

Radians: Arc Length and Areas of Sectors 2 - Edexcel Past Exam Questions

1.

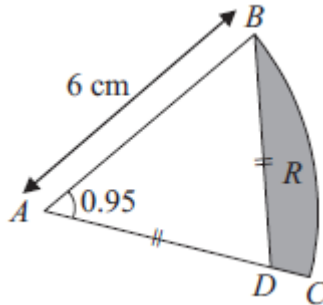

Figure 2

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)

Jan 12 Q7

2.

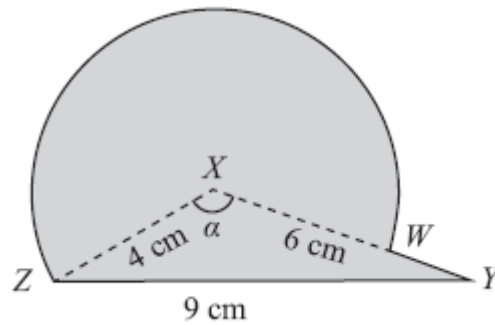


Figure 2

The triangle XYZ in Figure 1 has $XY = 6$ cm, $YZ = 9$ cm, $ZX = 4$ cm and angle $ZXY = \alpha$. The point W lies on the line XY .

The circular arc ZW , in Figure 1 is a major arc of the circle with centre X and radius 4 cm.

(a) Show that, to 3 significant figures, $\alpha = 2.22$ radians. (2)

(b) Find the area, in cm^2 , of the major sector $XZWX$. (3)

The region enclosed by the major arc ZW of the circle and the lines WY and YZ is shown shaded in Figure 1.

Calculate

(c) the area of this shaded region, (3)

(d) the perimeter $ZWYZ$ of this shaded region. (4)

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3.

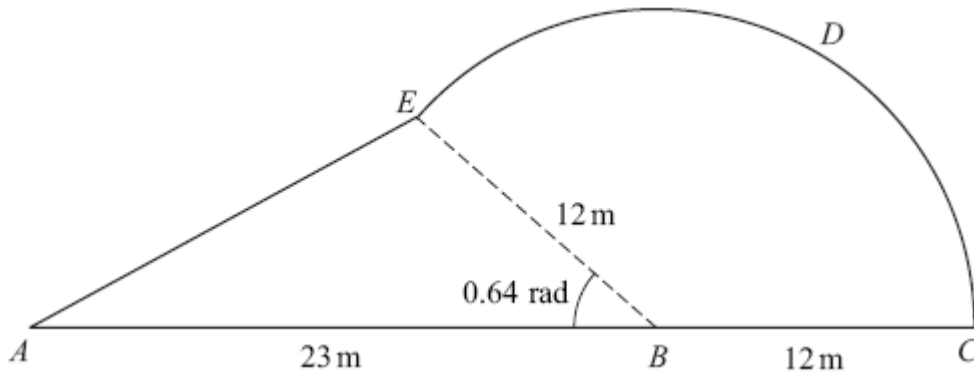
**Figure 2**

Figure 2 shows a plan view of a garden.

The plan of the garden $ABCDEA$ consists of a triangle ABE joined to a sector $BCDE$ of a circle with radius 12 m and centre B .

The points A , B and C lie on a straight line with $AB = 23$ m and $BC = 12$ m.

Given that the size of angle ABE is exactly 0.64 radians, find

(a) the area of the garden, giving your answer in m^2 , to 1 decimal place, (4)

(b) the perimeter of the garden, giving your answer in metres, to 1 decimal place. (5)

June 13 Q5

4.

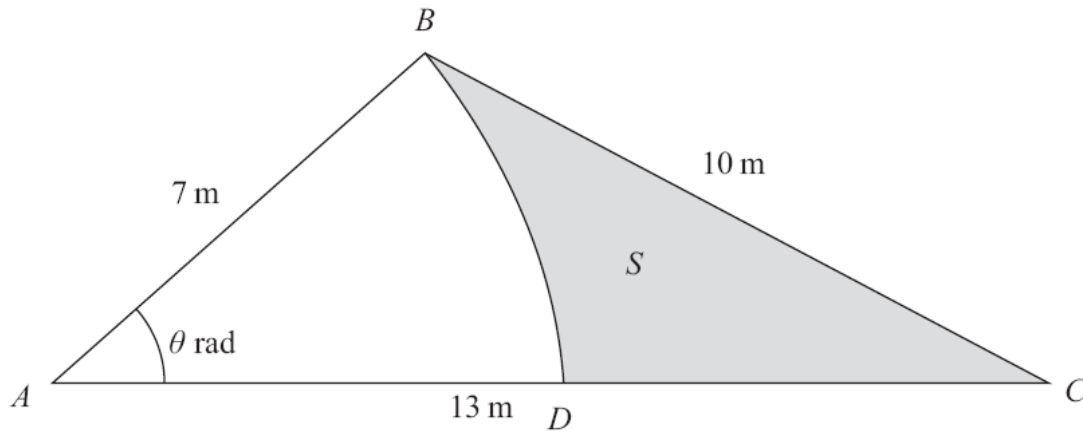


Figure 2

Figure 2 shows the design for a triangular garden ABC where $AB = 7$ m, $AC = 13$ m and $BC = 10$ m.

Given that angle $BAC = \theta$ radians,

(a) show that, to 3 decimal places, $\theta = 0.865$ (3)

The point D lies on AC such that BD is an arc of the circle centre A , radius 7 m.

The shaded region S is bounded by the arc BD and the lines BC and DC . The shaded region S will be sown with grass seed, to make a lawned area.

Given that 50 g of grass seed are needed for each square metre of lawn,

(b) find the amount of grass seed needed, giving your answer to the nearest 10 g. (7)
June 13(R) Q8

5.

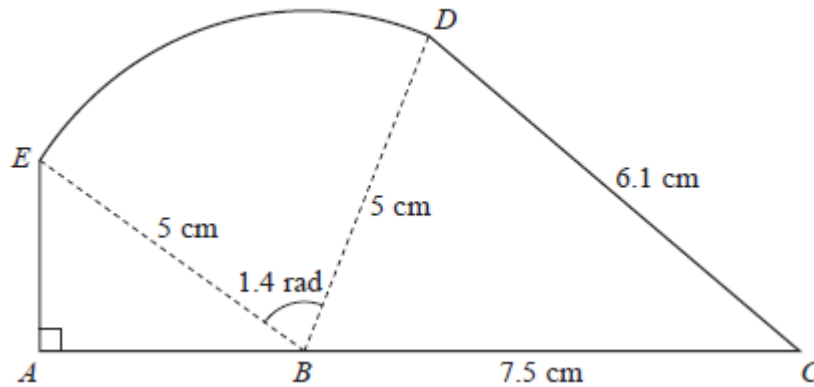


Figure 2

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)

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6.

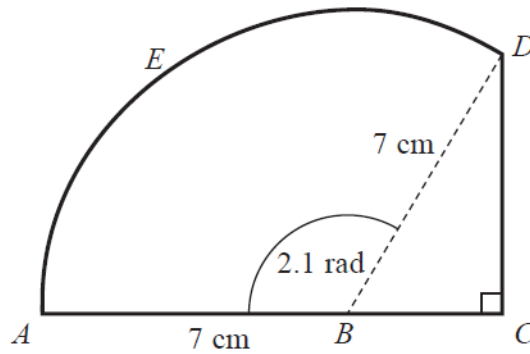
**Figure 2**

Figure 2 shows the shape $ABCDEA$ which consists of a right-angled triangle BCD joined to a sector $ABDEA$ of a circle with radius 7 cm and centre B .

A , B and C lie on a straight line with $AB = 7$ cm.

Given that the size of angle ABD is exactly 2.1 radians,

(a) find, in cm, the length of the arc DEA , (2)

(b) find, in cm, the perimeter of the shape $ABCDEA$, giving your answer to 1 decimal place.

(4)

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7.

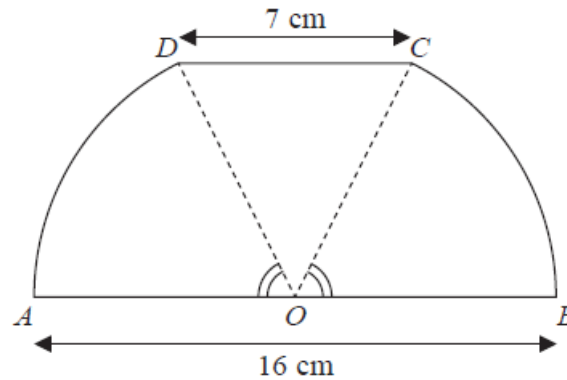

Figure 1

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)

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8.

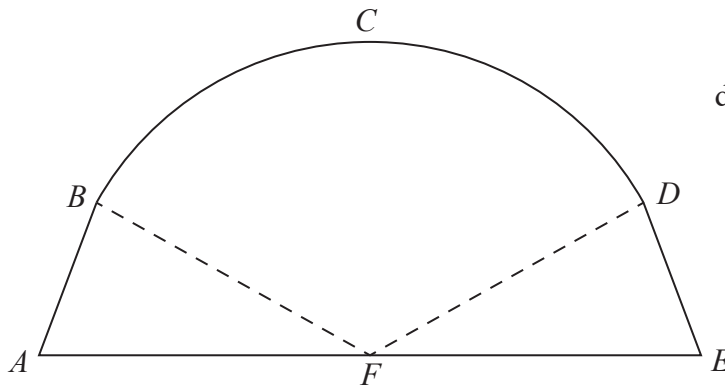

 Diagram not
drawn to scale

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)

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