

Section 2: Parametric differentiation and integration**Exercise level 1**

1. Find $\frac{dy}{dx}$ in terms of the parameter for
 - (i) $x = 3t - 2, y = t^3 + 1$
 - (ii) $x = 2\cos^3 \theta, y = 3\sin^3 \theta$
 - (iii) $x = \frac{1}{t^2}, y = 1 + t$

2. Given $x = t^3 - 2t, y = 5t^2 + \frac{1}{t}$,
 - (i) Find the coordinates of the point where $t = 1$
 - (ii) Find $\frac{dy}{dx}$
 - (iii) Find the gradient of the curve when $t = 1$
 - (iv) Hence find the equations of the tangent and normal at that point.

3. A curve has parametric equations $x = t + t^2, y = t - t^2$.
 - (i) Find the values of t for which the curve meets the x -axis.
 - (ii) Find the area enclosed between the curve and the x -axis.