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2. (a) Use the binomial expansion to expand

$$(4 - 5x)^{-\frac{1}{2}} \qquad |x| < \frac{4}{5}$$

in ascending powers of x, up to and including the term in x^2 giving each coefficient as a fully simplified fraction.

(4)

$$f(x) = \frac{2 + kx}{\sqrt{4 - 5x}} \qquad \text{where } k \text{ is a constant and } |x| < \frac{4}{5}$$

Given that the series expansion of f(x), in ascending powers of x, is

$$1 + \frac{3}{10}x + mx^2 + ... \qquad \text{where } m \text{ is a constant}$$

(b) find the value of k,

(2)

(c) find the value of m.

(2)

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Question 2 continued

Q2

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3.

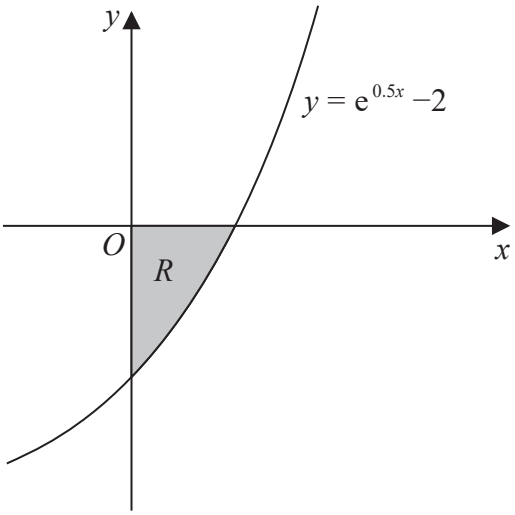


Figure 1

Figure 1 shows a sketch of part of the curve with equation $y = e^{0.5x} - 2$

The region R, shown shaded in Figure 1, is bounded by the curve, the x-axis and the y-axis.

The region R is rotated 360° about the x-axis to form a solid of revolution.

Show that the volume of this solid can be written in the form $a \ln 2 + b$, where a and b are constants to be found.

(6)

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