

8

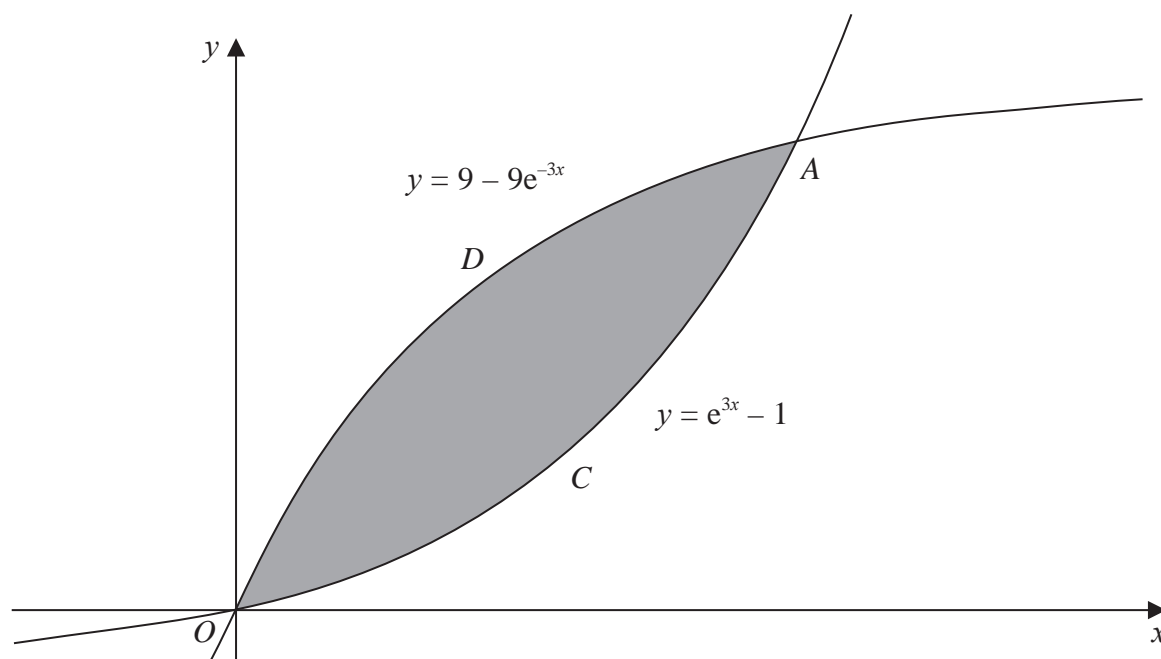
**Figure 2**

Figure 2 shows part of the curve C with equation $y = e^{3x} - 1$ and part of the curve D with equation $y = 9 - 9e^{-3x}$.

The curves intersect at the origin O and the point A .

- (a) (i) Show that the x coordinate of the point A satisfies the equation

$$(e^{3x})^2 - 10e^{3x} + 9 = 0$$

- (ii) Hence, show that the x coordinate of the point A is $\frac{1}{3} \ln 9$

(5)

The finite region bounded by C and by D is shown shaded in Figure 2.

- (b) Use calculus to find the exact area of this region.

(6)



Question 8 continued

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Handwriting practice area with horizontal dotted lines.



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Question 8 continued

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(Total for Question 8 is 11 marks)