Radians

Leave blank

1.

Figure 2

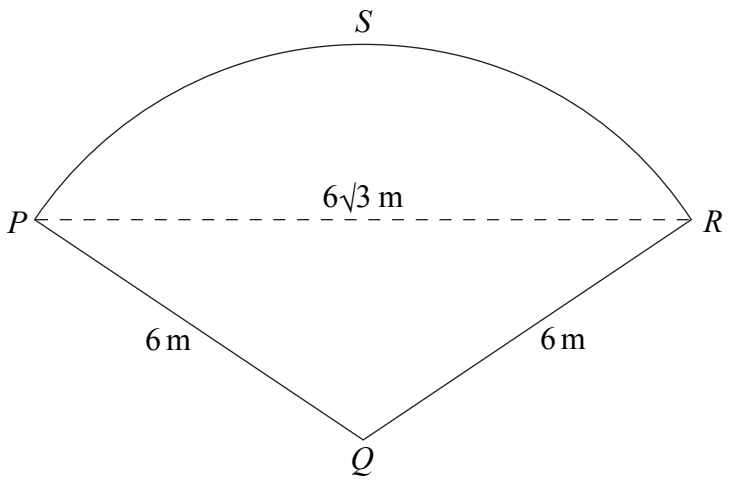

Figure 2 shows a plan of a patio. The patio $PQRS$ is in the shape of a sector of a circle with centre Q and radius 6 m.

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 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)

Leave blank

2. A circle C has centre M (6, 4) and radius 3.

(a) Write down the equation of the circle in the form

$$(x - a)^2 + (y - b)^2 = r^2.$$

(2)

Figure 3

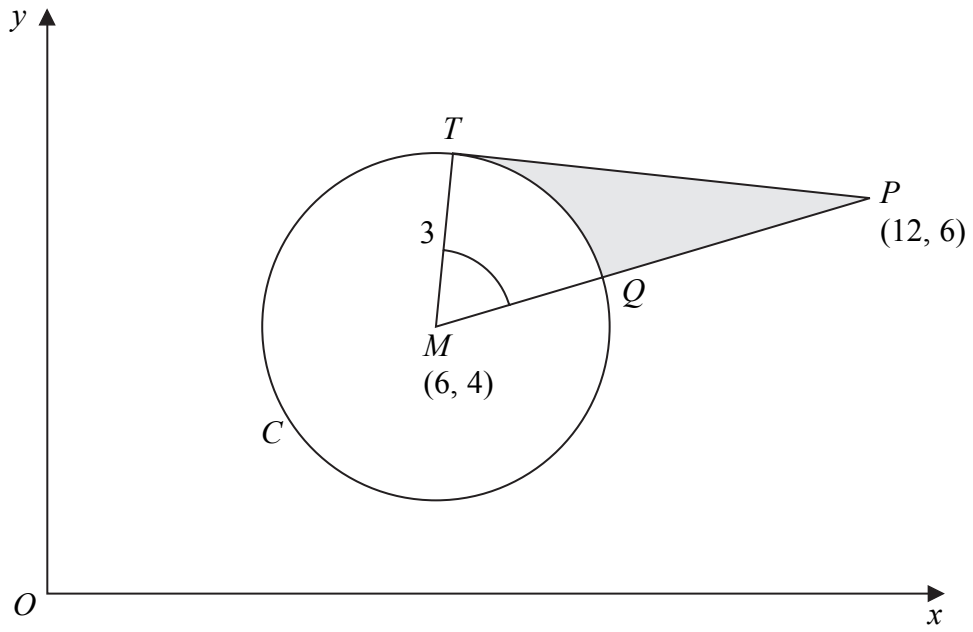

Figure 3 shows the circle C. The point T lies on the circle and the tangent at T passes through the point P (12, 6). The line MP cuts the circle at Q.

(b) Show that the angle TMQ is 1.0766 radians to 4 decimal places.

(4)

The shaded region TPQ is bounded by the straight lines TP, QP and the arc TQ, as shown in Figure 3.

(c) Find the area of the shaded region TPQ. Give your answer to 3 decimal places.

(5)

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3.

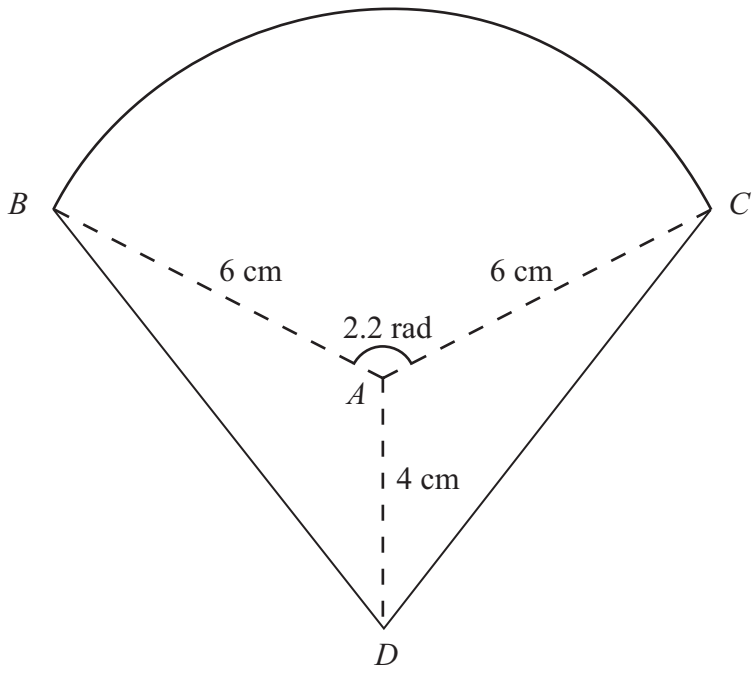

Figure 3

The shape BCD shown in Figure 3 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)

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4.

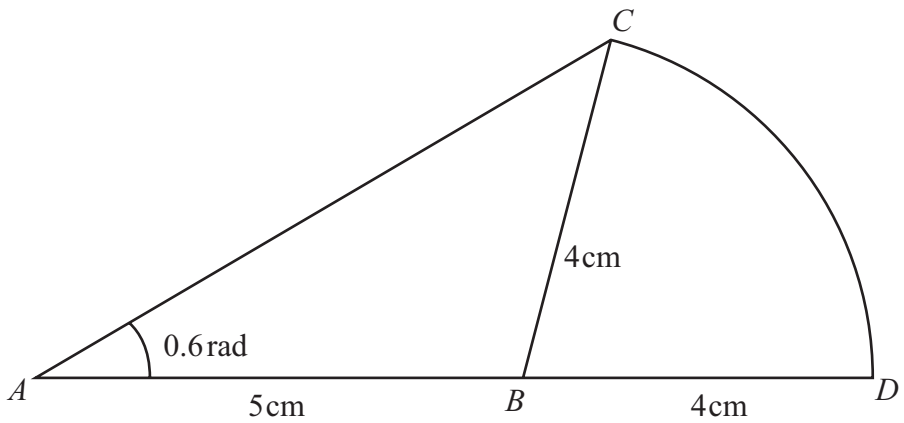

Figure 1

An emblem, as shown in Figure 1, 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)

N 3 5 1 0 1 A 0 6 2 4

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5. **Figure 2**

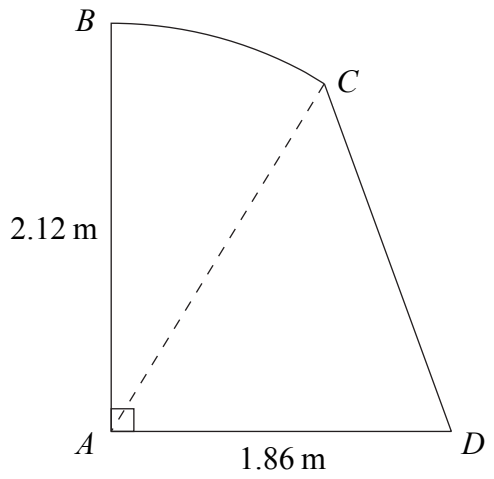

Figure 2 shows the cross section $ABCD$ of a small shed.
The straight line AB is vertical and has length 2.12 m.
The straight line AD is horizontal and has length 1.86 m.
The curve BC is an arc of a circle with centre A, and CD is a straight line.
Given that the size of $\angle BAC$ is 0.65 radians, find

(a) the length of the arc BC, in m, to 2 decimal places,

(2)

(b) the area of the sector BAC, in m^2, to 2 decimal places,

(2)

(c) the size of $\angle CAD$, in radians, to 2 decimal places,

(2)

(d) the area of the cross section $ABCD$ of the shed, in m^2, to 2 decimal places.

(3)

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6.

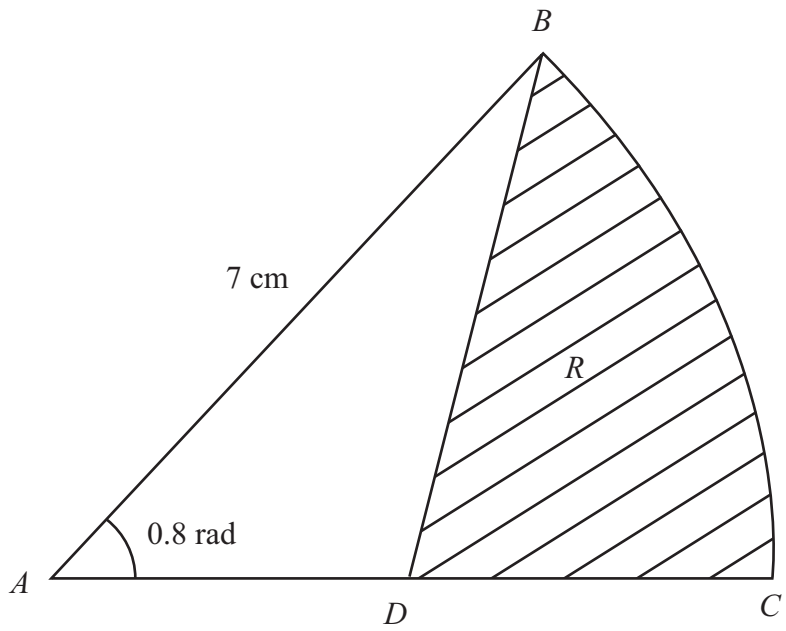

Figure 1

Figure 1 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 Figure 1, 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)

Leave blank

7.

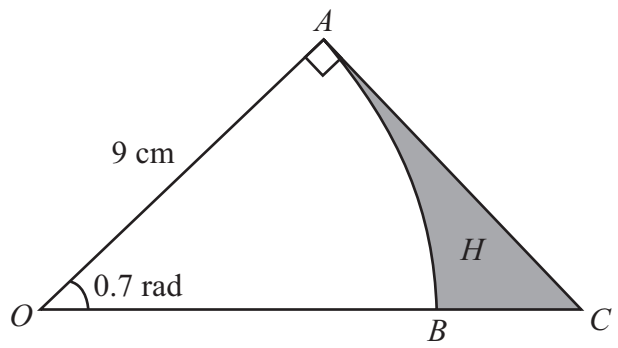

Figure 1

Figure 1 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 Figure 1 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)