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2. $f(x) = 3 + 12x - 2x^2$

(a) Express $f(x)$ in the form

$$a - b(x + c)^2$$

where a, b and c are integers to be found.

(3)

The curve with equation $y = f(x) - 7$ crosses the x-axis at the points P and Q and crosses the y-axis at the point R.

(b) Find the area of the triangle PQR, giving your answer in the form $m\sqrt{n}$ where m and n are integers to be found.

(4)

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Question 2 continued

Q2

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3.

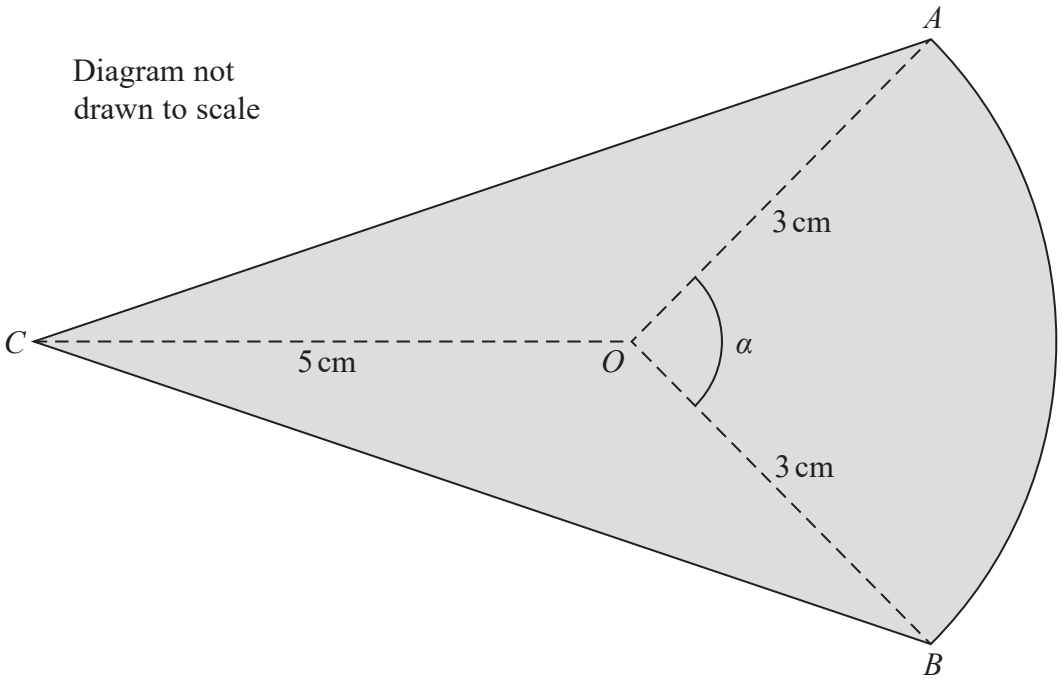


Figure 1

Figure 1 shows the design for a badge.

The design consists of two congruent triangles, AOC and BOC, joined to a sector AOB of a circle centre O.

- Angle $AOB = \alpha$
- $AO = OB = 3\,\text{cm}$
- $OC = 5\,\text{cm}$

Given that the area of sector AOB is $7.2\,\text{cm}^2$

(a) show that $\alpha = 1.6$ radians.

(2)

(b) Hence find

(i) the area of the badge, giving your answer in cm^2 to 2 significant figures,

(ii) the perimeter of the badge, giving your answer in cm to one decimal place.

(8)

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