Exercise walk-through

Parametric Functions ▪ 4.1

eXercise

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

Method — 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.

Method — Example

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

Practice 2.1 ▪ 1 mark

State what a parameter is in a parametric function.

Solution 2.1

Method: Parametric functions

Worked steps

an independent variable (t) that both x and y depend on **B1**.

Practice 2.2 ▪ 2 marks

For $x = t$, $y = 2t$, eliminate t.

Solution 2.2

Worked steps

$t = x$, so $y = 2x$ M1 A1.

Practice 2.3 ▪ 1 mark

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

Solution 2.3

Worked steps

$t = 2$: $x = 3$, $y = 2$, i.e. $(3, 2)$ **B1**.

Exam-style 3.1 ▪ 1 mark

In parametric form, x and y are both functions of

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

Solution 3.1

Method: Parametric functions

A each other

B a parameter t ✓

C the slope

D the origin

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

For $x = t$, $y = t^2$, eliminating t gives

A $y = x$

B $y = x^2$

C $x = y^2$

D $y = 2x$

Solution 3.2

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

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

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

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

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

(c) Eliminate t to relate x and y.

Solution 3.3

Worked steps

(a) $(0,-1)$ **B1**. (b) $(6,2)$ **B1**. (c) $t=\frac{x}{2}$, so $y=\frac{x}{2}-1$ **B1**.