



### MATHS

## BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

## PARABOLA, ELLIPSE AND HYPERBOLA

**Question Bank** 

1. The coordinates of focus of the parabola

$$y^2=\ -\ 5x$$
 are \_

A. (-5,0)

B. (0,-5/4)

C. (-5/4,0)

D. (0,-5)

#### Answer: C



**2.** The equation of directrix of the parabola  $4x^2=3y$  is \_

A. 16x+3=0

B. 16y+3=0

C. 16x-3=0

D. 16y-3=0

#### **Answer: B**

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3. The length of latus rectum of the parabola

$$(y-1)^2 = -6(x+2)$$
 is\_

A. 6 units

B. 3/2 units

C. 24 units

D. none of these

Answer: A

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**4.** If the coordinates of vertex and focus of a parabola be (2,1) & (2,3) respectively, then the axis of the parabola will be

A. a) Y-axis

B. b)X-axis

C. c)Parallel to the Y-axis

D. d)Parallel to the X-axis

Answer: C

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5. The coordinates of focus of the parabola $2y^2=\,-\,5x$  are

A. (-5/8,0)

- B. (-5/2,0)
- C. (0,-5/2)
- D. (0,-5/8)

#### Answer: D

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# **6.** The equation of directrix of the parabola $3x^2 = -4y$ is

A. 3y-1=0

#### B. 3x-1=0

C. 3y+1=0

D. 3x+1=0

#### Answer: B

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7. The coordinates of the vertex of the parabola  $\left(x+1
ight)^2=~-~9(y+2)$  are

A. (-1,-2)

#### B. (1,2)

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

#### Answer: A

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#### 8. Find the length of the latus rectum of the

parabola  $y = -2x^2 + 12x - 17$  .

A. 1/2 unit

B. 2 units

C.1 units

D. none of these

Answer: A

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**9.** The vertex of a parabola is at the origin and its focus is  $\left(0, -\frac{5}{4}\right)$ , find the equation of

#### the parabola.

A. 
$$x^2=5y$$
  
B.  $y^2=5x$   
C.  $x^2=-5y$ 

D. 
$$y^2=~-5x$$

#### Answer: C



10. Find the point on the parabola  $y^2 = -36x$  at which the ordinate is three times the abscissa .

A. (4,12)

B. (-12,-4)

C.)-4,-12)

D. (12,-4)

#### Answer: C



**11.** The coordinates of the vertex and focus of a parabola are (1,2) and (-1,2) respectively : find its equation.



**12.** Find the equation of the parabola whose vertexi is the point (1,-2) and the eqation of

directrix is y + 5 = 0.



**13.** Find the equatio of the parabola whose focus is at the origin and the equation of directrix is x + y = 1.

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**14.** Find the coordinates of vartex and the length of latus rectum of the parabola whose focus is (0,0) and the directrix is the line  $2 \times +$ 

y =1

**15.** If  $\theta$  is a variable paramete, then the equations

$$x=rac{1}{4}ig(3-\cos ec^2 hetaig), y=2+\cot heta$$

represent the equation of a/an

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16. The locus of middle points of a family of

focal chord of the parabola  $y^2=4ax$  is-

**17.** The coordinates of the two ends of latus rectum of a parabola are (8,1) and (-4,1) , find the equation of the parabola.

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**18.** A parabola passes through the points (0.0)

,(2,2) and (-2,-6) and its asix ia parallel to y-axis .

Find its equation .

19. If  $(at^2, 2at)$  be the coordinate of an extremity of a focal chord of the parabola  $y^2 = 4ax$ , then the length of the chord is-

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**20.** The directrix of a parabola is x + y + 4 = 0and vertix is the point (-1,-1) . Find (i) the position of focus and (ii) the equation of the parabola.



**21.** Show that the equation of the chord of the parabola  $y^2 = 4ax$  through the points  $(x_1, y_1)$  and  $(x_2, y_2)$  on its `(y-y\_1)(y-y\_2)=y^2-4ax.

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**22.** The pt.  $(2 + 4\cos\theta, 1 + 2\sin\theta)$  represents

the parametric coordinates of any point on the ellipse centre is

A. a. (-2,1)

B. b. (2,1)

#### C. c. (2,-1)

D. d.(-2,-1)

#### Answer: B

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23. If eccentricities of the ellipse
$$rac{x^2}{36}+rac{y^2}{25}=1$$
 and  $rac{x^2}{a^2}+rac{y^2}{b^2}=1ig(a^2< b^2ig)$ 

be equal, then a:b=

A. 4,3

B. 9,5

C. 3:5

D. 5:6

#### Answer: D

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# **24.** The length of the latus rectum of the ellipse $2x^2 + 4y^2 = 16$ is

#### A. $\sqrt{2}$ units

- B. 2 units
- C.  $2\sqrt{2}$  units
- D. none of these

#### Answer: C



#### 25. The coordinates of the foci of the ellipse

 $20x^2+4y^2=5$  are

A. 
$$(0, \pm 1)$$
  
B.  $(0, \pm \sqrt{2})$   
C.  $(\pm 1, 0)$   
D.  $(\pm \sqrt{2}, 0)$ 

#### Answer: A



**26.** The length of the semi-major axis of an ellipse is 13 and its eccentricity is 12/13. Then the length of the semi-minor axis is

A. 12

B. 6

C. 10

D. 5

#### Answer: D

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## **27.** The eccentricy of the ellipse

 $x^2 + 4y^2 + 2x - 24y + 33 = 0$  is





28. find the length of the latus rectum of the

ellipse 
$$\displaystyle rac{x^2}{9} + \displaystyle rac{y^2}{16} = 1$$

A. 16/3 units

- B. 32/3 units
- C. 3/4 units
- D. 9/2 units

#### Answer: D

**29.** The coordinates of the point on the ellipse  $(2, \sqrt{2})$ 

 $9x^2+16y^2=144$  are  $\left(2,rac{3\sqrt{3}}{2}
ight)$  , find the

eccentric angle of the point .

A.  $60^{\circ}$ 

B.  $30^{\circ}$ 

C.  $45^{\circ}$ 

D. none of these

#### Answer: A



**30.** If the distance between the foci of an ellipse is equal to the length of the latus rectum, then its eccentricity is \_

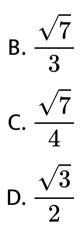
A. 
$$\frac{\sqrt{5}+1}{2}$$
B. 
$$\frac{\sqrt{5}-1}{2}$$
C. 
$$\frac{\sqrt{5}-1}{4}$$
D. 
$$\frac{\sqrt{5}-1}{4}$$

#### Answer: B



# **31.** Find the eccentricity, the length of latus rectum and the centre of ellipse $9x^2 + 16y^2 - 54x + 64y + 1 = 0$

#### A. 44320



Answer: C



#### **32.** Find the eccentricity of the ellipse if

the length of minor axis is equal to half the distance between the foci of the ellipse .

A. 
$$\frac{2}{\sqrt{5}}$$
  
B. 
$$\frac{\sqrt{3}}{2}$$
  
C. 
$$\frac{\sqrt{7}}{4}$$
  
D. 
$$\frac{\sqrt{7}}{3}$$





**33.** The eccentricity of an ellipse whose distance between the foci is 4 and distance between the directories is 16 is

A. 
$$\frac{1}{2}$$
  
B.  $\frac{1}{\sqrt{3}}$   
C. 44256

D. 44228

Answer: D



**34.** Taking major and minor axes as x and y - axes respectively , find the equation of the ellipse whose eccentricity is  $\frac{1}{\sqrt{2}}$  and the sum of the squares of major and minor axes is 24 .

**35.** Find the equation of the ellipse whose foci $(0, \pm 4)$  and the equation of directries is  $y=\pm 9.$ 



**36.** The eccentricity of an ellipse is  $\frac{2}{3}$  focus is S(5,4) and the major axis and directrix intersect at Z(8,7). Find the coordinates of the centre of the ellipse.

**37.** Find the equation to the ausiliary circle of the ellipse

$$4x^2 + 9y^2 - 24x - 36y + 36 = 0 \,.$$

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**38.** The coordinates of the focus of an ellipse are (1,2) and eccentricity is  $\frac{1}{2}$ , the equation of its directrix is 3x + 4y - 5 = 0. Find the equation of the ellipse.

**39.** Find the length of the latus rectum, eccentricity, coordinates of centre and foci of the ellipse  $3x^2 + 4y^2 + 6x - 8y - 5 = 0$ .

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**40.** Find the equation of the ellipse whose vertices are (-3,5) and (9,5) and eccentricity is  $\sqrt{5}$ 



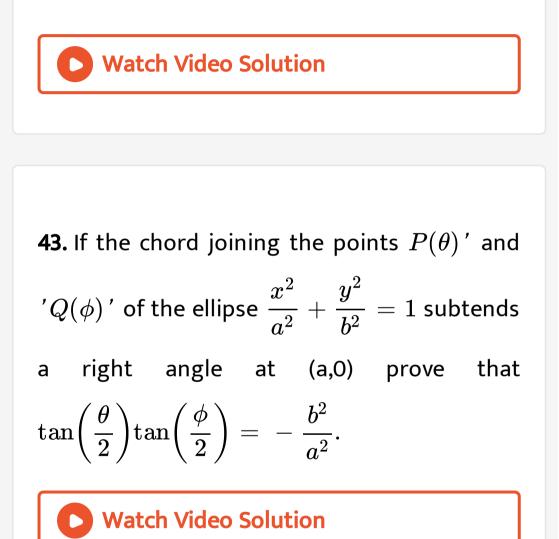
**41.** A line segment of length (a+b) units moves on a plane in such a way that its end points always lie on the coordinates axes. Suppose that P is a point on the line segment it in the ratio a:b. Prove that the locus of P is an ellipse.

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**42.** Find the eccentricity and equations of the directrices of the ellipse  $\frac{x^2}{100} + \frac{y^2}{36} = 1$  .

Show that the sum of the focal distances of

any point on this ellipse is constant.



**44.** P and Q be the extremities of the two conjugate diameters of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ , Show that the locus of the middle point of PQ is  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{1}{2}$ . Watch Video Solution

**45.** The length of latus rectum of the hyperabola  $9y^2 - 4x^2 = 36$  is -

A. 9/2 units

B.9 units

C. 7/2 units

D. 8 units

Answer: B

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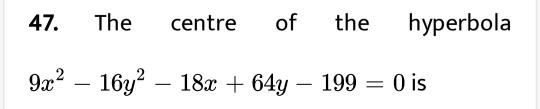
**46.** If the latus rectum of a hyperbola is equal to half of its transverse axis, then its eccentricity is -

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

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

D. none of these

#### Answer: C



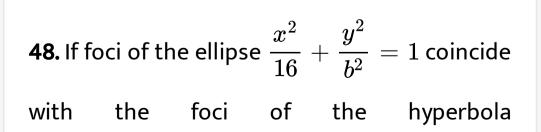
A. (1,2)

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

C. (-1,2)

D. (-1,-2)

#### Answer: A



$$\left(\frac{x^2}{144} - \frac{y^2}{81}\right) = \frac{1}{25}$$
, then the value of  $b^2$  is -  
A. 6  
B. 7  
C. 8  
D. 9

#### Answer: B



49. The eccentricity of the hyperbola $x^2 - y^2 = 4$  is A. 2 B.  $2\sqrt{2}$ 

 $\mathsf{C}.\,\sqrt{2}$ 

D. none of these

#### Answer: C

50. Find the equation to the locus represented

by the parametric equations $x=2t^2+t+1, y=t^2-t+1.$ 

A. circle

B. parabola

C. ellipse

D. hyperbola

Answer: D

51. The equation of the auxiliary circle of the

hyperbola 
$$rac{x^2}{a^2} - rac{y^2}{b^2} = 1$$
 is  
A. 1.  $x^2 + y^2 = a^2$   
B. 2.  $x^2 + y^2 = 4a^2$   
C. 3.  $x^2 + y^2 = b^2$   
D. 4.  $x^2 + y^2 = 4b^2$ 

#### Answer: A

**52.** The eccentricity of the curve

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

#### A. 44320

$$\mathsf{B.}\,\frac{\sqrt{34}}{5}$$

C. 44289

D. 
$$\frac{\sqrt{34}}{4}$$

#### **Answer: B**

**53.** The foci of the hyperbola  $4x^2 - 9y^2 = 36$ 

is

A. 
$$\left(0, \pm \frac{\sqrt{13}}{2}\right)$$
  
B.  $\left(\pm \frac{\sqrt{13}}{2}, 0\right)$   
C.  $\left(0, \pm \sqrt{13}\right)$   
D.  $\left(\pm \sqrt{13}, 0\right)$ 

#### Answer: C

**54.** If the length of conjugate axis and the length of latus rectum of a hyperbola are equal, find its eccentricity.

A. 
$$\frac{2}{\sqrt{3}}$$
  
B. 
$$\sqrt{2}$$
  
C. 
$$\frac{4}{\sqrt{3}}$$
  
D. 
$$\frac{2}{\sqrt{2}}$$

#### Answer: B

55. The equations of directrices of hyperbola

$$4x^2-9y^2-16x-54y-101=0$$
 are

A. 
$$x=2\pm rac{3}{\sqrt{13}}$$
  
B.  $y=2-+rac{3}{\sqrt{13}}$   
C.  $x=2-+rac{9}{\sqrt{13}}$   
D.  $y=2-+rac{9}{\sqrt{13}}$ 

#### Answer: C

56. Find the equation of the hyperbola whose

eccentricity is 3, focus is (-1,1) and equation of

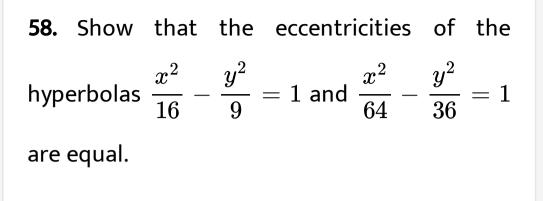
directrix is x - y + 3 = 0.



57. Show that the difference of the distances from each focus of any point on the hyperbola  $9x^2 - 16y^2 = 144$  is equal to the length of

the transverse axis.







59. Find the equation of the hyperbola, whose

axes are axes of coordinates and

transverse axis is 2a and the vertex bisects the

line segment joining the centre and focus.



60. Find the equation of the hyperbola whose

vertices are  $(\pm 4, 0)$  and  $foci(\pm 6, 0)$ .

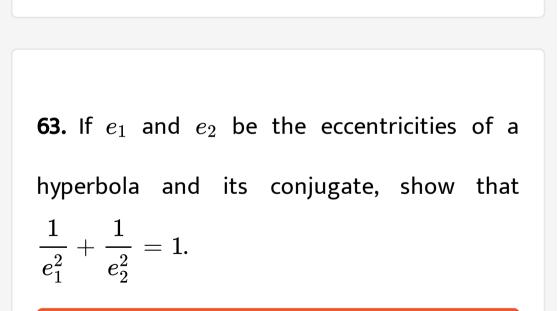
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# **61.** Show that $3x^2 - 3y^2 - 18x + 12y + 2 = 0$

represents a rectangular hyperbola. Find its

centre, foci and eccentricity.

**62.** In a rectangular hyperbola  $x^2 - y^2 = a^2$ , prove that SP.  $S'P = CP^2$ , where C is the centre and S, S' are the foci and P is any point on the hyperbola.



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64. Find the equation of the hyperbola, whose

axes are axes of coordinates and

distance between the foci is 10 and length of

conjugate axis is 6.

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65. The length of the intercepts on the x and yaxes of a circle are 2a and 2b unit respectively. Prove that the locus of the centre of the circle is hyperbola whose equation  $x^2 - y^2 = a^2 - b^2$ . Translating the origin to a suitable point show that the equation  $5x^2 - 4y^2 - 20x - 8y - 4 = 0$  represents a hyperbola. Find its eccentricity, coordinates of foci and equations of the directrices.

**66.** If the chord joining the points 
$$(a \sec \theta, b \tan \theta)$$
 and  $(a \sec \phi, b \tan \phi)$  on the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  passes through the focus (ae,0), prove that  $\tan\left(\frac{\theta}{2}\right) \tan\left(\frac{\phi}{2}\right) + \frac{e-1}{e+1} = 0.$ 

