

# Integration – Trapezium Rule

## Question Paper 1

<b>Level</b>	International A Level
<b>Subject</b>	Maths
<b>Exam Board</b>	CIE
<b>Topic</b>	Integration
<b>Sub Topic</b>	Integration – Trapezium Rule
<b>Booklet</b>	Question Paper 1

**Time Allowed:** 57 minutes

**Score:** /47

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

- 1 Use the trapezium rule with four intervals to find an approximation to

$$\int_1^5 |2^x - 8| dx. \quad [3]$$

2 (a) Show that  $\int_6^{16} \frac{6}{2x-7} dx = \ln 125.$  [5]

- (b) Use the trapezium rule with four intervals to find an approximation to

$$\int_1^{17} \log_{10} x dx,$$

giving your answer correct to 3 significant figures. [3]

3 (a) Find  $\int 4 \cos\left(\frac{1}{3}x + 2\right) dx.$  [2]

- (b) Use the trapezium rule with three intervals to find an approximation to

$$\int_0^{12} \sqrt{4 + x^2} dx,$$

giving your answer correct to 3 significant figures. [3]

- 4 (a) Find

(i)  $\int \frac{e^{2x} + 6}{e^{2x}} dx,$  [3]

(ii)  $\int 3 \cos^2 x dx.$  [3]

- (b) Use the trapezium rule with 2 intervals to estimate the value of

$$\int_1^2 \frac{6}{\ln(x+2)} dx,$$

giving your answer correct to 2 decimal places. [3]

5 (a) Find  $\int (\sin x - \cos x)^2 dx$ . [4]

(b) (i) Use the trapezium rule with 2 intervals to estimate the value of

$$\int_{\frac{1}{4}\pi}^{\frac{1}{2}\pi} \operatorname{cosec} x \, dx,$$

giving your answer correct to 3 decimal places. [3]

(ii) Using a sketch of the graph of  $y = \operatorname{cosec} x$  for  $0 < x \leq \frac{1}{2}\pi$ , explain whether the trapezium rule gives an under-estimate or an over-estimate of the true value of the integral in part (i). [2]

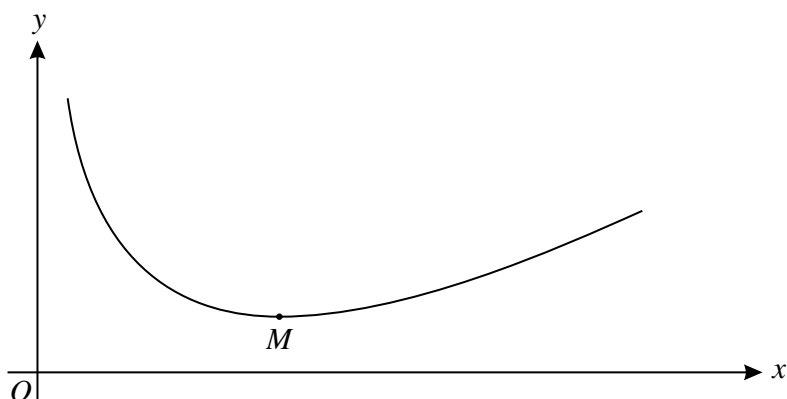
6 (a) Use the trapezium rule with two intervals to estimate the value of

$$\int_0^1 \frac{1}{6 + 2e^x} \, dx,$$

giving your answer correct to 2 decimal places. [3]

(b) Find  $\int \frac{(e^x - 2)^2}{e^{2x}} \, dx$ . [4]

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The diagram shows the curve  $y = x - 2 \ln x$  and its minimum point  $M$ .

- (i) Find the  $x$ -coordinate of  $M$ . [2]
- (ii) Use the trapezium rule with three intervals to estimate the value of

$$\int_2^5 (x - 2 \ln x) dx,$$

giving your answer correct to 2 decimal places. [3]

- (iii) State, with a reason, whether the trapezium rule gives an under-estimate or an over-estimate of the true value of the integral in part (ii). [1]