



















**Question 5 continued**

Leave  
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Lined area for writing answers.

**(Total 7 marks)**

**Q5**







7.

Figure 1

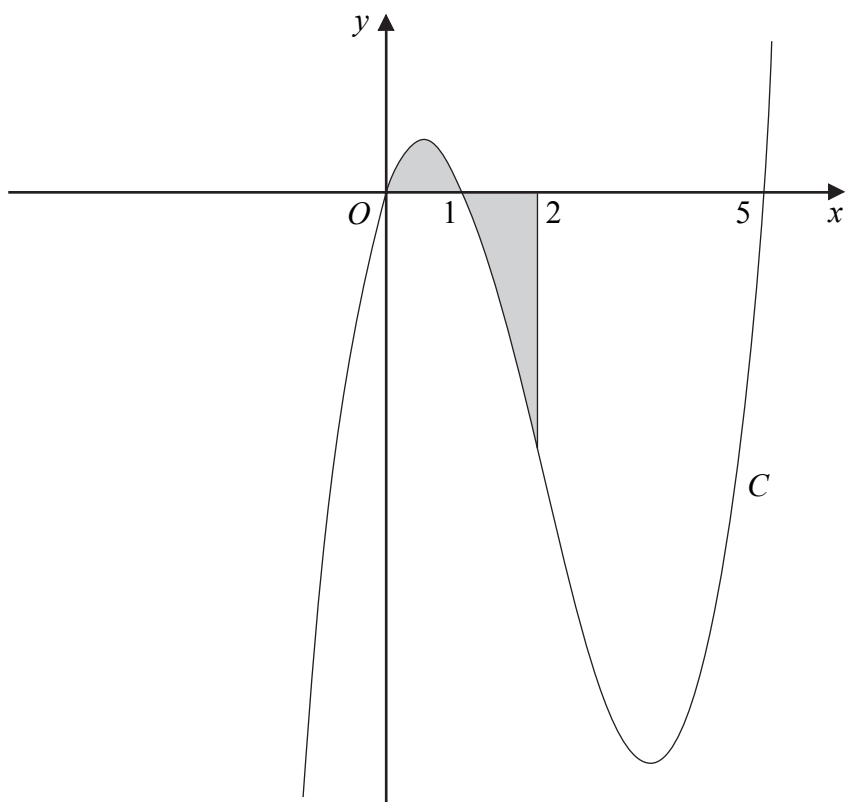


Figure 1 shows a sketch of part of the curve  $C$  with equation

$$y = x(x - 1)(x - 5).$$

Use calculus to find the total area of the finite region, shown shaded in Figure 1, that is between  $x = 0$  and  $x = 2$  and is bounded by  $C$ , the  $x$ -axis and the line  $x = 2$ .

(9)

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**Question 8 continued**

Lined writing area for question 8.

**(Total 9 marks)**

**Q8**



9.

**Figure 2**

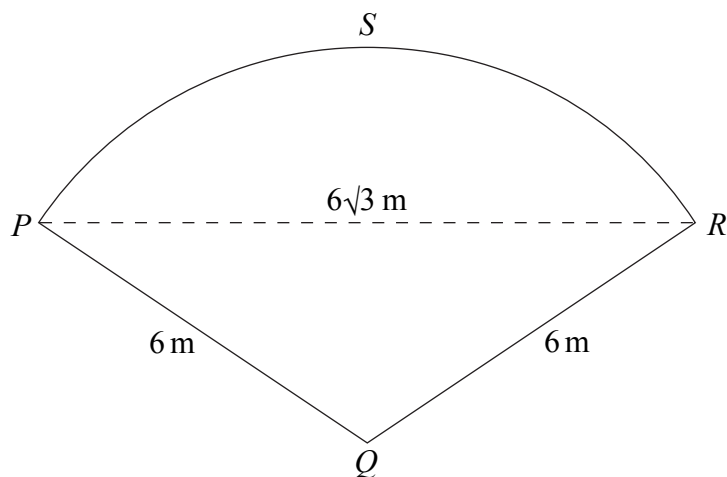


Figure 2 shows a plan of a patio. The patio  $PQRS$  is in the shape of a sector of a circle with centre  $Q$  and radius 6 m.

Given that the length of the straight line  $PR$  is  $6\sqrt{3}$  m,

- (a) find the exact size of angle  $PQR$  in radians. (3)
- (b) Show that the area of the patio  $PQRS$  is  $12\pi$  m<sup>2</sup>. (2)
- (c) Find the exact area of the triangle  $PQR$ . (2)
- (d) Find, in m<sup>2</sup> to 1 decimal place, the area of the segment  $PRS$ . (2)
- (e) Find, in m to 1 decimal place, the perimeter of the patio  $PQRS$ . (2)

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Question 9 continued

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Ruled area for writing answers, consisting of 28 horizontal lines.



Question 9 continued

Lined writing area consisting of 25 horizontal lines for student response.

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Q9

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(Total 11 marks)



N 2 4 3 2 2 A 0 2 1 2 4

10. A geometric series is  $a + ar + ar^2 + \dots$

(a) Prove that the sum of the first  $n$  terms of this series is given by

$$S_n = \frac{a(1-r^n)}{1-r} \quad (4)$$

(b) Find

$$\sum_{k=1}^{10} 100(2^k) \quad (3)$$

(c) Find the sum to infinity of the geometric series

$$\frac{5}{6} + \frac{5}{18} + \frac{5}{54} + \dots \quad (3)$$

(d) State the condition for an infinite geometric series with common ratio  $r$  to be convergent.

(1)

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