

Section 1: Introduction to integration

Exercise level 1

1. Find the following indefinite integrals.
 - (i) $\int(2x+3)dx$
 - (ii) $\int(x^2-4x-1)dx$
 - (iii) $\int(x^5+1)dx$
 - (iv) $\int(x^3+2x-7)dx$

2. A curve has gradient function $\frac{dy}{dx} = 3x^2 - 4$.
 - (i) Find an expression for y in terms of x .
 - (ii) Find the particular curve that passes through the point $(2, -1)$.
 - (iii) Show that this curve also passes through the point $(1, -4)$.

3. The gradient function of a curve is given by $\frac{dy}{dx} = 4x - x^2$. Find the equation of the curve given that it passes through the point $(3, 2)$.

4. A stone is thrown vertically upwards such that $\frac{dh}{dt} = 25 - 10t$, where t is the time in seconds and h is the height of the stone in metres. Given that when $t = 0$, $h = 30$, find the value of t for which $h = 0$.

5. Find y in terms of x given that $\frac{dy}{dx} = (x+1)^2$ and that $y = 0$ when $x = 2$.