

Conic Sections — CBSE Pattern Test 2

Class 11 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 11 Maths · Conic Sections · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

1. The centre of the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ is

- (A) (2, 3)
- (B) (-2, -3)
- (C) (4, 6)
- (D) (2, -3)

2. For the parabola $y^2 = 4ax$, the directrix is

- (A) $x = -a$
- (B) $x = a$
- (C) $y = -a$
- (D) $y = a$

3. The length of the latus rectum of $y^2 = 4ax$ is

- (A) $4a$
- (B) $2a$
- (C) a
- (D) $8a$

4. 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) $(0, \pm b)$

5. The eccentricity of a hyperbola satisfies

- (A) $e > 1$
- (B) $0 < e < 1$
- (C) $e = 1$
- (D) $e = 0$

6. The parametric form of the parabola $y^2 = 4ax$ is

- (A) $(at^2, 2at)$
- (B) $(2at, at^2)$
- (C) (a, t)
- (D) (at, at)

7. A conic is an ellipse when

- (A) $0 < e < 1$

- (B) $e = 1$
 (C) $e > 1$
 (D) $e = 0$
8. 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) $(at^2, 2at)$
9. Write the equation of the directrix of $y^2 = 4ax$.
10. Write the parametric form of the parabola $y^2 = 4ax$.

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. Find the radius of the circle $x^2 + y^2 = 16$.
12. Find the eccentricity range for an ellipse.
13. State the eccentricity range for a hyperbola.
14. Write the parametric form of the ellipse $x^2/a^2 + y^2/b^2 = 1$.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Find the equation of the circle with centre $(2, 3)$ and radius 4.
16. Find the equation of the parabola with focus $(2, 0)$ and directrix $x = -2$.
17. Find the foci of the ellipse $x^2/16 + y^2/9 = 1$.
18. Find the foci of the hyperbola $x^2/25 - y^2/24 = 1$.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Find the equation of the circle with centre $(2, -3)$ passing through the point $(4, 1)$.
20. Find the eccentricity, foci and length of the latus rectum of the hyperbola $x^2/16 - y^2/9 = 1$. Also identify the conic $4x^2 + 9y^2 = 36$ by its eccentricity.

Answer Key (Marking Scheme)

- Q1 — (A) $(2, 3)$. Q2 — (A) $x = -a$. Q3 — (A) $4a$. Q4 — (A) $(\pm ae, 0)$.
 Q5 — (A) $e > 1$. Q6 — (A) $(at^2, 2at)$. Q7 — (A) $0 < e < 1$. Q8 — (A) $(a \sec \theta, b \tan \theta)$.
 Q9 — $x = -a$.
 Q10 — $(at^2, 2at)$.
 Q11 — 4.
 Q12 — $0 < e < 1$.
 Q13 — $e > 1$.
 Q14 — $(a \cos \theta, b \sin \theta)$.
 Q15 — $(x-2)^2 + (y-3)^2 = 16$.
 Q16 — $y^2 = 8x$.
 Q17 — $(\pm\sqrt{7}, 0)$.
 Q18 — $(\pm 7, 0)$.

Q19 — $(x-2)^2 + (y+3)^2 = 20$.

Q20 — $e = 5/4$, foci $(\pm 5, 0)$, latus rectum $9/2$; ellipse.