

Areas & Arc Length

Difficulty: Medium

Question Paper 2

Level	A Level only
Subject	Maths - Pure
Exam Board	Edexcel
Topic	Radians
Sub-Topic	Areas & Arc Length
Difficulty	Medium
Booklet	Question Paper 2

Time allowed: 60 minutes

Score: /50

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>76%	61%	52%	42%	33%	23%	<23%

Question 1

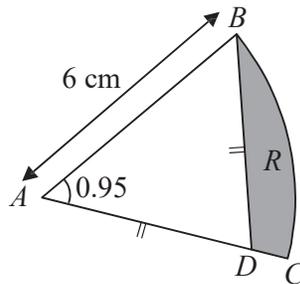


Figure 2

Figure 2 shows ABC , a sector of a circle of radius 6 cm with centre A . Given that the size of angle BAC is 0.95 radians, find

(a) the length of the arc BC , (2)

(b) the area of the sector ABC . (2)

The point D lies on the line AC and is such that $AD = BD$. The region R , shown shaded in Figure 2, is bounded by the lines CD , DB and the arc BC .

(c) Show that the length of AD is 5.16 cm to 3 significant figures. (2)

Find

(d) the perimeter of R , (2)

(e) the area of R , giving your answer to 2 significant figures. (4)

(Total 12 marks)

Question 2

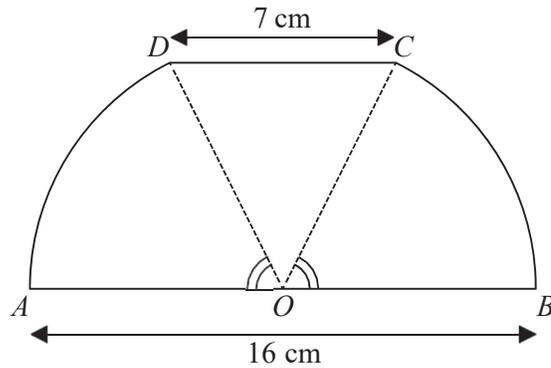


Figure 1

Figure 1 shows a sketch of a design for a scraper blade. The blade $AOBCDA$ consists of an isosceles triangle COD joined along its equal sides to sectors OBC and ODA of a circle with centre O and radius 8 cm. Angles AOD and BOC are equal. AOB is a straight line and is parallel to the line DC . DC has length 7 cm.

- (a) Show that the angle COD is 0.906 radians, correct to 3 significant figures. **(2)**
- (b) Find the perimeter of $AOBCDA$, giving your answer to 3 significant figures. **(3)**
- (c) Find the area of $AOBCDA$, giving your answer to 3 significant figures. **(3)**

(Total 8 marks)

Question 3

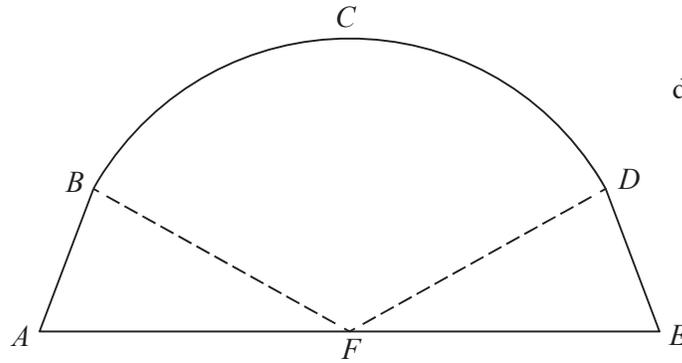


Diagram not drawn to scale

Figure 1

Figure 1 is a sketch representing the cross-section of a large tent $ABCDEF$.
 AB and DE are line segments of equal length.
Angle FAB and angle DEF are equal.
 F is the midpoint of the straight line AE and FC is perpendicular to AE .
 BCD is an arc of a circle of radius 3.5 m with centre at F .
It is given that

$$AF = FE = 3.7\text{m}$$

$$BF = FD = 3.5\text{m}$$

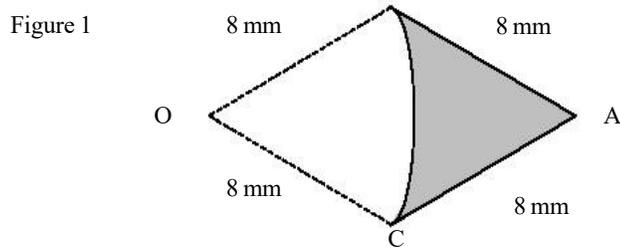
$$\text{angle } BFD = 1.77 \text{ radians}$$

Find

- (a) the length of the arc BCD in metres to 2 decimal places, (2)
- (b) the area of the sector $FBCD$ in m^2 to 2 decimal places, (2)
- (c) the total area of the cross-section of the tent in m^2 to 2 decimal places. (4)

(Total 8 marks)

Question 4



The shaded area in Fig. 1 shows a badge ABC , where AB and AC are straight lines, with $AB = AC = 8$ mm. The curve BC is an arc of a circle, centre O , where $OB = OC = 8$ mm and O is in the same plane as ABC . The angle BAC is 0.9 radians.

(a) Find the perimeter of the badge. (2)

(b) Find the area of the badge. (5)

(Total 7 marks)

Question 5

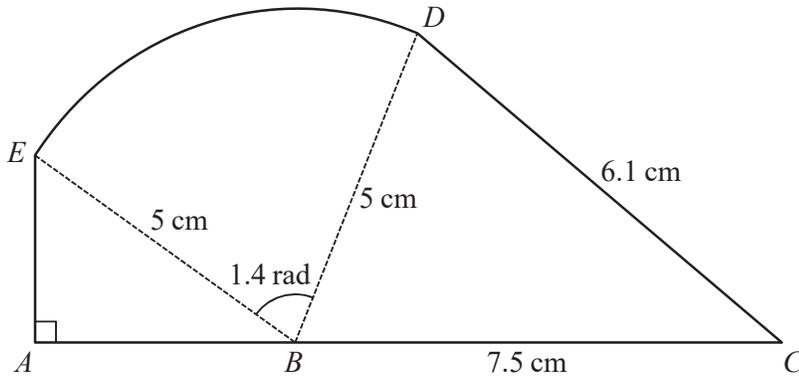


Figure 2

The shape $ABCDEA$, as shown in Figure 2, consists of a right-angled triangle EAB and a triangle DBC joined to a sector BDE of a circle with radius 5 cm and centre B .

The points A , B and C lie on a straight line with $BC = 7.5$ cm.

Angle $EAB = \frac{\pi}{2}$ radians, angle $EBD = 1.4$ radians and $CD = 6.1$ cm.

- (a) Find, in cm^2 , the area of the sector BDE . (2)
- (b) Find the size of the angle DBC , giving your answer in radians to 3 decimal places. (2)
- (c) Find, in cm^2 , the area of the shape $ABCDEA$, giving your answer to 3 significant figures. (5)