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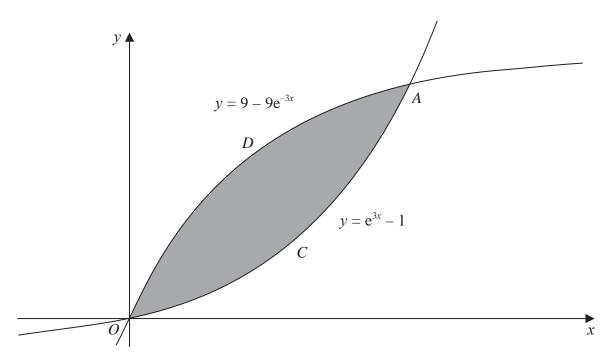


Figure 2

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)** 

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