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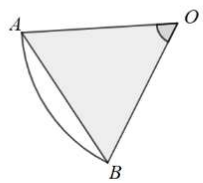
**A LEVEL MATHS**

# (26) Areas of Sectors and Segments (Radians)

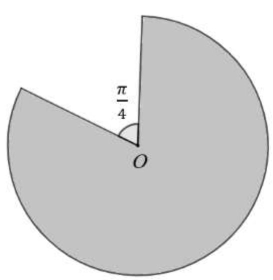
## WORKING AT D/E

(1) The diagram below shows a sector centre $O$ with radius $6cm$ and $< AOB = \frac{\pi}{3}$. A straight line $AB$ is drawn. $AB$ is also an arc of the sector.



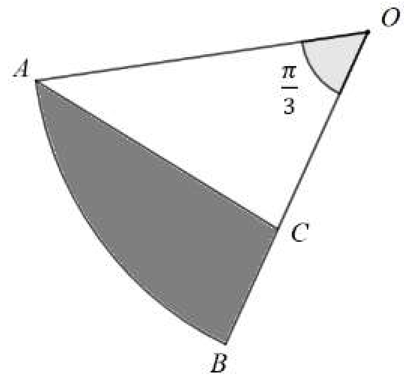

(a) Find the area of the entire sector in the form $a\pi$.
(b) Show that the area of the shaded triangle $AOB = 9\sqrt{3}\ cm^2$
(c) Hence, find the exact area of the unshaded segment shown on the diagram.

(2) The diagram below shows a major segment, centre $O$ with radius $4cm$. The angle shown is $\frac{\pi}{4}$.
Find the **exact value** of the shaded area.



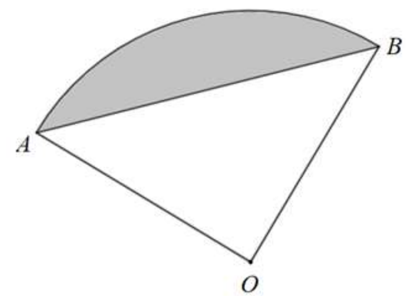

## WORKING AT B/C

(1) The diagram below shows sector with radius 8 and centre $O$ and $< AOB = \frac{\pi}{3}$




$AB$ is a minor arc of the sector and the lines $AC$ and $OB$ are perpendicular.
Show that the dark shaded area is $\frac{32\pi}{3} - 8\sqrt{3}$ .

(2) The diagram below shows a sector with centre $O$.



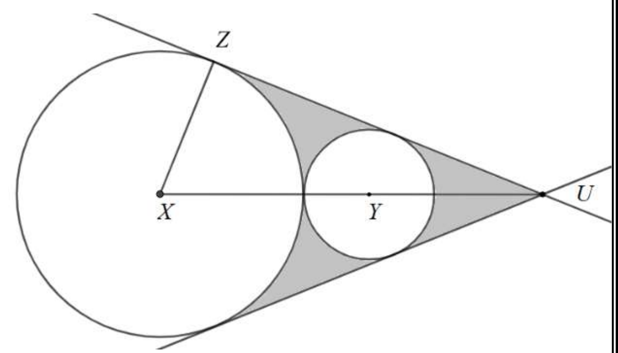

Given that the $< AOB = 1.4$ radians and the minor arc $AB$ has length $7cm$, find the area of the shaded segment to 1 decimal place.

(3) A minor sector has radius 4 and area 8. Find the perimeter of the shape.

## WORKING AT A*/A

(1) In $\Delta ABC$, $< BAC = \frac{\pi}{3}$, $BC = 13cm$ and $AB = 10\sqrt{2}cm$.
(a) Find the **least possible** size of the area of $\Delta ABC$.
The entirety of $\Delta ABC$ lies inside a circle where $AB$ is a diameter of the circle.
(b) Explain why the point $C$ doesn't lie on the circle.
(c) What proportion of the circle does the triangle occupy?

(2) The diagram below shows two touching circles with centres $X$ and $Y$. The circles touch a shared tangents that meet at the point $U$. The line $XZ$ is a radius of the larger circle




Given $< ZUX = \frac{\pi}{6}$ , $XZ = \sqrt{3}$ and the radius of the smaller circle is $r$, show that the total shaded area can be written as $3\sqrt{3} - \pi(1 + r^2)$.

(3) The area of a quarter circle is $(\pi - 2)cm^2$ and radius $x^{0.5}$. Find the value of $x$ in the form $p + \frac{q}{\pi}$