Parametric descriptions of curves

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find the point at $t = 2$ for $x = t - 1,\ y = t^2 + 1$. [2 marks]

Substitute into both coordinates.

$x = 1,\ y = 5.$

Answer: $(1, 5)$

2. Eliminate t from $x = 3t + 1,\ y = 2t - 4$. [2 marks]

$t = \frac{x-1}{3}$.

Substitute into y.

Answer: $y = \frac{2}{3}(x - 1) - 4$

3. For $x = t^2,\ y = t,\ t \geq 0$, give the Cartesian equation and restriction. [2 marks]

Use $t = y$.

The parameter restriction selects the upper branch.

Answer: $x = y^2,\ y \geq 0.$

4. Parameterise the segment from $(0, 4)$ to $(6, 1)$. [2 marks]

The displacement is $(6, -3)$.

Add its t multiple to the starting point.

Answer: $x = 6t$, $y = 4 - 3t$, $0 \le t \le 1$.

5. For $x = 4 - t$, $y = t^2$, $0 \le t \le 2$, find the start and end points. [2 marks]

Evaluate the two endpoints.

$\frac{dx}{dt} = -1$.

Answer: From $(4, 0)$ to $(2, 4)$, moving left.

6. Explain the repeated trace for $x = t^2$, $y = t^2$, $-1 \le t \le 1$. [2 marks]

Opposite t values have equal squares.

The Cartesian equation $y = x$ does not show the reversal.

Answer: It travels from $(1, 1)$ to $(0, 0)$, then back to $(1, 1)$.