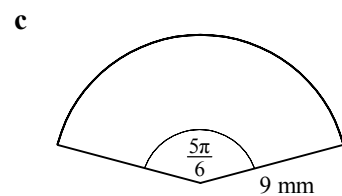
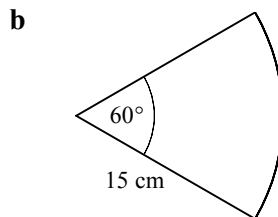
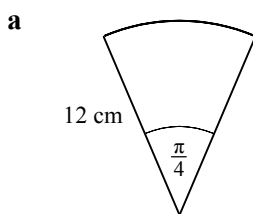
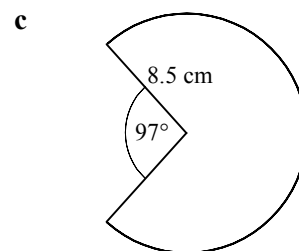
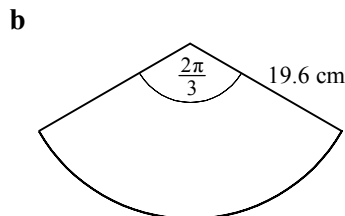
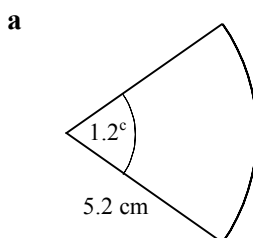


- 1 Convert each angle from degrees to radians, giving your answers in terms of π .
- a 180° b 30° c 45° d 720° e 18° f 120°
 g 15° h 40° i 270° j 7.5° k 144° l 220°
- 2 Convert each angle from degrees to radians, giving your answers to 2 decimal places.
- a 10° b 38° c 291° d 63.8° e 507° f 126.2°
- 3 Convert each angle from radians to degrees.
- a 2π b $\frac{\pi}{3}$ c $\frac{\pi}{2}$ d $\frac{3\pi}{4}$ e $\frac{\pi}{18}$ f $\frac{\pi}{30}$
 g $\frac{5\pi}{6}$ h $\frac{\pi}{8}$ i 3π j $\frac{2\pi}{15}$ k $\frac{7\pi}{3}$ l $\frac{9\pi}{20}$
- 4 Convert each angle from radians to degrees, giving your answers to 1 decimal place.
- a 2° b 0.5° c 3.1° d 1.43° e 8.7° f 0.742°

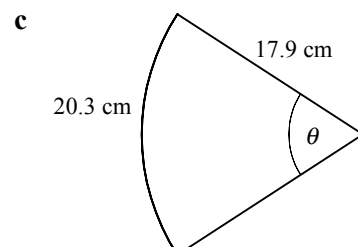
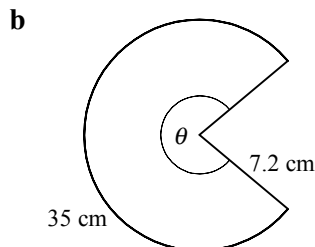
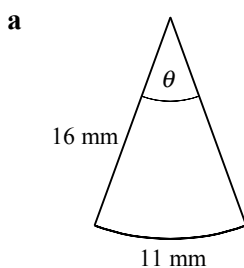
- 5 Find, in terms of π , the length of the arc in each of the following circular sectors.



- 6 Find, to 3 significant figures, the perimeter of each of the following circular sectors.



- 7 Find, in radians to 2 decimal places, the angle θ in each of the following circular sectors.



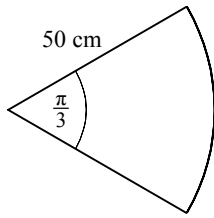
- 8 The minor arc AB of a circle, centre O , has length 46.2 cm.

Given that $\angle AOB = 78.5^\circ$, find

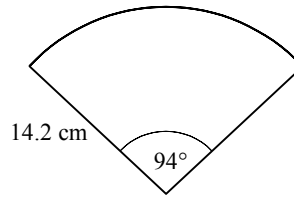
- a the distance OA , b the perimeter of sector OAB .

9 Find, in cm^2 to 1 decimal place, the area of each of the following circular sectors.

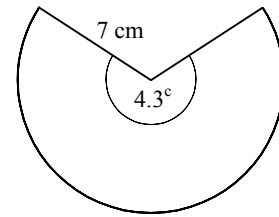
a



b



c

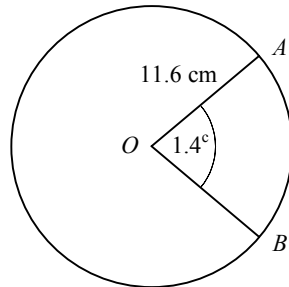


10 PQ is an arc of a circle of radius 8 cm, centre O .

Given that arc PQ has length 12 cm, find

- a the angle, in radians, subtended by PQ at O ,
- b the area of sector OPQ .

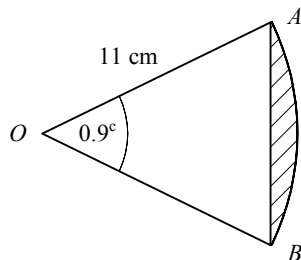
11



The diagram shows a circle of radius 11.6 cm, centre O . The arc of the circle AB subtends an angle of 1.4 radians at O . Find, to 3 significant figures,

- a the perimeter of the minor sector OAB ,
- b the perimeter of the major sector OAB ,
- c the area of the minor sector OAB ,
- d the area of the major sector OAB .

12

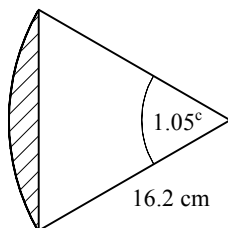


The diagram shows a circular sector OAB . Find the area of

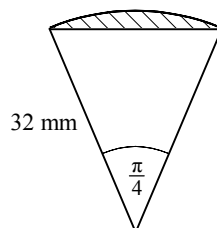
- a the sector OAB ,
- b the triangle OAB ,
- c the shaded segment.

13 Find the area of the shaded segment in each of the following circular sectors.

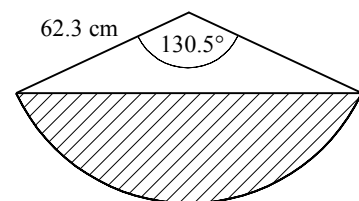
a



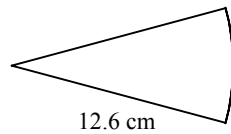
b



c

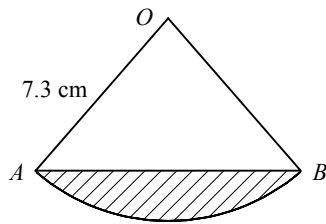


1



The diagram shows a sector of a circle of radius 12.6 cm.
Given that the perimeter of the sector is 31.7 cm, find its area.

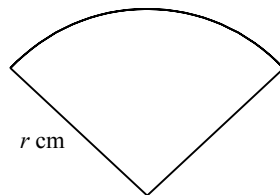
2



The diagram shows a sector OAB of a circle, centre O and radius 7.3 cm.
Given that the area of the sector is 38.4 cm^2 , find

- the size of $\angle AOB$ in radians,
- the perimeter of the shaded segment.

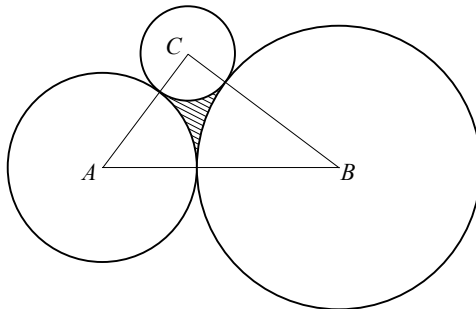
3



The diagram shows a sector of a circle of radius r cm. The area of the sector is 40 cm^2 .

- Show that the perimeter of the sector is $(2r + \frac{80}{r})$ cm.
- Hence find the set of values of r for which the perimeter of the sector is less than 26 cm.

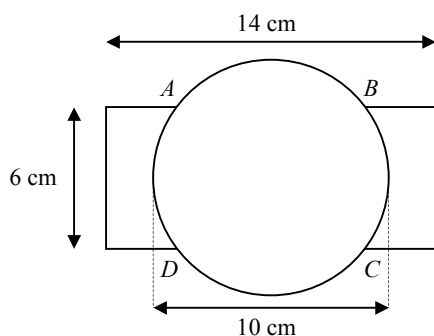
4



The diagram shows three circles with centres A , B and C , and radii 4 cm, 6 cm and 2 cm respectively. Each circle touches the other two circles.

- Prove that triangle ABC is a right-angled triangle.
- Find $\angle ABC$ in radians to 2 decimal places.
- Show that the area of the shaded region enclosed by the three circles is 1.86 cm^2 to 3 significant figures.

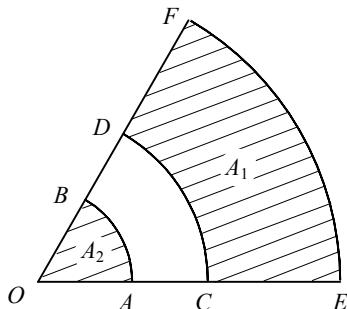
5



The diagram shows a company logo which consists of a circle of diameter 10 cm drawn on top of a rectangle measuring 6 cm by 14 cm. The centres of the circle and rectangle are coincident and the two shapes intersect at A , B , C and D .

- Find the length of the chord of the circle AB .
- Show that the perimeter of the logo is 42.5 cm to 3 significant figures.
- Find the area of the logo.

6



AB , CD and EF are arcs of concentric circles, centre O , such that $OACE$ and $OBDF$ are straight lines as shown in the diagram. The area of the shaded region $CEFD$ is denoted by A_1 and the area of the shaded sector OAB by A_2 .

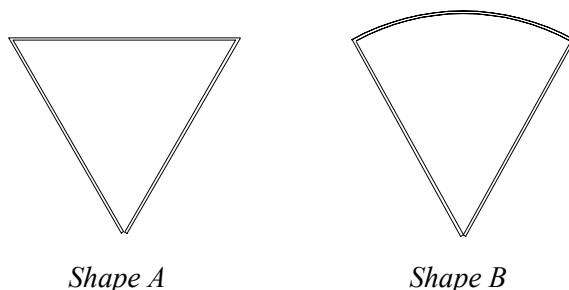
Given that $OA = r$ cm, $AC = 2$ cm, $OE = 8$ cm and $\angle AOB = \theta$ radians,

- find an expression for A_1 in terms of r and θ .

Given also that $A_1 = 7A_2$,

- show that $r = 2.5$

7



Shape A

Shape B

A girl is playing with a paper clip. She straightens the wire and then bends it to form an equilateral triangle, *Shape A* above. She then curves one side of the triangle to form a sector of a circle, *Shape B* above.

Find, to 1 decimal place, the percentage change in the area enclosed by the paper clip when it is changed from *Shape A* to *Shape B*, indicating whether this is an increase or decrease.