

Co-ordinate Geometry

Part 3: Parametric and Cartesian Equations



AS Level
Pt 1: Equation of a Line Pt. 2: Circles

A-Level
Pt 3: Parametric and Cartesian Equations

1. A curve is given by the parametric equations,

$$x = t^2 + 1 \qquad y = \frac{4}{t}$$

a. Write down the co-ordinates of the point on the curve where $t = 2$ (2)

b. Find the value of t at the point on the curve with coordinates $(\frac{5}{4}, -8)$. (1)

2. A curve is given by the parametric equations,

$$x = 2t \qquad y = \frac{1}{t}$$

Find the cartesian equation of the curve. (2)

3. A curve has parametric equations,

$$x = 2t + 1 \qquad y = t^2$$

a. Find a cartesian equation for the curve (2)

b. Hence, sketch the curve (2)

4. A curve is given by the parametric equations,

$$x = \sin \Theta \qquad y = \cos 2\Theta$$

Find the cartesian equation of the curve. (2)

5. A curve is given by the parametric equations,

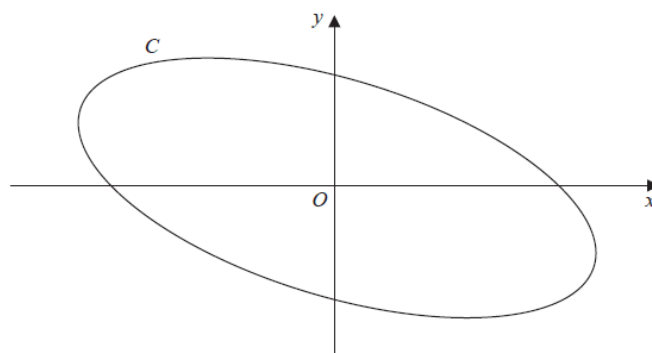
$$x = 3 + 2\cos \Theta \qquad y = 1 + 2\sin \Theta$$

Find the cartesian equation of the curve. (3)

6. Write down the parametric equations for a circle with a radius of (0, 0) and a radius of 5. (2)

7. The figure below shows a sketch of the curve C with parametric equations:

$$x = 4 \cos \left(t + \frac{\pi}{6}\right) \qquad y = 2 \sin t \qquad 0 \leq t < 2\pi$$



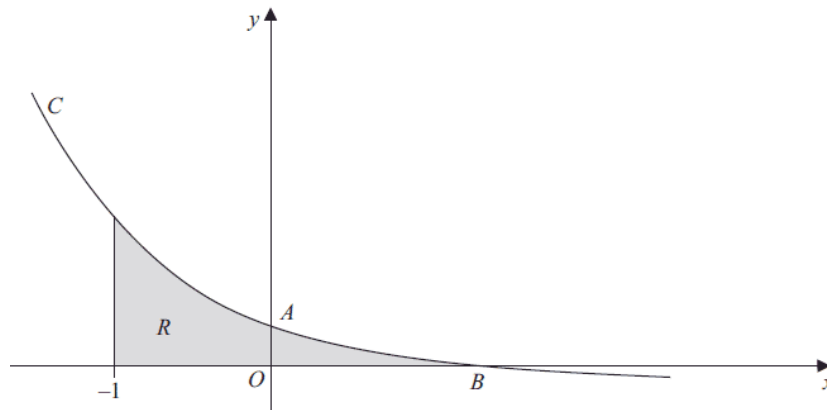
a. Show that $x + y = 2\sqrt{3} \cos t$ (3)

b. Show that a cartesian equation of C is $(x + y)^2 + ay^2 = b$ (3)

8. The figure below shows a sketch of the curve C with parametric equations:

$$x = 1 - \frac{1}{2}t$$

$$y = 2^t - 1$$



The curve crosses the y -axis at the point A and crosses the x -axis at the point B .

a. Show that A has coordinates $(0, 3)$

(2)

b. Find the x coordinate of the point B

(3)

c. Find the cartesian equation of the curve

(2)

