

Section 3: Further techniques for integration**Exercise level 2**

1. Identify the technique required to do the following integrals:

(i) $\int \frac{1}{\sqrt{2x+1}} dx$ (ii) $\int \frac{1}{x^2-4} dx$ (iii) $\int \frac{x}{x^2-4} dx$.

2. Find $\int \frac{1}{x^2+3x+2} dx$.

3. Show that $\int_1^2 \frac{1}{x^2(x+1)} dx = \frac{1}{2} + \ln\left(\frac{3}{4}\right)$.

4. Find $\int \frac{x}{\sqrt{x^2-4}} dx$.

5. Show that $\int_0^1 x\sqrt{1+x} dx = \frac{4}{15}(1+\sqrt{2})$.

6. Evaluate $\int_0^1 \frac{2x+3}{x^2+3x+2} dx$ exactly, expressing your answer as a single logarithm.