2.

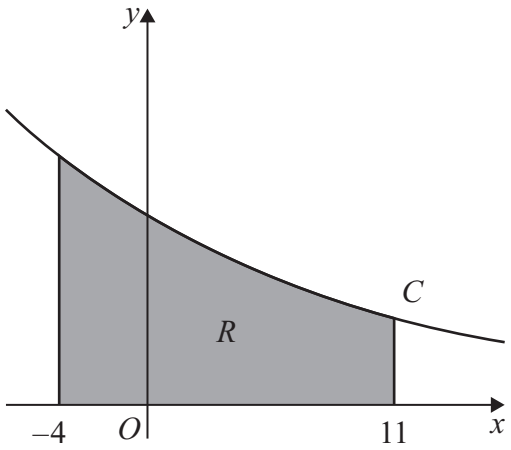

Figure 1

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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Question 2 continued

(Total for Question 2 is 6 marks)

3. (i) Given that

- $f(x) = 4x^3 + 6x + k$, where k is a constant
- $(x + 2)$ is a factor of $f(x)$

find the remainder when $f(x)$ is divided by $(x - 5)$

(4)

(ii) Find the remainder, R, and the quotient, $Q(x)$, when

$$6x^3 - 15x^2 - 21x + 8$$

is divided by $(2x + 3)$

(3)

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