

11.8+) Finding areas: Areas under parametric curves

Worked example

Determine the area bound between the curve with parametric equations $x = t^2$ and $y = t - 1$, the x -axis, and the lines $x = 0$ and $x = 5$.

Your turn

Determine the area bound between the curve with parametric equations $x = t^2$ and $y = t + 1$, the x -axis, and the lines $x = 0$ and $x = 3$.

$$2\sqrt{3} + 3$$

Worked example

The curve C has parametric equations

$$x = t(2 + t), \quad y = \frac{1}{2 + t}, \quad t \geq 0$$

Find the exact area of the region, bounded by C , the x -axis and the lines $x = 0$ and $x = 8$.

Your turn

The curve C has parametric equations

$$x = t(1 + t), \quad y = \frac{1}{1 + t}, \quad t \geq 0$$

Find the exact area of the region, bounded by C , the x -axis and the lines $x = 0$ and $x = 2$.

$$2 - \ln 2$$

Worked example

The curve C has parametric equations

$$x = 1 - \frac{1}{4}t, \quad y = 4^t - 1, \quad t \geq 0$$

A finite region is bounded by the curve C , the x -axis and the line $x = -1$. Find the exact area of this region.

Your turn

The curve C has parametric equations

$$x = 1 - \frac{1}{2}t, \quad y = 2^t - 1, \quad t \geq 0$$

A finite region is bounded by the curve C , the x -axis and the line $x = -1$. Find the exact area of this region.

$$\frac{15}{2 \ln 2} - 2$$