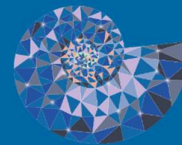# Parametric curves

## Gold

A curve $C$ is given by the parametric equations:

$$x = \sin(\pi t),\ y = t^2 - 7t + k,\ -1 < t < 1$$

where $k$ is a constant. Given that the point $(1, -1)$ lies on the curve, find the value of $k$.

## Silver

A curve $C$ is given by the parametric equations:

$$x = \frac{1}{t} + 2,\ y = t^2 + t - 6,\ -10 \le t \le 10$$

Find the points where $C$ intersects:

**a** the $x$-axis

**b** the $y$-axis.

## Bronze

A curve is given by the parametric equations:

$$x = t^3,\ y = \frac{t^2}{3},\ -4 \le t \le 4$$

Copy and complete the following table:

| $t$ | −4 | −3 | −2 | −1 | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|
| $x = t^3$ | | | | | | | | | |
| $y = \dfrac{t^2}{3}$ | | | | | | | | | |