

Conic Sections — CBSE Pattern Test 1

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

Test 1 — 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)

- 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 standard equation of a parabola opening to the right is
 - $y^2 = 4ax$
 - $y^2 = -4ax$
 - $x^2 = 4ay$
 - $x^2 = -4ay$
- For the parabola $y^2 = 4ax$, the focus is at
 - $(a, 0)$
 - $(-a, 0)$
 - $(0, a)$
 - $(0, -a)$
- The eccentricity of an ellipse satisfies
 - $0 < e < 1$
 - $e > 1$
 - $e = 1$
 - $e < 0$
- The standard equation of a hyperbola with transverse axis along the x -axis is
 - $x^2/a^2 - y^2/b^2 = 1$
 - $x^2/a^2 + y^2/b^2 = 1$
 - $y^2 = 4ax$
 - $x^2 + y^2 = a^2$
- The parametric form of the circle $x^2 + y^2 = a^2$ is
 - $(a \cos \theta, a \sin \theta)$

(B) $(a \sin \theta, a \cos \theta)$

(C) $(a \theta, a \theta)$

(D) (a, θ)

8. A conic is a parabola when its eccentricity e is

(A) $e = 1$

(B) $0 < e < 1$

(C) $e > 1$

(D) $e = 0$

9. Write the equation of a circle with centre (h, k) and radius r .

10. Write the standard equation of an ellipse with major axis along the x -axis.

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

11. Write the general equation of a circle.

12. Find the focus of the parabola $y^2 = 8x$.

13. Write the relation between a , b and e for an ellipse.

14. Write the relation between a , b and e for a hyperbola.

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

15. Find the centre and radius of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$.

16. Find the focus, axis and latus rectum of the parabola $y^2 = 12x$.

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

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

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

19. Find the equation of the circle passing through the points $(0, 0)$, $(a, 0)$ and $(0, b)$.

20. Find the eccentricity, foci and length of the latus rectum of the ellipse $x^2/36 + y^2/16 = 1$. Also find the parametric equations of the ellipse $x^2/25 + y^2/9 = 1$.

Answer Key (Marking Scheme)

Q1 — (A) $(x - h)^2 + (y - k)^2 = r^2$. Q2 — (A) 5. Q3 — (A) $y^2 = 4ax$. Q4 — (A) $(a, 0)$.

Q5 — (A) $0 < e < 1$. Q6 — (A) $x^2/a^2 - y^2/b^2 = 1$. Q7 — (A) $(a \cos \theta, a \sin \theta)$. Q8 — (A) $e = 1$.

Q9 — $(x - h)^2 + (y - k)^2 = r^2$.

Q10 — $x^2/a^2 + y^2/b^2 = 1$ ($a > b$).

Q11 — $x^2 + y^2 + 2gx + 2fy + c = 0$.

Q12 — $(2, 0)$.

Q13 — $b^2 = a^2(1 - e^2)$.

Q14 — $b^2 = a^2(e^2 - 1)$.

Q15 — Centre $(3, -2)$, radius 5.

Q16 — Focus $(3, 0)$, axis $y = 0$, latus rectum 12.

Q17 — $e = 4/5$.

Q18 — $e = 5/3$.

Q19 — $x^2 + y^2 - ax - by = 0$.

Q20 — $e = \sqrt{5/3}$, foci $(\pm 2\sqrt{5}, 0)$, latus rectum $16/3$; ellipse parametric $(5 \cos \theta, 3 \sin \theta)$.