



# MATHS

## BOOKS - NCERT MATHS (ENGLISH)

### CONIC SECTIONS

#### Short Answer

1. Find the equation of the circle which touches the both axes in first quadrant and whose radius is  $a$ .



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2. Show that the point  $(x, y)$  given by

$$x = \frac{2at}{1+t^2} \text{ and } y = \left( \frac{1-t^2}{1+t^2} \right) \text{ lies on a circle}$$

for all real values of  $t$  such that  $-1 \leq t \leq 1$ ,

where  $a$  is any given real number.



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3. If a circle passes through the points  $(0,0)$ ,

$(a,0)$  and  $(0,b)$ , then find the coordinates of its

centre.

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

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

C.  $(a, b)$

D. none of these

**Answer: A**



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4. Find the equation of the circle which touches the x-axis and whose center is (1, 2).

A.  $x^2 + y^2 - 2x - 4y + 1 = 0$

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

C.  $x^2 - y^2 + 4x - 6y + 5 = 0$

D. none of these

**Answer: A**



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5. If the lines  $3x - 4y + 4 = 0$  and  $6x - 8y - 7 = 0$  are tangents to a circle, then find the radius of the circle.



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6. Find the equation of the circle which touches both the axes and the line  $3x - 4y + 8 = 0$  and lies in the third quadrant.

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

B.  $x^2 + y^2 + 4x + 4y + 4 = 0$

C.  $x^2 + y^2 + 2x + 2y + 4 = 0$

D. none of these

**Answer: B**



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7. If one end of a diameter of the circle  $x^2 + y^2 - 4x - 6y + 11 = 0$  is  $(3, 4)$ , then find the coordinates of the other end of the diameter.



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8. Find the equation of the circle having  $(1, -2)$  as its centre and passing through the intersection of the lines  $3x + y = 14$  and  $2x + 5y = 18$ .



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9. If the line  $y = \sqrt{3}x + k$  touches the circle  $x^2 + y^2 = 16$ , then find the value of  $k$ .



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**10.** Find The equation of circle concentric with circle  $x^2 + y^2 - 6x + 12y + 15 = 0$  when its area is double.



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



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



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**13.** If the eccentricity of an ellipse is  $\frac{5}{8}$  and the distance between its foci is 10, then find the latusrectum of the ellipse.



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



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**15.** Find the distance between the directrices  
the ellipse  $\frac{x^2}{36} + \frac{y^2}{20} = 1$ .



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**16.** Find the coordinates of points on the parabola  $y^2 = 8x$  whose focal distance is 4.



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**17.** Find the length of the line segment joining the vertex of the parabola  $y^2 = 4ax$  and a point on the parabola where the line segment makes an angle  $\theta$  to the  $x$ -axis.



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**18.** If the points  $(0, 4)$  and  $(0, 2)$  are respectively the vertex and focus of a parabola, then find the equation of the parabola.



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**19.** If the line  $y = mx + 1$  is tangent to the parabola  $y^2 = 4x$ , then find the value of  $m$ .



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20. If the distance between the foci of a hyperbola is 16 and its eccentricity is  $\sqrt{2}$ , then obtain its equation.



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21. Find the eccentricity of the hyperbola

$$9y^2 - 4x^2 = 36$$



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22. Equation of the hyperbola with eccentricity  $\frac{3}{2}$  and foci at  $(\pm 2, 0)$  is



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**Long Answer**

1. If the lines  $2x-3y=5$  and  $3x-4y=7$  are the diameters of a circle of area 154 square units, then obtain the equation of the circle.



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2. Find the equation of the circle which passes through the points  $(2, 3)$ ,  $(4, 5)$  and the centre lies on the straight line  $y - 4x + 3 = 0$ .



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3. Find the equation of the circle whose centre is at  $(3, -1)$  and which cuts off a chord of length  $6$  units on the line  $2x - 5y + 18 = 0$ .



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4. Find the equation of the circle whose radius is 5 and which touches the circle  $x^2 + y^2 - 2x - 4y - 20 = 0$  externally at the point  $(5, 5)$ .



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5. Find the equation of the circle passing through the point  $(7, 3)$  having radius 3 units and whose centre lies on the line  $y = x - 1$





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6. Find the equation of the parabola having focus at  $(-1, -2)$  and directrix is  $x - 2y + 3 = 0$ .



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



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8. 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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9. Show that the set all points such that the difference of their distances from  $(4, 0)$  and  $(-4, 0)$  is always equal to 2 represents a hyperbola.



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10. Find the equation of the hyperbola with vertices  $(\pm 5, 0)$  and foci  $(\pm 7, 0)$



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True False

1. Check Whether The line  $x+3y=0$  is a diameter of the circle  $x^2 + y^2 + 6x + 2y = 0$



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2. The shortest distance from the point  $(2, -7)$  to circle  $x^2 + y^2 - 14x - 10y - 151 = 0$



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3. If the line  $lx + my - 1 = 0$  touches the circle  $x^2 + y^2 = a^2$ , then prove that  $(l, m)$  lies on a circle.



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4. Check whether The point (1,2) lies inside the circle  $x^2 + y^2 - 2x + 6y + 1 = 0$ .



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5. If the line  $lx + my + n = 0$  touches the parabola  $y^2 = 4ax$ , prove that  $ln = am^2$



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6. If P is a point on the ellipse  $\frac{x^2}{16} + \frac{y^2}{25} = 1$  whose foci are S and S', then  $PS+PS'=8$ .



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7. The line  $2x+3y=12$  touches the ellipse  $\frac{x^2}{9} + \frac{y^2}{4} = 2$  at the points (3,2). This Statement Is true or false.



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8. The locus of the point of intersection of lines  $\sqrt{3}x - y - 4\sqrt{3k} = 0$  and  $\sqrt{3k}x + ky - 4\sqrt{3} = 0$  for different value of  $k$  is a hyperbola whose eccentricity is 2.



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## Fillers

1. Find the equation of the circle having centre at  $(3, -4)$  and touching the line

$$5x + 12y - 12 = 0.$$



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2. Find the equation of the circle which circumscribes the triangle formed by the line:

$$y = x + 2, 3y = 4x \text{ and } 2y = 3x$$



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3. An ellipse is described by using an endless string which is passed over two pins. If the



axes are  $6\text{cm}$  and  $4\text{cm}$ , the length of the string and distance between the pins are .....



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4. The equation of the ellipse having foci  $(1,0)$ ,  $(0,-1)$  and minor axis of length 1 is .....



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5. Find the equation of the parabola whose focus is at  $(-1,-2)$  and the directrix the line

$$x - 2y + 3 = 0$$



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**6.** The equation of the hyperbola with vertices at  $(0, \pm 6)$  and eccentricity  $5/3$  is..... And its foci are .....



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**Objective Type**

1. The area of the circle centred at (1,2) and passing through (4,6) is

A.  $5\pi$

B.  $10\pi$

C.  $25\pi$

D. none of these

**Answer: C**



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2. Equation of a circle which passes through (3,6) and touches the axes is

A.  $x^2 + y^2 + 6x + 6y + 3 = 0$

B.  $x^2 + y^2 - 6x - 6y - 9 = 0$

C.  $x^2 + y^2 - 6x - 6y + 9 = 0$

D. none of these

**Answer: C**



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3. Equation of the circle with centre on the  $y$ -axis and passing through the origin and  $(2, 3)$  is

A.  $x^2 + y^2 + 13y = 0$

B.  $3x^2 + 3y^2 + 13x + 3 = 0$

C.  $3x^2 + 3y^2 - 13y = 0$

D.  $x^2 + y^2 + 13x + 3 = 0$

**Answer: C**



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4. Find the equation of a circle with origin as centre and which circumscribes equilateral triangle whose median of length  $3a$

A.  $x^2 + y^2 = 9a^2$

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

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

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

**Answer: C**



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5. If the focus of a parabola is  $(0,-3)$  and its directrix is  $y=3$ , then its equation is

A.  $x^2 = -12y$

B.  $x^2 = 12y$

C.  $y^2 = -12x$

D.  $y^2 = 12x$

**Answer: A**



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6. If the parabola  $y^2 = 4ax$  passes through the point (3,2) then find the length of its latus rectum.

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

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

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

D. 4

**Answer: B**



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7. If the vertex of a parabola is the point  $(-3, 0)$  and the directrix is the line  $x + 5 = 0$ , then find its equation.

A.  $y^2 = 8(x + 3)$

B.  $x^2 = 8(y + 3)$

C.  $y^2 = -8(x + 3)$

D.  $y^2 = 8(x + 5)$

**Answer: A**



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

A.  $7x^2 + 2xy + 7y^2 - 10x + 10y + 7 = 0$

B.  $7x^2 + 2xy + 7y^2 + 7 = 0$

C.  $7x^2 + 2xy + 7y^2 + 10x - 10y - 7 = 0$

D. none of these

**Answer: A**



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9. The length of the latusrectum of the ellipse

$$3x^2 + y^2 = 12 \text{ is}$$

A. 4

B. 3

C. 8

D.  $\frac{4}{\sqrt{3}}$

**Answer: D**



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10. If  $e$  is eccentricity of the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ (where, } a < b\text{), then}$$

A.  $b^2 = a^2(1 - e^2)$

B.  $a^2 = b^2(1 - e^2)$

C.  $a^2 = b^2(e^2 - 1)$

D.  $b^2 = a^2(e^2 - 1)$

**Answer: B**



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11. The eccentricity of the hyperbola whose length of the latus rectum is equal to 8 and the length of its conjugate axis is equal to half of the distance between its foci, is :

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

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

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

D. none of these

**Answer: C**



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12. The distance between the foci of a hyperbola is 16 and its eccentricity is  $\sqrt{2}$  then equation of the hyperbola is

A.  $x^2 - y^2 = 32$

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

C.  $2x - 3y^2 = 7$

D. none of these

**Answer: A**





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13. Equation of the hyperbola with eccentricity  $\frac{3}{2}$  and foci at  $(\pm 2, 0)$  is

A.  $\frac{x^2}{4} - \frac{y^2}{5} = \frac{4}{9}$

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

C.  $\frac{x^2}{4} - \frac{y^2}{9} = 1$

D. none of these

**Answer: A**



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