

Core 2 Integration Questions

- 2 (a) Use the trapezium rule with five ordinates (four strips) to find an approximate value for

$$\int_0^4 \frac{1}{x^2 + 1} dx$$

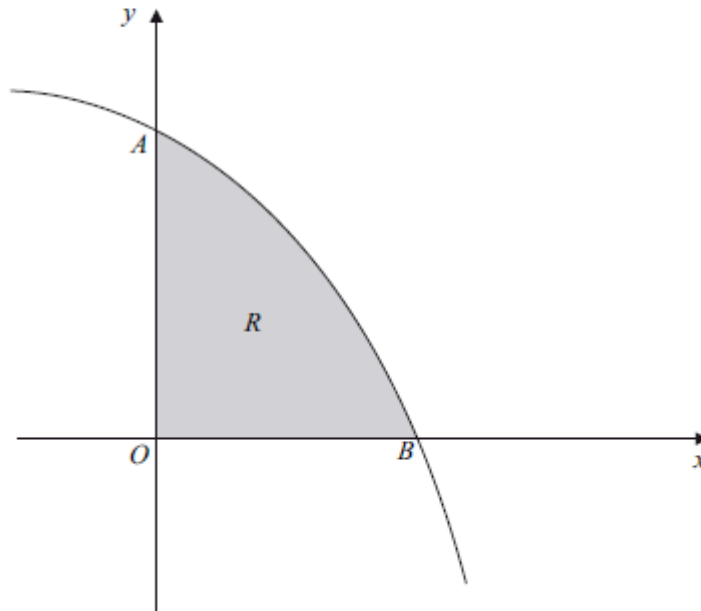
giving your answer to four significant figures.

(4 marks)

- (b) State how you could obtain a better approximation to the value of the integral using the trapezium rule.

(1 mark)

- 6 The diagram shows a sketch of the curve with equation $y = 27 - 3^x$.



The curve $y = 27 - 3^x$ intersects the y -axis at the point A and the x -axis at the point B .

- (a) (i) Find the y -coordinate of point A . (2 marks)
- (ii) Verify that the x -coordinate of point B is 3. (1 mark)
- (b) The region, R , bounded by the curve $y = 27 - 3^x$ and the coordinate axes is shaded. Use the trapezium rule with four ordinates (three strips) to find an approximate value for the area of R . (4 marks)
- (c) (i) Use logarithms to solve the equation $3^x = 13$, giving your answer to four decimal places. (3 marks)

- (ii) The line $y = k$ intersects the curve $y = 27 - 3^x$ at the point where $3^x = 13$.
Find the value of k . (1 mark)
- (d) (i) Describe the single geometrical transformation by which the curve with equation $y = -3^x$ can be obtained **from** the curve $y = 27 - 3^x$. (2 marks)
- (ii) Sketch the curve $y = -3^x$. (2 marks)
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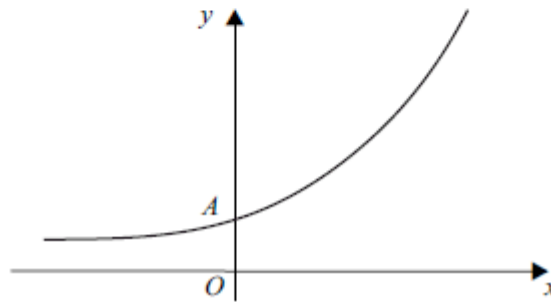
- 2 Use the trapezium rule with four ordinates (three strips) to find an approximate value for

$$\int_0^3 \sqrt{2^x} \, dx$$

giving your answer to three decimal places.

(4 marks)

- 6 The diagram shows a sketch of the curve with equation $y = 3(2^x + 1)$.



The curve $y = 3(2^x + 1)$ intersects the y -axis at the point A .

- (a) Find the y -coordinate of the point A . (2 marks)
- (b) Use the trapezium rule with four ordinates (three strips) to find an approximate value for $\int_0^6 3(2^x + 1) \, dx$. (4 marks)
- (c) The line $y = 21$ intersects the curve $y = 3(2^x + 1)$ at the point P .

- (i) Show that the x -coordinate of P satisfies the equation

$$2^x = 6 \quad \text{(1 mark)}$$

- (ii) Use logarithms to find the x -coordinate of P , giving your answer to three significant figures. (3 marks)
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