

Conic Sections — Assignment 1

Class 11 Maths · Topic-wise question bank covering every concept of the chapter · Narayan Gurukul Academy

Instructions: (1) Attempt all questions. This worksheet walks through every concept of the chapter, topic by topic.
(2) The interactive MCQ version of these questions (with instant answer reveal) is available on the notes page.
(3) Universal values: $g = 10 \text{ m/s}^2$ unless stated. Give answers with correct SI units.

Circles

MCQ Questions (choose the correct option)

- The equation of a circle with centre (h, k) and radius r is
 - $(x - h)^2 + (y - k)^2 = r^2$
 - $x^2 + y^2 = r^2$
 - $(x + h)^2 + (y + k)^2 = r^2$
 - $x^2 - y^2 = r^2$
- The radius of the circle $x^2 + y^2 = 25$ is
 - 5
 - 25
 - 10
 - $\sqrt{5}$
- The centre of the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ is
 - $(2, 3)$
 - $(-2, -3)$
 - $(4, 6)$
 - $(2, -3)$
- The general equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a real circle if
 - $g^2 + f^2 - c > 0$
 - $g^2 + f^2 - c = 0$
 - $g^2 + f^2 - c < 0$
 - $g^2 + f^2 + c > 0$

1 Mark Questions

- Write the equation of a circle with centre (h, k) and radius r .
- Find the radius of the circle $x^2 + y^2 = 16$.
- Write the general equation of a circle.

2 Mark Questions

- Find the centre and radius of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$.
- Find the equation of the circle with centre $(2, 3)$ and radius 4.

3 Mark Questions

- Find the equation of the circle with centre $(2, -3)$ passing through the point $(4, 1)$.
- Find the equation of the circle passing through the points $(0, 0)$, $(a, 0)$ and $(0, b)$.

Parabola

MCQ Questions (choose the correct option)

1. The standard equation of a parabola opening to the right is
 - (A) $y^2 = 4ax$
 - (B) $y^2 = -4ax$
 - (C) $x^2 = 4ay$
 - (D) $x^2 = -4ay$
2. For the parabola $y^2 = 4ax$, the focus is at
 - (A) $(a, 0)$
 - (B) $(-a, 0)$
 - (C) $(0, a)$
 - (D) $(0, -a)$
3. For the parabola $y^2 = 4ax$, the directrix is
 - (A) $x = -a$
 - (B) $x = a$
 - (C) $y = -a$
 - (D) $y = a$
4. The length of the latus rectum of $y^2 = 4ax$ is
 - (A) $4a$
 - (B) $2a$
 - (C) a
 - (D) $8a$

1 Mark Questions

1. Write the standard equation of a parabola opening to the right.
2. Find the focus of the parabola $y^2 = 8x$.
3. Write the equation of the directrix of $y^2 = 4ax$.

2 Mark Questions

1. Find the focus, axis and latus rectum of the parabola $y^2 = 12x$.
2. Find the equation of the parabola with focus $(2, 0)$ and directrix $x = -2$.

3 Mark Questions

1. Find the focus, directrix, axis and length of the latus rectum of the parabola $y^2 = 16x$.
2. Find the equation of the parabola whose focus is $(0, -3)$ and directrix is $y = 3$.

Ellipse**MCQ Questions (choose the correct option)**

1. The standard equation of an ellipse with major axis along the x-axis is
 - (A) $x^2/a^2 + y^2/b^2 = 1$ ($a > b$)
 - (B) $x^2/a^2 - y^2/b^2 = 1$
 - (C) $y^2 = 4ax$
 - (D) $x^2 + y^2 = a^2$
2. The eccentricity of an ellipse satisfies

- (A) $0 < e < 1$
 (B) $e > 1$
 (C) $e = 1$
 (D) $e < 0$
3. For the ellipse $x^2/a^2 + y^2/b^2 = 1$ ($a > b$), the foci are
 (A) $(\pm ae, 0)$
 (B) $(0, \pm ae)$
 (C) $(\pm a, 0)$
 (D) $(0, \pm b)$
4. For an ellipse, the relation between a , b , e is
 (A) $b^2 = a^2(1 - e^2)$
 (B) $b^2 = a^2(1 + e^2)$
 (C) $a^2 = b^2(1 - e^2)$
 (D) $e^2 = a^2 + b^2$

1 Mark Questions

- Write the standard equation of an ellipse with major axis along the x-axis.
- Write the relation between a , b and e for an ellipse.
- Find the eccentricity range for an ellipse.

2 Mark Questions

- Find the eccentricity of the ellipse $x^2/25 + y^2/9 = 1$.
- Find the foci of the ellipse $x^2/16 + y^2/9 = 1$.

3 Mark Questions

- Find the eccentricity, foci and length of the latus rectum of the ellipse $x^2/36 + y^2/16 = 1$.
- Find the equation of the ellipse with vertices $(\pm 5, 0)$ and foci $(\pm 4, 0)$.

Hyperbola

MCQ Questions (choose the correct option)

- The standard equation of a hyperbola with transverse axis along the x-axis is
 (A) $x^2/a^2 - y^2/b^2 = 1$
 (B) $x^2/a^2 + y^2/b^2 = 1$
 (C) $y^2 = 4ax$
 (D) $x^2 + y^2 = a^2$
- The eccentricity of a hyperbola satisfies
 (A) $e > 1$
 (B) $0 < e < 1$
 (C) $e = 1$
 (D) $e = 0$
- For $x^2/a^2 - y^2/b^2 = 1$, the foci are
 (A) $(\pm ae, 0)$
 (B) $(0, \pm ae)$
 (C) $(\pm a, 0)$

(D) $(\pm b, 0)$

4. For a hyperbola, the relation between a , b , e is

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

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

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

(D) $e^2 = a^2 + b^2$

1 Mark Questions

1. Write the standard equation of a hyperbola with transverse axis along the x -axis.
2. Write the relation between a , b and e for a hyperbola.
3. State the eccentricity range for a hyperbola.

2 Mark Questions

1. Find the eccentricity of the hyperbola $x^2/9 - y^2/16 = 1$.
2. Find the foci of the hyperbola $x^2/25 - y^2/24 = 1$.

3 Mark Questions

1. Find the eccentricity, foci and length of the latus rectum of the hyperbola $x^2/16 - y^2/9 = 1$.
2. Find the equation of the hyperbola with foci $(\pm 5, 0)$ and transverse axis length 6.

Identifying Conics by Eccentricity

MCQ Questions (choose the correct option)

1. A conic is a parabola when its eccentricity e is
 - (A) $e = 1$
 - (B) $0 < e < 1$
 - (C) $e > 1$
 - (D) $e = 0$
2. A conic is an ellipse when
 - (A) $0 < e < 1$
 - (B) $e = 1$
 - (C) $e > 1$
 - (D) $e = 0$
3. A conic is a hyperbola when
 - (A) $e > 1$
 - (B) $e = 1$
 - (C) $0 < e < 1$
 - (D) $e < 0$
4. A circle is a special conic with eccentricity
 - (A) $e = 0$
 - (B) $e = 1$
 - (C) $e > 1$
 - (D) $e = -1$

1 Mark Questions

1. Classify a conic with eccentricity $e = 1$.
2. Classify a conic with $0 < e < 1$.
3. What is the eccentricity of a circle?

2 Mark Questions

1. Identify the conic: $4x^2 + 9y^2 = 36$.
2. Identify the conic: $9x^2 - 16y^2 = 144$.

3 Mark Questions

1. Identify the type of conic represented by $x^2/25 + y^2/16 = 1$ and by $x^2/25 - y^2/16 = 1$, using eccentricity.
2. Determine the eccentricity of each of the conics $x^2/16 + y^2/9 = 1$ and $x^2/9 - y^2/16 = 1$ and classify them.

Parametric Equations of Conics

MCQ Questions (choose the correct option)

1. The parametric form of the circle $x^2 + y^2 = a^2$ is
 - (A) $(a \cos \theta, a \sin \theta)$
 - (B) $(a \sin \theta, a \cos \theta)$
 - (C) $(a \theta, a \theta)$
 - (D) (a, θ)
2. The parametric form of the parabola $y^2 = 4ax$ is
 - (A) $(at^2, 2at)$
 - (B) $(2at, at^2)$
 - (C) (a, t)
 - (D) (at, at)
3. The parametric form of the ellipse $x^2/a^2 + y^2/b^2 = 1$ is
 - (A) $(a \cos \theta, b \sin \theta)$
 - (B) $(a \sin \theta, b \cos \theta)$
 - (C) (a, b)
 - (D) $(a \theta, b \theta)$
4. The parametric form of the hyperbola $x^2/a^2 - y^2/b^2 = 1$ is
 - (A) $(a \sec \theta, b \tan \theta)$
 - (B) $(a \cos \theta, b \sin \theta)$
 - (C) $(a \tan \theta, b \sec \theta)$
 - (D) $(at^2, 2at)$

1 Mark Questions

1. Write the parametric form of the circle $x^2 + y^2 = a^2$.
2. Write the parametric form of the parabola $y^2 = 4ax$.
3. Write the parametric form of the ellipse $x^2/a^2 + y^2/b^2 = 1$.

2 Mark Questions

1. Find the parametric equations of the circle $x^2 + y^2 = 25$.
2. Find the point on the parabola $y^2 = 8x$ at $t = 2$.

3 Mark Questions

1. Find the parametric equations of the ellipse $x^2/25 + y^2/9 = 1$ and the hyperbola $x^2/16 - y^2/9 = 1$.
2. For the parabola $y^2 = 4ax$, find the point at $t = 1/2$ and verify it satisfies the equation.