

AQA, Edexcel, OCR, MEI

A Level

A Level Mathematics

C4 Parametric Equations

Name:

M M E

Mathsmadeeasy.co.uk

Total Marks: /52

1. Write the following parametric equations in cartesian form:

(a) $x = t, \quad y = 2t.$ [2]

(b) $x = t^2, \quad y = t^2.$ [1]

(c) $x = t - 1, \quad y = 4t + 2.$ [2]

(d) $x = t - 1, \quad y = t^2 - 2t + 1.$ [2]

(e) $x = 2 \cos x, \quad y = 2 \sin x.$ [2]

(f) $x = t^2 - 1, \quad y = \sin(t^2).$ [2]

(g) $x = \ln t, \quad y = e^t.$ [2]

(h) $x = (e^{\ln t})^2, \quad y = e^{4t^2}.$ [3]

(i) $x = e^{2t}, \quad y = t^2 e^t.$ [3]

2. Sketch the curves parameterised by the following equations:

(a) $x = 2 \cos t, \quad y = 2 \sin t.$ [2]

(b) $x = 3 \cos t, \quad y = 3 \sin t.$ [2]

(c) $x = \cos t, \quad y = 2 \sin t.$ [3]

(d) $x = t, \quad y = 2t.$ [2]

(e) $x = 2 \cos t + 1, \quad y = 2 \sin t.$ [3]

Turn over

3. Find $\frac{dy}{dx}$ for each of the following sets of parametric equations. Leave your answer in terms of t . *Hint:*
 $\frac{dy}{dx} = \frac{dy}{dt} \times \frac{dt}{dx}$:

(a) $x = t^2, \quad y = t^2.$ [2]

(b) $x = \tan t, \quad y = \sin t.$ [2]

(c) $x = 5t, \quad y = t^3 + 1.$ [3]

(d) $x = e^t, \quad y = \ln t.$ [2]

(e) $x = \sin t, \quad y = t \sin t.$ [3]

(f) $x = \frac{1}{2}t \sin(2t) + \frac{1}{4} \cos(2t), \quad y = \sin t \cos t.$ [3]

4. Consider the set of parametric equations:

$$\begin{aligned}x &= e^t, \\y &= e^{2t} - 1.\end{aligned}$$

(a) Find $\frac{dy}{dx}$ in terms of the parameter t . [2]

(b) Find $\frac{dy}{dx}$ without the t dependence. [2]

(c) Give the formula for the function parametrised by the above equations in the form $y = f(x)$. [2]