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Question 2 continued

Lined writing area for the answer to Question 2.

(Total 6 marks)

Q2



N 2 4 3 2 2 A 0 5 2 4

7.

Figure 1

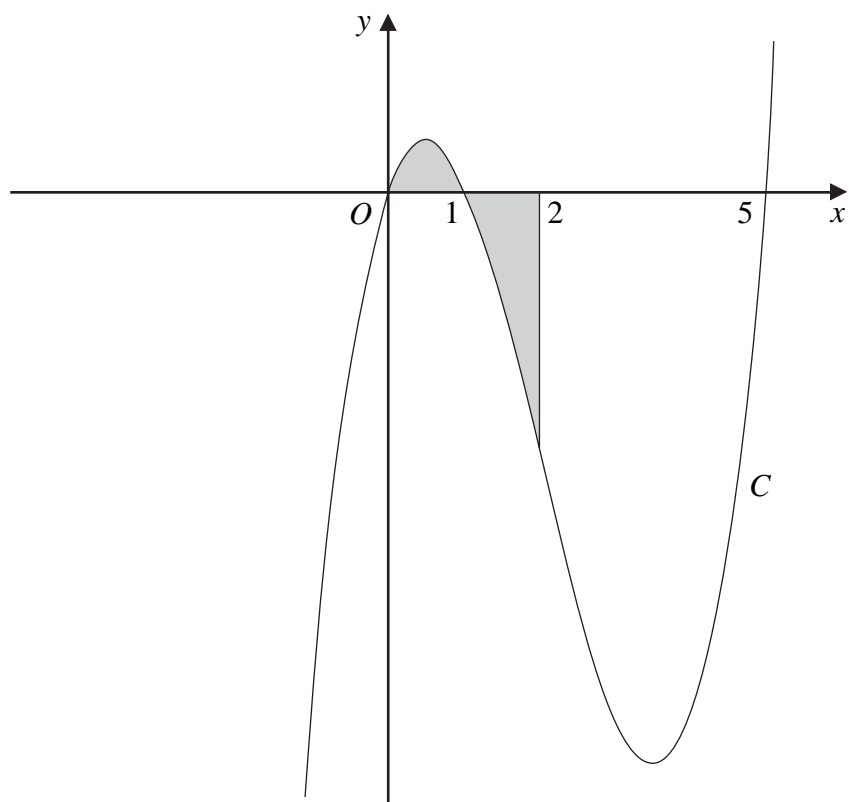


Figure 1 shows a sketch of part of the curve C with equation

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

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)



9.

Figure 2

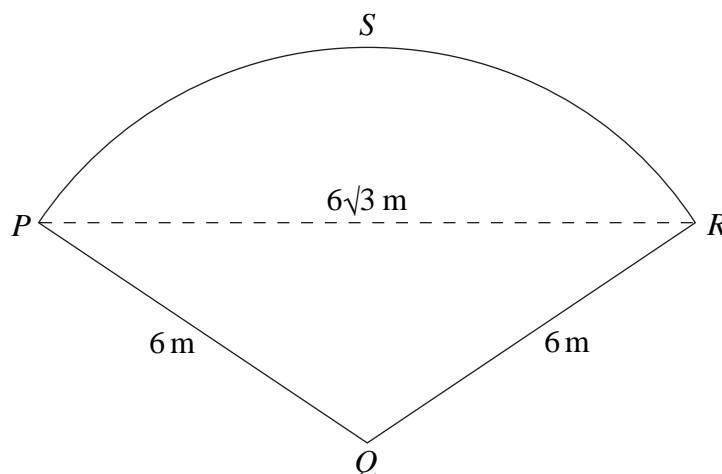


Figure 2 shows a plan of a patio. The patio $PQRS$ is in the shape of a sector of a circle with centre Q and radius 6 m.

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 12π m². (2)
- (c) Find the exact area of the triangle PQR . (2)
- (d) Find, in m² 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)



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)



