8/9$

Answer:

Watch Video Solution

97. The product of the slopes of the tangents to the ellipse $2x^2 + 3y^2 = 6$ drawn from the point $(1, 2)$ is

A. 1

B. 2

C. -1

D. -2

Answer: C

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98. The total number of real tangents that can be drawn to the ellipse $3x^2 + 5y^2 = 32$ and $25x^2 + 9y^2 = 450$ passing through (3, 5) is

A. 0

B. 2

C. 3

D. 4

Answer:

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99. If any tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ intercepts equal length l on the axes then l =

A. $a^2 + b^2$

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

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

D. none

Answer:

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100. The equation to the director circle of the ellipse $2x^2 + 3y^2 = 6$ is

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

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

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

D. $x^2 + y^2 = 43$

Answer:

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101. The equation to the auxiliary circle of $\frac{x^2}{12} + \frac{y^2}{18} = 1$ is

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

B. $x^2 + y^2 = 18$

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

D. $x^2 + y^2 = 30$

Answer:

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102. The equation to the circle on $S'S$ as diameter where S and S' are the foci of an ellipse $x^2/a^2 + y^2/b^2 = 1$ is

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

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

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

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

Answer:

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103. 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 at (0, 3) is

A. 4

B. 3

C. $\sqrt{12}$

D. $7/2$

Answer:

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104. If tangents are drawn from any point on the circle $x^2 + y^2 = 25$ to the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ then the angle between the tangents is

A. $\left(2, 3\sqrt{3}/2\right), (4, 0)$

B. $\left(2, \sqrt{3}/\sqrt{2}\right), \left(4, \sqrt{3}/2\right)$

C. $\left(4, 3\sqrt{3}/\sqrt{3}\right), (2, 0)$

D. $(2, 0), (4, 0)$

Answer:

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105. The locus of the point of intersection of the perpendicular tangents to the ellipse $x^2/a^2 + y^2/b^2 = 1$ is

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

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

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

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

Answer:

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106. The locus of the point of intersection of two tangents to the ellipse $x^2/a^2 + y^2/b^2 = 1$ which make an angle 60° with one another is

A. $\left(x^2 + y^2 - a^2 - b^2\right)^2 = 12\left(b^2x^2 + a^2y^2 - a^2b^2\right)$

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

C. $3\left(x^2 + y^2 - a^2 - b^2\right)^2 = 4\left(b^2x^2 + a^2y^2 - a^2b^2\right)$

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

Answer:

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107. If tangents are drawn from any point on the circle $x^2 + y^2 = 25$ to the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ then the angle between the tangents is

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

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

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

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

Answer:

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108. The product of the perpendiculars from the foci on any tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ is

A. a^2

B. $a^2 - b^2$

C. b^2

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

Answer:

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109. If F_1, F_2, F_3 be the feet of the perpendicular from the foci S_1, S_2 of an ellipse $x^2/5 + y^2/3 = 1$ on the tangent at any point P on the ellipse then $S_1F_1 \cdot S_2F_2 =$

A. 2

B. 3

C. 4

D. 5

Answer:

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110. Perpendiculars are drawn from the points $(0, \pm ae)$ on any tangent to $x^2/a^2 + y^2/b^2 = 1$. Then the sum of their squares is

A. $2b^2$

B. $2a^2$

C. b^2

D. a^2

Answer:

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111. The sum of the squares of the perpendiculars on any tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ from two points on the minor axis each at a distance $\sqrt{a^2 - b^2}$ from the centre is

A. $2a^2$

B. $2b^2$

C. $a^2 + b^2$

D. $a^2 - b^2$

Answer:

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112. Let d and d' be the perpendicular distances from the foci of an ellipse to the tangent at P on the ellipse whose foci are S and S'. Then $S'P : SP =$

A. $d : d'$

B. $d' : d$

C. $d^2 : d^2$

D. $a : b$

Answer:

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113. Tangents to the ellipse $x^2/a^2 + y^2/b^2 = 1$ make angles θ_1, θ_2 with the major axis. The equation of the locus of their point of intersection when $\tan(\theta_1 + \theta_2) = k$ is

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

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

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

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

Answer:

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114. The tangent to $x^2/a^2 + y^2/b^2 = 1$ meets the major and minor axes in P and Q respectively, then $a^2/CP^2 + b^2/CQ^2 =$

A. 4

B. 3

C. 2

D. 1

Answer:

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115. S (3, 4) and S' (9, 12) are the focii of an ellipse and the foot of the perpendicular from S to a tangent to the ellipse is (1, -4). Then the eccentricity of the ellipse is

A. $3/13$

B. $4/13$

C. $5/13$

D. none

Answer:

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116. The locus of the foot of the perpendicular drawn from the centre of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ to any of its tangents is

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

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

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

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

Answer:

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117. The area (in sq . Unit) of the quadrilateral formed by the tangents at the end points of the latera recta to the ellipse $\frac{x^2}{9}+\frac{y^2}{5}=1$ is

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

B. 18

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

D. 27

Answer:

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

A. ae

B. ae^2

C. ae^3

D. ae^4

Answer:

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119. If the normal at the end of latus rectum of an ellipse $x^2/a^2 + y^2/b^2 = 1$ of eccentricity e passes through one end of the minor axis then $e^4 + e^2 =$

A. 0

B. 1

C. -1

D. 2

Answer:

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120. The slope of a common tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ and a concentric circle of radius r is

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

B. $\sqrt{\left[\frac{r^2-b^2}{a^2-r^2}\right]}$

C. $\left[\frac{r^2-b^2}{a^2-r^2}\right]$

D. $\sqrt{\left[\frac{a^2-r^2}{r^2-b^2}\right]}$

Answer:

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121. The parametric representation $\left(2+t^2, 2t+1\right)$ represents

A. a parabola with focus at (2, 1)

B. a parabola with vertex at (2, 1)

C. an ellipse with centre at (2, 1)

D. none

Answer:

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122. The points on the ellipse $2x^2 + 3y^2 = 6$ whose eccentric angles differ by two right angles is

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

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

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

D. $\left(Sqrt(3)\cos\theta, \sqrt{2}\sin\theta\right), \left(-\sqrt{3}\cos\theta, \sqrt{2}\sin\theta\right)$

Answer:

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123. The equation of the tangent at a point $\theta = 3\pi/4$ to the ellipse $x^2/16 + y^2/9 = 1$ is

A. $3x + 4y + 12\sqrt{2} = 0$

B. $3x + 4y - 12\sqrt{2} = 0$

C. $3x - 4y + 12\sqrt{2} = 0$

D. $3x - 4y - 12\sqrt{2} = 0$

Answer:

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124. The equation of the normal to the ellipse $x^2/16 + y^2/9 = 1$ at the point whose eccentric angle $\theta = \pi/6$ is

A. $5x - 3y = 8\sqrt{2}$

B. $8x - 6\sqrt{3}y = 7\sqrt{3}$

C. $6x + \sqrt{2}y = 2\sqrt{2}$

D. $2x + 3\sqrt{3}y = 12$

Answer:

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125. If $\frac{x}{a}+\frac{y}{b}=\sqrt{2}$ touches the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, then its eccentric angle $'\theta'$ is equal to

A. 0°

B. 90°

C. 45°

D. 60°

Answer:

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126. The distance of a point on the ellipse $x^2/6+y^2/2=1$ from the centre is 2. The eccentric angle of the point is

A. $\pi/3$

B. $2\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer:

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127. The eccentric angles of the extremities of latusrecta of the ellipse $x^2/a^2 + y^2/b^2 = 1$ is

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

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

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

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

Answer:

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128. The tangent and normal to the ellipse $4x^2 + 9y^2 = 36$ at a point P on it meets the major axis in Q and R respectively. If QR = 4, then the eccentric angle of P is

A. $\cos^{-1} -\frac{3}{5}$

B. $\cos^{-1}\frac{2}{3}$

C. $\cos^{-1}\frac{1}{3}$

D. $\cos^{-1}\frac{1}{5}$

Answer:

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129. If α and β are the eccentric angles of the ends of a focal chord of the ellipse then $\cos^2\left(\frac{\alpha+\beta}{2}\right)\sec^2\left(\frac{\alpha-\beta}{2}\right)$=

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

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

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

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

Answer:

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130. The tangent at a point $P(a\cos\theta, b\sin\theta)$ on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets the auxillary circle in two points. The chord joining them subtends a right angle at the centre. Find the eccentricity of the ellipse:

A. $\sqrt{1+\sin^2\alpha}$

B. $\sqrt{1+\cos^2\alpha}$

C. $\frac{1}{\sqrt{1+\sin^2\alpha}}$

D. $\frac{1}{\sqrt{1+\cos^2\alpha}}$

Answer:

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131. The locus of the foot of perpandicular drawn from the centre 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:

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132. If P is a point on the ellipse of eccentricity e and A, A 1 are the vertices and S, S' are the foci then area of SPS' : area of APA' =

A. $\angle A'PA$

B. $\angle A'PS$

C. $\angle S'PS$

D. $\angle S'PA$

Answer:

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133. $P(\theta)$ and $D\left(\frac{\pi}{2}+\theta\right)$ are two points on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. Show that the locus of the point of intersection of tangents at P and Q to the ellipse is $\frac{x^2}{a^2}+\frac{y^2}{b^2}=2$

A. $x^2/a^2+y^2/b^2=1/a$

B. $x^2/a^2+y^2/b^2=1/b$

C. $x^2/a^2+y^2/b^2=1/2$

D. $x^2/a^2+y^2/b^2=1/6$

Answer:

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134. $P(\theta)$ and $D\left(\frac{\pi}{2}+\theta\right)$ are two points on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. Show that the locus of the point of intersection of tangents at P and Q to the ellipse is $\frac{x^2}{a^2}+\frac{y^2}{b^2}=2$

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

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

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

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

Answer:

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135. The maximum number of normals that can be drawn from any point to an ellipse, in general, is

A. 1

B. 2

C. 3

D. 4

Answer:

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136. The condition that the line $lx + my + n = 0$ to be a normal to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

A. $a^2 - b^2$

B. $a^2 + b^2$

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

D. $\left(a^2 - b^2\right)^2$

Answer:

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137. The normal at a poitn $P(\theta)$ on the ellipse $5x^2 + 14y^2 = 70$ cuts the curve again at a point Q $(2\theta) then \cos\theta$

A. $2/3$

B. $-2/3$

C. $1/3$

D. $-1/3$

Answer:

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138. If the normal at θ on the hyperbola $x^2/a^2 - y^2/b^2 = 1$ meets the transverse axis at G, then AG. A'G=

A. SP

B. eSP

C. SP/e

D. e

Answer:

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139. The tangent at a point $P(a\cos\theta, b\sin\theta)$ on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ meets the auxillary circle in two points. The chord joining them subtends a right angle at the centre. Find the eccentricity of the ellipse:

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

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

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

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

Answer:

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140. The tangent at 'p' on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ cuts the major axis in T and PN is the perpendicular to the x-axis, C being centre then CN.CT =

A. a^2

B. b^2

C. $2a^2$

D. $2b^2$

Answer:

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Exercise 1 B

1. The equation of the chord of contact of the point (1, -2) w.r.t the ellipse $4x^2 + 5y^2 = 20$ is

A. $x + 16y - 12 = 0$

B. $2x - 5y - 10 = 0$

C. $5x + 7y - 16 = 0$

D. $x - 15y - 20 = 0$

Answer:

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2. The equation of the polar of the point (2, -1) w.r.t the ellipse $3x^2 + 4y^2 = 12$ is

A. $x + y - 1 = 0$

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

C. $5x - 5y - 6 = 0$

D. $13x - 9y + 16 = 0$

Answer:

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3. Pole of the line $2x + 3y + 4 = 0$ w.r.t. the ellipse $x^2/2 + y^2/4 = 1$ is

A. (1, 3)

B. (1, -3)

C. (-1, 3)

D. (-1, -3)

Answer:

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4. The pole of line x = a/e with respect to the ellipse $x^2/a^2 + y^2/b^2 = 1$ is

A. (a/e, 0)

B. (-a/e, 0)

C. (ae, 0)

D. (-ae, 0)

Answer:

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5. The pole of the line y = x + 2 with respect to the ellipse $x2 + 2y2 - 4x + 12y + 14 = 0$ is

A. (9/4, -5/24)

B. (6/7, -17/7)

C. (-26/ 35/4)

D. none

Answer:

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6. The value of k if (1, 2), (k, -1) are conjugate points with respect to the ellipse $2x^2 + 3y^2 = 6$ is

A. 2

B. 4

C. 6

D. 8

Answer:

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7. If $2x - y + 3 = 0, 4x + ky + 3 = 0$ are conjugate with respect to the ellipse $5x^2 + 6y^2 - 15 = 0$ then k =

A. 1

B. 2

C. 3

D. 6

Answer:

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8. The locus of poles with respect to the hyperbola $x^2/a^2 - y^2/b^2 = 1$ of tangents to its auxiliary circle is

A. $x^2/a^2 + y^2/b^2 = 1/a^2$

B. $x^2/a^2 + y^2/b^2 = 1/b^2$

C. $x^2/a^4 + y^2/b^4 = 1/a^2$

D. $x^2/a^4 + y^2/b^4 = 1/b^2$

Answer:

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9. Show that the locus of middle points of a focal chord of an ellipe $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{ex}{a}$

A. $\alpha^2 x^2/a^2 + \beta^2 y^2/b^2 = 1$

B. $\alpha^2 x^2/a^4 + \beta^2 y^2/b^4 = 1$

C. $\alpha^2 x^2/b^4 + \beta^2 y^2/a^4 = 1$

D. $\alpha^2 x^2/b^2 + \beta^2 y^2/a^2 = 1$

Answer:

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10. The locus of midpoints of chords of the ellipse $x^2/a^2 + y^2/b^2 = 1$ which pass through the positive end of the major axis is

A. $x^2/a^4 + y^2/b^4 = 1/a^2 + 1/b^2$

B. $x^2/a^4 + y^2/b^4 = 1/a^2 - 1/b^2$

C. $x^2/a^4 - y^2/b^4 = 1/a^2 + 1/b^2$

D. $x^2/a^4 - y^2/b^4 = 1/a^2 - 1/b^2$

Answer:

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

A. a^2/b^2

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

C. $-a^4/b^4$

D. $-b^4/a^4$

Answer:

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12. The equation of the chord of the ellipse $2x^2 + 3y^2 = 6$ having (1, -1) as its midpoint is

A. $8x + 9y - 25 = 0$

B. $2x - 3y - 5 = 0$

C. $x + y - 1 = 0$

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

Answer: B

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13. The midpoint of a chord of the ellipse $x^2 + 4y^2 - 2x + 20y = 0$ is (2, -4). The equation of the chord is

A. $x - 6y = 26$

B. $x + 6y = 26$

C. $6x - y = 26$

D. $6x + y = 26$

Answer:

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14. The midpoint of the chord $4x + 5y - 13 = 0$ of the ellipse $2x^2 + 5y^2 = 20$ is

A. (2, -1)

B. (-2, 1)

C. (-2, -1)

D. (2, 1)

Answer:

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15. If the line 2x + 5y = 12 intersects the ellipse $4x^2 + 5y^2 = 20$ in two distinct points A and B, then the midpoint of AB is

A. (0, 10)

B. (1, 2)

C. (1, 0)

D. (2, 1)

Answer:

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16. The locus of midpoints of chords of the ellipse $x^2/a^2 + y^2/b^2 = 1$ which pass through the positive end of the major axis is

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

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

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

D. none of these

Answer:

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17. The locus of midpoints of chords of the ellipse $x^2/a^2 + y^2/b^2 = 1$ which pass through the positive end of the major axis is

A. $x^2/a^2 + y^2/b^2 = 1/a$

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

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

D. $x^2/a^2 + y^2/b^2 = 1/b$

Answer:

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18. The locus of midpoints of chords of the ellipse $x^2/a^2 + y^2/b^2 = 1$ that pass through the focus (ae, 0) is

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

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

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

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

Answer:

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19. The locus of the point of intersection of the perpendicular tangents to the ellipse $x^2/a^2 + y^2/b^2 = 1$ is

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

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

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

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

Answer:

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20. The equation of the locus of the middle point of the portion of a tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ included between the axes is

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

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

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

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

Answer:

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21. The locus of midpoints of chords of the ellipse $x^2/a^2 + y^2/b^2 = 1$ that pass through the focus (ae, 0) is

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

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

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

D. none

Answer:

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22. A variable line drawn throgh the point of intersection of the lines $\frac{x}{a}+\frac{y}{b}=1, \frac{x}{b}+\frac{y}{a}=1$ meets the coordinate axes in A and B. Then the locus of midpoint of AB is

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

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

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

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

Answer:

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23. The locus of midpoints of chords of the ellipse $x^2/a^2+y^2/b^2=1$ which pass through the positive end of the major axis is

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

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

C. $a^6/x^2 + b^6/y^2 = (a^2 + b^2)^2$

D. $a^6/x^2 + b^6/y^2 = (a^2 - b^2)^2$

Answer:

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24. The equation of the locus of the middle point of the portion of a tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$ included between the axes is

A. $x^2/a^2 + y^2/b^2 = 4$

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

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

D. $b^2x^2 + a^2y^2 = 4$

Answer:

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Exercise 2 Set 1

1. I : The equation of the ellipse with its axes as the coordinate axes respectively and whose latus rectum = 8 and eccentricity $= 1/\sqrt{2}$ is $x^2/64 + y^2/32 = 1$

II : The equation o the ellipse with its axes as the coordinate axes respectively and whose minor axis = 6 and eccentricity = 1/2 is $x^2/12 + y^2/9 = 1$

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer:

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2. The equation of the tangent to the ellipse $3x^2 + 2y^2 = 30$ at (-2, 3) is

A. only I is true

B. only II is true

C. both I and II are true

D. neither I nor II true

Answer:

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Exercise 2 Set 2

1. The equation of the chord of contact of the point (1, -2) w.r.t the ellipse $4x^2 + 5y^2 = 20$ is

A. a, b, c

B. b, c, a

C. c, a, b

D. b, a, c

Answer:

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