

INTEGRATION (Q 8, PAPER 1)

2000

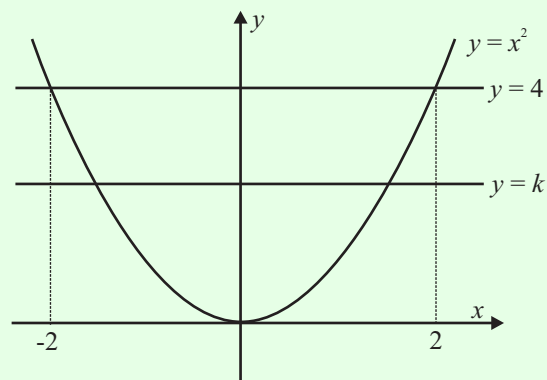
8 (a) Find (i) $\int (x^2 + 2)dx$ (ii) $\int e^{3x}dx$.

8 (b) Evaluate (i) $\int_0^{\frac{\pi}{2}} \sin^2 3\theta d\theta$ (ii) $\int_0^1 \frac{x}{x^2 + 4} dx$.

8 (c) (i) Find the value of the real number p given that

$$\int_2^p \frac{dx}{x^2 - 4x + 5} = \frac{\pi}{4}.$$

(ii) The region bounded by the curve $y = x^2$ and the line $y = 4$ is divided into two regions of equal area by the line $y = k$.
Show that $k^3 = 16$.



ANSWERS

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

8 (b) (i) $\frac{\pi}{4}$ (ii) $\frac{1}{4}\ln\left(\frac{5}{4}\right)$

8 (c) (i) $p = 3$