1. (a) Find the first 4 terms, in ascending powers of x, of the binomial expansion of

$$(3 + kx)^7$$

where k is a non-zero constant. Give each term in simplest form.

(4)

Given that, in this expansion, the coefficient of x^2 is 3 times the coefficient of x^3

(b) find, in simplest form, the value of k.

(2)

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Question 1 continued

(Total for Question 1 is 6 marks)

2.

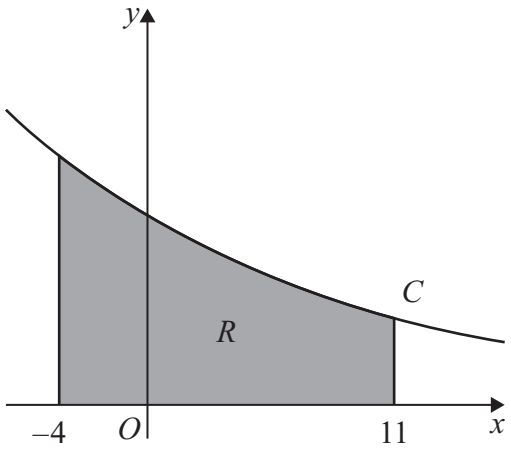


Figure 1

Figure 1 shows a sketch of part of the curve C with equation $y = 2^{-0.1x}$

The table below shows corresponding values of x and y for $y = 2^{-0.1x}$

The y values are given to 4 decimal places.

x	–4	–1	2	5	8	11
y	1.3195	1.0718	0.8706	0.7071	0.5743	0.4665

The region R, shown shaded in Figure 1, is bounded by C, the x-axis and the lines with equations $x = –4$ and $x = 11$

(a) Use the trapezium rule with all the values of y in the table to find an estimate for the area of R. Give the answer to 2 decimal places.

(3)

(b) State how you would use the trapezium rule to get a more accurate estimate for the true area of R.

(1)

Using the answer to part (a) and showing your working,

(c) estimate the value of

$$\int_{-4}^{11} 2^{3-0.1x}\,\mathrm{d}x$$

(2)

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