7. Jem pays money into a savings scheme, *A*, over a period of 300 months.

Jem pays £20 into scheme *A* in month 1, £20.50 in month 2, £21 in month 3 and so on, so that the amounts Jem pays each month form an arithmetic sequence.

(a) Show that Jem pays £69.50 into scheme *A* in month 100

(1)

(b) Find the **total** amount that Jem pays into scheme *A* over the period of 300 months.

(2)

Kim pays money into a different savings scheme, *B*, over the same period of 300 months.

In a model, the amounts Kim pays into scheme *B* increase by the same percentage each month, so that the amounts Kim pays each month form a geometric sequence.

Given that Kim pays

- £20 into scheme *B* in month 1
- £250 into scheme *B* in month 300

(c) use the model to calculate, to the nearest £10, the difference between the total amount paid into scheme *A* and the total amount paid into scheme *B* over the period of 300 months.

(3)

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Question 7 continued

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Question 7 continued

(Total for Question 7 is 6 marks)

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8. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

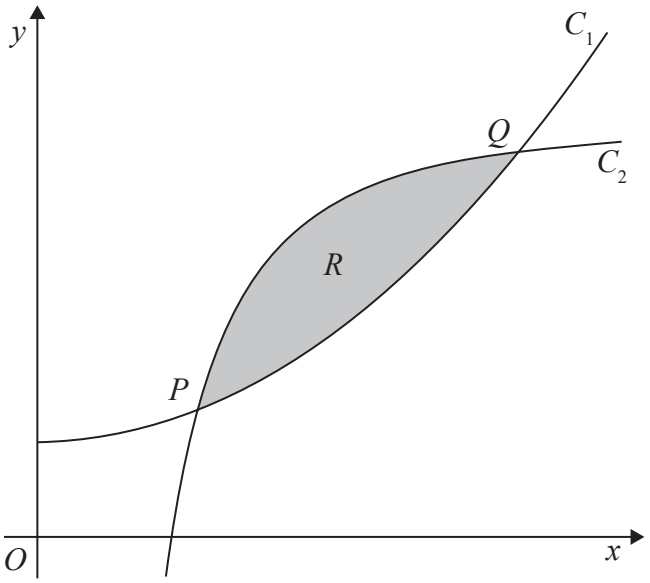


Figure 1

Figure 1 shows a sketch of part of the curve C_1 with equation

$$y = x^2 + 3 \qquad x > 0$$

and part of the curve C_2 with equation

$$y = 13 - \frac{9}{x^2} \qquad x > 0$$

The curves C_1 and C_2 intersect at the points P and Q as shown in Figure 1.

(a) Use algebra to find the x coordinate of P and the x coordinate of Q.

(4)

The finite region R, shown shaded in Figure 1, is bounded by C_1 and C_2

(b) Use algebraic integration to find the exact area of R.

(4)

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