MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

HYPERBOLA

Solved Examples

1. Find the lengths of the axes, the coordinates of the vertices and the foci, the eccentricity

and length of the latus rectum of the hyperbola

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

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2. Find the lengths of the axes, the coordinates of the vertices and the foci, the eccentricity and length of the latus rectum of the hyperbola

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

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3. Find the equations of the hyperbola satisfying the given conditions :Vertices $(\pm 2, 0)$, $foci(\pm 3, 0)$

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4. Find the equations of the hyperbola satisfying the given conditions :Foci $(\pm 5, 0)$, the transverse axis is of length 8.

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5. Find the equations of the hyperbola satisfying the given conditions :Foci $(\pm 4, 0)$, the latus rectum is of length 12

6. Find the equation of the hyperbola whose vertices are $(\pm 7, 0)$ and the eccentricity is $\frac{4}{3}$.

7. Find the equation of the hyperbola whose eccentricity is $\dfrac{3}{2}$ and whose foci are $(\pm 2, 0)$.

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

$$\dfrac{y^2}{4} - \dfrac{x^2}{9} = 1,$$

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

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

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10. Find the equation of the hyperbola whose vertices are $(0, \pm 3)$ and the foci are $(0, \pm 5)$.

11. Find the equation of the hyperbola whose eccentricity is $\dfrac{5}{3}$ and whose vertices are $(0, \pm 6)$. Also, find the coordinates of its foci

.

12. Find the equation of the hyperbola where foci are $(0, \pm 12)$and the length of the latus rectum is 36.

13. Find the equation of the hyperbola with centre at the origin , length of the transverse axis 6 and one focus at (0,4) .

14. Find the equation of the hyperbola whose foci are at $(0, \pm 6)$ and the length of whose conjugate axis is $2\sqrt{11}$.

A. $\dfrac{y^2}{25} - \dfrac{x^2}{11} = 1$

B. $\dfrac{y^2}{11} - \dfrac{x^2}{25} = 1$

C. $\dfrac{y^2}{11} + \dfrac{x^2}{25} = 1$

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

Answer: A

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15. Referred to the principal axes as the axes of

coordinates find the equation of the

hyperbola whose foci are at $\left(0, \pm \sqrt{10}\right)$ and which passes through the point $(2, 3)$.

Exercise 24

1. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

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

2. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

$$\frac{x^2}{25} - \frac{y^2}{4} = 1$$

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3. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii

(iv)ecentricity(v)length of latus rectum

$$x^2 - y^2 = 1$$

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4. Find the (i)length of the axis(ii)coordinate of vertices   (iii)coordinate   of   the   focii (iv)ecentricity(v)length of latus rectum

$$3x^2 - 2y^2 = 6$$

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5. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

$$25x^2 - 9y^2 = 225$$

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6. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

$$24x^2 - 25y^2 = 600$$

7. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

$$\frac{y^2}{16} - \frac{x^2}{49} = 1$$

8. Find the coordinates of the foci and the vertices, the eccentricity and the length of the latus rectum of the hyperbolas. $\frac{y^2}{9} - \frac{x^2}{27} = 1$

9. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii (iv)ecentricity(v)length of latus rectum

$$3y^2 - x^2 = 108$$

10. Find the (i)length of the axis(ii)coordinate of vertices (iii)coordinate of the focii

(iv)ecentricity(v)length of latus rectum

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

11. Find the equation of the hyperbola with vertices at $(\pm 6, 0)$ and foci at $(\pm 8, 0)$.

12. Find the equations of the hyperbola satisfying the given conditions :Vertices

$(0, \pm 5)$, $foci(0, \pm 8)$

13. Find the equation of the hyperbola whose foci are $\left(\pm \sqrt{29}, 0 \right)$ and the transverse axis is of the length 10.

14. Find the equation of the hyperbola whose foci are $(\pm 5, 0)$ and the conjugate axis is of

the length 8. Also ,Find its eccentricity .

15. Find the equations of the hyperbola satisfying the given conditions :Foci $\left(\pm 3\sqrt{5}, 0\right)$, the latus rectum is of length 8.

16. The equation of the hyperbola whose foci are (-2, 0) and (2,0) and eccentricity is 2 is

given by

17. Find the equation of the hyperbola whose foci are $\left(\pm\sqrt{5}, 0\right)$ and the eccentricity is $\sqrt{\dfrac{5}{3}}$.

18. Find the equation of the hyperbola , the length of whose latus rectum is 4 and the

eccentricity is 3.

19. Find the equation of the hyperbola with eccentricity $\sqrt{2}$ and the distance between whose foci is 16.

20. Find the equation of the hyperbola whose vertices are $(0, \pm 3)$ and the eccentricity is $\dfrac{4}{3}$

,Also find the coordinates of its foci .

21. Find the equation of the hyperbola whose foci are (0 ± 13) and the length of whose conjugate axis is 24.

22. Find the equation of the hyperbola whose foci are $(0, \pm 10)$ and the length of whose

latus rectum is 9 units .

23. Find the equation of the hyperbola having its foci at $\left(0, \pm \sqrt{14}\right)$ and passing through the point $P(3, 4)$.