











4. Use the substitution  $x = \sin \theta$  to find the exact value of

$$\int_0^{\frac{1}{2}} \frac{1}{(1-x^2)^{\frac{3}{2}}} dx.$$

(7)

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5.

Figure 1

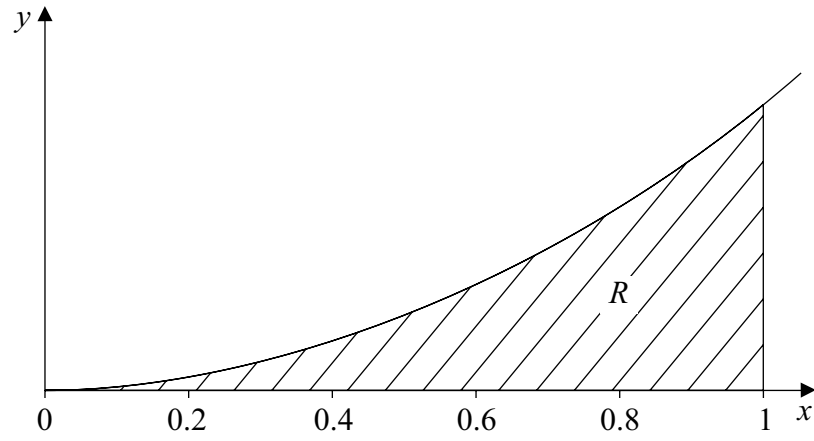


Figure 1 shows the graph of the curve with equation

$$y = xe^{2x}, \quad x \geq 0.$$

The finite region  $R$  bounded by the lines  $x = 1$ , the  $x$ -axis and the curve is shown shaded in Figure 1.

(a) Use integration to find the exact value for the area of  $R$ . (5)

(b) Complete the table with the values of  $y$  corresponding to  $x = 0.4$  and  $0.8$ .

$x$	0	0.2	0.4	0.6	0.8	1
$y = xe^{2x}$	0	0.29836		1.99207		7.38906

(1)

(c) Use the trapezium rule with all the values in the table to find an approximate value for this area, giving your answer to 4 significant figures. (4)

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