MATHS

BOOKS - NDA PREVIOUS YEARS

CONICS - PARABOLA, ELLIPSE & HYPERBOLA

Math

1. If the latus rectum of an ellipse is equal to the half of minor axis, then find its eccentricity.

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

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

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

D. $\dfrac{\sqrt{15}}{4}$

Answer: B

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2. P(2, 2) is a point on the parabola $y^2 = 2x$ and A is its vertex. Q is anoter point on the

parabola such that PQ is perpendicular to AP.

What is the length of PQ.

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. $4\sqrt{2}$

D. $6\sqrt{2}$

Answer: D

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3. The focal distance of a point on the parabola

$y^2 = 12\xi s4.$ Find the abscissa of this point.

A. 1

B. -1

C. $2\sqrt{2}$

D. -2

Answer: A

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4. If $(2, 0)$ is the vertex and y-axis the directrix of a parabola then its focus is

    A. $(0, 0)$

    B. $(-2, 0)$

    C. $(4, 0)$

    D. $(-4, 0)$

Answer: C

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5. Which one of the following points lies outside the ellipse $(x^2/a^2) + (y^2/b^2)$?

A. (a, 0)

B. (0, b)

C. (-a, 0)

D. (a, 0)

Answer: D

6. What is the equation of the parabola, whose vertex and focus are on the x-axis at distance a and b from the origin respectively ? $(b > a > 0)$

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

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

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

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

Answer: D

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7. If the eccentricity and length of latus rectum of a hyperbola are $\dfrac{\sqrt{13}}{3}$ and $\dfrac{10}{3}$ units respectively, then what is the length of the transvers axis ?

A. $\dfrac{7}{2}$ unit

B. 12 unit

C. $\dfrac{15}{2}$ unit

D. $\dfrac{15}{4}$ unit

Answer: C

8. In how many points do the ellipse $\dfrac{x^2}{4} + \dfrac{y^2}{8} = 1$ and the circle $x^2 + y^2 = 9$ intersect ?

A. One

B. Two

C. Four

D. None of above

Answer: D

9. If the foci of the conics $\dfrac{x^2}{a^2} + \dfrac{y^2}{7} = 1$ and $\dfrac{x^2}{144} - \dfrac{y^2}{81} = \dfrac{1}{25}$ were to coincide, then what is the value of a ?

A. 2

B. 3

C. 4

D. 16

Answer: C

10. Which one of the following is correct? The

eccentricity   of   the   conic

$$\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1, (\lambda \geq 0)$$

    A. increases with increase in λ

    B. decreases with increase in λ

    C. does not changes with λ

    D. None of above

Answer: B

11. Consider the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1 (b > a)$.

Then, which one of the following is correct ?

A. Real foci do not exist

B. Foci are $(\pm ae, 0)$

C. Foci are $(\pm be, 0)$

D. Foci are $(0, \pm be)$

Answer: D

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12. Consider the parabolas $S_1 = y^2 - 4ax = 0$

and $S_2 = y^2 - 4bx = 0$. S_2 will S_1, if

   A. $a > b > 0$

   B. $b > a > 0$

   C. $a > 0, b <$ but $|b| > a$

   D. $a < 0, b >$ but $|b| > a$

Answer: B

13. Equation of the hyperbola with eccentricity 3/2 and foci at $(\pm 2, 0)$ is $5x^2 - 4y^2 = k^2$.

What is the value of k ?

A. $4/3$

B. $3/4$

C. $(4/3)\sqrt{5}$

D. $(4/4)\sqrt{5}$

Answer: C

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14. If the latusrectum of an ellipse is equal to half of minor axis, find its eccentricity.

A. $1/4$

B. $1/2$

C. $\sqrt{3}/5$

D. $\sqrt{3}/2$

Answer: D

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15. What is the sum of focal radii of any point on an ellipse equal to ?

A. Length of latusrectum

B. Length of major-axis

C. Length of minor-axis

D. Length of semi-latusretum

Answer: B

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16. What does an equation of the first degree containing one arbitray parameter through a fixed point pepresent ?

A. Circle

B. Straight line

C. Parabola

D. Ellipse

Answer: B

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17. The curve $y^2 = -4ax (a > 0)$ lies in

A. First and fourth quadrants

B. First and second quadrants

C. Second and third quadrants

D. Third and fourth quadrants

Answer: C

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18. The ellipse $\dfrac{x^2}{169} + \dfrac{y^2}{25} = 1$ has the same eccentricity as the ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$. What is the ratio of a to b ?

A. $5/13$

B. $13/5$

C. $7/8$

D. $8/7$

Answer: B

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19. If (4, 0) and (-4, 0) are the foci of an ellipse and the semiminor axis is 3, then the ellipse passes thrugh which one of the following points ?

A. (2, 0)

B. (0, 5)

C. (0, 0)

D. (5, 0)

Answer: D

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20. What is the locus of points, the difference of whose distances from two points being constant ?

    A. Pair of straight lines

    B. An ellipse

    C. A hyperbola

    D. A parabola

Answer: C

21. A circle is drawn with the two foci an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ at the end of the diameter.

What is the equation of the eircle ?

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

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

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

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

Answer: B

22. What are the equations of the directrices of

the ellipse $25^2 + 16y^2 = 400$?

    A. $3x \pm 25 = 0$

    B. $3y \pm 25 = 0$

    C. $x \pm 15 = 0$

    D. $y \pm 25 = 0$

Answer: B

23. Let E be the ellipse $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$ and C be the circle $x^2 + y^2 = 9$. Let P = (1, 2) and Q = (2, 1). Which one of the following is correct?

    A. Q lies inside C but outside E

    B. Q lies outside both C and E

    C. P line inside both C and E

    D. P line inside C but outside E.

Answer: D

24. Find the locus of a point whiich moves in such a way that the sum of its distances from the points $(a, 0, 0)$ and $(a, 0, 0)$ is constant.

A. Circle

B. Ellipse

C. Hyperbola

D. Parabola

Answer: C

25. If the latusrectum of an ellipse is equal to half of minor axis, find its eccentricity.

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

B. $\sqrt{3}$

C. $\sqrt{3}/2$

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

Answer: C

26. What are the points of intersection of the curve $4x^2 - 9y^2 = 1$ with its conjugate axis ?

A. $(1/2, 0)$ and $(-1/2, 0)$

B. $(0, 2)$ and $(0, 2)$

C. $(0, 3)$ and $(0, -3)$

D. None such point exists

Answer: D

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27. What is the sum of the focal distances of a point of an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$?

A. a

B. b

C. 2a

D. 2b

Answer: C

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28. 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.

A. 9 square units

B. 12 square units

C. 14 square units

D. 18 square units

Answer: D

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29. What is the focal distance of any point $P(x_1, y_1)$ on the parabola $y^2 = 4ax$?

A. $x_1 + y_1$

B. $x_1 y_1$

C. ax_1

D. $a + x_1$

Answer: D

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30. If the latus rectum of an ellipse is equal to half of the minor axis, then what is its eccentricity ?

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

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

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

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

Answer: C

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31. What is the eccentricity of the conic $4x^2 + 9y^2 = 144$?

A. $\dfrac{\sqrt{5}}{3}$

B. $\dfrac{\sqrt{5}}{4}$

C. $\dfrac{3}{\sqrt{5}}$

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

Answer: A

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32. The sum of focal distances of a point on the ellipse $\dfrac{x^2}{4} + \dfrac{y^2}{9} = 1$ is:

A. 4 units

B. 6 units

C. 8 units

D. 10 units

Answer: A

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33. The eccentricity e of an ellipse satisfies the condition :

A. $e < 0$

B. $0 < e < 1$

C. $e = 1$

D. $e > 1$

Answer: B

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34. The equation of the ellipse whose vertices are $(\pm 5, 0)$ and foci at $(\pm 4, 0)$ is

A. $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$

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

C. $\dfrac{x^2}{16} + \dfrac{y^2}{25} = 1$

D. $\dfrac{x^2}{25} + \dfrac{y^2}{16} = 1$

Answer: A

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35. Difference of Focal radii of any point is equal to the length of major axis

A. latus rectum

B. semi-transverse axis

C. transverse axis

D. semi-latus rectum

Answer: C

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36. The foci of the hyperbola

$4x^2 - 9y^2 - 1 = 0$ are

A. $\left(\pm \sqrt{13}, 0 \right)$

B. $\left(\pm \dfrac{\sqrt{13}}{6}, 0 \right)$

C. $\left(0, \pm \dfrac{\sqrt{13}}{6} \right)$

D. None of these

Answer: B

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37. The axis of the parabola $y^2 + 2x = 0$ is

A. x=0

B. y=0

C. x=2

D. y=2

Answer: B

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38. What is the sum the major and minor axes of the ellipse whose eccentricity is 4/5 and length of latus rectum is 14.4 unit ?

    A. 32 units

    B. 48 units

    C. 64 units

    D. None of these

Answer: C

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39. Find the area of the greatest rectangle that can be inscribed in an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

A. ab

B. 2 ab

C. $ab/2$

D. $\sqrt{ab}$

Answer: B

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40. Find the area of the greatest rectangle that can be inscribed in an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

A. $ab(\pi - 1)$

B. $2a(\pi - 1$

C. $ab(\pi - 2)$

D. None of these

Answer: C

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41. Consider an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

What is the eauation of parabola whose verted

is at (0, 0) and focus is at (0, 2) ?

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

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

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

D. $x^2 - 8y = 0$

Answer: C

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42. Consider an ellipse $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

What is the length of the latus rectum of the ellipse $25x^2 + 16y^2 = 400$?

A. $25/2$

B. $25/4$

C. $156/5$

D. $32/5$

Answer: D

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43. The line $2y = 3x + 12$ cuts the parabola $4y = 3x^2$.

Where does the line cut the parabola ?

    A. $At(- 2, 3)$ only

    B. At (4, 12) only

    C. At both (-2, 3) and (4, 12)

    D. Neither at (-2, 3) nor (4, 12)

Answer: C

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44. Find the area enclosed by the parabola $4y = 3x^2$ and the line $2y = 3x + 12$.

A. 27 square unit

B. 36 squre unit

C. 48 square unit

D. 54 square unit

Answer: A

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45. The line $2y = 3x + 12$ cuts the parabola

$4y = 3x^2$.

Where does the line cut the parabola ?

A. 7 square unit

B. 14 square unit

C. 20 square unit

D. 21 square unit

Answer: C

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46. The point on $y^2 = 4ax$ nearst to the focus

has to abscissa equal to

A. x=0

B. x=a

C. $x = \dfrac{a}{2}$

D. $x = 2a$

Answer: A

47. The line $2y = 3x + 12$ cuts the parabola $4y = 3x^2$.

The hyperbola $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ passes through the point $(3\sqrt{5}, 1)$ and the length of its latus rectum is $\dfrac{4}{3}$ units. The length of the conjugate axis is

A. 2 units

B. 3 units

C. 4 units

D. 5 units

Answer: C

48. Consider any point P on the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$ in the first quadrant. Let r and s represent its distances from (4, 0) and (-4, 0) respectively, then (r + s) is equal to:

A. 10 units

B. 9 unit

C. 8 unit

D. 6 unit

Answer: A

49. The eccentricity of the hyperbola $16x^2 - 9y^2 = 1$ is?

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

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

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

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

Answer: B

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50. The line $2y = 3x + 12$ cuts the parabola

$4y = 3x^2$.

What is the equation of the hyperbola having

rectum and eccentrieity 8 and $\dfrac{3}{\sqrt{5}}$ respectivly

?

A. $\dfrac{x^2}{25} + \dfrac{y^2}{20} = 1$

B. $\dfrac{x^2}{40} + \dfrac{y^2}{20} = 1$

C. $\dfrac{x^2}{40} + \dfrac{y^2}{30} = 1$

D. $\dfrac{x^2}{30} + \dfrac{y^2}{25} = 1$

Answer: A

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51. The line $2y = 3x + 12$ cuts the parabola $4y = 3x^2$.

If the ellipse $9x^2 + 16y^2 = 144$ intersecpts the

line $3x + 4y = 12$ then what is the length of the chord so formed ?

A. 5 units

B. 5 units

C. 8 units

D. 10 units

Answer: A

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52. The line $2y = 3x + 12$ cuts the parabola $4y = 3x^2$.

What ishte eccentricity of rectangular hyper bola ?

A. $\sqrt{2}$

B. $\sqrt{3}$

C. $\sqrt{5}$

D. $\sqrt{6}$

Answer: A

53. Find the coordinates of a point on the parabola $y = x^2 + 7x + 2$ which is closest to the straight line $y = 3x - 3$.

A. $(0, 2)$

B. $(-2, -8)$

C. $(-7, 2)$

D. $(1, 10)$

Answer: B

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54. Find the coordinates of a point on the parabola $y = x^2 + 7x + 2$ which is closest to the straight line $y = 3x - 3$.

A. $\dfrac{\sqrt{10}}{2}$

B. $\dfrac{\sqrt{10}}{5}$

C. $\dfrac{1}{\sqrt{10}}$

D. $\dfrac{\sqrt{5}}{4}$

Answer: C

55. Consider the parabola $y = x^2 + 7x + 2$ and the straight line $y = 3x - 3$.

What is equation of the ellipse having foci $(\pm 2, 0)$ the eccentricity $\dfrac{1}{4}$?

A. $\dfrac{x^2}{64} + \dfrac{y^2}{60} = 1$

B. $\dfrac{x^2}{60} + \dfrac{y^2}{64} = 1$

C. $\dfrac{x^2}{20} + \dfrac{y^2}{24} = 1$

D. $\dfrac{x^2}{24} + \dfrac{y^2}{20} = 1$

Answer: A

56. एक व्यक्ति दौड़पथ पर दौड़ते हुए अंकित करता है कि उससे दो झंडा चौकियों की दूरियां का योग सदैव 10 मीटर रहता है और झंडा चौकियों के बीच की दूरी 8 मीटर है व्यक्ति द्वारा बनाए पथ का समीकरण ज्ञात कीजिए

A. 18π square metres

B. 15π square metres

C. 12π square metres

D. 8π square metres

Answer: B

57. Consider the parabola $y = x^2 + 7x + 2$ and the straight line $y = 3x - 3$.

The position of the point, (1, 2) relative to the ellipse $2x^2 + 7y^2 = 20$ is

A. Outside the ellipse

B. inside the ellipse but not at the focus

C. on the ellispe

D. at the focus

Answer: A

58. Consider the parabola $y = x^2 + 7x + 2$ and the straight line $y = 3x - 3$.

The equation of the ellipse whose centre is at origin, major axis is along x-axis with eccentricity $\dfrac{3}{4}$ and latus rectum 4 units is

A. $\dfrac{x^2}{1024} + \dfrac{7y^2}{64} = 1$

B. $\dfrac{49x^2}{1024} + \dfrac{7y^2}{64} = 1$

C. $\dfrac{7x^2}{1024} + \dfrac{49y^2}{64} = 1$

D. $\dfrac{x^2}{1024} + \dfrac{49y^2}{64} = 1$

Answer: B

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59. The equation of the ellipse whose vertices are $(\pm 5, 0)$ and foci at $(\pm 4, 0)$ is

A. $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$

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

C. $\dfrac{x^2}{25} + \dfrac{y^2}{16} = 1$

D. $\dfrac{x^2}{9} + \dfrac{y^2}{25} = 1$

Answer: A

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60. Consider the parabola $y = x^2 + 7x + 2$ and the straight line $y = 3x - 3$.

The sum of the focal distances of a point on an ellipse is constant and equal to the

A. length of equal to the

B. length of major axis

C. length of major axis

D. length of latus rectum

Answer: B

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61. Consider the parabola $y = x^2 + 7x + 2$

and the straight line $y = 3x - 3$.

The equation $2x^2 - 3y^2 - 6 = 0$ represents

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola

Answer: D

62. Consider the parabola $y = x^2 + 7x + 2$ and the straight line $y = 3x - 3$.

The two parabolas $y^2 = 4ax$ and $x^2 = 4ay$ intersect

    A. at two points on the line y = x

    B. only at the origin

    C. at three points one of which lies on y + x

       = 0

    D. only at (4a, 4a)

Answer: A