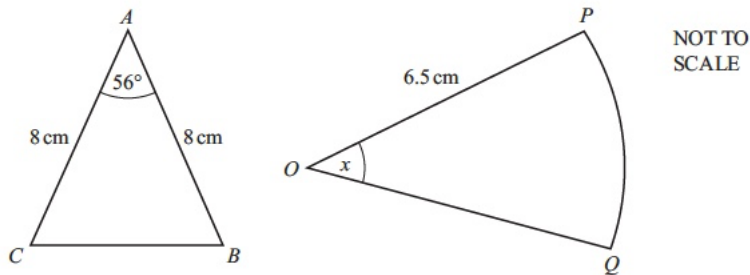


Problem 0580/43/O/N/14/Q7



The diagram shows a triangle and a sector of a circle.
 In triangle ABC , $AB = AC = 8$ cm and angle $BAC = 56^\circ$.
 Sector OPQ has centre O , sector angle x and radius 6.5 cm.

- (a) Show that the area of triangle ABC is 26.5 cm² correct to 1 decimal place.

Answer(a)

$$\frac{1}{2} \times 8 \times 8 \times \sin 56^\circ = 26.5$$

[2]

- (b) The area of sector OPQ is equal to the area of triangle ABC .

- (i) Calculate the sector angle x .

$$\pi \times 6.5^2 \times \frac{x}{360} = 26.5$$

$$x = \frac{26.5 \times 360}{6.5^2 \times \pi}$$

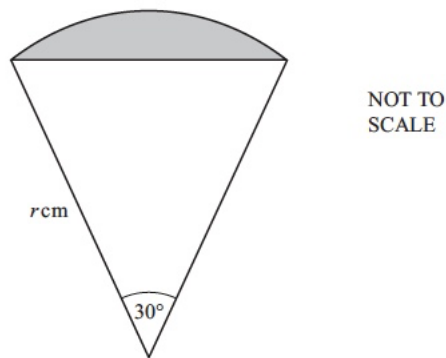
Answer(b)(i) 71.95 [3]

- (ii) Calculate the perimeter of the sector OPQ .

$$2 \times 6.5 + 2 \pi 6.5 \times \frac{71.95}{360}$$

Answer(b)(ii) 21.2 cm [3]

(c) The diagram shows a sector of a circle, radius r cm.



(i) Show that the area of the shaded segment is $\frac{1}{4}r^2\left(\frac{1}{3}\pi - 1\right)$ cm².

Answer(c)(i) Area of shaded segment
 = Area of sector - Area of Δ
 = $\pi r^2 \frac{30}{360} - \frac{1}{2} \times r \times r \times \sin 60$
 = $\frac{1}{12} \pi r^2 - \frac{1}{4} r^2 = \frac{1}{4} r^2 \left(\frac{1}{3} \pi - 1 \right)$

[4]

(ii) The area of the segment is 5 cm².

Find the value of r .

$$\frac{1}{4} r^2 \left(\frac{\pi}{3} - 1 \right) = 5$$

$$\frac{1}{4} r^2 \left(\frac{\pi - 3}{3} \right) = 20$$

$$r = \sqrt{\frac{3 \times 20}{\pi - 3}}$$

Answer(c)(ii) $r = \dots\dots\dots 20.6$ [3]

