Radians Assessment

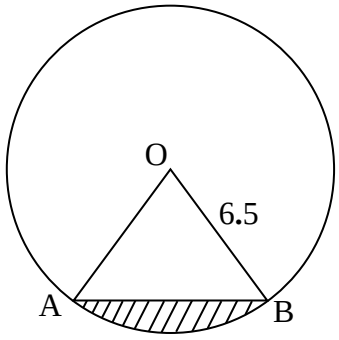
Red

1) a) State the exact value of $\tan\frac{5\pi}{6}$ [1]

b) Express 330° in radians, giving your answer in the form kπ where k is a fraction in its lowest terms [2]

c) Express $\frac{7\pi}{3}$ in degrees [2]

2) The diagram shows the sector *AOB* of a circle, with centre *O* and radius 6.5 cm, and $\angle AOB = 0.8$ radians



a) Calculate, in cm^2, the area of the sector *AOB*. [2]

b) Show that the length of the chord *AB* is 5.06 cm, to 3 significant figures [3]

The segment *R*, shaded in Fig. 1, is enclosed by the arc *AB* and the straight line *AB*

c) Calculate, in cm, the perimeter of the shaded segment [2]

Radians Assessment

Amber

3) Solve for $0 \leq x \leq 2\pi$

a) $\sin(x-1) = \frac{1}{\sqrt{2}}$ [4]

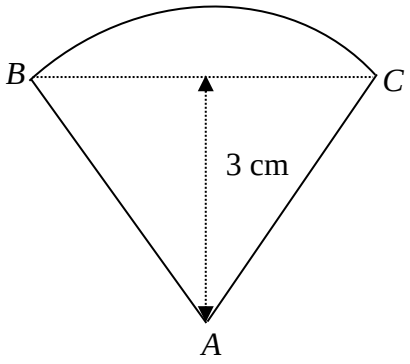
b) $\cos(3x) = -0.4$ [6]

4) Solve: $5 \sin x = 2 \cos x, \quad -\frac{3\pi}{4} \leq x < \frac{3\pi}{4}$ [4]

5)

The shape of a badge is a sector ABC of a circle with centre A and radius AB, as shown in the diagram.

The triangle ABC is equilateral and has a perpendicular height 3 cm

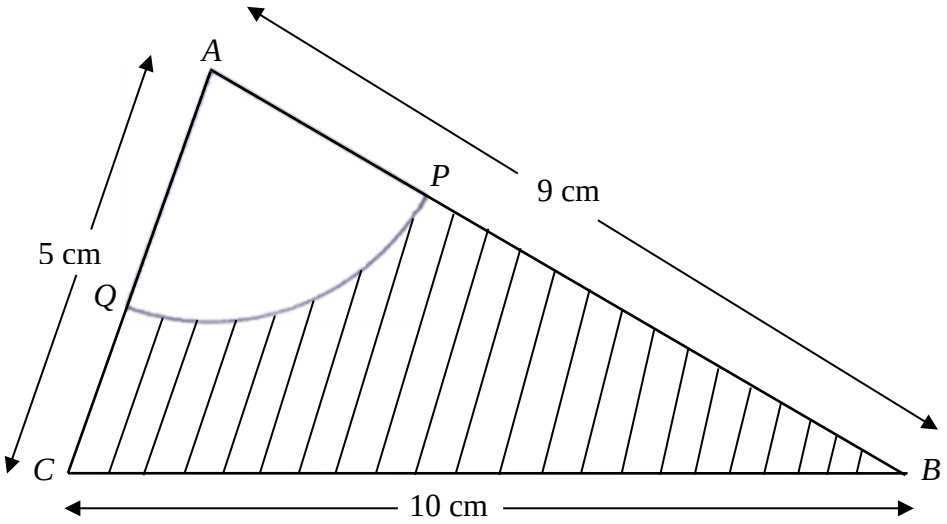


a) Find, in surd form, the length AB. [2]

b) Find, in terms of π, the area of the badge. [2]

c) Prove that the perimeter of the badge is $\frac{2\sqrt{3}}{3}(\pi + 6)$ cm. [3]

6)



Triangle ABC has AB = 9 cm, BC 10 cm and CA = 5 cm.
A circle, centre A and radius 3 cm, intersects AB and AC at P and Q respectively

a) Show that, to 3 decimal places, $\angle BAC = 1.504$ radians. [3]

b) Calculate the area, in cm^2, of the sector APQ, [2]

c) Calculate the area, in cm^2, of the shaded region $BPQC$, [3]

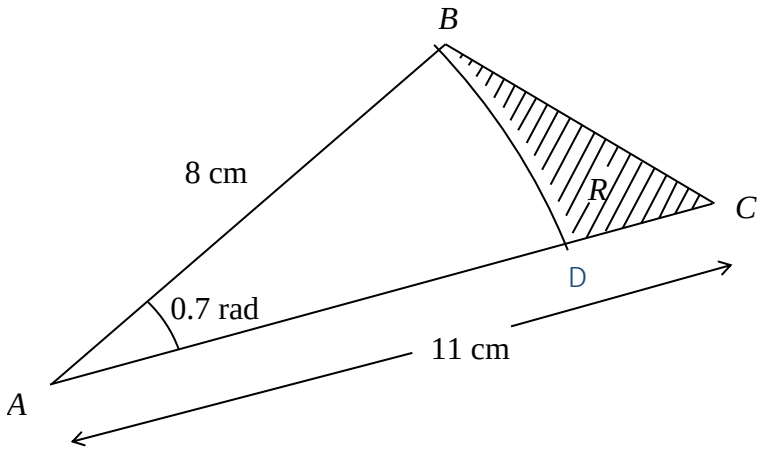
d) Calculate the perimeter, in cm, of the shaded region $BPQC$ [4]

7)

The diagram 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*.



a) Find the length of the arc *BD*, [2]

b) Find the perimeter of *R*, giving your answer to 3 significant figures, [4]

c) Find the area of *R*, giving your answer to 3 significant figures. [5]

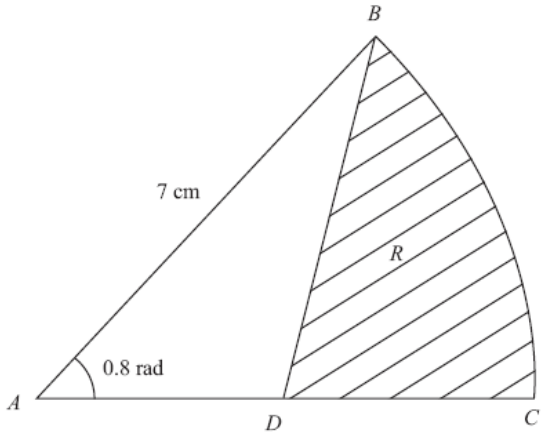
Green

8) a) Sketch, for $0 \leq x \leq 2\pi$ the graph of $y = sin\left(x + \frac{\pi}{6}\right)$ [2]

b) Write down the coordinates of the points at which the graph meets the axes [3]

c) Solve, for $0 \leq x \leq 2\pi$ the equation $sin\left(x + \frac{\pi}{6}\right) = -\frac{1}{2}$ [3]

9)



The diagram shows ABC, a sector of a circle with centre A and radius 7 cm
Given that the size of ∠BAC is exactly 0.8 radians

a) Find the length of the arc BC, [2]

b) Find 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

c) Find the perimeter of R, giving your answer to 3 significant figures [4]

d) Find the area of R, giving your answer to 3 significant figures. [4]

10) Find, in degrees, the value of θ in the interval $0 \leq x \leq 2\pi$ for which

$$2\cos^2\theta - \cos\theta - 1 = \sin^2\theta$$

Give your answers to 1 decimal place where appropriate [6]

11) a) Show that the equation $2\sin x \tan x - 5 = \cos x$ can be written in the form $3\cos^2 x + 5\cos x - 2 = 0$ [3]

b) Hence solve the equation $2\sin x \tan x - 5 = \cos x$, giving all values of x in radians for $0 \leq x \leq 2\pi$ [4]

TOTAL 88 marks

A	B	C	D	E
80%	70%	60%	50%	40%

www:
EBI: (What you are going to do)