

Circles, arcs and sectors

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 80 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber and a calculator for Section B.

Instructions

- Use black ink or black ballpoint pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions in the spaces provided.
- **Section A** (questions 1 to 5): you must not use a calculator.
- **Section B** (questions 6 to 20): you may use a calculator.
- Do all rough work in this booklet. Cross through any work you do not want marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this booklet is 70.

Advice

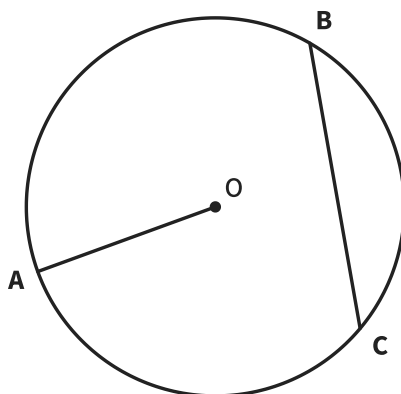
- Read each question carefully.
- In all calculations, show clearly how you work out your answer.

For teacher's use

Q	Mark	Q	Mark
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	
TOTAL			

Section A**You must not use a calculator**Do not
write
outside
the box

- 1** The diagram shows a circle with centre O.



Not drawn accurately

- (a)** Write down the mathematical name of the line OA.

Answer _____

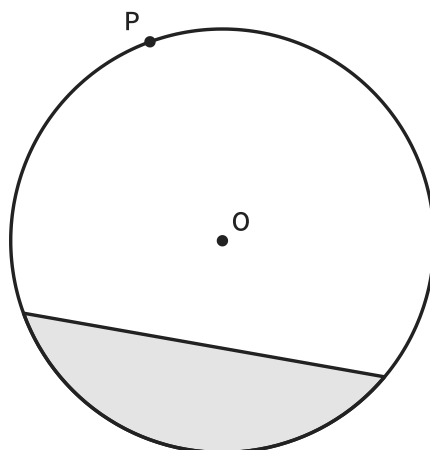
[1 mark]

- (b)** Write down the mathematical name of the line BC.

Answer _____

[1 mark]

- 2 The diagram shows a circle with centre O.



- (a) Circle the name of the shaded region.
arc sector segment tangent

[1 mark]

- (b) P is a point on the circle.
Draw a tangent to the circle at P.

[1 mark]

- 3 (a) A circle has a radius of 6 cm
Work out the area of the circle.
Give your answer in terms of π .

Answer _____ cm^2

[2 marks]

- (b) A different circle has a circumference of 20π cm
Work out the diameter of this circle.

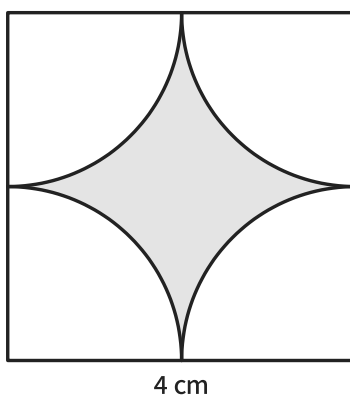
Answer _____ cm

[1 mark]

Do not
write
outside
the box

4

The diagram shows a square of side 4 cm
At each corner there is a quarter circle of radius 2 cm



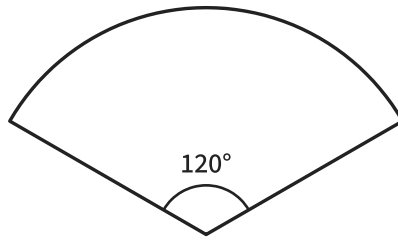
Not drawn accurately

Show that the area of the shaded region is $(16 - 4\pi) \text{ cm}^2$

Do not
write
outside
the box

[3 marks]

- 5 The diagram shows a sector of a circle with angle 120°
The area of the sector is $12\pi \text{ cm}^2$



Not drawn accurately

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

Do not
write
outside
the box

Answer _____ cm

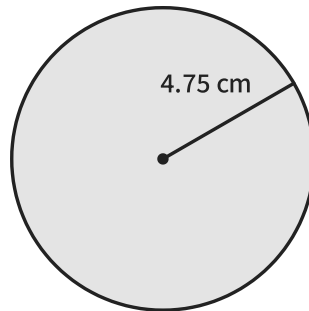
[4 marks]

Section B

You may use a calculator

Do not
write
outside
the box

- 6** A drinks coaster is a circle with radius 4.75 cm



Not drawn accurately

- (a)** Write down the diameter of the coaster.

Answer _____ cm

[1 mark]

- (b)** Work out the circumference of the coaster.
Give your answer to 1 decimal place.

Answer _____ cm

[2 marks]

7 A circular rug has a diameter of 1.8 m

- (a) Work out the area of the rug.
Give your answer to 2 decimal places.

Answer _____ m^2

[2 marks]

- (b) Braid is sewn all the way round the edge of the rug.
Work out the length of the braid.
Give your answer to 2 decimal places.

Answer _____ m

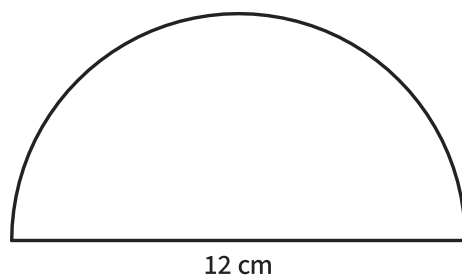
[2 marks]

8 A shop sells two rugs.
The round rug is a circle with radius 1.24 m
The square rug has sides of length 2.2 m

Which rug has the larger area?
You must show your working.

[3 marks]

- 9 The diagram shows a semicircle with diameter 12 cm



Not drawn accurately

Work out the perimeter of the semicircle.
Give your answer to 1 decimal place.

Answer _____ cm
[3 marks]

- 10 A bicycle travels 1.7 km in a straight line.
The front wheel turns exactly 850 times.

Work out the diameter of the front wheel.
Give your answer in centimetres, to the nearest centimetre.

Answer _____ cm
[3 marks]

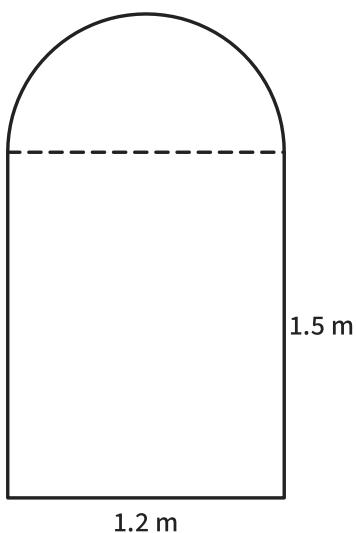
Do not
write
outside
the box

- 11** Cable is wound round a drum with a diameter of 66 cm
Each turn of cable is the same length as the circumference of the drum.
Workers unwind 500 complete turns of cable.

Have they unwound more than 1 km of cable?
You must show your working.

[3 marks]

- 12** A window is a rectangle with a semicircle on top.



Not drawn accurately

Work out the area of the window.
Give your answer to 2 decimal places.

Answer _____ m^2

[3 marks]

- 13** A circle has the same area as a square of side 10 cm

Work out the circumference of the circle.

Give your answer to 1 decimal place.

Answer _____ cm

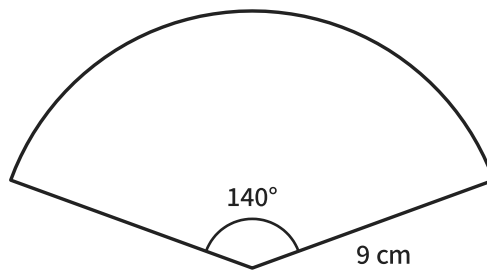
[3 marks]

- 14** The diagram shows a sector of a circle with radius 9 cm and angle 140°

Zara works out the perimeter of the sector.

Here is her working.

$$\text{Perimeter} = \frac{140}{360} \times \pi \times 9 = 11.0 \text{ cm}$$



Not drawn accurately

- (a)** Write down **two** mistakes Zara has made.

[2 marks]

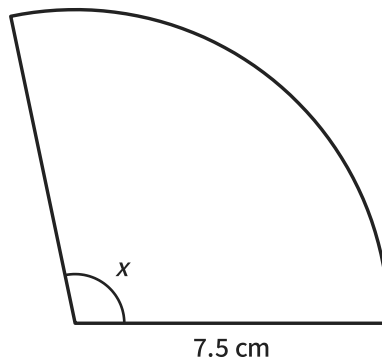
- (b)** Work out the perimeter of the sector.
Give your answer to 1 decimal place.

Answer _____ cm

[2 marks]

15

The diagram shows a sector of a circle with radius 7.5 cm
The area of the sector is 50 cm^2



Not drawn accurately

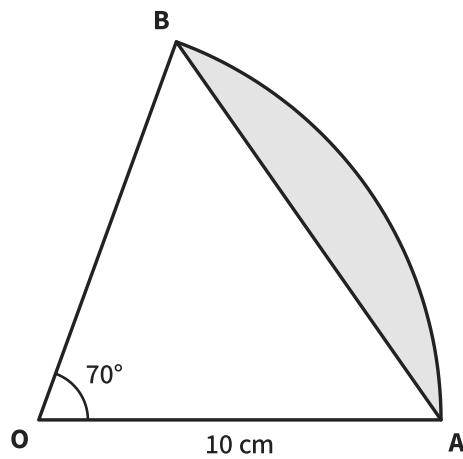
Work out the angle x .
Give your answer to 1 decimal place.

Answer _____ degrees
[3 marks]

Do not
write
outside
the box

- 16** OAB is a sector of a circle with centre O and radius 10 cm
Angle AOB = 70°

Do not
write
outside
the box



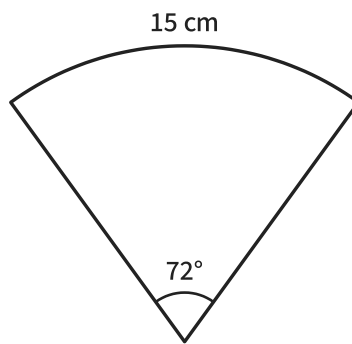
Not drawn accurately

Work out the area of the shaded segment.
Give your answer to 1 decimal place.

Answer _____ cm^2

[4 marks]

- 17** The diagram shows a sector of a circle with angle 72°
The arc length of the sector is 15 cm



Not drawn accurately

Work out the area of the sector.
Give your answer to 1 decimal place.

Answer _____ cm^2

[4 marks]

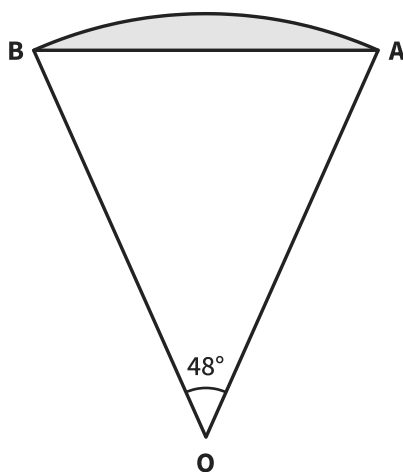
Do not
write
outside
the box

18

OAB is a sector of a circle with centre O.

Angle AOB = 48°

The area of the sector is 64 cm^2



Not drawn accurately

Work out the perimeter of the shaded segment.

Give your answer to 1 decimal place.

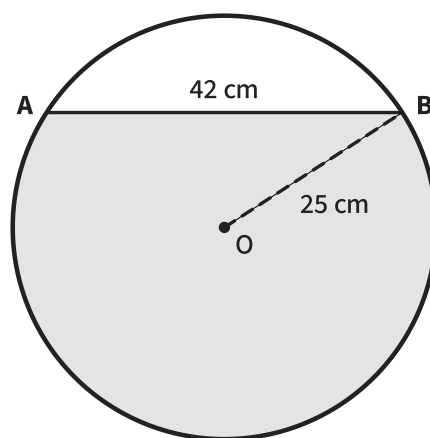
Answer _____ cm

[5 marks]

Do not
write
outside
the box

19

The diagram shows the cross-section of a pipe with some water in it.
 The cross-section is a circle with centre O and radius 25 cm
 The surface of the water, AB, is 42 cm wide.
 The centre O is below the surface of the water.



Not drawn accurately

Work out the percentage of the cross-section that is filled with water.
 Give your answer to 1 decimal place.

Answer _____ %

[5 marks]

Do not
write
outside
the box

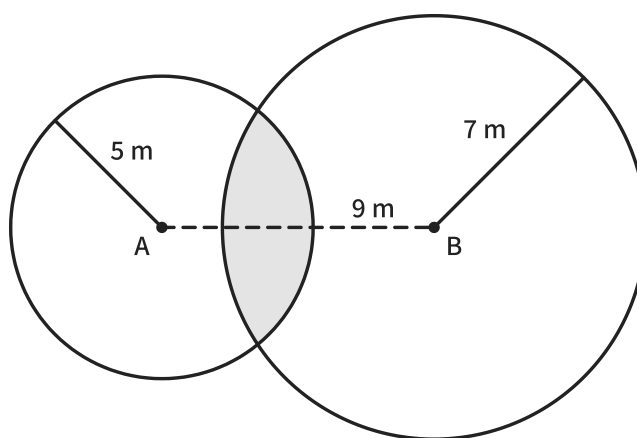
20

Two spotlights shine on a stage.

One lights a circle with centre A and radius 5 m

The other lights a circle with centre B and radius 7 m

$AB = 9$ m



Not drawn accurately

Work out the area of the stage lit by both spotlights.

Give your answer to 3 significant figures.

Answer _____ m^2

[6 marks]

END OF QUESTIONS

Do not
write
outside
the box