# 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]

$t = (x - 1)/3$.

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.

$dx/dt = -1$.

**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).