AP PRECALCULUS • EXERCISE SHEET

4.6 Conic Sections

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **conic sections**.

You must be able to:

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

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ Conic sections

Curves formed by slicing a cone. Standard equations:

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

■ Example

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

2 Practice

2.1 Name the four conic sections. [1]

2.2 State the standard equation of an ellipse. [1]

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

3 Exam-style questions

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

- **A** a circle
- **B** an ellipse
- **C** a parabola
- **D** a hyperbola

3.2 The equation $x^2 - y^2 = 1$ is [1]

- **A** a circle
- **B** an ellipse
- **C** a hyperbola
- **D** a line

3.3 Classify each conic.

(a) $x^2 + y^2 = 25$. [1]

(b) $y = x^2$. [1]

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

4 Go further

- work through the **4.6 Conic Sections** lesson on the **Learn** page;
- read the **Functions Involving Parameters, Vectors, and Matrices** section of

the AP Precalculus handout on the **Know** page.

Solutions

2.1 circle, ellipse, parabola, hyperbola.

2.2 $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$.

2.3 an ellipse.

3.1 **B**.

3.2 **C**.

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