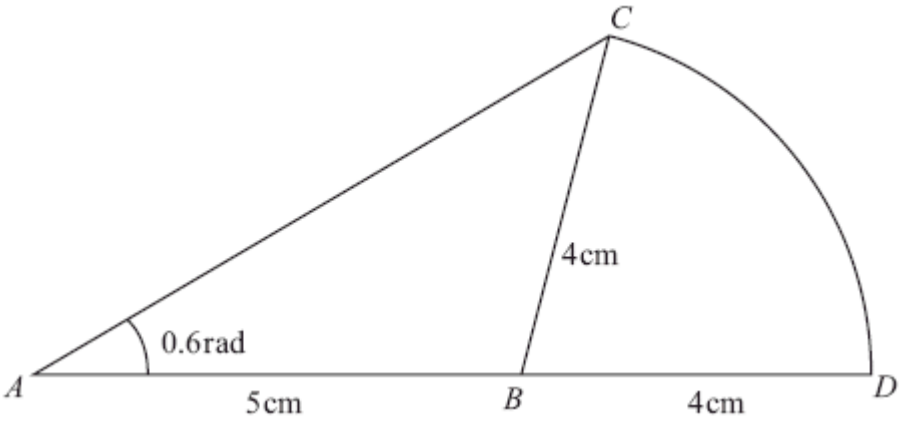
Year 2 Pure Chapter 5: Radians – Exam Questions (Total Marks 47)

1.



An emblem, as shown in the diagram above, consists of a triangle *ABC* joined to a sector *CBD* of a circle with radius 4 cm and centre *B*. The points *A*, *B* and *D* lie on a straight line with *AB* = 5 cm and *BD* = 4 cm. Angle *BAC* = 0.6 radians and *AC* is the longest side of the triangle *ABC*.

(a) Show that angle *ABC* = 1.76 radians, correct to 3 significant figures.

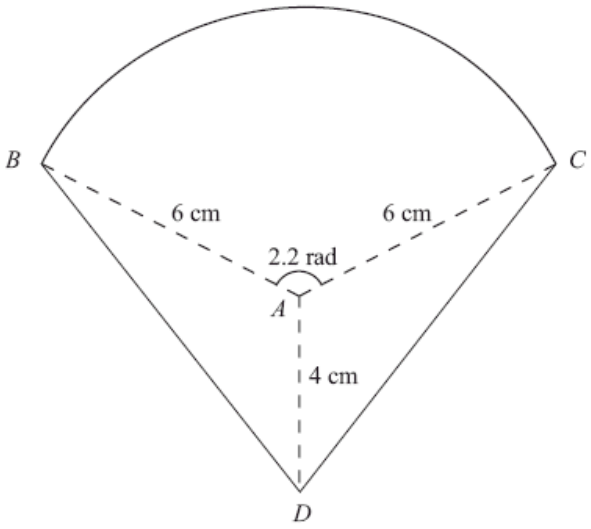
(4)

(b) Find the area of the emblem.

(3)

(Total 7 marks)

2.



The shape *BCD* shown above is a design for a logo.

The straight lines *DB* and *DC* are equal in length. The curve *BC* is an arc of a circle with centre *A* and radius 6 cm. The size of $\angle BAC$ is 2.2 radians and $AD = 4$ cm.

Find

(a) the area of the sector *BAC*, in cm^2,

(2)

(b) the size of $\angle DAC$, in radians to 3 significant figures,

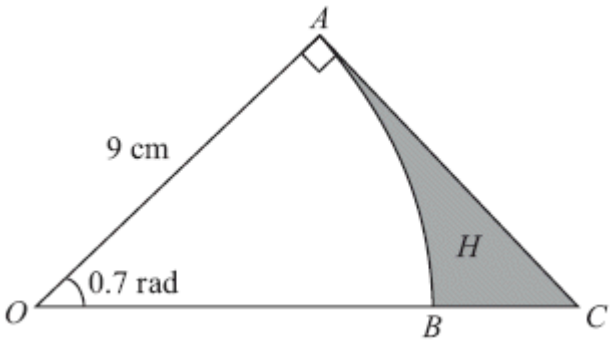
(2)

(c) the complete area of the logo design, to the nearest cm^2.

(4)

(Total 8 marks)

3.



The diagram above shows the sector OAB of a circle with centre O, radius 9 cm and angle 0.7 radians.

(a) Find the length of the arc AB.

(2)

(b) Find the area of the sector OAB.

(2)

The line AC shown in the diagram above is perpendicular to OA, and OBC is a straight line.

(c) Find the length of AC, giving your answer to 2 decimal places.

(2)

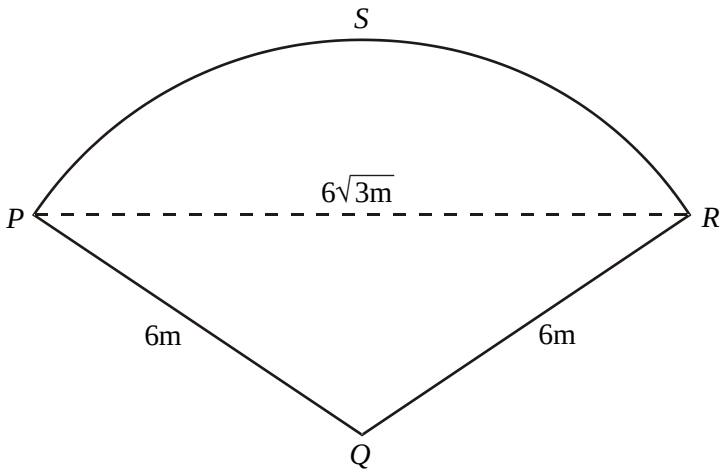
The region H is bounded by the arc AB and the lines AC and CB.

(d) Find the area of H, giving your answer to 2 decimal places.

(3)

(Total 9 marks)

4.



The diagram above 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 m^2.

(2)

(c) Find the exact area of the triangle *PQR*.

(2)

(d) Find, in m^2 to 1 decimal place, the area of the segment *PRS*.

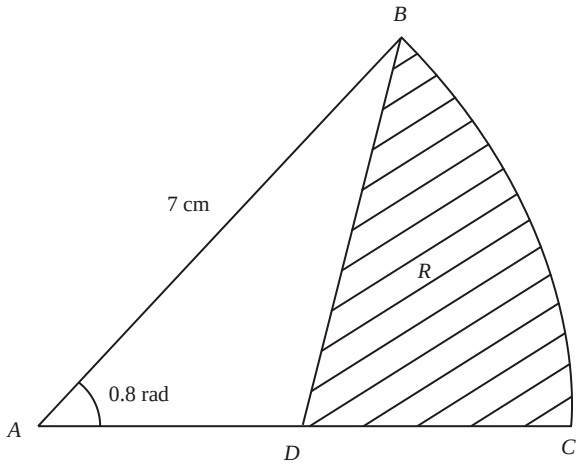
(2)

(e) Find, in m to 1 decimal place, the perimeter of the patio *PQRS*.

(2)

(Total 11 marks)

5.



The diagram above shows *ABC*, a sector of a circle with centre *A* and radius 7 cm.

Given that the size of $\angle BAC$ is exactly 0.8 radians, find

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

(2)

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

(2)

The point *D* is the mid-point of *AC*. The region *R*, shown shaded in the diagram above, is bounded by *CD*, *DB* and the arc *BC*.

Find

(c) the perimeter of *R*, giving your answer to 3 significant figures,

(4)

(d) the area of *R*, giving your answer to 3 significant figures.

(4)

(Total 12 marks)