Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 42

Arcs and sectors

Higher tier

Past paper question booklet

24	2003-2024	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

15.

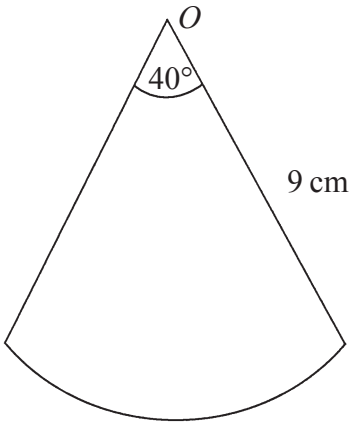


Diagram **NOT** accurately drawn

Leave blank

The diagram shows a sector of a circle, centre O.
The radius of the circle is 9 cm.
The angle at the centre of the circle is 40°.

Find the perimeter of the sector.
Leave your answer in terms of π.

.....cm

(4)

blank

18.

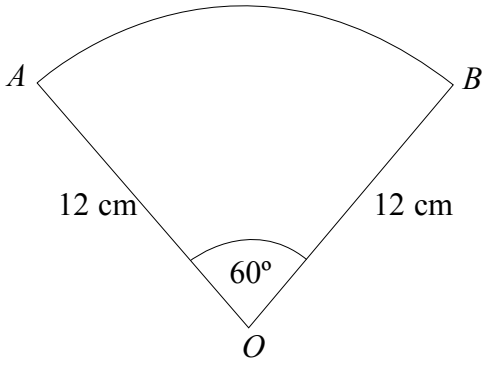


Diagram **NOT** accurately drawn

OAB is a sector of a circle, centre *O*.
Angle *AOB* = 60°.
OA = *OB* = 12 cm.

Work out the length of the arc *AB*.
Give your answer in terms of π.

..... cm

Q18

(Total 3 marks)

24.

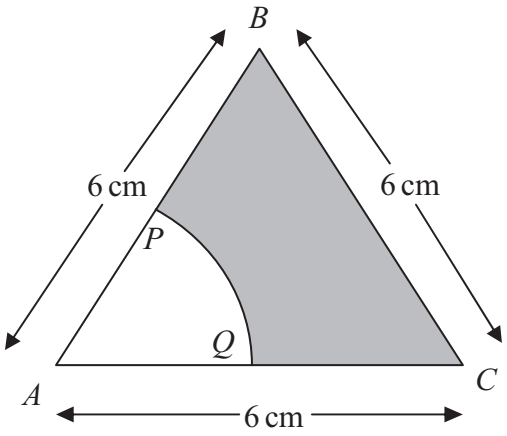


Diagram **NOT** accurately drawn

The diagram shows an equilateral triangle ABC with sides of length 6 cm.

P is the midpoint of AB.
Q is the midpoint of AC.
APQ is a sector of a circle, centre A.

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

..... cm^2

(Total 4 marks)

Q24

26. The diagram shows a sector of a circle with centre O.
The radius of the circle is 8 cm.

PRS is an arc of the circle.
PS is a chord of the circle.
Angle $POS = 40°$

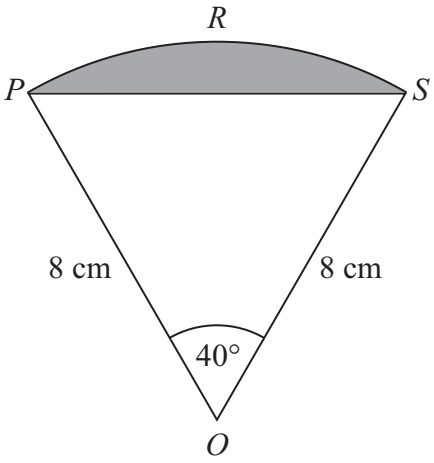


Diagram **NOT** accurately drawn

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

..... cm^2 **Q26**

(Total 5 marks)

19

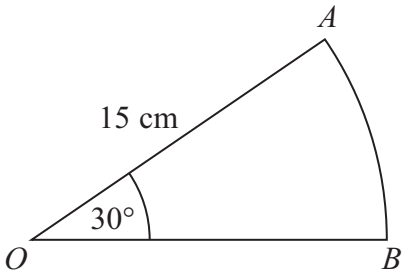


Diagram **NOT** accurately drawn

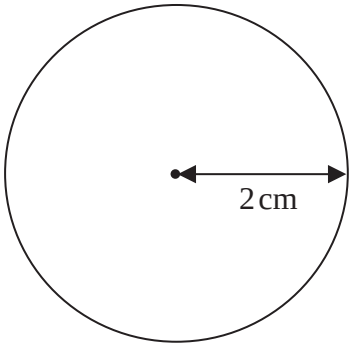
OAB is a sector of a circle, centre *O*.
The radius of the circle is 15 cm.
The angle of the sector is 30°.

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

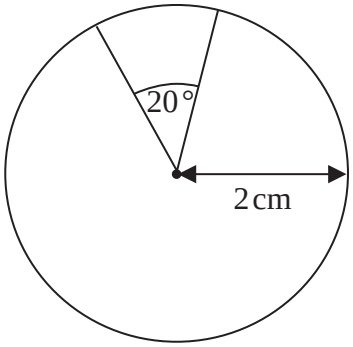
..... cm^2

(Total for Question 19 is 2 marks)

20 Here are two watch faces, **A** and **B**.



face **A**



face **B**

Diagram **NOT** accurately drawn

Both watch faces are circular with radius 2 cm.

The materials used to make both watch faces have the same thickness.

A is made entirely of plastic.
B has a 20° sector of metal and a 340° sector of plastic.

The ratio of the cost per cm^2 of the metal to the cost per cm^2 of the plastic is 3 : 2

Work out the ratio of the cost of the materials for **A** to the cost of the materials for **B**.
Give your answer in its simplest form.
You must show all your working.

.....

(Total for Question 20 is 4 marks)

15 The diagram shows a pond.

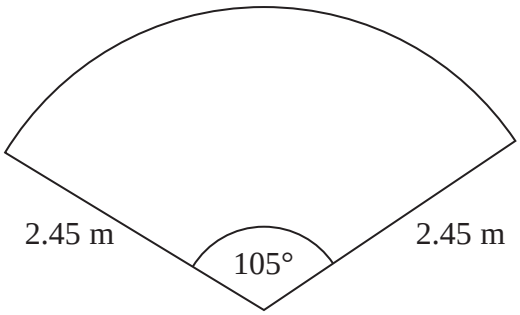


Diagram **NOT** accurately drawn

The pond is in the shape of a sector of a circle.

Toby is going to put edging on the perimeter of the pond.

Edging is sold in lengths of 1.75 metres.
Each length of edging costs £3.49

Work out the total cost of edging Toby needs to buy.

£ .....

(Total for Question 15 is 5 marks)

22

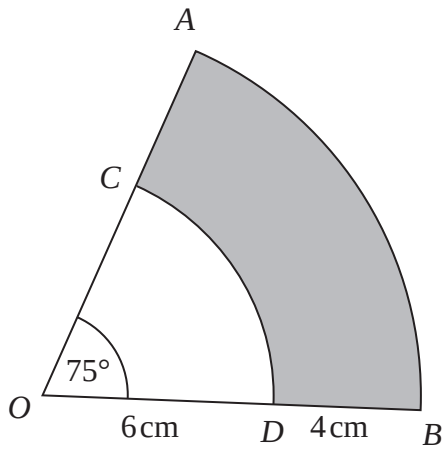


Diagram **NOT** accurately drawn

OAB is a sector of a circle, centre *O*.
OCD is a sector of a circle, centre *O*.
OCA and *ODB* are straight lines.

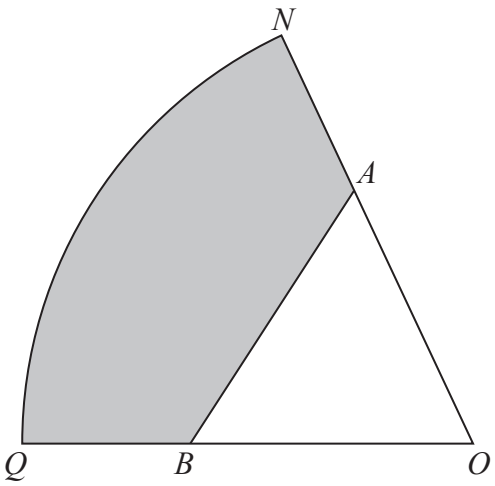
Angle *AOB* = 75°
OD = 6 cm
DB = 4 cm

Calculate the perimeter of the shaded region.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 22 is 3 marks)

17



ONQ is a sector of a circle with centre *O* and radius 11 cm.

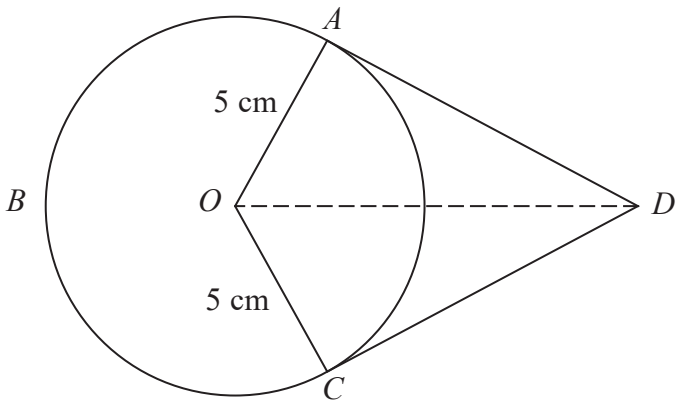
A is the point on *ON* and *B* is the point on *OQ* such that *AOB* is an equilateral triangle of side 7 cm.

Calculate the area of the shaded region as a percentage of the area of the sector *ONQ*.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 17 is 5 marks)

18



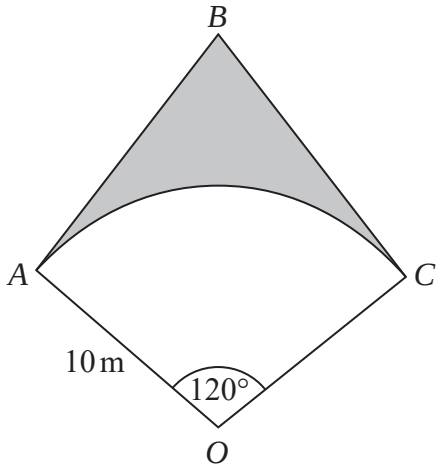
A, *B* and *C* are points on a circle of radius 5 cm, centre *O*.
DA and *DC* are tangents to the circle.
DO = 9 cm

Work out the length of arc *ABC*.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 18 is 5 marks)

20



OAC is a sector of a circle, centre *O*, radius 10 m.

BA is the tangent to the circle at point *A*.
BC is the tangent to the circle at point *C*.

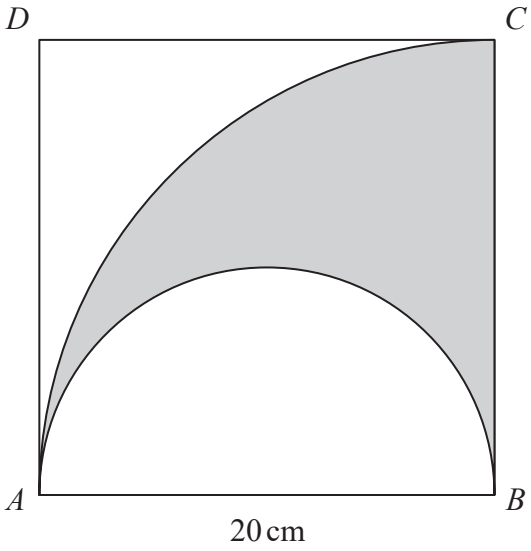
Angle *AOC* = 120°

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

..... m^2

(Total for Question 20 is 5 marks)

7 The diagram shows a square $ABCD$ with sides of length 20 cm.
It also shows a semicircle and an arc of a circle.

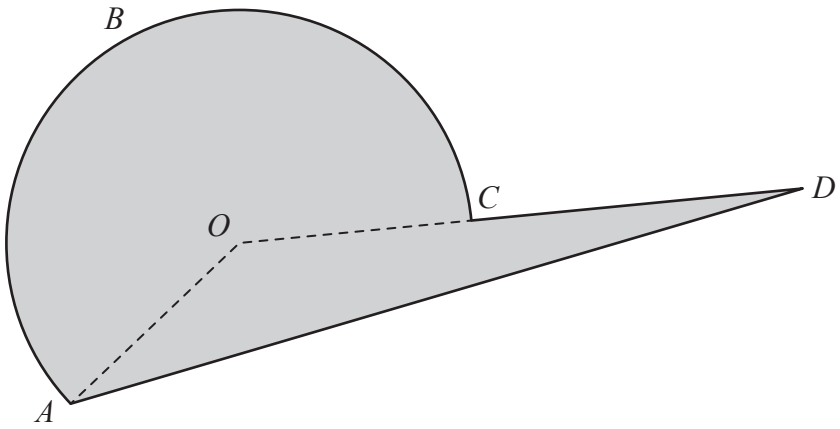


AB is the diameter of the semicircle.
AC is an arc of a circle with centre B.

Show that $\dfrac{\text{area of shaded region}}{\text{area of square}} = \dfrac{\pi}{8}$

(Total for Question 7 is 4 marks)

16 Here is a shaded shape $ABCD$.



The shape is made from a triangle and a sector of a circle, centre O and radius 6 cm.
OCD is a straight line.

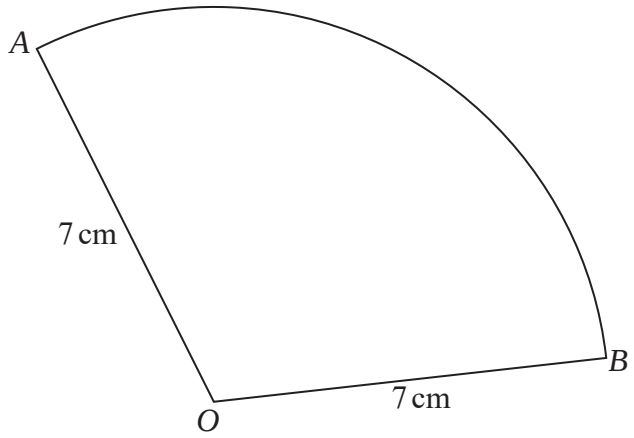
$AD = 14$ cm
Angle $AOD = 140°$
Angle $OAD = 24°$

Calculate the perimeter of the shape.
Give your answer correct to 3 significant figures.

.....cm

(Total for Question 16 is 5 marks)

12 OAB is a sector of a circle with centre O and radius 7 cm.



The area of the sector is 40 cm^2

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

..... cm

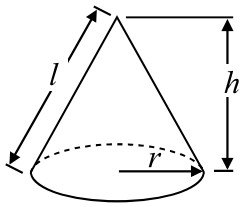
(Total for Question 12 is 4 marks)

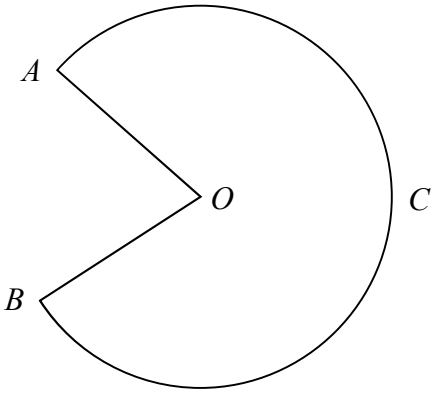
23 The diagram shows a sector $OACB$ of a circle with centre O.
The point C is the midpoint of the arc AB.

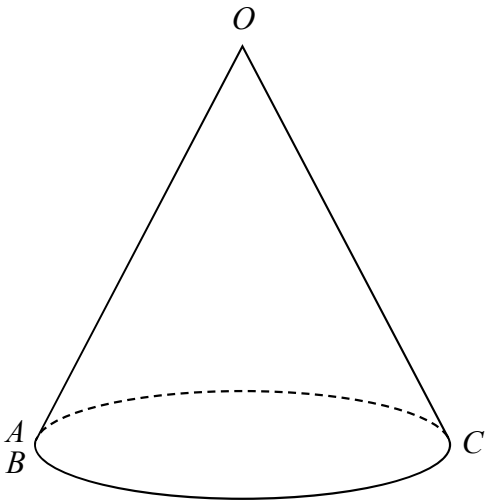
The diagram also shows a hollow cone with vertex O.
The cone is formed by joining OA and OB.

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi rl$







The cone has volume $56.8\,\text{cm}^3$ and height $3.6\,\text{cm}$.

Calculate the size of angle AOB of sector $OACB$.
Give your answer correct to 3 significant figures.
You must show all your working.

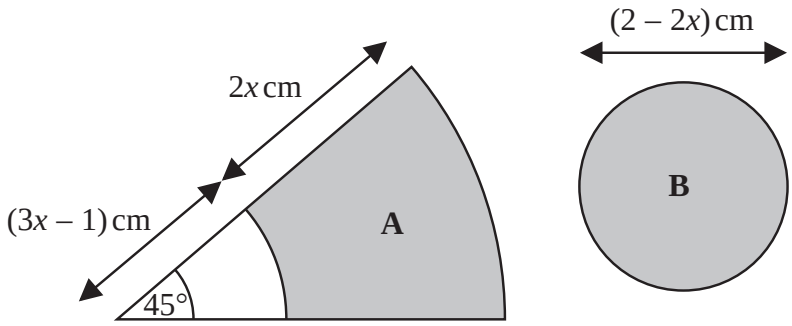
°

.....

(Total for Question 23 is 5 marks)

22 The diagram shows two shaded shapes, **A** and **B**.

Shape **A** is formed by removing a sector of a circle with radius $(3x - 1)$ cm from a sector of the circle with radius $(5x - 1)$ cm.
Shape **B** is a circle of diameter $(2 - 2x)$ cm.



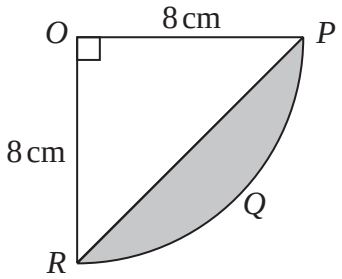
The area of shape **A** is equal to the area of shape **B**.

Find the value of x.
You must show all your working.

.....

(Total for Question 22 is 5 marks)

7 The diagram shows a sector $OPQR$ of a circle, centre O and radius 8 cm.



OPR is a triangle.

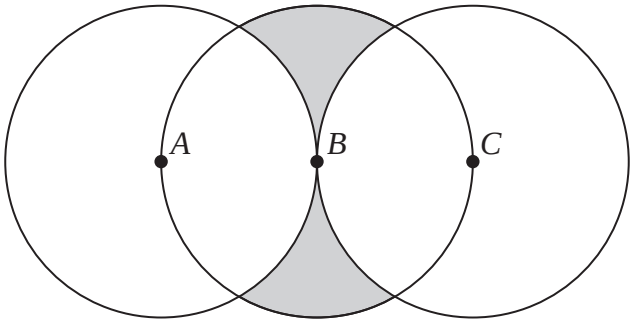
Work out the area of the shaded segment PQR.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 7 is 4 marks)

21 The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A, B and C such that ABC is a straight line and $AB = BC = 4$ cm.

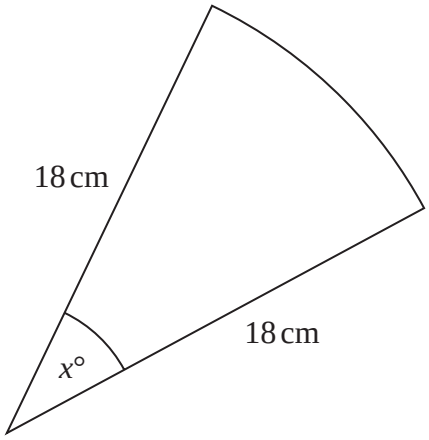


Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm^2

(Total for Question 21 is 5 marks)

15 The diagram shows a sector of a circle of radius 18 cm.



The length of the arc is 4π cm.

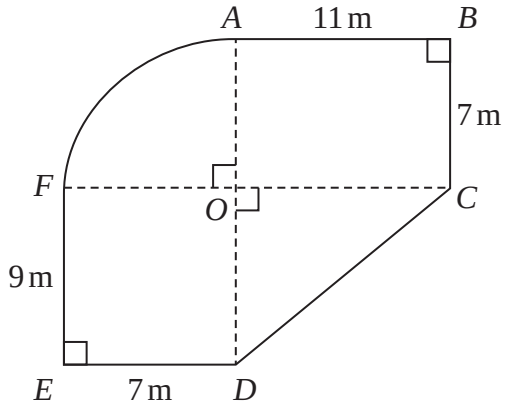
Work out the value of x.

$x =$ .....

(Total for Question 15 is 3 marks)

4 The diagram shows a plan of Jason's garden.

ABCO and *DEFO* are rectangles.
CDO is a right-angled triangle.
AFO is a sector of a circle with centre *O* and angle *AOF* = 90°



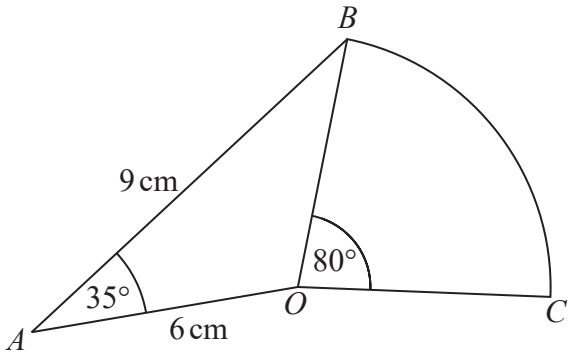
Jason is going to cover his garden with grass seed.
Each bag of grass seed covers 14 m^2 of garden.
Each bag of grass seed costs £10.95

Work out how much it will cost Jason to buy all the bags of grass seed he needs.

£.....

(Total for Question 4 is 5 marks)

14 *OAB* is a triangle.
OBC is a sector of a circle, centre *O*.

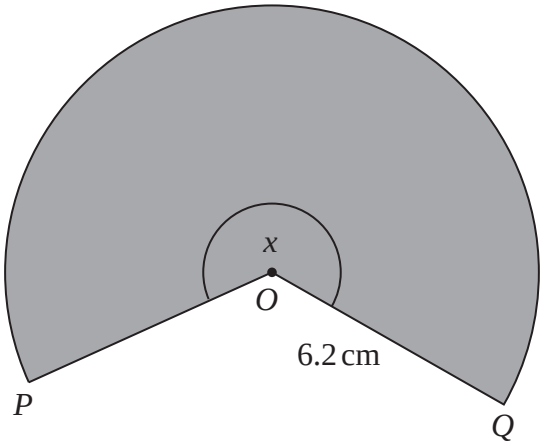


Calculate the area of *OBC*.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 14 is 4 marks)

12 The diagram shows a shaded sector POQ of a circle with centre O and radius 6.2 cm.



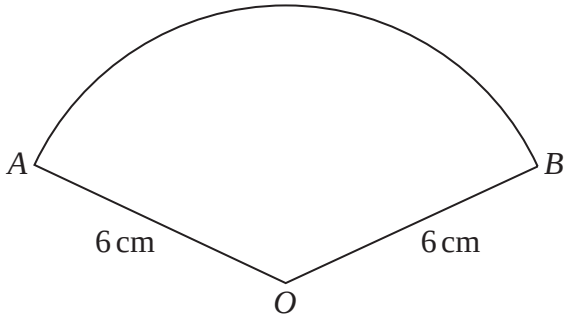
The area of the shaded sector is 82.6 cm^2

Calculate the size of angle x.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 12 is 2 marks)

15 OAB is a sector of a circle with centre O and radius 6 cm.



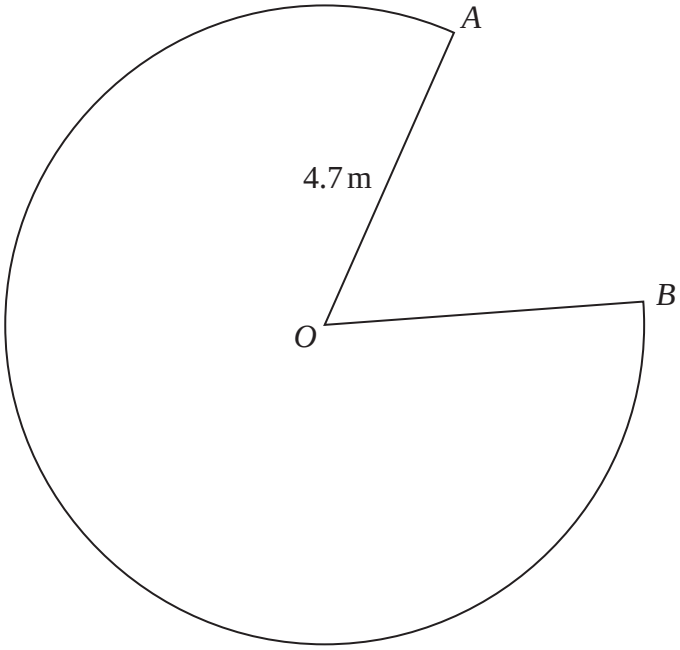
The length of the arc AB is 5π cm.

Work out, in terms of π, the area of the sector.
Give your answer in its simplest form.

..... cm^2

(Total for Question 15 is 4 marks)

11 *OAB* is a sector of a circle with centre *O* and radius 4.7 m.



The sector has a perimeter of 34.3 m.

Find the size of the reflex angle *AOB*.
Give your answer correct to the nearest degree.

.....°

(Total for Question 11 is 3 marks)