Exercise walk-through

Conic Sections ▪ 4.6

eXercise

You must be able to

- identify a **conic section** 圆锥曲线 (circle, ellipse, parabola, hyperbola) from its equation

Method — Conic sections

Curves formed by slicing a cone. Standard equations:

- **circle**: $x^2 + y^2 = r^2$;
- **ellipse**: $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$;
- **parabola**: $y = ax^2$;
- **hyperbola**: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.

Method — Example

$\frac{x^2}{9} + \frac{y^2}{4} = 1$ is an ellipse (sum of squared terms $= 1$).

Practice 2.1 ▪ 1 mark

Name the four conic sections.

Solution 2.1

Method: Conic sections

Worked steps

circle, ellipse, parabola, hyperbola B1.

Practice 2.2 ▪ 1 mark

State the standard equation of an ellipse.

Solution 2.2

Method: Conic sections

Worked steps

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \quad \text{B1}.$$

Practice 2.3 ▪ 2 marks

Identify the conic $\frac{x^2}{9} + \frac{y^2}{4} = 1$.

Solution 2.3

Method: Conic sections

Worked steps

an ellipse M1 A1.

Exam-style 3.1 ▪ 1 mark

The equation $\frac{x^2}{16} + \frac{y^2}{9} = 1$ is

A a circle

B an ellipse

C a parabola

D a hyperbola

Solution 3.1

A a circle

B an ellipse ✓

C a parabola

D a hyperbola

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

The equation $x^2 - y^2 = 1$ is

A a circle

B an ellipse

C a hyperbola

D a line

Solution 3.2

A a circle

B an ellipse

C a hyperbola ✓

D a line

Worked steps

C.

Exam-style 3.3 ▪ 1 mark

Classify each conic.

(a) $x^2 + y^2 = 25$.

(b) $y = x^2$.

(c) $\dfrac{x^2}{4} - \dfrac{y^2}{9} = 1$.

Solution 3.3

Method: Conic sections

Worked steps

(a) circle B1. (b) parabola B1. (c) hyperbola B1.