

Recognising Integrals

Difficulty: Medium

Question Paper 1

Level	A Level
Subject	Maths Pure 3
Exam Board	CIE
Topic	Integration
Sub-Topic	Recognising integrals
Difficulty	Medium
Booklet	Question Paper 1

Time allowed: 25 minutes

Score: /18

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>90%	81%	70%	58%	46%	34%

Question 1

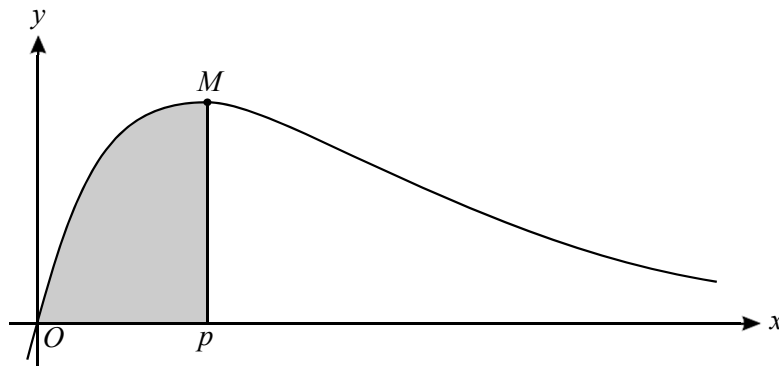
(i) Prove the identity

$$\sin^2 \theta \cos^2 \theta \equiv \frac{1}{8} (1 - \cos 4\theta). \quad [3]$$

(ii) Hence find the exact value of

$$\int_0^{\frac{1}{3}\pi} \sin^2 \theta \cos^2 \theta d\theta. \quad [3]$$

Question 2



The diagram shows the curve $y = e^{-x} - e^{-2x}$ and its maximum point M . The x -coordinate of M is denoted by p .

- (i) Find the exact value of p . [4]

- (i) Show that the area of the shaded region bounded by the curve, the x -axis and the line $x = p$ is equal to $\frac{1}{8}$. [4]

Question 3

Find the exact value of the constant k for which $\int_1^k \frac{1}{2x-1} dx = 1$. [4]