



# MATHS

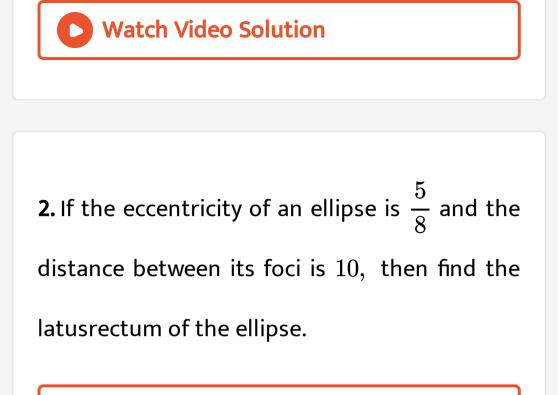
# BOOKS - RD SHARMA MATHS (ENGLISH)

# **ELLIPSE**

## Others

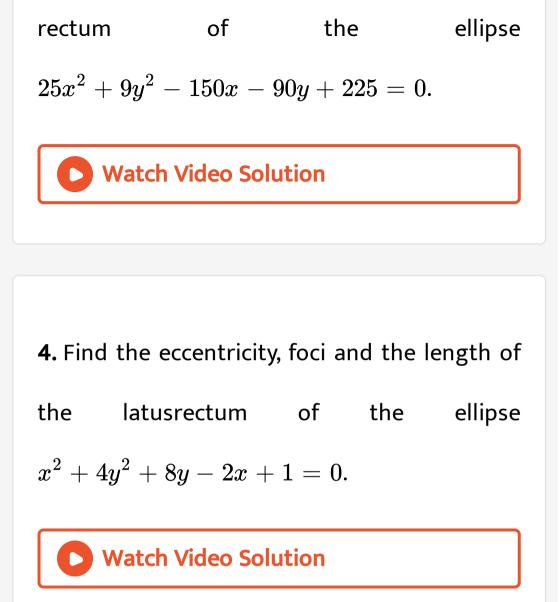
1. Find the distance between the directrices of

the ellipse 
$$rac{x^2}{36}+rac{y^2}{20}=1.$$





**3.** Find the eccentricity, centre, vertices, foci, minor axis, major axis, directrices and latus-



5. For the following ellipses find ellipses find the lengths of major and minor axes, coordinates of foci, vertices and the eccentricity:  $16x^2 + 25y^2 = 400$ 

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**6.** Show that  $x^2 + 4y^2 - 2x + 16y + 13 = 0$ 

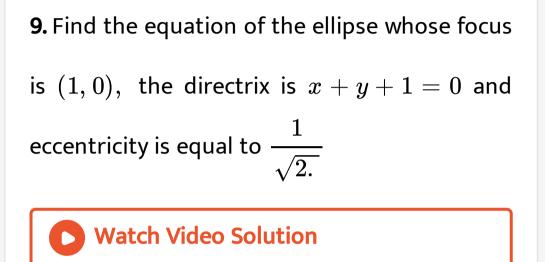
is the equation of an ellipse. Find its eccentricity, vertices, foci, directices and , the length and the equation of the latus-rectum.



7. Find the equation of the ellipse with focus at (-1, 1) and eccentricity  $\frac{1}{2}$  and directrix x - y + 3 = 0.

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8. Find the equation of the ellipse whose eccentricity is  $\frac{1}{2}$ , the focus is (1, 1) and the directrix is x - y + 3 = 0.



**10.** A straight rod of given length slides between two fixed bars which include an angle of  $90^0$ . Show that the locus of a point on the rod which divides it in a given ratio is an

ellipse. If this ratio be 1/2, show that the eccentricity of the ellipse is  $\sqrt{3}/2$ .



**11.** A point moves so that the sum of the squares of its distances from two intersecting straight lines is constant. Prove that its locus is an ellipse.

**12.** Find the equation of the set of all points whose distances from (0,4) are  $\frac{2}{3}$  of their distances from the line y = 9.

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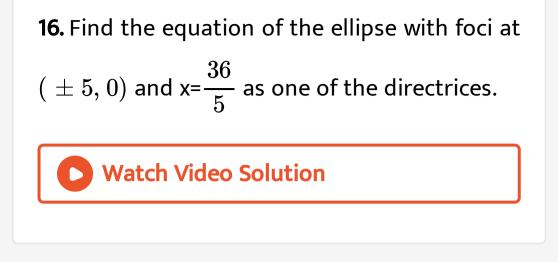
**13.** Find the equation of the ellipse whose axes are along the coordinate axes, vertices are  $(0, \pm 10)$  and eccentricitye = 4/5.

14. If the latusrectum of an ellipse is equal to

half of minor axis, find its eccentricity.



**15.** Find the equation of the ellipse whose axes are parallel to the coordinate axes having its centre at the point (2, -3) one focus at (3, -3) and vertex at (4, -3).

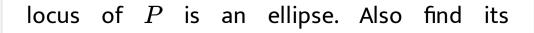


17. Find the equation of the ellipse whose centre is at the origin, foci are (1,0)and(-1,0) and eccentricity is 1/2.

**18.** Find the equation of the set of all points the sum of whose distance from the points (3, 0) and (9, 0) is 12.



19. A rod AB of length 15cm rests in between two coordinate axes in such a way that the end point A lies on x – axis and end point Blies on y-axis . A point is taken on the rod in such a way that AP = 6cm . Show that the



eccentricity.



**20.** Find the equation of the ellipse whose foci are (2, 3), (-2, 3) and whose semi-minor axes is  $\sqrt{5}$ .

**21.** The weight of an object on the surface of the Earth is 40 N. Its weight at a height equal to the radius of the Earth is



**22.** An arc is in the form of a semi-ellipse. It is 8m wide and 2m high at the centre. Find the height of the arch at a point 1. 5m from one end.



23. Find the equation of the ellipse whose axes are along the coordinate axes, vertices are  $(\pm 5, 0)$  and foci at  $(\pm 4, 0)$ .

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24. Find the equation of the ellipse whose axes

are along the coordinate axes, foci at

 $(0, \pm 4)$  and eccentricity 4/5.

25. Find the equation of the ellipse (referred to its axes as the axes of xandy, respectively) whose foci are  $(\pm 2, 0)$  and eccentricity is  $\frac{1}{2}$ 



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**26.** A man running a racecourse notes that the sum of the distances from the two flag posts from him is always 10 m and the distance between the flag posts is 8 m. Find the equation of the posts traced by the man.



**27.** Find the equation of the ellipse whose focus is (1,-2) the directrix 3x - 2y + 5 = 0 and eccentricity equal to 1/2.

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28. Find the equation of the ellipse in the following case: focus is (0,1) , directrix is x + y = 0 and  $e = \frac{1}{2}$ .

29. Find the equation of the ellipse in the following case: focus is (-1,1) directirx is x - y + 3 = 0 and  $e = \frac{1}{2}$ .

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**30.** Find the equation of the ellipse in the following case: focus is (-2,3) directrix is x+y=0 and e=1/2



**31.** Find the equation of the ellipse in the following case: focus is (1,2), directrix is 3x + 4y - 5 = 0 and  $e = \frac{1}{2}$ .

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**32.** Find the eccentricity ,coordinates of foci ,length of the latus rectum of the following ellipse:  $4x^2 + 9y^2 = 1$ 

**33.** Find the eccentricity ,coordinates of foci, length of the latus rectum of the following ellipse:  $25x^2 + 16y^2 = 1600$ .



**34.** Find the eccentricity ,coordinates of foci, length of the latus rectum of the following ellipse:  $5x^2 + 4y^2 = 1$ 

**35.** Find the eccentricity ,coordinates of foci, length of the latus rectum of the following ellipse:  $4x^2 + 3y^2 = 1$ 

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**36.** Find the eccentricity, coordinates of foci, length of the latus rectum of the following ellipse:  $9x^2 + 25y^2 = 225$ 

**37.** Find the equation to the ellipse (referred to its axes as the axes of x and y respectively) which passes through the point (-3,1) and has eccentricity  $\sqrt{\frac{2}{5}}$ 

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38. Find the equation of the ellipse (referred

to its axes as the axes of xandy , respectively)

whose foci are  $(\pm 2,0)$  and eccentricity is  $rac{1}{2}$ 

**39.** Find the equation of the ellipse in the following case: eccentricity  $e = \frac{2}{3}$  and length of latus rectum = 5.

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40. Find the equation of the ellipse in the following case: eccentricity  $e=rac{1}{2}$  and semi

major axis = 4.

**41.** Find the equation of the ellipse in the following case: eccentricity  $e = \frac{1}{2}$  and major axis = 12

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**42.** Find the equation of the ellipse in the following case: the ellipse passes through (1,4) and (-6,1).

**43.** Find the equation of the ellipse whose axes are along the coordinate axes, vertices are  $(\pm 5, 0)$  and foci at  $(\pm 4, 0)$ .



**44.** Find the equation of the ellipse in the following case: ends of major axis  $(\pm 3, 0)$  ends of minor axis  $(0, \pm 2)$ 

**45.** Find the equation for the ellipse that satisfies the given conditions: Ends of major axis  $\left(0, \pm \sqrt{5}\right)$ , ends of minor axis  $(\pm 1, 0)$ 

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46. Find the equation for the ellipse that satisfies the given conditions: Length of major axis 26, foci (  $\pm$  5, 0)

47. Find the equation of the ellipse in the following case: Length of minor axis 16 ,foci $(0,\ \pm\ 6)$ 

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**48.** Find the equation of the ellipse in the following case: Foci (  $\pm 3, 0$ ), a = 4

49. Find the equation of the ellipse whose foci

are (4,0) and (-4,0), eccentricity =1/3.

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**50.** Find the equation of the ellipse whose minor axis is equal to distance between the foci and latus rectum is 10.

**51.** Find the equation of the ellipse whose centre is (-2,3) and whose semi axes are 3 and 2 when major axis is (i.) parallel to x-axis (ii.) parallel to y-axis.

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52. If the latus rectum of an ellipse is equal to

the half of minor axis, then find its eccentricity.



53. Find the centre ,the lengths of the axes, eccentricity, foci of the following ellipse: $x^2 + 2y^2 - 2x + 12y + 10 = 0$ 

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54. Find the centre, the lengths of the axes, eccentricity, foci of the following ellipse:  $(3x^2 + 4y^2 - 12x - 8y + 4)$ =0

55. Find the centre, the lengths of the axes, eccentricity, foci of the following ellipse:  $4x^2 + y^2 - 8x + 2y + 1 = 0$ 

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56. Find the centre, the lengths of the axes, eccentricity, foci of the following ellipse:  $4x^2 + 16y^2 - 24x - 32y - 2 = 0$ 

57. Find the centre ,the lengths of the axes, eccentricity, foci of the following ellipse:  $3x^2 + 4y^2 - 12x - 8y + 3 = 0$ 

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**58.** Find the centre ,the lengths of the axes, eccentricity, foci of the following ellipse:

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

59. Find the equation of an ellipse whose foci are at  $(\pm 3, 0)$  and which passes through (4,1).



**60.** Find the equation of an ellipse whose eccentricity is 2/3, the latus rectum is 5 and the centre is at the origin.

**61.** Find the equation of an ellipse with its foci on y-axis, eccentricity 3/4 , centre at the origin and passing through (6,4).

**62.** Find the equation of an ellipse whose axes lie along coordinate axes and which passes through (4,3) and (-1,4).

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63. Find the equation of an ellipse whose axes lie along the coordinate axes, which passes through the point (-3,1) and has eccentricity equal to  $\sqrt{2/5}$ 

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**64.** Find the equation of an ellipse the distance between the foci is 8 units and the distance between the directrices is 18 units.



**65.** Find the equation of an ellipse whose vertices are  $(0, \pm 10)$  and eccentricity  $e = rac{4}{5}$ 

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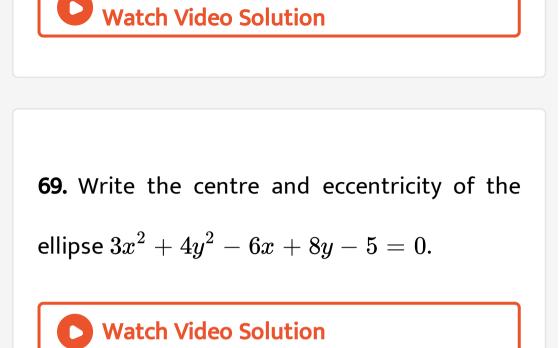
**66.** A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point *P* on the rod, which is 3cm from the end in contact with the x-axis.

**67.** If the lengths of semi major and semi minor axes of an ellipse are 2 and  $\sqrt{3}$  and their corresponding equation are y - 5 = 0 and x + 3 = 0 then write the equation of the ellipse.

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68. Write the eccentricity of the ellipse $9x^2+5y^2-18x-2y-16=0.$ 





70. PSQ is a focal chord of the ellipse  $4x^2 + 9y^2 = 36$  such that SP=4. If S' the another focus write the value of S'Q.

71. If the latus rectum of an ellipse is equal to

the half of minor axis, then find its eccentricity.

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**72.** The eccentricity of the ellipse, if the distance between the foci is equal to the lenght of the latus rectum, is

**73.** If S and S' are two foci of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  and B is and end of the minor axis such that  $\triangle BSS'$  is equilateral, then write the eccentricity of the ellipse.

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**74.** If the minor axis of an ellipse subtends an equilateral triangle with vertex at one end of major axis, then write the eccentricity of the ellipse.

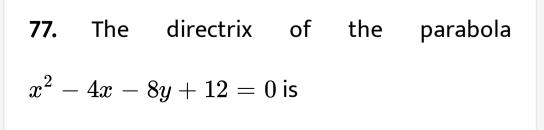
A. 
$$e=\sqrt{rac{2}{3}}$$
  
B.  $e=rac{2}{3}$   
C.  $e=\sqrt{rac{1}{3}}$   
D.  $e=\sqrt{rac{3}{4}}$ 

#### Answer: A



**75.** If a latus rectum of an ellipse subtends a right angle at the centre of the ellipse, then write the eccentricity of the ellipse.

76. For the ellipse  $12x^2 + 4y^2 + 24x - 16y + 25 = 0$  a.centre is (-1, 2) b. lengths of the axes are  $\sqrt{3}$  and 1 c. eccentricity  $= \sqrt{\frac{2}{3}}$  d. all of these Watch Video Solution



78. The equation of the ellipse with focus (-1,1) directrix x - y + 3 = 0 and eccentricity is a.  $7x^2 + 2xy + 7y^2 + 10x + 10y + 7 = 0$  b.  $7x^2 + 2xy + 7y^2 + 10x - 10y + 7 = 0$  c.  $7x^2 + 2xy + 7y^2 + 10x - 10y + 7 = 0$  d. None of these

**79.** The equation of the circle drawn with the two foci of  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  as the end-points of a diameter is



80. If the latus rectum of an ellipse is equal to

the half of minor axis, then find its eccentricity.

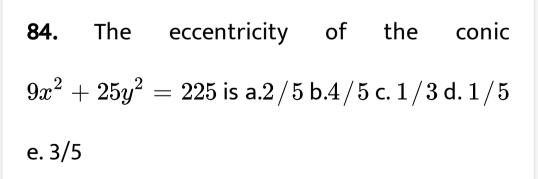


**81.** The eccentricity of the ellipse if the distance between the foci is equal to the length of the latus rectum is 
$$a \cdot \frac{\sqrt{5}-1}{2} b \cdot \frac{\sqrt{5}+1}{2} c \cdot \frac{\sqrt{5}-1}{4} d \cdot none of these$$
  
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82. The eccentricity of ellipse, if the distance between the foci and L.R is same a.  $\frac{\sqrt{3}}{2}$  b.  $\frac{2}{\sqrt{3}}$  c.  $\frac{1}{\sqrt{2}}$  d.  $\frac{\sqrt{5}-1}{2}$ 

**83.** The difference between the lengths of the major axis and the latus rectum of an ellipse is a.*ae* b. 2ae c.  $ae^2$  d.  $2ae^2$ 

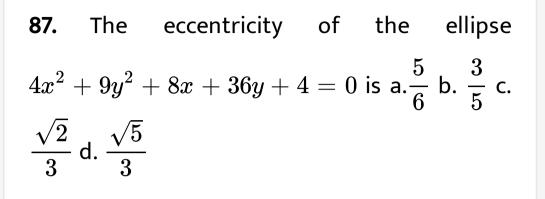
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85. The latus rectum of the conic  

$$3x^2 + 4y^2 - 6x + 8y - 5 = 0$$
 is a.3 b.  $\frac{\sqrt{3}}{2}$  c.  
 $\frac{2}{\sqrt{3}}$  d. none of these  
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**86.** Find the equations of the tangents drawn from the point (2, 3) to the ellipse  $9x^2 + 16y^2 = 144.$ 

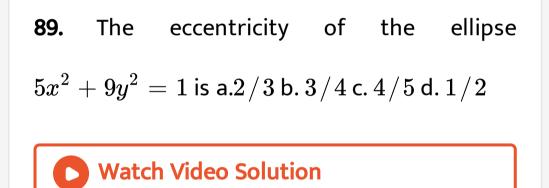


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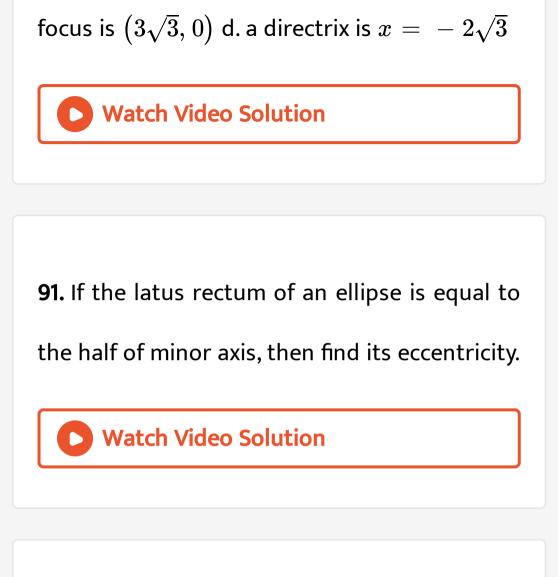
88. The eccentricity of the ellipse  $4x^2 + 9y^2 = 36$  is a. $\frac{1}{2\sqrt{3}}$ b. $\frac{1}{\sqrt{3}}$ 

c. 
$$\frac{\sqrt{5}}{3}$$
  
d.  $\frac{\sqrt{5}}{6}$ 

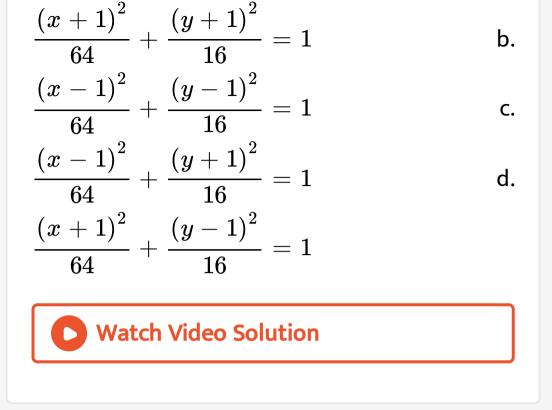
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**90.** For the ellipse  $x^2 + 4y^2 = 9$  a. the eccentricity is 1/2 b. the latus rectum is 3/2 c. a



**92.** An ellipse has its centre at (1,-1) and semi major axis =8 and it passes through the point (1,3). The equation of the ellipse is a.



93. Find the sum of the focal distances of any

point on the ellipse  $9x^2 + 16y^2 = 144$ .

**94.** If (2,4) and (10,10) are the ends of a latus rectum of an ellipse with eccentricity then the length of semi major axis is a.20/3 b. 15/3 c. 40/3 d. none of these

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**95.** The equation 
$$rac{x^2}{2-\lambda}+rac{y^2}{\lambda-5}+1=0$$

represents an elipse, if

96. The eccentricity of the ellipse  $9x^2 + 25y^2 - 18x - 100y - 116 = 0$  is a. 25/16 b. 4/5 c. 16/25 d. 5/4

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97. If the major axis of an ellipse is three times

the minor axis, then its eccentricity is equal to

a.
$$rac{1}{3}$$
 b. $rac{1}{\sqrt{3}}$  c. $rac{1}{\sqrt{2}}$  d. $rac{2\sqrt{2}}{3}$  e. $rac{3}{3\sqrt{2}}$ 

98. The eccentricity of the ellipse  $25x^2 + 16y^2 = 400$  is a.3/5 b. 1/3 c. 2/5 d. 1/5



