

Name: _____

GCSE (1 – 9)

Sector Area and Arc Length

Instructions

- Use **black** ink or ball-point pen.
- Answer all Questions.
- Answer the Questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

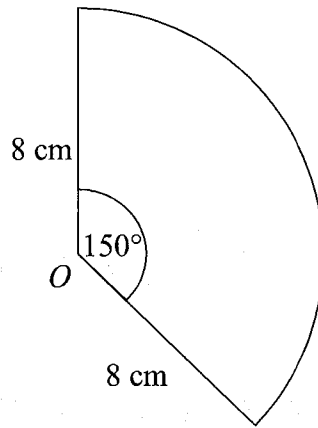
Information

- The marks for each Question are shown in brackets
– *use this as a guide as to how much time to spend on each Question.*

Advice

- Read each Question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every Question.
- Check your answers if you have time at the end

- 1 The diagram shows a sector, centre O .
The radius of the circle is 8 cm.
The angle of the sector is 150° .



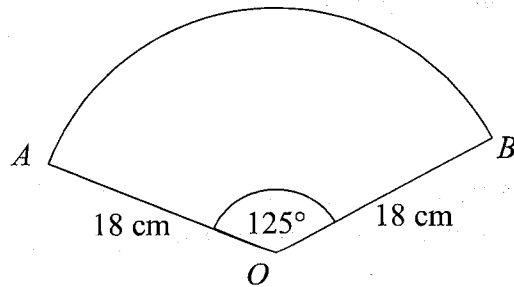
Calculate the area of the sector.
Give your answer correct to 3 significant figures.

$$\frac{150}{360} \times \pi (8)^2 = 83.8$$

83.8 cm²

(Total for Question 1 is 2 marks)

- 2 AOB is a sector of a circle, centre O and radius 18 cm.
The angle of the sector is 125° .



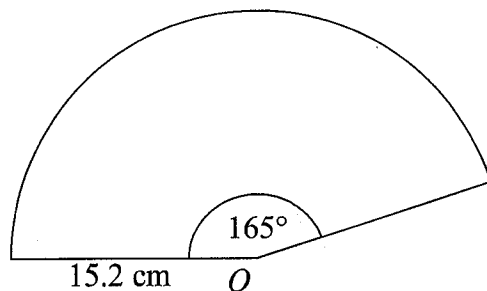
Calculate the length of the arc AB .
Give your answer in terms of π .

$$\frac{125}{360} \times 2\pi (18) = \frac{25}{2} \pi$$

$\frac{25}{2} \pi$ cm

(Total for Question 2 is 2 marks)

- 3 The diagram shows a sector, centre O .
The radius of the circle is 15.2 cm.
The angle of the sector is 165° .



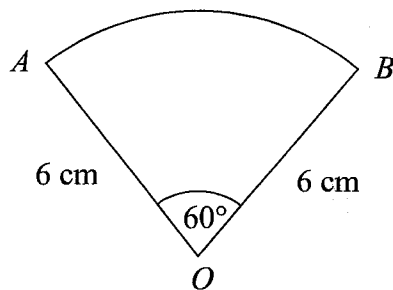
Calculate the area of the sector.
Give your answer correct to 3 significant figures.

$$\frac{165}{360} \times \pi (15.2)^2 = 333 \text{ cm}^2$$

333 cm²

(Total for Question 3 is 3 marks)

- 4 AOB is a sector of a circle, centre O and radius 6 cm.
The angle of the sector is 60° .



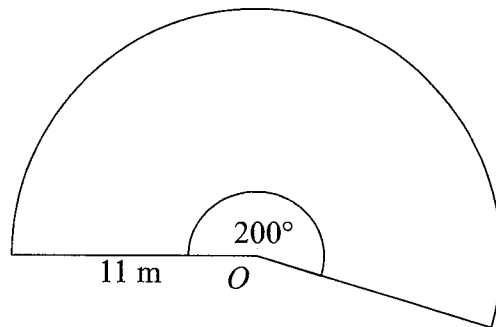
Find the length of the arc AB .
Give your answer in terms of π .

$$\frac{60}{360} \times 2\pi(6) = 2\pi$$

2π cm

(Total for Question 4 is 2 marks)

- 5 The diagram shows a sector, centre O .
The radius of the circle is 11 m.
The angle of the sector is 200° .



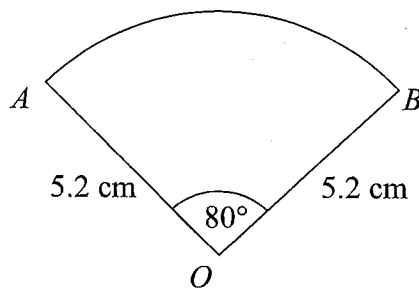
Calculate the area of the sector.
Give your answer correct to 3 significant figures.

$$\frac{200}{360} \times \pi (11)^2 = 211 \text{ m}^2$$

..... 211 m²

(Total for Question 5 is 2 marks)

- 6 AOB is a sector of a circle, centre O and radius 5.2 cm.
The angle of the sector is 80° .



Find the **perimeter** of the sector.
Give your answer correct to 3 significant figures.

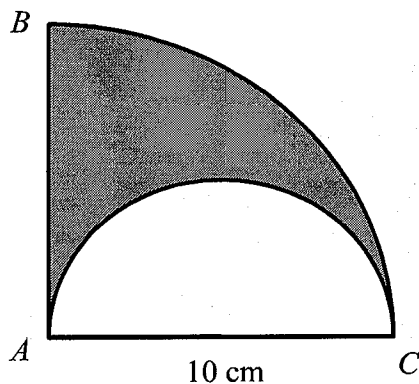
$$\begin{aligned} \text{Arc length} &= \frac{80}{360} \times 2\pi(5.2) \\ &= 7.3 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 5.2 + 5.2 + 7.3 \\ &= 17.7 \text{ cm} \end{aligned}$$

..... 17.7 cm

(Total for Question 6 is 3 marks)

- 7 BAC is a sector of a circle, centre A .
 AC is the diameter of a semi circle.
 AC is 10 cm.



Find the area of the shaded region.
Give your answer in terms of π .

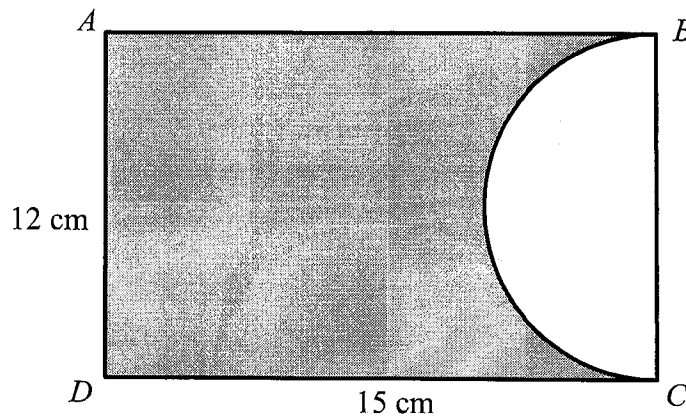
$$\begin{aligned}\text{Area of } \triangle &= \frac{1}{4} \pi (10)^2 \\ &= 25\pi\end{aligned}$$

$$\begin{aligned}\text{Area of } \text{semi-circle} &= \frac{1}{2} \pi (5)^2 \\ &= 12.5\pi\end{aligned}$$

$$\begin{aligned}\text{Shaded area} &= 25\pi - 12.5\pi \\ &= 12.5\pi\end{aligned}$$

12.5\pi cm²
(Total for Question 7 is 4 marks)

- 8 The diagram shows a rectangle, $ABCD$, and a semi circle.
 BC is the diameter of a semi circle.



Calculate the percentage of the area of the rectangle that is shaded.
 Give your answer correct to 1 decimal place.

$$\begin{aligned} \text{Area of rectangle} &= 12 \times 15 \\ &= 180 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of semi circle} &= \frac{1}{2} \pi (6)^2 \\ &= 18\pi \text{ cm}^2 \end{aligned}$$

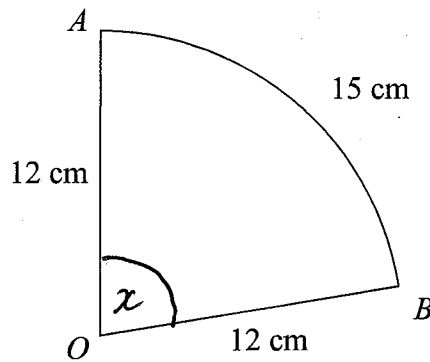
$$\begin{aligned} \text{Shaded area} &= 180 - 18\pi \\ &= 123.45 \text{ cm}^2 \end{aligned}$$

$$\frac{123.45}{180} \times 100 = \underline{\underline{68.6\%}} \quad \underline{\underline{68.6}} \%$$

(Total for Question 1 is 8 marks)

9

AOB is a sector of a circle, centre O and radius 12 cm.
The length of arc AB is 15 cm.



Find the area of the sector.

~~Give your answer correct to 3 significant figures~~

$$\text{Arc length} = \frac{x}{360} \times 2\pi r$$

$$15 = \frac{x}{360} \times 2\pi (12)$$

$$5400 = x \times 24\pi$$

$$x = \frac{5400}{24\pi}$$

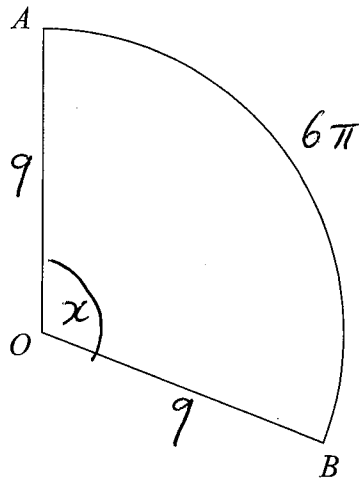
$$= 71.6^\circ$$

$$\frac{71.6}{360} \times \pi (12)^2 = 90$$

90 cm²

(Total for Question 9 is 4 marks)

- 10 AOB is a sector of a circle, centre O and radius 9 cm.
The length of arc AB is 6π cm.



Find the area of the sector.
Give your answer in terms of π .

$$\frac{x}{360} \times 2\pi(9) = 6\pi$$

$$\frac{18x}{360} = 6$$

$$x = \frac{6 \times 360}{18}$$

$$= 120^\circ$$

$$\text{Area} = \frac{120}{360} \times \pi(9)^2$$

$$= \underline{\underline{27\pi}} \text{ cm}^2$$

$$\underline{\underline{27\pi}} \text{ cm}^2$$

(Total for Question 10 is 4 marks)