

**INTEGRATION (Q 8, PAPER 1)**

**2005**

8 (a) Find (i)  $\int (2 + x^3) dx$  (ii)  $\int e^{3x} dx$

8 (b) Evaluate (i)  $\int_1^4 \frac{2x+1}{x^2+x+1} dx$  (ii)  $\int_0^{\frac{\pi}{8}} \sin^2 2\theta d\theta$

8 (c) (i) Evaluate  $\int_1^2 \frac{1}{\sqrt{3+2x-x^2}} dx$ .

(ii) Use integration methods to derive a formula for the volume of a cone.

**ANSWERS**

8 (a) (i)  $2x + \frac{1}{4}x^4 + c$  (ii)  $\frac{1}{3}e^{3x} + c$

8 (b) (i)  $\ln 7$  (ii)  $\frac{\pi}{16} - \frac{1}{8}$

8 (c) (i)  $\frac{\pi}{6}$  (ii)  $V = \frac{1}{3}\pi r^2 h$