

8.1) Parametric equations

Worked example

A curve has parametric equations

$$x = 3t, \quad y = t^2, \quad -4 < t < 4$$

Find:

- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$
- Sketch the curve

Your turn

A curve has parametric equations

$$x = 2t, \quad y = t^2, \quad -3 < t < 3$$

Find:

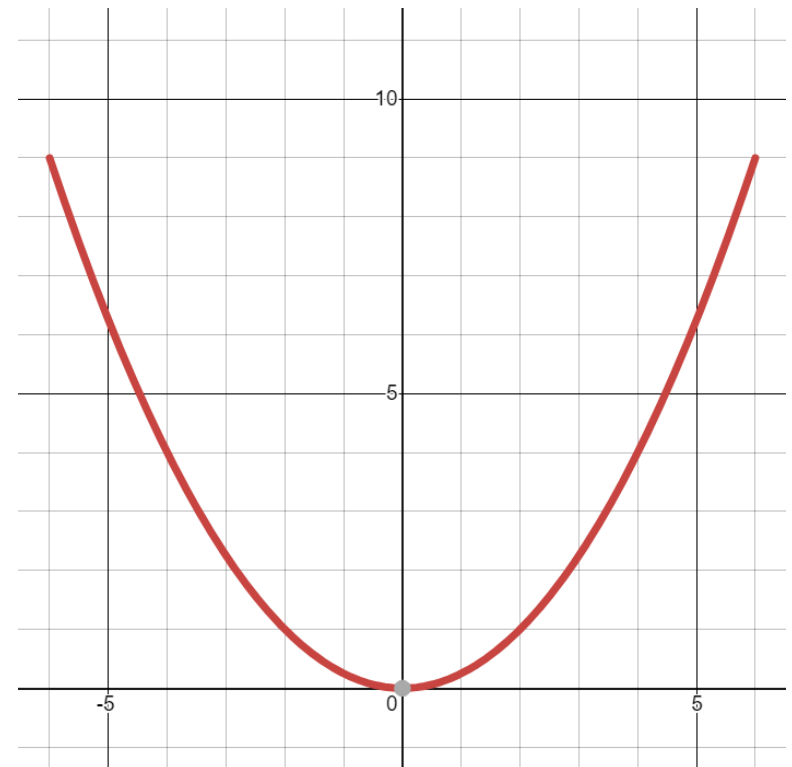
- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$
- Sketch the curve

a) $y = \frac{x^2}{4}$

b) Domain: $-6 < x < 6$

Range: $0 \leq f(x) < 9$

c)



Worked example

A curve has parametric equations

$$x = \ln(t + 5), \quad y = \frac{1}{t + 7}, \quad t > -4$$

Find:

- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$

Your turn

A curve has parametric equations

$$x = \ln(t + 3), \quad y = \frac{1}{t + 5}, \quad t > -2$$

Find:

- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$

a) $y = \frac{1}{e^{x+2}}$

b) Domain: $x > 0$

Range: $0 < f(x) < \frac{1}{3}$

Worked example

A curve has parametric equations

$$x = \ln t, \quad y = t^3 - 4, \quad t > 0$$

Find:

- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$

Your turn

A curve has parametric equations

$$x = \ln t, \quad y = t^2 - 1, \quad t > 0$$

Find:

- A Cartesian equation of the curve in the form $y = f(x)$
- The domain and range of $f(x)$

a) $y = e^{2x} - 1$

b) Domain: $x \in \mathbb{R}$

Range: $f(x) > -1$

Worked example

A curve has parametric equations

$$x = \frac{3t}{1-t}, \quad y = 5t + \frac{2}{t},$$

Show that the Cartesian equation of the curve is

$$y = \frac{ax^2 + bx + c}{x(x+3)}$$

where a , b and c are constants to be found.

Your turn

A curve has parametric equations

$$x = \frac{5t}{1-t}, \quad y = 2t + \frac{3}{t},$$

Show that the Cartesian equation of the curve is

$$y = \frac{ax^2 + bx + c}{x(x+5)}$$

where a , b and c are constants to be found.

Shown

$$a = 5, b = 30, c = 75$$