Edexcel A level Maths Parametric equations

Topic assessment

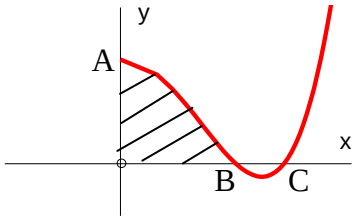
1. A curve is defined by the parametric equations $x = 2t^2$, $y = 4t$.
   (i) By eliminating the parameter, find the cartesian equation of the curve. [3]
   (ii) Find the equation of the tangent to the curve at the point A with parameter $t = 2$. [4]
   (iii) Show that the tangent does not meets the curve again. [3]
   (iv) The normal of the curve at A cuts the curve again at B. Find the coordinates of B. [5]

2. Find the turning points of the curve with parametric equations $x = 3t$, $y = 12t - t^3$ and distinguish between them. [6]

3. A circle is defined by the parametric equations $x = 1 + 2\cos\theta$, $y = 3 + 2\sin\theta$.
   (i) Sketch the circle. [2]
   (ii) Find $\frac{dy}{dx}$ at the point with parameter θ. [3]
   (iii) Find the equation of the tangent at the point with parameter θ. [3]
   (iv) Find the coordinates of the point where $\theta = \frac{\pi}{3}$. [2]
   (v) Find the equation of the normal at the point where $\theta = \frac{\pi}{3}$. [4]

4. A line is defined by the parametric equations $x = \cos 2t$, $y = \sin^2 t$
   (i) Find $\frac{dy}{dx}$. [3]
   (ii) Find the cartesian equation of the line. [3]

5. The diagram below shows the curve given by the parametric equations $x = 2\sqrt{t}$, $y = t^2 - 3t + 2$.



   (i) Find the coordinates of the points A, B and C. [3]
   (ii) Find the shaded area. [6]

Total 50 marks