June 10 Q6.

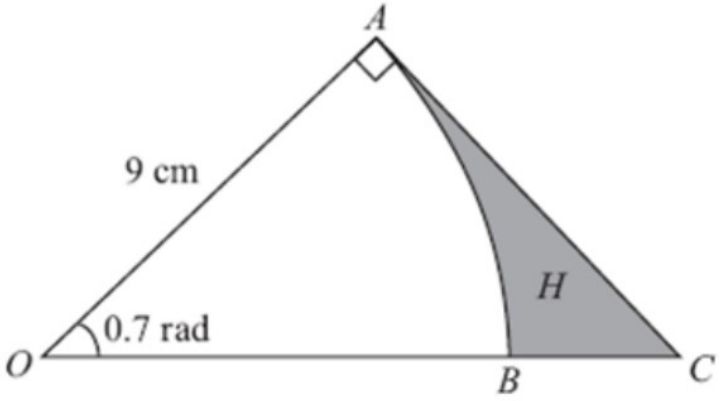

Figure 1

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)

Question Number	Scheme	Marks
6	(a) $r\theta = 9 \times 0.7 = 6.3$ (Also allow 6.30, or awrt 6.30)	M1 A1 (2)
	(b) $\frac{1}{2}r^2\theta = \frac{1}{2} \times 81 \times 0.7 = 28.35$ (Also allow 28.3 or 28.4, or awrt 28.3 or 28.4) (Condone 28.35^2 written instead of $28.35\,\text{cm}^2$)	M1 A1 (2)
	(c) $\tan 0.7 = \frac{AC}{9}$ $AC = 7.58$ (Allow awrt) NOT 7.59 (see below)	M1 A1 (2)
	(d) Area of triangle $AOC = \frac{1}{2}(9 \times \text{their } AC)$ (or other complete method) Area of R = "34.11" – "28.35" (triangle – sector) or (sector – triangle) (needs a value for each) $= 5.76$ (Allow awrt)	M1 M1 A1 (3) **9**

Jan 05 Q7.

Figure 1

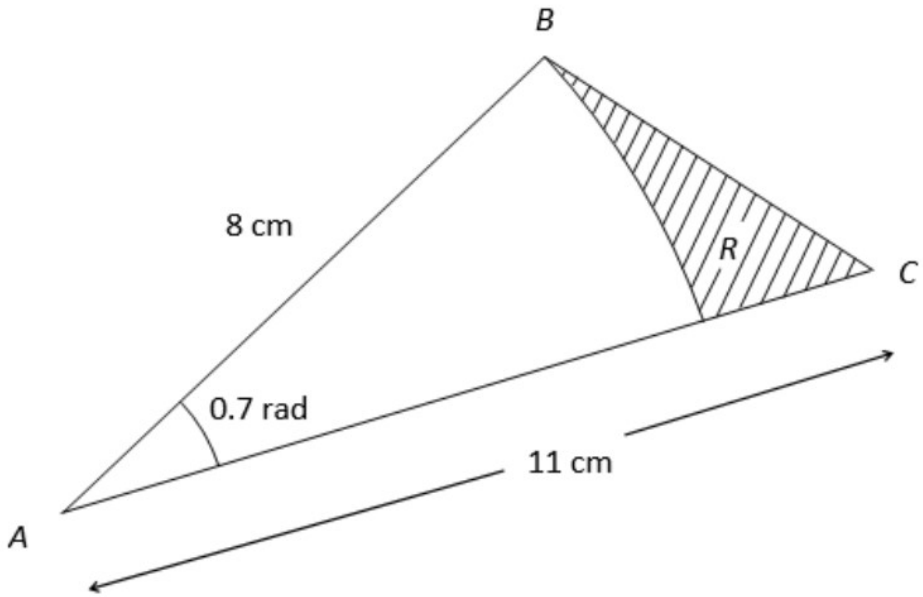

Figure 1 shows the triangle ABC, with $AB = 8$ cm, $AC = 11$ cm and $\angle BAC = 0.7$ radians. The arc BD, where D lies on AC, is an arc of a circle with centre A and radius 8 cm. The region R, shown shaded in Figure 1, is bounded by the straight lines BC and CD and the arc BD.

Find

(a) the length of the arc BD,

(2)

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

(4)

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

(5)

Question Number	Scheme	Marks
7.	(a) $r\theta = 8\times 0.7, = 5.6(cm)$	M1, A1 (2)
	(b) $BC^2 = 8^2 + 11^2 - 2\times 8\times 11\times \cos 0.7$	M1
	$\Rightarrow$ $BC = 7.098$ or 7.10 (Awrt) or $\sqrt{(50.4)}$ or better	A1
	Perimeter = $(a) + (11-8) + BC, = 15.7(cm)$	M1, A1cao (4)
	(c) $\Delta = \frac{1}{2}ab\sin c =, \frac{1}{2}\times 11\times 8\times \sin 0.7$	M1, A1
	Sector $= \frac{1}{2}r^2\theta =, \frac{1}{2}\times 8^2\times 0.7$	M1, A1
	Area of $R = 28.345..... - 22.4 = 5.9455 = 5.95(cm^2)$	A1 (5)
		(11)

Jan 09 Q7.

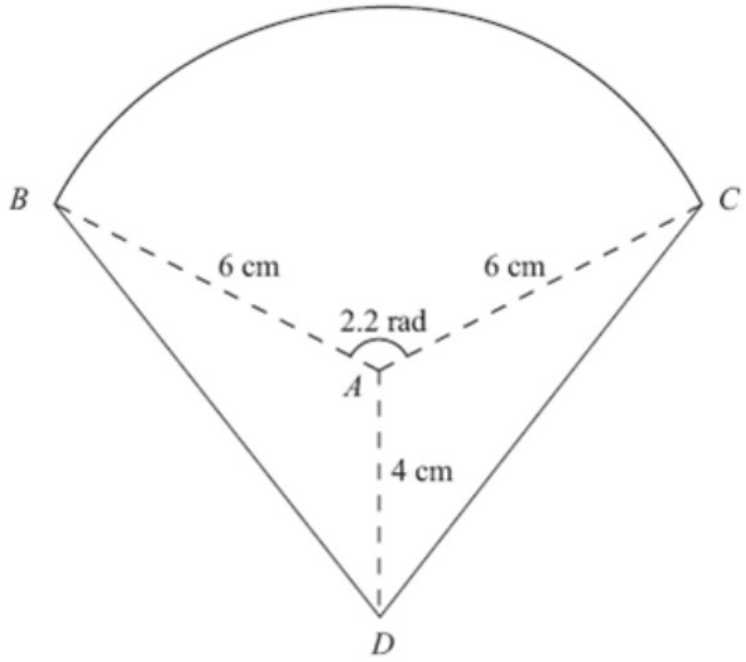

Figure 3

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)

Question Number		Scheme	Marks	
7	(a)	$\frac{1}{2}r^2\theta = \frac{1}{2}\times 6^2 \times 2.2 = 39.6 \quad (\text{cm}^2)$	M1 A1	(2)
	(b)	$\left(\frac{2\pi - 2.2}{2} =\right) \pi - 1.1 = 2.04 \text{ (rad)}$	M1 A1	(2)
		(c) $\Delta DAC = \frac{1}{2}\times 6 \times 4 \sin 2.04 \quad (\approx 10.7)$	M1 A1ft	
		Total area = sector + 2 triangles = 61 (cm^2)	M1 A1	(4) **[8]**

Jan 07 Q9.

Figure 2

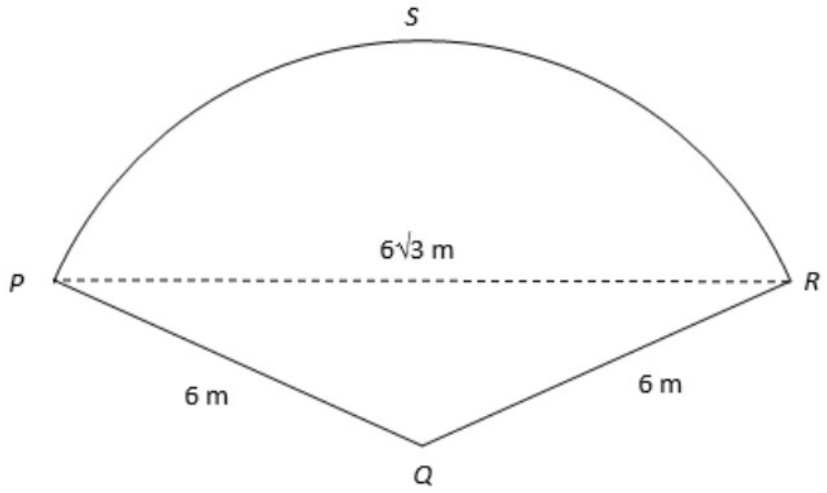

Figure 2 shows a plan of a patio. The patio $PQRS$ is in the shape of a sector of a circle with centre Q and radius 6 m.

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)

Question Number	Scheme	Marks
9. (a)	$\cos PQR = \dfrac{6^2 + 6^2 - (6\sqrt{3})^2}{2 \times 6 \times 6} \quad \left\{ = -\dfrac{1}{2} \right\}$ $PQR = \dfrac{2\pi}{3}$	M1, A1 A1 (3)
(b)	Area $= \dfrac{1}{2} \times 6^2 \times \dfrac{2\pi}{3}\ \text{m}^2$ $= 12\pi\ \text{m}^2$ (✱)	M1 A1cso (2)
(c)	Area of $\Delta = \dfrac{1}{2} \times 6 \times 6 \times \sin\dfrac{2\pi}{3}\ \text{m}^2$ $= 9\sqrt{3}\ \text{m}^2$	M1 A1cso (2)
(d)	Area of segment $= 12\pi - 9\sqrt{3}\ \text{m}^2$ $= 22.1\ \text{m}^2$	M1 A1 (2)
(e)	Perimeter $= 6 + 6 + \left[6 \times \dfrac{2\pi}{3} \right]\ \text{m}$ $= 24.6\ \text{m}$	M1 A1ft (2) **(11)**