

Expressions & Formulae

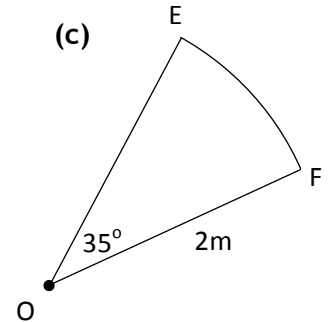
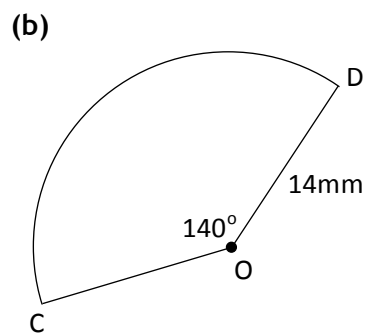
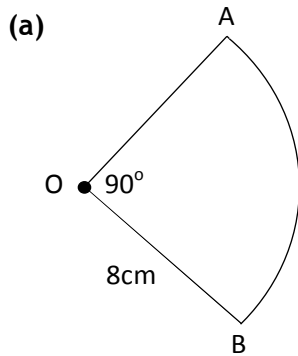
1.4:

Calculate the length of an arc or the area of a sector of a circle

1.4:

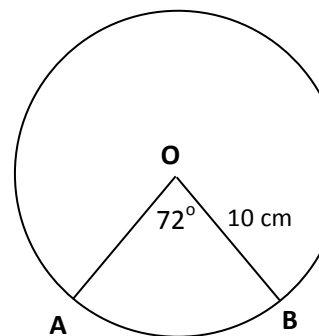
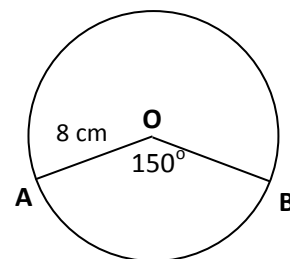
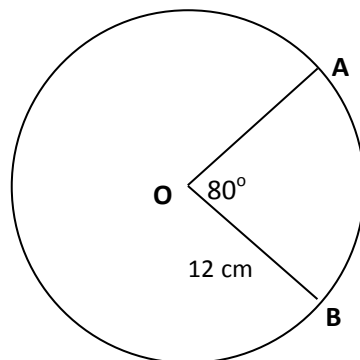
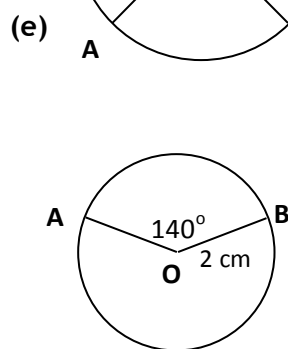
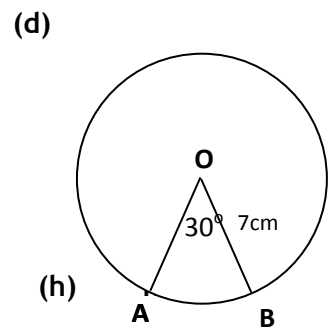
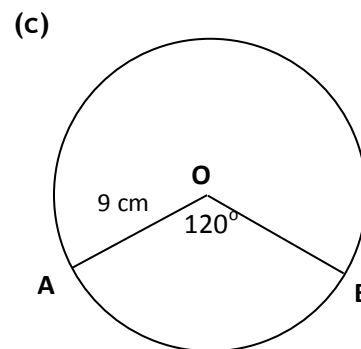
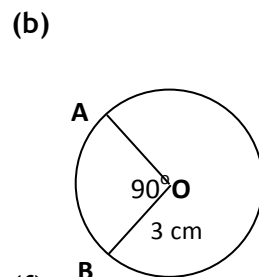
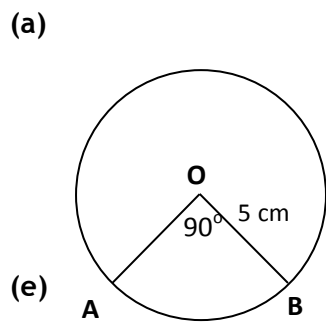
Exercise 1: The Length of an Arc

1. Calculate the length of the arc in each diagram below, giving your answer correct to 1 d.p.



2. Calculate the perimeter of each sector in Question 1. Giving your answers correct to 1 d.p.

3. Find the length of the minor arc AB in each of the following circles, giving your answers correct to 1 d.p.

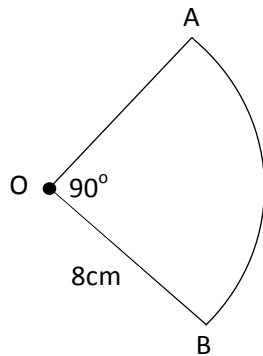


4. Calculate the length of the major arc in the circles shown in Question 3, giving your answers correct to 1 d.p.

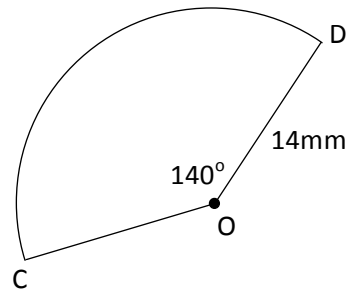
Exercise 2: The Area of a Sector

1. Calculate the area of the sector in each diagram below, giving your answer correct to 3 significant figures

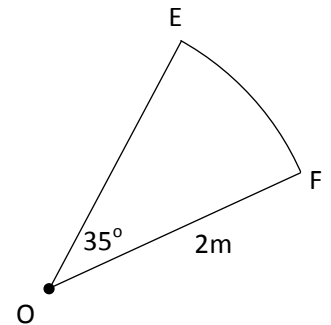
(a)



(b)

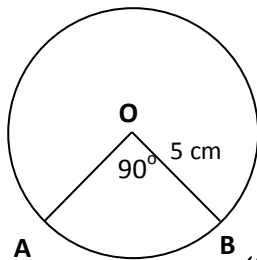


(c)

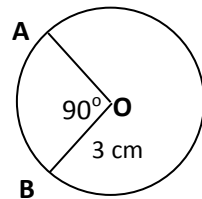


2. Calculate the area of minor sector OAB in the circles shown below, giving your answers correct to 3 significant figures.

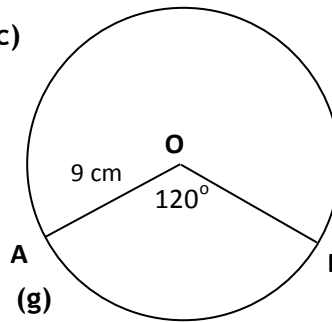
(a)



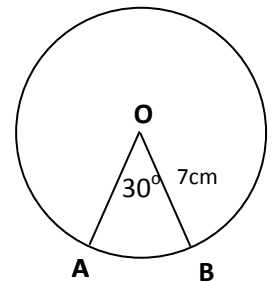
(b)



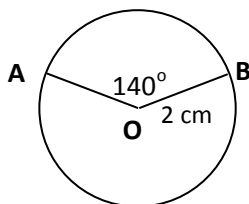
(c)



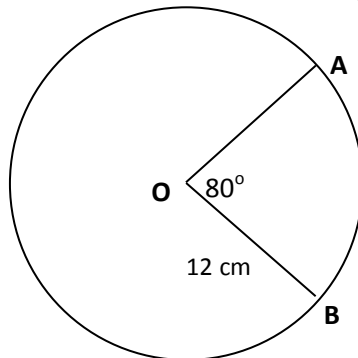
(d)



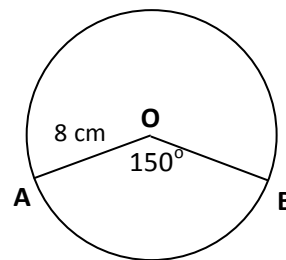
(e)



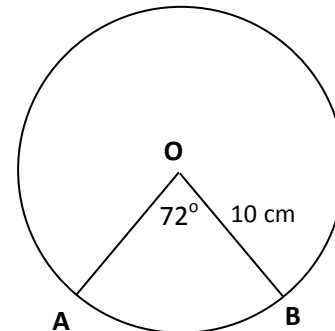
(f)



(g)



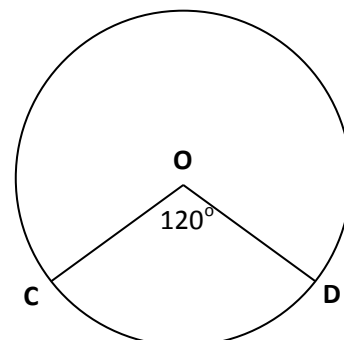
(h)



3. Calculate the area of the major sector for the circles in Question 2, giving your answers correct to 3 significant figures.

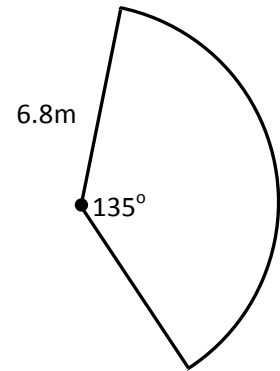
4. The length of minor arc CD is 7.33 cm.

Calculate the area of the circle.



Exercise 3: Problem Solving with Arcs and Sectors

1. Calculate the area of the sector shown in the diagram, given that it has radius 6.8cm.

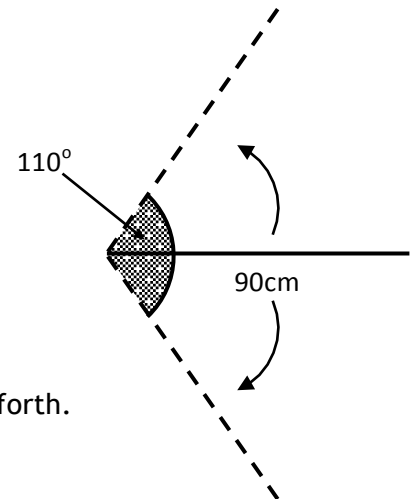


2. A table is in the shape of a sector of a circle with radius 1.6m. Calculate the perimeter of the table, given that the angle at the centre is 130°
3. The door into a restaurant kitchen swings backwards and forwards through 110° .



The width of the door is 90cm.

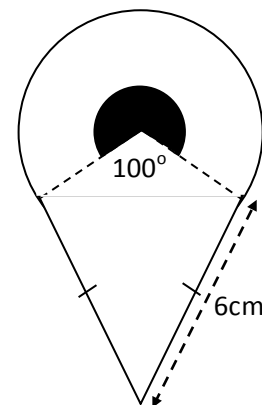
Calculate the area swept out by the door as it swings back and forth.



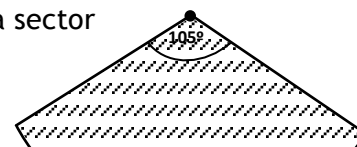
4. The YUMMY ICE CREAM Co uses a logo in the shape of an ice-cream cone. It is made up from an isosceles triangle and a sector of a circle as shown in the diagram.

- The equal sides of the triangle are 6cm
- The radius of the sector is 3.3cm.

Calculate the perimeter of the logo.



5. A sensor on a security system covers a horizontal area in the shape of a sector



of a circle of radius 3.5m.

The sensor detects movement in an area with an angle of 105° .

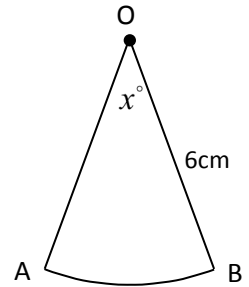
Calculate the area covered by the sensor.

6. A sector of a circle with radius 6cm is shown opposite.

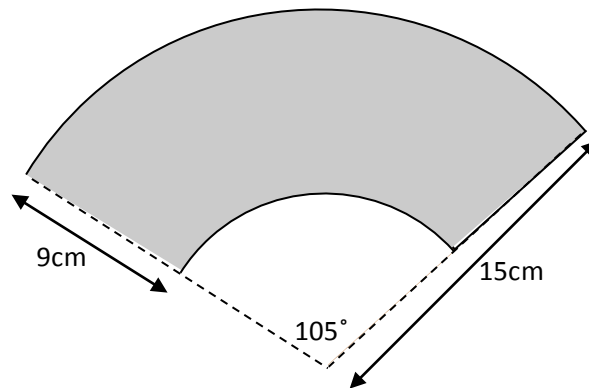
Angle $AOB = x^\circ$

If the exact area of the sector is 4π square centimetres,

calculate the size of the angle marked x .



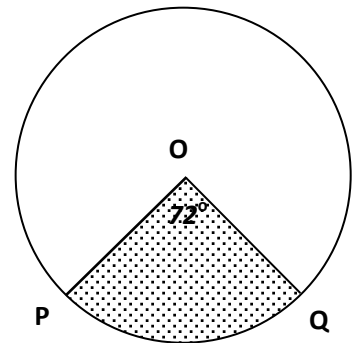
7. A hand fan is made of wooden slats with material on the outer edge.



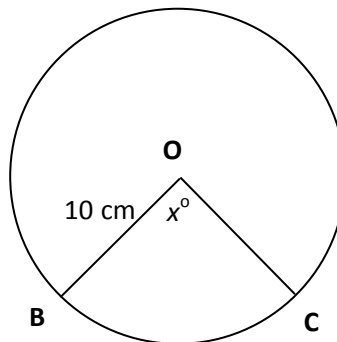
- (a) Calculate the area of material needed for the hand fan.
(b) Calculate the perimeter of the shaded area in the diagram above.

8. The area of the shaded sector OPQ is 5.024 cm^2 .

Calculate the area of the circle.



9. The area sector OBC is 78.5 cm^2 .
Calculate the size of angle x° .



ANSWERS

Exercise 1, Page 2

- | | | | | | | | | |
|----|-----|--------|-----|--------|-----|--------|-----|--------|
| 1. | (a) | 12·6cm | (b) | 34·2mm | (c) | 1·2m | | |
| 2. | (a) | 28·6cm | (b) | 62·2mm | (c) | 5·2m | | |
| 3. | (a) | 7·85cm | (b) | 4·7cm | (c) | 18·8cm | (d) | 3·7cm |
| | (e) | 4·9cm | (f) | 16·7cm | (g) | 20·9cm | (h) | 12·6cm |
| 4. | (a) | 23·6cm | (b) | 14·1cm | (c) | 37·7cm | (d) | 40·3cm |
| | (e) | 7·7cm | (f) | 58·6cm | (g) | 29·3cm | (h) | 50·2cm |

Exercise 2, Page 3

- | | | | | | | | | |
|----|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|
| 1. | (a) | 50·2cm ² | (b) | 239mm ² | (c) | 1·22m ² | | |
| 2. | (a) | 19·6cm ² | (b) | 7·07cm ² | (c) | 84·8cm ² | (d) | 12·8cm ² |
| | (e) | 4·88cm ² | (f) | 100cm ² | (g) | 83·7cm ² | (h) | 62·8cm ² |
| 3. | (a) | 58·9cm ² | (b) | 21·2cm ² | (c) | 170cm ² | (d) | 141cm ² |
| | (e) | 7·68cm ² | (f) | 352cm ² | (g) | 117cm ² | (h) | 251cm ² |
| 4. | | 12·8cm ² | | | | | | |

Exercise 3, Page 3

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|----|---------------------|----|------------------------|-----|---------------------|----|------|----|--|
| 1. | 54·4cm ² | 2. | 6·83m | 3. | 7770cm ² | 4. | 27cm | 5. | |
| | 11·2m ² | | | | | | | | |
| 6. | 40° | 7. | (a) 173cm ² | (b) | 56·5cm | | | | |
| 8. | 25·1cm ² | 9. | 90° | | | | | | |