



Aberdare Community School  
Mathematics Department

WJEC GCSE

**Higher – Calculator**

Shape

# **Arc length and area of a sector**

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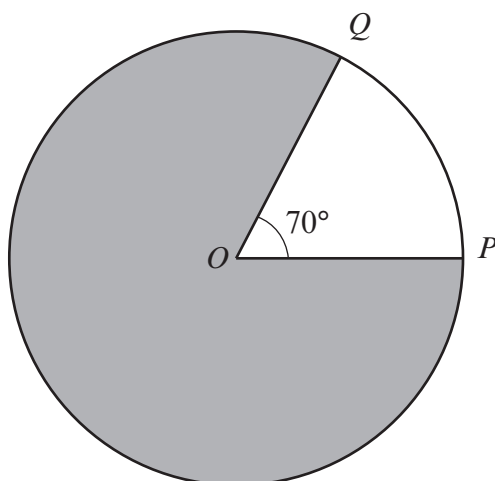
Teacher: .....







12.

*Diagram not drawn to scale*

The points  $P$  and  $Q$  lie on a circle, with centre  $O$  and radius 12 cm, and  $\widehat{POQ} = 70^\circ$ .

(a) Calculate the length of the minor arc  $PQ$ .

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[2]

(b) Calculate the area of the shaded part of the circle.

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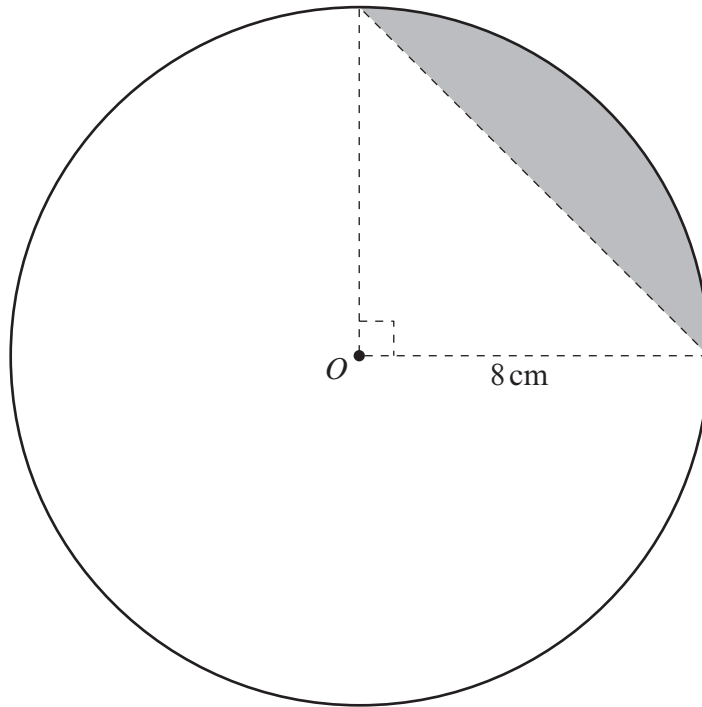
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13. Calculate the area of the shaded part of the circle, centre  $O$ , shown below.



*Diagram not drawn to scale*

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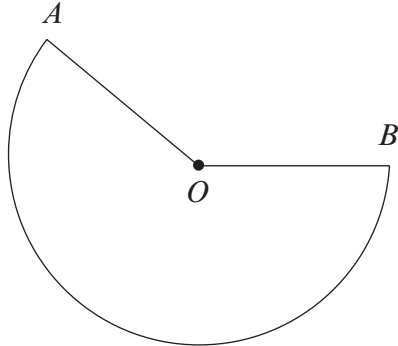
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[3]

14. A sector of a circular metal plate centre  $O$ , with radius 18 cm, is removed to leave the following shape.



*Diagram not drawn to scale*

The length of the arc  $AB$  of the shape is 66 cm.

- (a) Calculate the size of the reflex angle  $AOB$  correct to the nearest degree.

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- (b) What was the area of the piece of metal that was removed?

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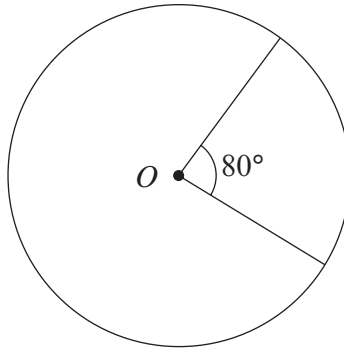
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13. The diagram shows a circular flower bed, which is split into two sectors, one for spring flowers and the other for roses.  
The centre of the circle is  $O$  and the area of the minor sector is  $31.3 \text{ m}^2$ .



*Diagram not drawn to scale*

- (a) Calculate the radius of the flower bed.

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[3]

- (b) Calculate the perimeter of the major sector of the flower bed.

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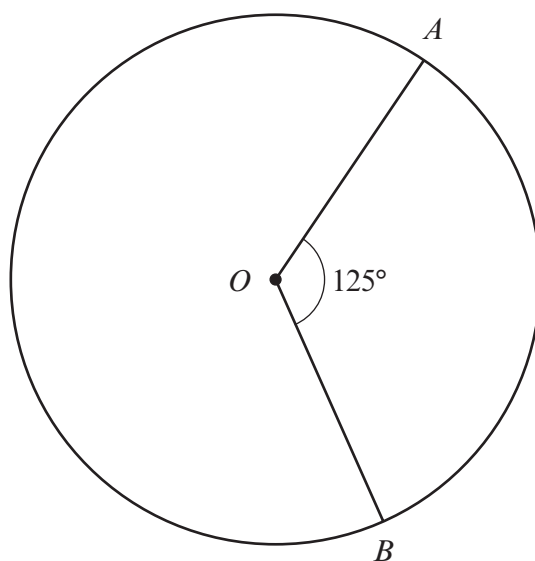
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12. The radius of the circle below is 3.6 cm.



*Diagram not drawn to scale*

Calculate the length of the minor arc  $AB$ .

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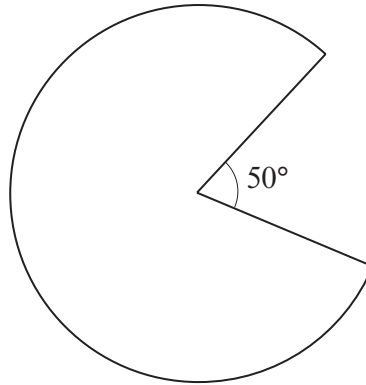
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[2]



11. A company logo is in the shape of a sector of a circle as shown below.



*Diagram not drawn to scale*

- (a) The logo on the side of their headquarters uses a sector of a circle, whose radius is 3 metres.  
Calculate the length of the perimeter of this logo.

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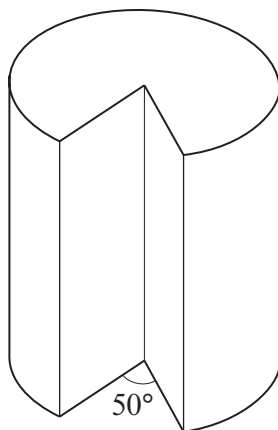
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[3]

- (b) A solid metal block is made as part of a machine that prints the logo onto the company's products.  
The part is made from a solid metal cylinder of radius 2 cm and height 6 cm, as shown below.



*Diagram not drawn to scale*

Calculate the volume of metal that has been **cut out** of the cylinder.

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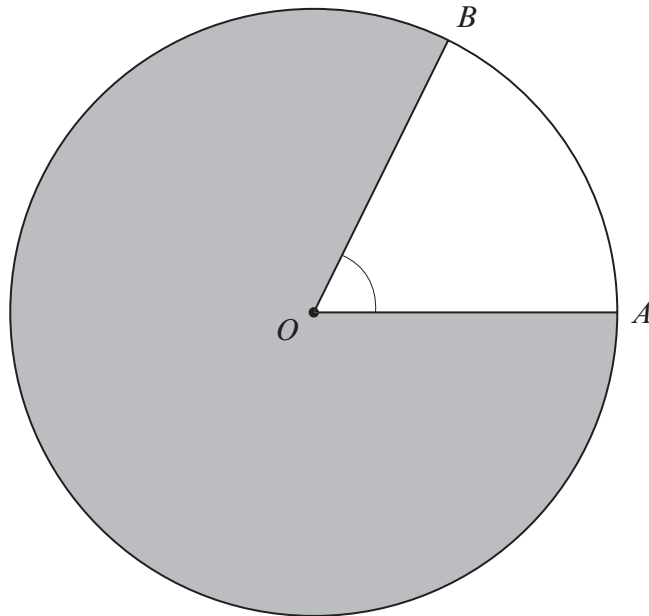
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[4]

11.



*Diagram not drawn to scale*

The points  $A$  and  $B$  lie on a circle with centre  $O$ .

The radius of the circle is 15 cm and  $\widehat{AOB} = 80^\circ$ .

(a) Calculate the length of the minor arc  $AB$ .

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[2]

(b) Calculate the area of the shaded sector of the circle.

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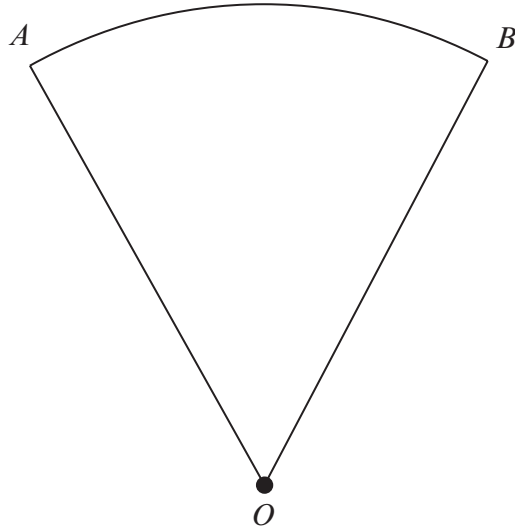
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13. A landing area, as shown below, is marked out for a throwing event in a sports field.  
 $AB$  is an arc of a circle centre  $O$ . The angle  $\widehat{AOB} = 60^\circ$  and  $OA = OB = 80$  m.



*Diagram not drawn to scale*

A rope is used to mark the boundary of the whole landing area.

- (a) Calculate the area enclosed by the rope.

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[2]

- (b) What is the total length of the rope that is used to mark the landing area?

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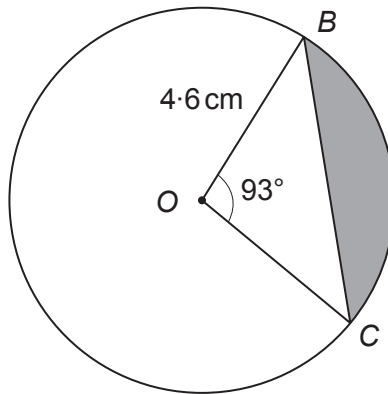
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18. The diagram below shows a circle with centre  $O$ .



*Diagram not drawn to scale*

Calculate the area of the shaded segment.

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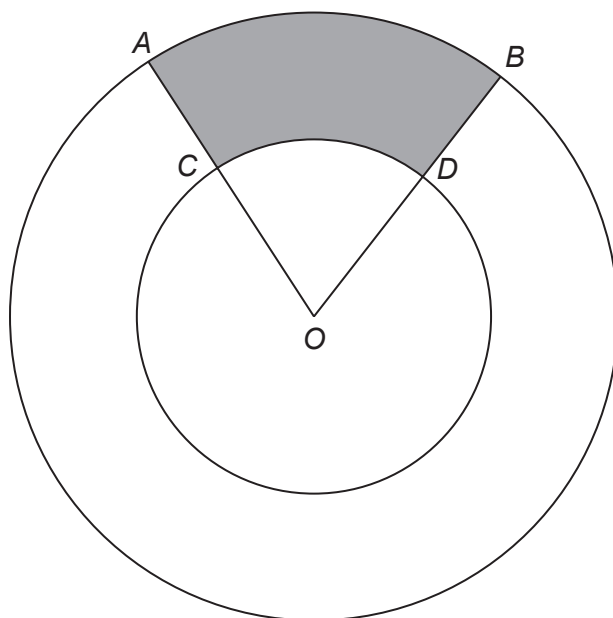
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**END OF PAPER**

13. The diagram below shows two circles, both with  $O$  as their centre.  
 $OA = 12$  cm,  $OC = 8$  cm and  $\widehat{AOB} = 70^\circ$ .



*Diagram not drawn to scale*

- (a) Calculate the length of the arc  $AB$ .

[2]

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- (b) Calculate the area that has been shaded.

[4]

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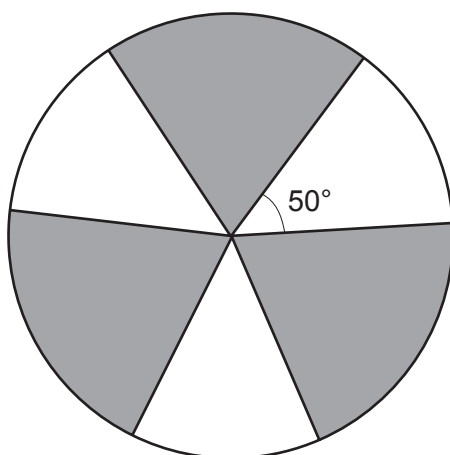
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11. A circular logo, with radius 8 cm, is shown below.



All three white sectors are equal in size and shape.  
All three shaded sectors are equal in size and shape.

- (a) Calculate the total area of the shaded sectors.

[4]

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- (b) The whole perimeter of all the shaded sectors is to be drawn in red.  
Calculate the total length of all these red boundary lines.

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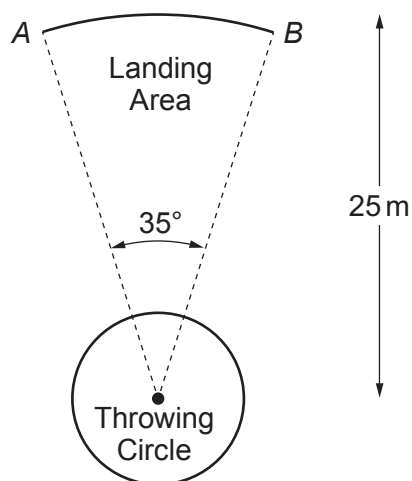
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15. In a shot put event, competitors throw the shot from the throwing circle into a landing area. The landing area is part of a sector of a circle of radius 25 m, with its centre at the centre point of the throwing circle. The sector angle is  $35^\circ$ . A diagram of the throwing circle and landing area is shown below.



*Diagram not drawn to scale*

Calculate the length of the arc  $AB$ .

[2]

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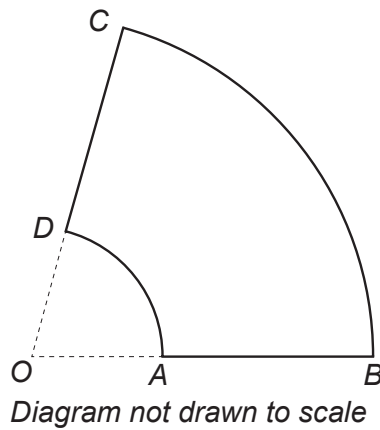
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13. A concrete patio  $ABCD$  is shaped as shown below.



Arcs  $BC$  and  $AD$  are formed from circles whose centres are both at point  $O$ .  
Radius  $OC = 20\text{ m}$  and radius  $OA = 7\text{ m}$ .  
The area of the patio is  $199.1\text{ m}^2$ .

(a) Calculate the size of  $\widehat{BOC}$ , giving your answer to the nearest degree. [3]

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(b) Using your answer to part (a), calculate the length of the perimeter of patio  $ABCD$ . [4]

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