

# National 5 Maths

## Arcs and Sectors

SQA past paper and specimen paper  
questions and answers by topic

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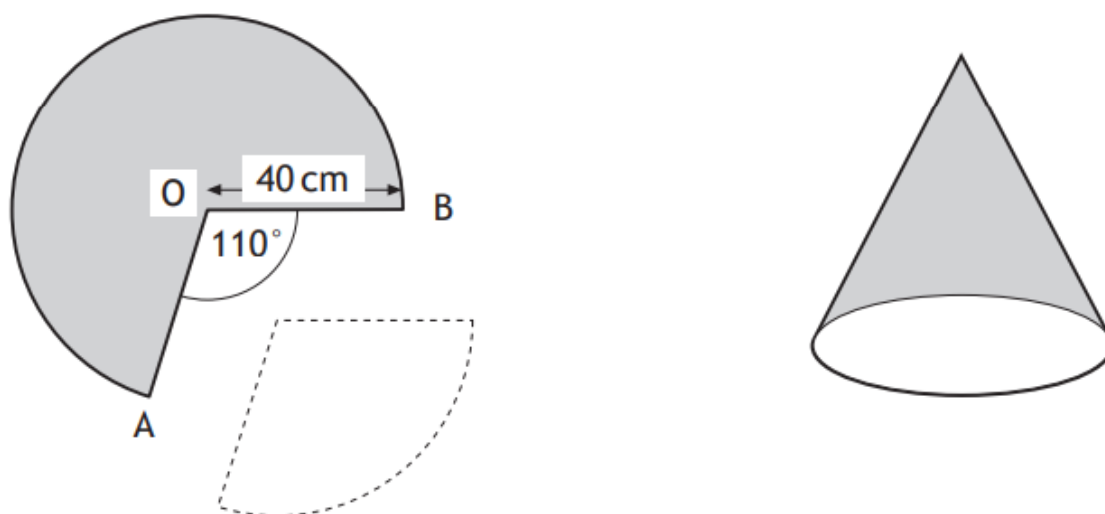
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A cone is formed from a paper circle with a sector removed as shown.  
The radius of the paper circle is 40 centimetres.  
Angle AOB is  $110^\circ$ .



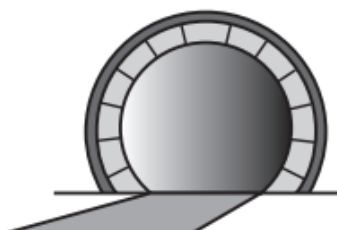
- (a) Calculate the area of the sector removed from the circle. 3
- (b) Calculate the circumference of the base of the cone. 3

Answers:

- (a)  $1536 \text{ cm}^2$
- (b) 175 cm (approximately)

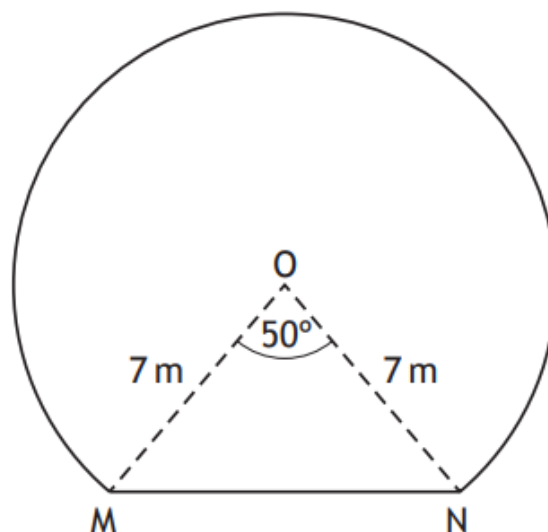


The picture shows the entrance to a tunnel which is in the shape of part of a circle.



The diagram below represents the cross-section of the tunnel.

- The centre of the circle is  $O$ .
- $MN$  is a chord of the circle.
- Angle  $MON$  is  $50^\circ$ .
- The radius of the circle is 7 metres.



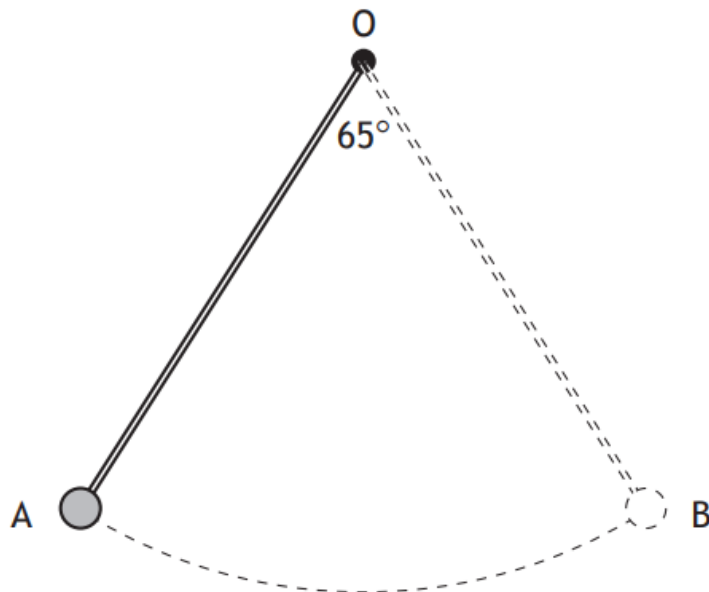
Calculate the area of the cross-section of the tunnel.

5

Answer:

151.3 m<sup>2</sup>

The pendulum of a clock swings along an arc of a circle, centre O.



The pendulum swings through an angle of  $65^\circ$ , travelling from A to B.

The length of the arc AB is 28.4 centimetres.

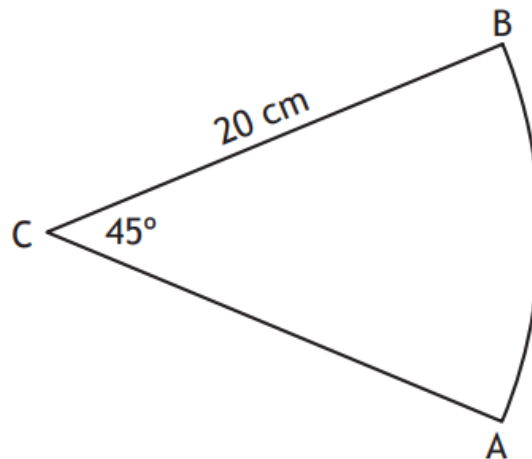
Calculate the length of the pendulum.

4

Answer:

25.0 cm

The diagram shows a sector of a circle, centre C.



The radius of the circle is 20 centimetres and angle ACB is  $45^\circ$ .

Calculate the area of the sector.

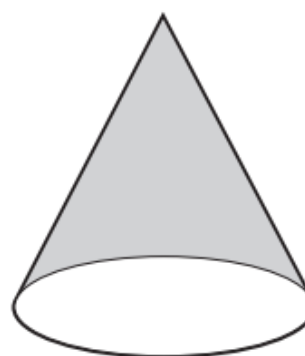
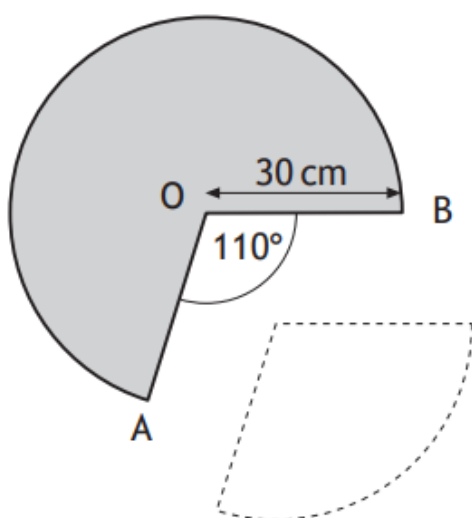
Take  $\pi = 3.14$ .

3

Answer:

157 cm<sup>2</sup>

A cone is formed from a paper circle with a sector removed as shown.  
The radius of the paper circle is 30 centimetres.  
Angle AOB is  $110^\circ$ .

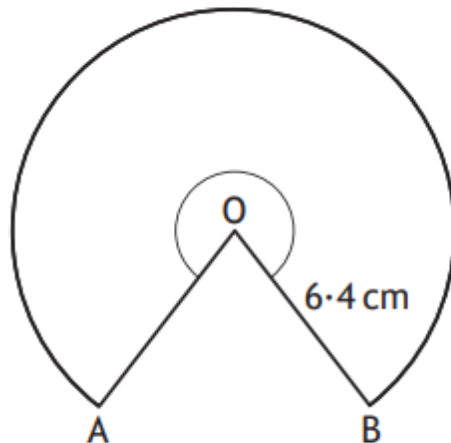


- (a) Calculate the area of the sector removed from the circle. 3
- (b) Calculate the circumference of the base of the cone. 3

Answers:

- (a)  $864 \text{ cm}^2$
- (b) 131 cm (approximately)

The diagram below shows part of a circle, centre O.



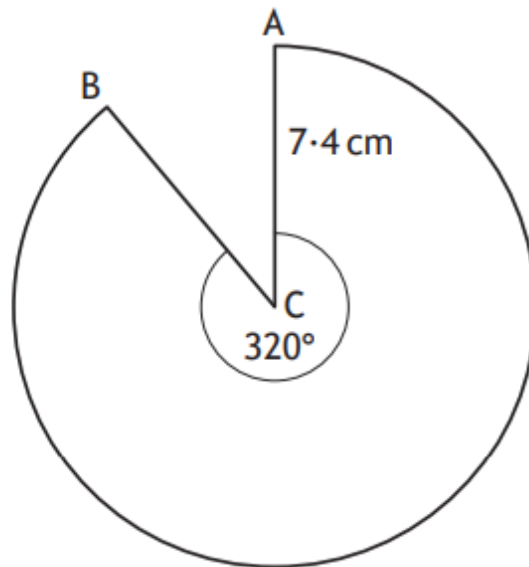
The radius of the circle is 6.4 centimetres.  
Major arc AB has length 31.5 centimetres.  
Calculate the size of the reflex angle AOB.

3

Answer:

282.0°

The diagram below shows a sector of a circle, centre C.



The radius of the circle is 7.4 centimetres.

Calculate the length of the major arc AB.

3

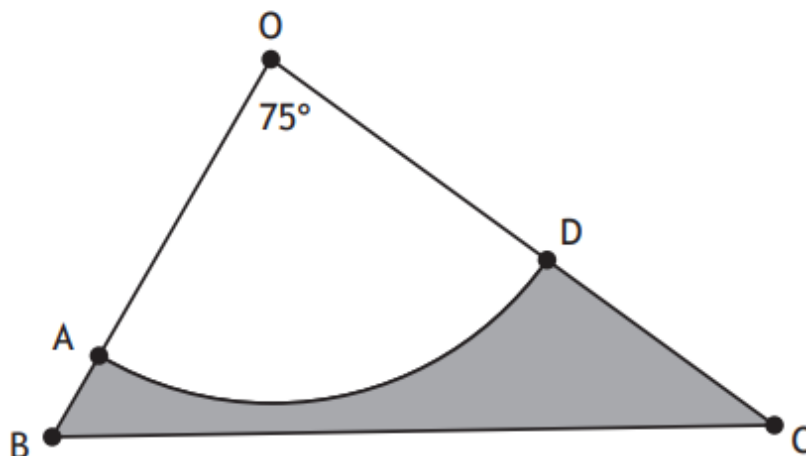
Answer:

41.32 cm





In the diagram below AOD is a sector of a circle, with centre O, and BOC is a triangle.



In sector AOD:

- radius = 30 centimetres
- angle AOD =  $75^\circ$ .

In triangle OBC:

- OB = 38 centimetres
- OC = 55 centimetres.

Calculate the area of the shaded region, ABCD.

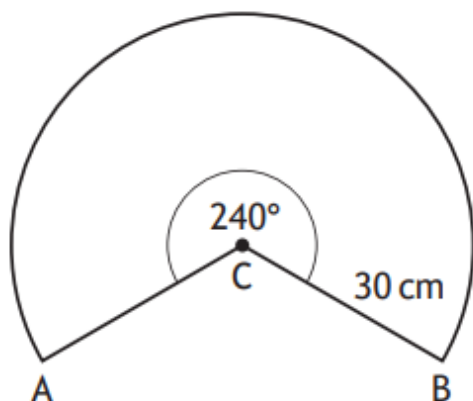
5

Answer:

420.3 cm<sup>2</sup>



The diagram below shows a sector of a circle, centre C.



The radius of the circle is 30 centimetres.

Calculate the length of the major arc AB.

Take  $\pi = 3.14$ .

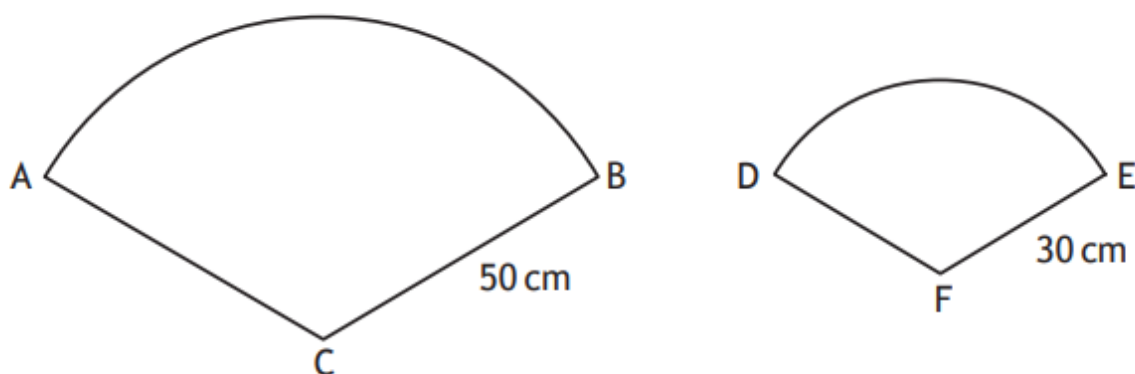
3

Answer:

125.6 cm

In the diagram

- ABC is a sector of a circle, centre C
- DEF is a sector of a circle, centre F.



The sectors are mathematically similar.

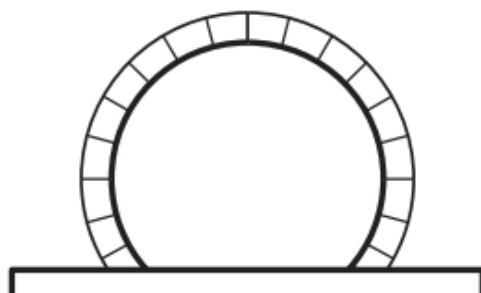
The area of the larger sector, ABC, is 2750 square centimetres.

- (a) Calculate the area of the smaller sector, DEF. 3
- (b) Calculate the size of angle ACB. 3

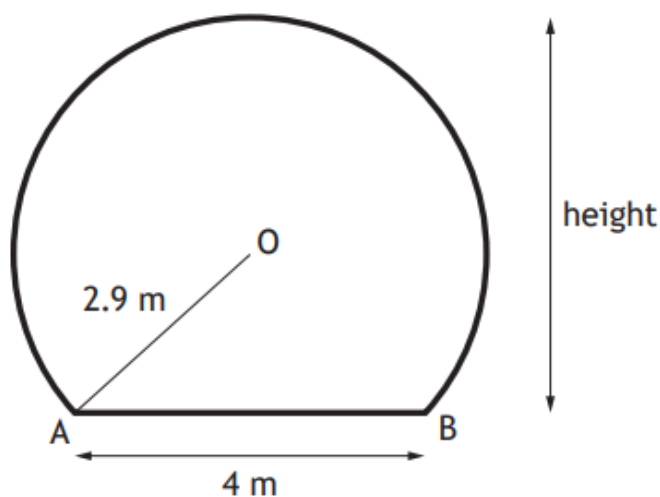
Answers:

- (a)  $990 \text{ cm}^2$   
(b)  $126.1^\circ$

A train tunnel has a circular cross-section with a horizontal floor.



A diagram of the cross-section is shown below.



- The centre of the circle is O.
- Chord AB is 4 metres.
- The radius OA is 2.9 metres.

Calculate the height of the tunnel.

4

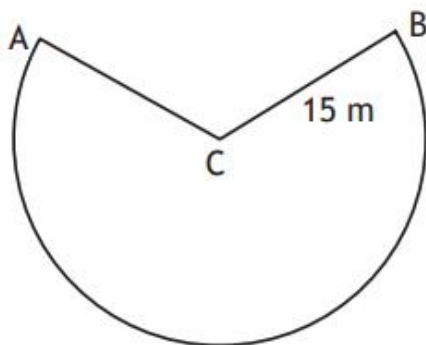
Answer:

5 m

An attraction at a theme park has a carriage attached to an arm.



The arm swings from A to B along the arc of a circle, centre C, as shown in the diagram below.



- The length of the arm, CB, is 15 metres.
- The length of the major arc, AB, is 69.4 metres.

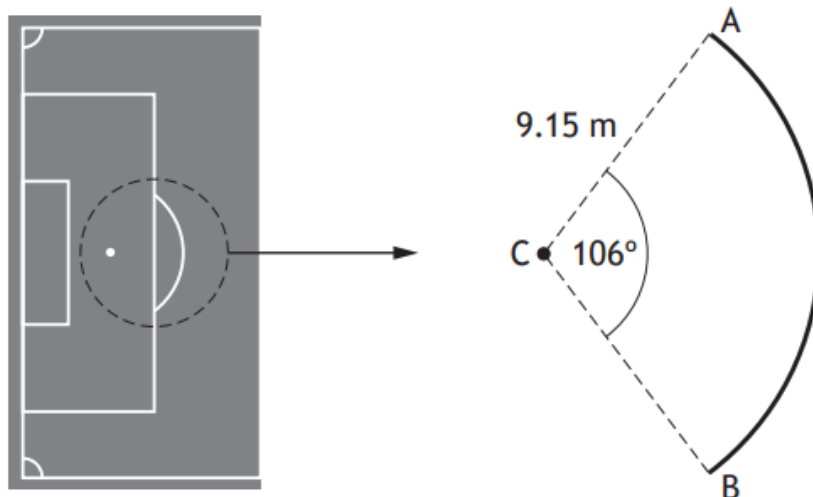
Calculate the size of the reflex angle ACB.

3

Answer:

265.1°

The diagram shows part of a football pitch.



The penalty spot is marked at point C.

AB is an arc of a circle, centre C, radius 9.15 metres.

Calculate the length of the arc AB.

3

Answer:

16.9 metres