

Trapezium Rule

Question Paper 1

Level	A Level
Subject	Maths
Exam Board	OCR
Module	Core 2
Topic	Integration
Sub Topic	Trapezium Rule
Booklet	Question Paper - 1

Time Allowed: 50 minutes

Score: /41

Percentage: /100

Grade Boundaries:

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

- 1 (i) Use the trapezium rule, with 4 strips each of width 1.5, to estimate the value of

$$\int_4^{10} \sqrt{2x-1} \, dx,$$

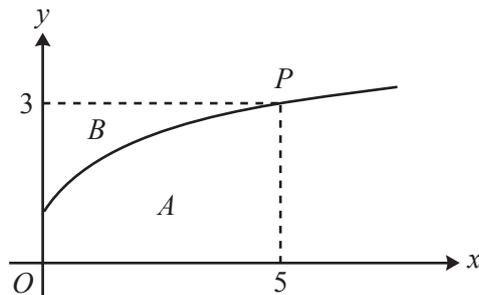
giving your answer correct to 3 significant figures.

[4]

- (ii) Explain how the trapezium rule could be used to obtain a more accurate estimate.

[1]

2



The diagram shows part of the curve $y = -3 + 2\sqrt{x+4}$. The point $P(5, 3)$ lies on the curve. Region A is bounded by the curve, the x -axis, the y -axis and the line $x = 5$. Region B is bounded by the curve, the y -axis and the line $y = 3$.

- (i) Use the trapezium rule, with 2 strips each of width 2.5, to find an approximate value for the area of region A , giving your answer correct to 3 significant figures. [3]
- (ii) Use your answer to part (i) to deduce an approximate value for the area of region B . [2]
- (iii) By first writing the equation of the curve in the form $x = f(y)$, use integration to show that the exact area of region B is $\frac{14}{3}$. [7]

- 3 Use the trapezium rule, with 3 strips each of width 2, to estimate the value of

$$\int_5^{11} \frac{8}{x} \, dx. \quad [4]$$

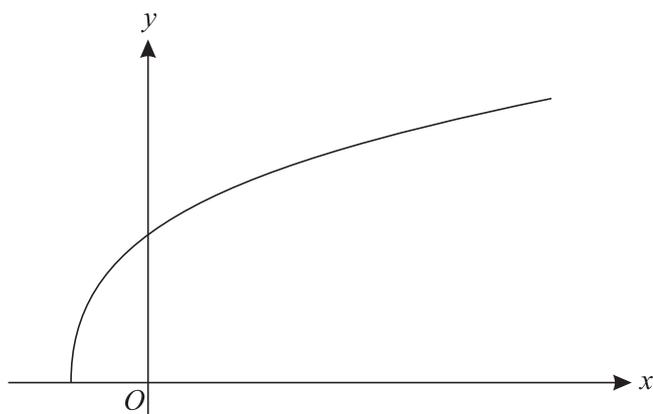
- 4 (i) Use the trapezium rule, with 2 strips each of width 4, to show that an approximate value of $\int_1^9 4\sqrt{x} \, dx$ is $32 + 16\sqrt{5}$. [3]

- (ii) Use a sketch graph to explain why the actual value of $\int_1^9 4\sqrt{x} \, dx$ is greater than $32 + 16\sqrt{5}$. [2]

- (iii) Use integration to find the exact value of $\int_1^9 4\sqrt{x} \, dx$. [4]

- 5 (i) Use the trapezium rule, with 3 strips each of width 3, to estimate the area of the region bounded by the curve $y = \sqrt[3]{7+x}$, the x -axis, and the lines $x = 1$ and $x = 10$. Give your answer correct to 3 significant figures. [4]
- (ii) Explain how the trapezium rule could be used to obtain a more accurate estimate of the area. [1]

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The diagram shows the curve $y = \sqrt{4x+1}$.

- (i) Use the trapezium rule, with strips of width 0.5, to find an approximate value for the area of the region bounded by the curve $y = \sqrt{4x+1}$, the x -axis, and the lines $x = 1$ and $x = 3$. Give your answer correct to 3 significant figures. [4]
- (ii) State with a reason whether this approximation is an under-estimate or an over-estimate. [2]