

**Section 3: Further integration****Exercise level 1**

1. Find the following indefinite integrals

(i)  $\int \frac{1}{x^2} dx$

(ii)  $\int x^{\frac{1}{4}} dx$

(iii)  $\int \sqrt[3]{x} dx$

(iv)  $\int (2x^{\frac{3}{4}} - 3x^{\frac{2}{3}}) dx$

(v)  $\int (3x^{-3} - 4x^{-4}) dx$

(vi)  $\int \left( \frac{1}{x^2} - \frac{2}{x^3} \right) dx$

2. Evaluate the following definite integrals

(i)  $\int_1^3 \frac{1}{x^3} dx$

(ii)  $\int_1^9 \frac{1}{\sqrt{x}} dx$

(iii)  $\int_1^4 (\sqrt{x} - 1) dx$

(iv)  $\int_1^3 \frac{1}{x^2} - \frac{1}{x^3} dx$

3. A curve has gradient function  $\frac{dy}{dx} = 2\sqrt{x} - 3x$  and passes through the point (1, -1).

Find the equation of the curve.

4. Find the area under the graph  $y = \frac{1}{x^2} + x$  between  $x = 1$  and  $x = 4$ .