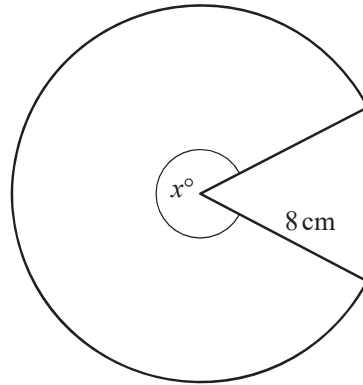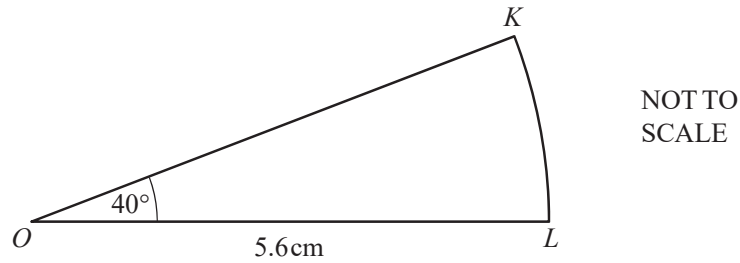# Circle Problems

Question Paper

NOT TO
SCALE

The diagram shows a sector of a circle of radius 8 cm.
The angle of the sector is $x°$.
The perimeter of the sector is $(16 + 14\pi)$ cm.

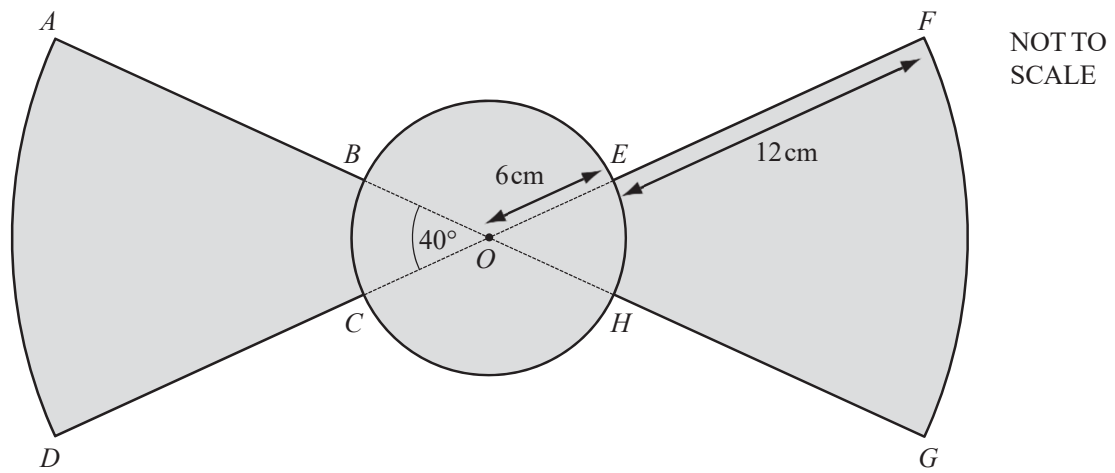Find the value of x.   [3]

K

NOT TO
SCALE

40°

O 5.6cm L

OKL is a sector of a circle, centre *O*, radius 5.6 cm.
Angle *KOL* = 40°.

Calculate

(a) the area of the sector,   [2]
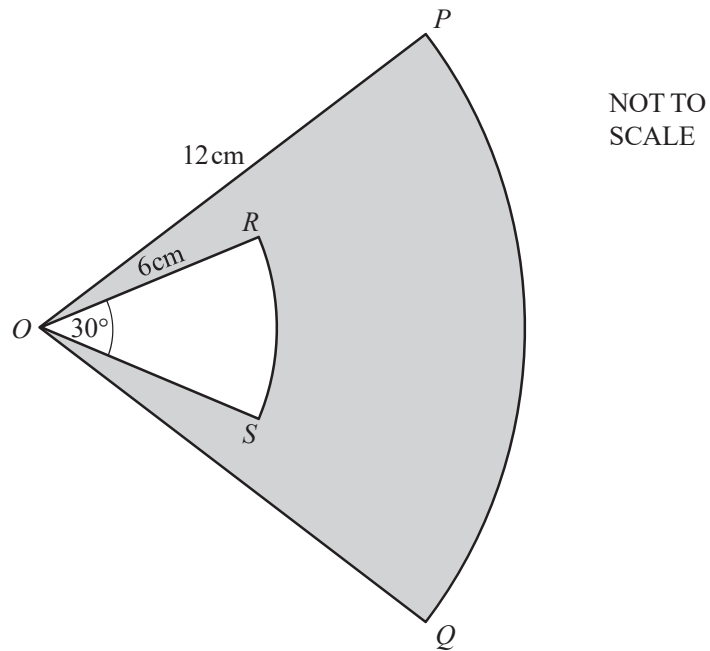
(b) the perimeter of the sector.   [2]

The diagram shows part of a fan.
OFG and *OAD* are sectors, centre *O*, with radius 18 cm and sector angle 40°.
B, *C*, *H* and *E* lie on a circle, centre *O* and radius 6 cm.
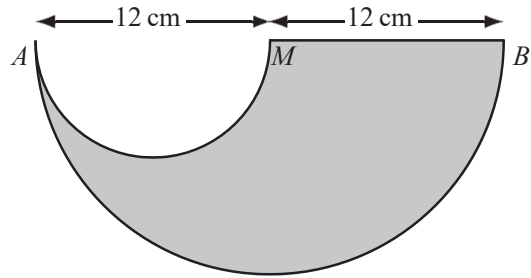Calculate the shaded area.   [4]

NOT TO SCALE

OPQ is a sector of a circle, radius 12 cm, centre *O*. Angle *POQ* = 50°.

ORS is a sector of a circle, radius 6 cm, also centre *O*. Angle *ROS* = 30°.

(a) Calculate the shaded area. [3]
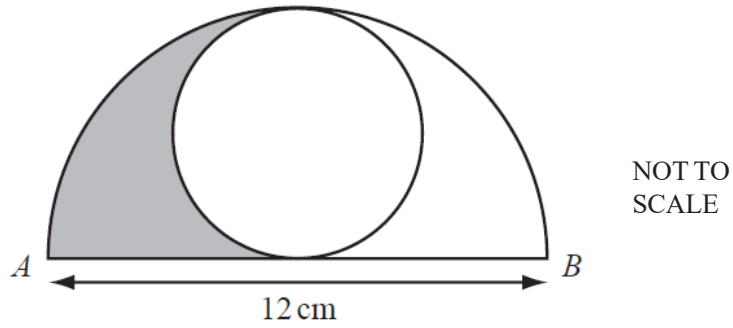
(b) Calculate the perimeter of the shaded area, *PORSOQP*. [3]

The shape above is made by removing a small semi-circle from a large semi-circle.

$AM = MB = 12$ cm

Calculate the area of the shape. [3]

NOT TO SCALE

The largest possible circle is drawn inside a semicircle, as shown in the diagram.
The distance *AB* is 12 centimetres.

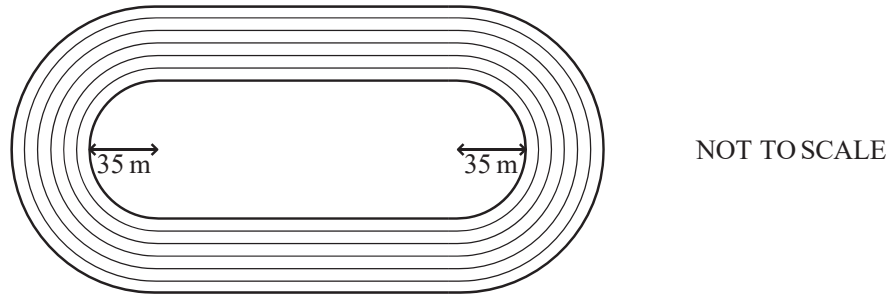(a) Find the shaded area.   [4]

(b) Find the perimeter of the shaded area.   [2]

NOT TO SCALE

The diagram shows an athletics track with six lanes.
The distance around the inside of the inner lane is 400 metres.
The radius of each semicircular section of the inside of the inner lane is 35 metres.

(a) Calculate the total length of the two straight sections at the inside of the inner lane. [3]

(b) Each lane is one metre wide.
Calculate the difference in the distances around the outside of the outer lane and the
inside of the inner lane. [2]
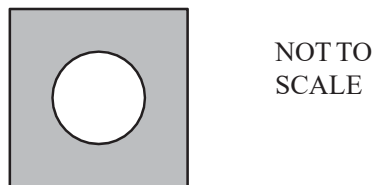
Question 8

8 cm

NOT TO
SCALE

6 cm

6 cm
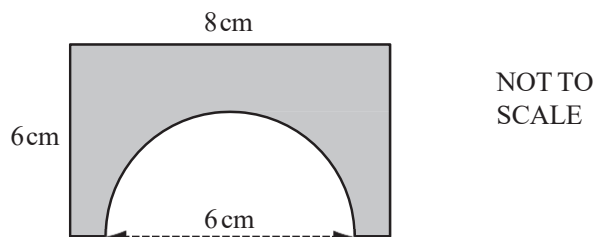
A semicircle of diameter 6 cm is cut from a rectangle with sides 6 cm and 8 cm.

Calculate the perimeter of the shaded shape, correct to 1 decimal place.
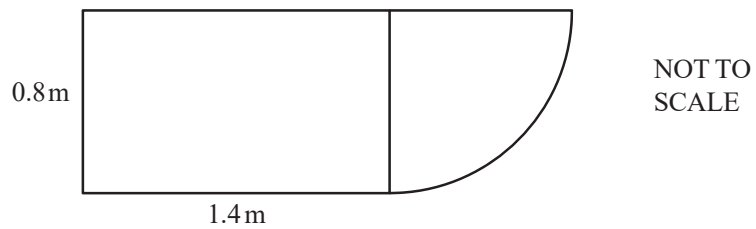
[3]

Question 9

NOT TO
SCALE

The diagram shows a circle of radius 5cm in a square of side 18cm.
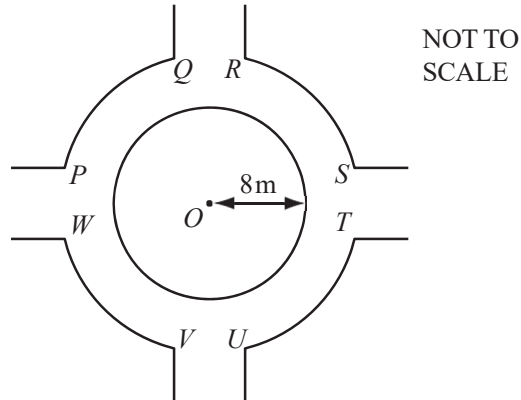
Calculate the shaded area.

[3]

Question 10

The top of a desk is made from a rectangle and a quarter circle.
The rectangle measures 0.8m by 1.4m.

Calculate the surface area of the top of the desk.   [3]

Question 11

The diagram shows the junction of four paths.
In the junction there is a circular area covered in grass.
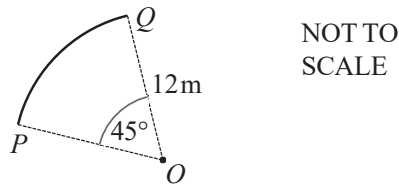This circle has centre O and radius 8 m.

(a) Calculate the area of grass. [2]

$$A = \pi r^2$$

$$= 64\pi$$

$$= 201$$

(b)

NOT TO SCALE

The arc PQ and the other three identical arcs, RS, TU and VW are each part of a circle, centre O, radius 12m.
The angle POQ is 45°.
The arcs PQ, RS, TU, VW and the circumference of the circle in part(a) are painted white. [4]
Calculate the total length painted white.

Question 12

A spacecraft made 58 376 orbits of the Earth and travelled a distance of 2.656×10^{9} kilometres.

(a) Calculate the distance travelled in 1 orbit correct to the nearest kilometre. [2]

(b) The orbit of the spacecraft is a circle.

Calculate the radius of the orbit. [2]

Question 12

Question 13

A large conference table is made from four rectangular sections and four corner sections.
Each rectangular section is 4 m long and 1.2 m wide.
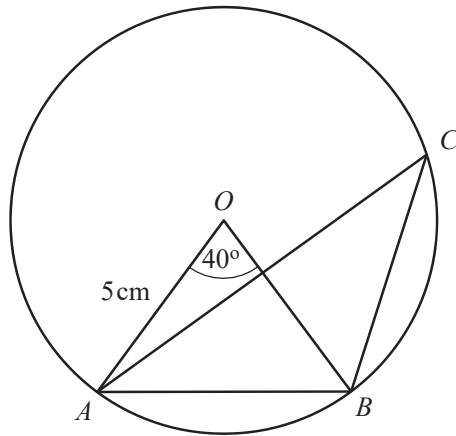Each corner section is a quarter circle, radius 1.2 m.
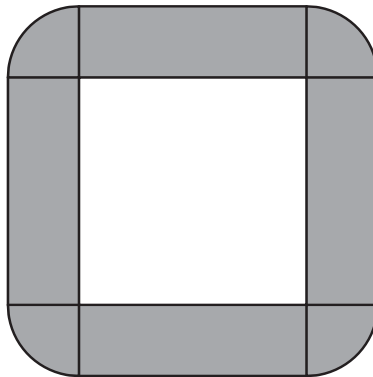
NOT TO
SCALE

Each person sitting at the conference table requires one metre of its outside perimeter.
Calculate the greatest number of people who can sit around the **outside** of the table.
Show all your working. [3]

Question 14

NOT TO SCALE

A, *B* and *C* are points on a circle, centre *O*.
Angle $AOB = 40°$.

(a) (i) Write down the size of angle *ACB*. [1]

(ii) Find the size of angle *OAB*. [1]

(b) The radius of the circle is 5 cm.

(i) Calculate the length of the minor arc *AB*. [2]

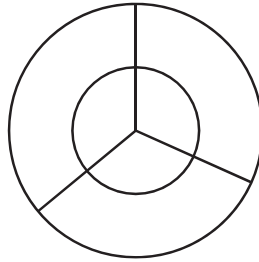(ii) Calculate the area of the minor sector *OAB*. [2]

Question 15

The radius of the Earth at the equator is approximately 6.4×10^6 metres.
Calculate the circumference of the Earth at the equator. Give your answer in standard form, correct to 2 significant figures. [3]

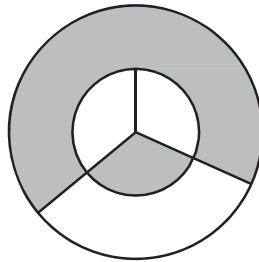NOT TO
SCALE

The diagram shows two concentric circles and three radii.
The diagram has rotational symmetry of order 3.

A club uses the diagram for its badge with some sections shaded.
The radius of the large circle is 6 cm and the radius of the small circle is 4 cm.

NOT TO
SCALE

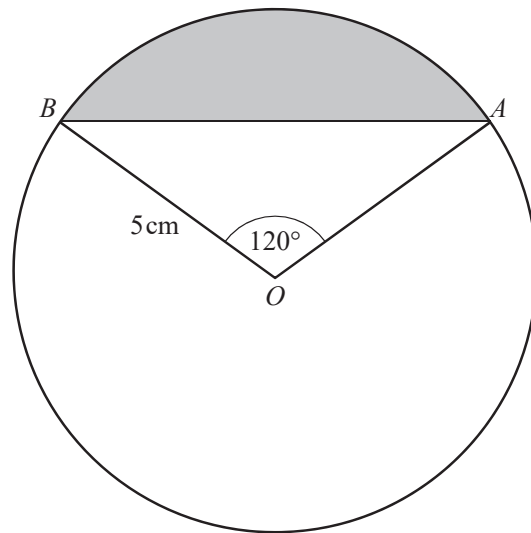Calculate the total perimeter of the shaded area. [5]

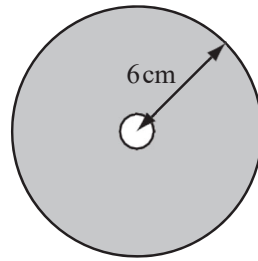Find the circumference of a circle of radius 2.5 cm.

[2]

Question 18

NOT TO
SCALE

A and *B* lie on a circle centre *O*, radius 5cm.
Angle *AOB* = 120°.

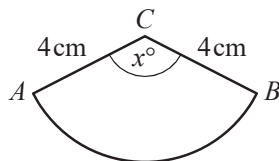Find the area of the shaded segment.

[4]

NOT TO
SCALE

6 cm

The diagram shows a circular disc with radius 6 cm.
In the centre of the disc there is a circular hole with radius 0.5 cm.

Calculate the area of the shaded section. [3]
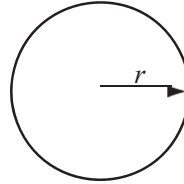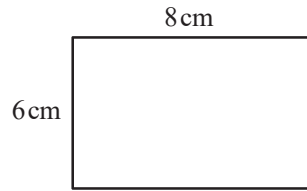
Question 20

C

4 cm   4 cm
       x°

A   *B*

NOT TO
SCALE

ABC is a sector of a circle, radius 4 cm and centre *C*.   [3]
The length of the arc *AB* is 8 cm and angle *ACB* = *x*°.

Calculate the value of *x* .

8 cm

6 cm

r

NOT TO
SCALE

The perimeter of the rectangle is the same length as the circumference of the circle.

Calculate the radius, r, of the circle. [3]

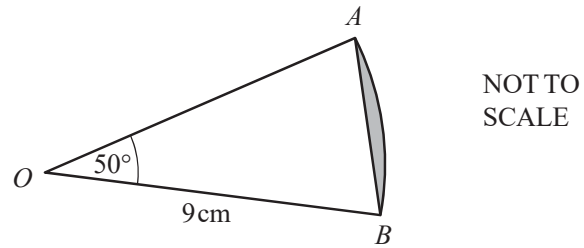**Question 22**

A circle has a radius of 50 cm.

(a) Calculate the area of the circle in cm^2. [2]
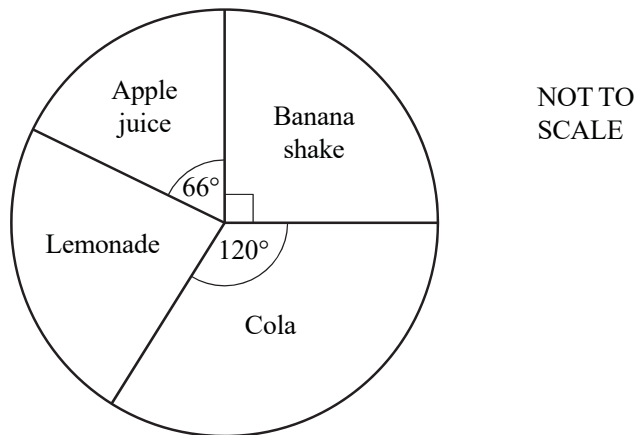
(b) Write your answer to part (a) in m^2. [1]

The diagram shows a sector AOB of a circle, centre O, radius 9 cm with angle $AOB = 50°$.

Calculate the area of the segment shaded in the diagram.   [4]

60 students recorded their favourite drink.
The results are shown in the pie chart.

NOT TO SCALE

(a) **Calculate** the angle for the sector labelled Lemonade. [1]

(b) Calculate the number of students who chose Banana shake. [1]

(c) The pie chart has a radius of 3 cm.
    Calculate the arc length of the sector representing Cola. [2]