

4.1 Parametric Functions

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

Build the skills to answer exam questions on **parametric functions**.

You must be able to:

- interpret a **parametric function** 参数函数 $x = f(t)$, $y = g(t)$
- eliminate the **parameter** 参数 to relate x and y

1 Worked examples

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

■ Parametric functions

Both coordinates depend on a **parameter** t : $x = f(t)$, $y = g(t)$. As t varies, (x, y) traces a curve. Eliminate t to get a direct relation between x and y .

■ Example

$x = t$, $y = t^2$: since $x = t$, substitute to get $y = x^2$.

2 Practice

2.1 State what a parameter is in a parametric function. [1]

2.2 For $x = t$, $y = 2t$, eliminate t . [2]

2.3 For $x = t + 1$, $y = t$, find the point at $t = 2$. [1]

3 Exam-style questions

3.1 In parametric form, x and y are both functions of [1]

- **A** each other
 - **B** a parameter t
 - **C** the slope
 - **D** the origin
-

3.2 For $x = t$, $y = t^2$, eliminating t gives [1]

- **A** $y = x$
 - **B** $y = x^2$
 - **C** $x = y^2$
 - **D** $y = 2x$
-

3.3 $x = 2t$, $y = t - 1$.

(a) Find the point at $t = 0$. [1]

(b) Find the point at $t = 3$. [1]

(c) Eliminate t to relate x and y . [1]

4 Go further

- work through the **4.1 Parametric Functions** 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 an independent variable (t) that both x and y depend on.

2.2 $t = x$, so $y = 2x$.

2.3 $t = 2$: $x = 3$, $y = 2$, i.e. $(3, 2)$.

3.1 B.

3.2 B.

3.3 (a) $(0, -1)$. (b) $(6, 2)$. (c) $t = \frac{x}{2}$, so $y = \frac{x}{2} - 1$.