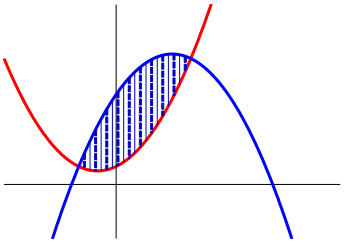
# Edexcel A level Mathematics Integration

## Topic assessment

1. The diagram below shows the graphs of $y = x^2 + x + 1$ and $y = 5 + 3x - x^2$.



(i) Find the coordinates of the points of intersection of the curves. [3]
(ii) Calculate the shaded area. [6]

2. Find the following indefinite integrals, using any appropriate method.

(i) $\int \frac{x^2}{(x^3+2)^2}\,\mathrm{d}x$ [4]

(ii) $\int \frac{\mathrm{e}^x}{1+\mathrm{e}^x}\,\mathrm{d}x$ [4]

3. Evaluate

(i) $\int_0^2 x\mathrm{e}^{x^2}\mathrm{d}x$. [5]

(ii) $\int_0^{\pi/2} \frac{\cos x}{\sin x + 1}\,\mathrm{d}x$. [5]

(iii) $\int_0^{\pi/2} \sin^2 x \cos x\,\mathrm{d}x$. [5]

4. Evaluate $\int_0^1 x\sqrt{(1-x)}\,\mathrm{d}x$. [5]

5. Evaluate $\int_1^{\mathrm{e}} \frac{1}{x^2}\ln x\,\mathrm{d}x$. [5]

6. Find $\int x\sin 3x\,\mathrm{d}x$. [4]

7. Express $\mathrm{f}(x) = \frac{x}{(x+1)(x+2)}$ in partial fractions and hence evaluate $\int_0^2 \mathrm{f}(x)\,\mathrm{d}x$ leaving your answer in logarithmic form. [6]

8. Using a suitable method integrate

(i) $\int \frac{x}{(x^2-1)^3}\,\mathrm{d}x$. [4]

(ii) $\int \frac{x}{x-1}\,\mathrm{d}x$ [4]

**Total 60 marks**