

Name

Class



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Circles

(9 – 1) Topic booklet

Foundation

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

Information

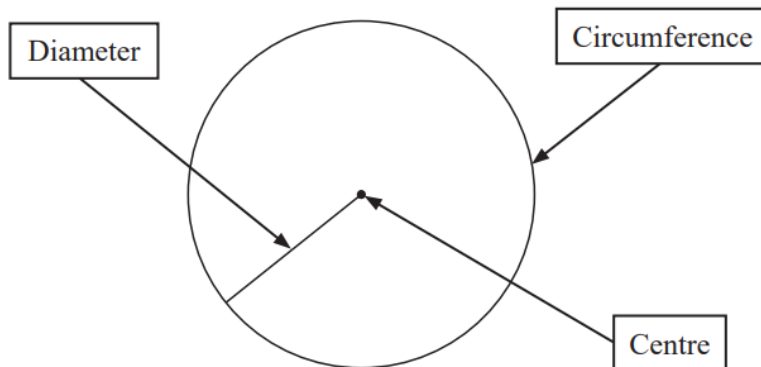
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

6 Freddie adds labels to this diagram of a circle.



Explain why one of the labels is wrong.

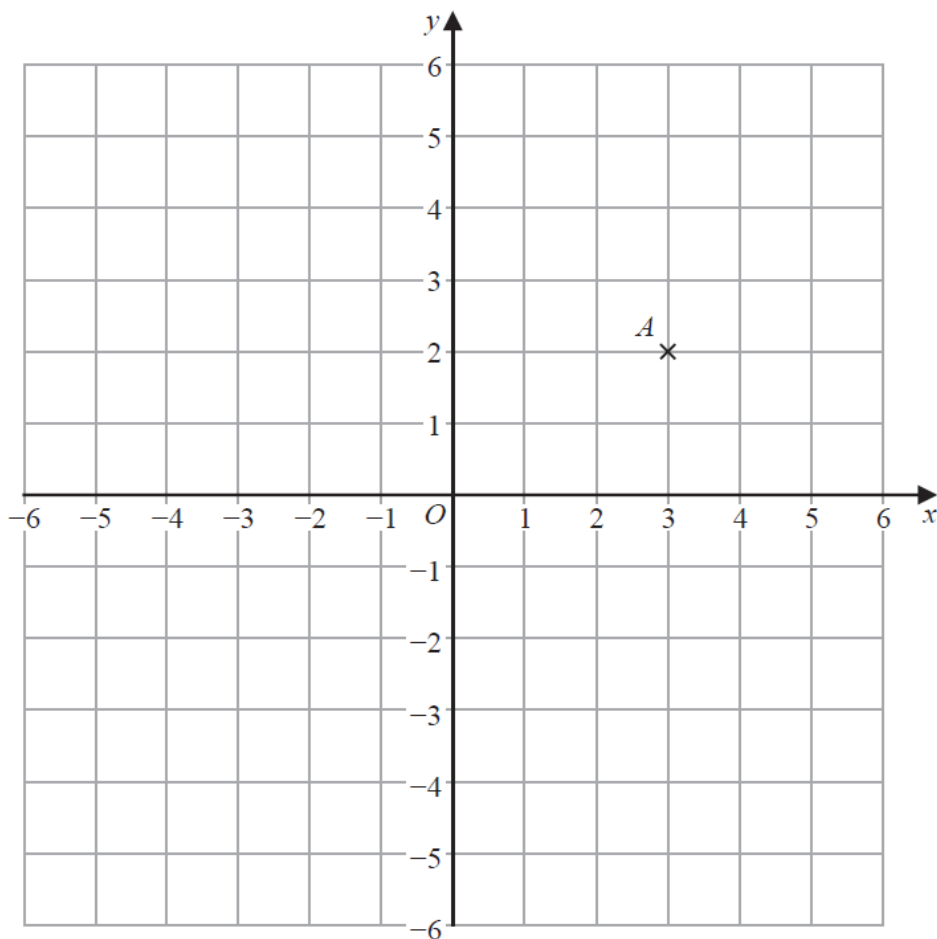
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June 2023 – Paper 1F

(Total for Question 6 is 1 mark)

8 Here is a centimetre grid.



(a) Write down the coordinates of point A .

(.....,)
(1)

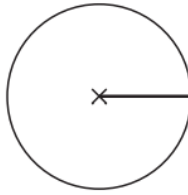
(b) On the grid, mark with a cross (\times) the point with coordinates $(-4, 3)$
Label this point B .

(1)

(c) On the grid, draw the circle with
centre $(1, -1)$
and radius 4 cm.

(2)

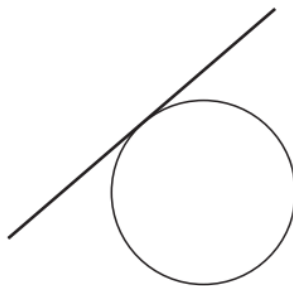
- 9 The centre of this circle is marked with a cross (×).



- (a) Write down the mathematical name of the straight line shown in the circle.

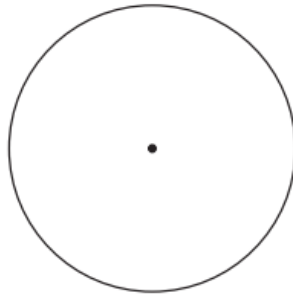
.....
(1)

- (b) Write down the mathematical name of the straight line that is touching the circle.



.....
(1)

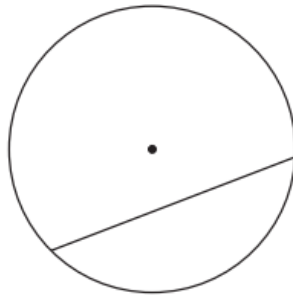
10 Here is a circle.



(a) On the diagram above, draw a radius of the circle.

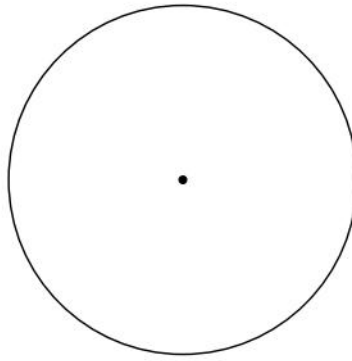
(1)

Here is another circle.



(b) Write down the mathematical name for the straight line inside this circle.

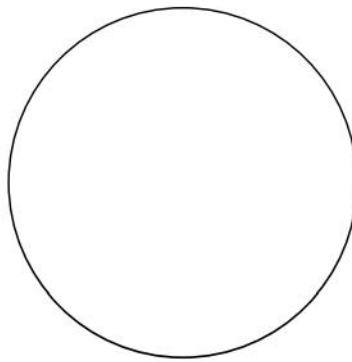
(1)



(a) On the diagram above, draw a diameter of the circle.

(1)

(b) On the diagram below, draw a segment of the circle.
Shade the segment.

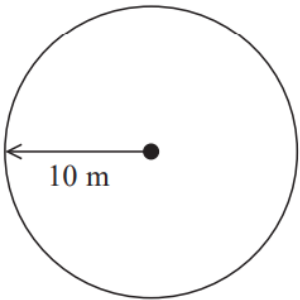


(1)

18 Balena has a garden in the shape of a circle of radius 10 m.
He is going to cover the garden with grass seed to make a lawn.

Grass seed is sold in boxes.
Each box of grass seed will cover 46 m² of garden.

Balena wants to cover all the garden with grass seed.



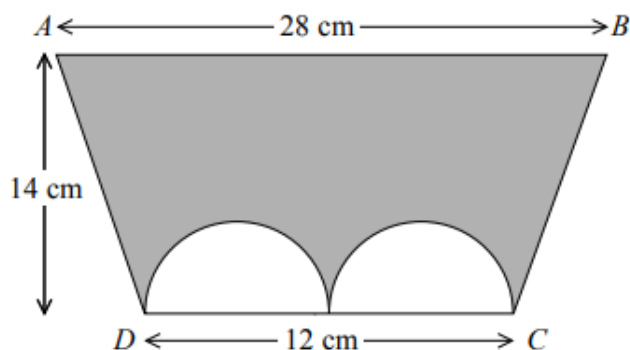
- (a) Work out an estimate for the number of boxes of grass seed Balena needs.
You must show your working.

.....
(4)

- (b) Is your estimate for part (a) an underestimate or an overestimate?
Give a reason for your answer.

.....
(1)

18 The diagram shows a trapezium $ABCD$ and two identical semicircles.



The centre of each semicircle is on DC .

Work out the area of the shaded region.

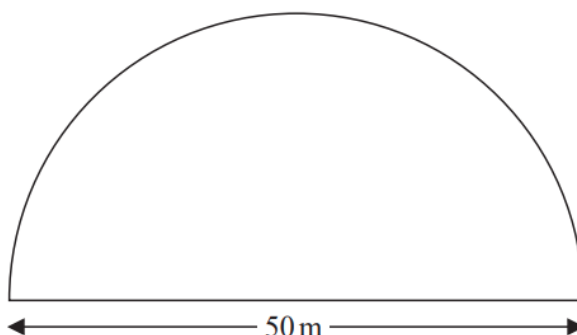
Give your answer correct to 3 significant figures.

..... cm^2

Sample 1 – Paper 3F

(Total for Question 18 is 4 marks)

19 A farmer has a field in the shape of a semicircle of diameter 50 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

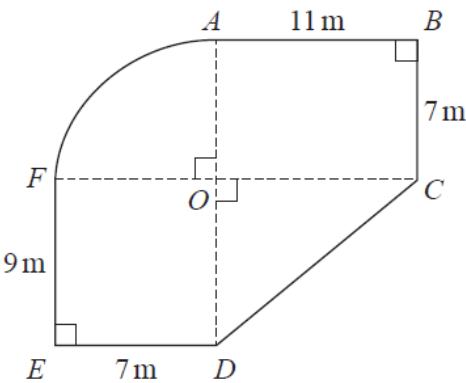
Work out the total cost.

£.....

21 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 $AOF = 90^\circ$

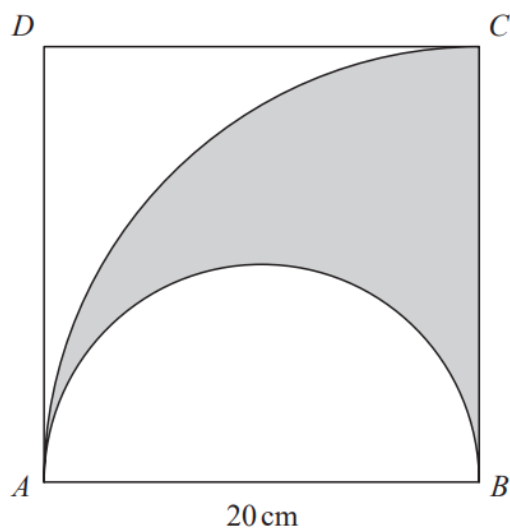


Jason is going to cover his garden with grass seed.
 Each bag of grass seed covers 14m^2 of garden.
 Each bag of grass seed costs £10.95

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

£.....

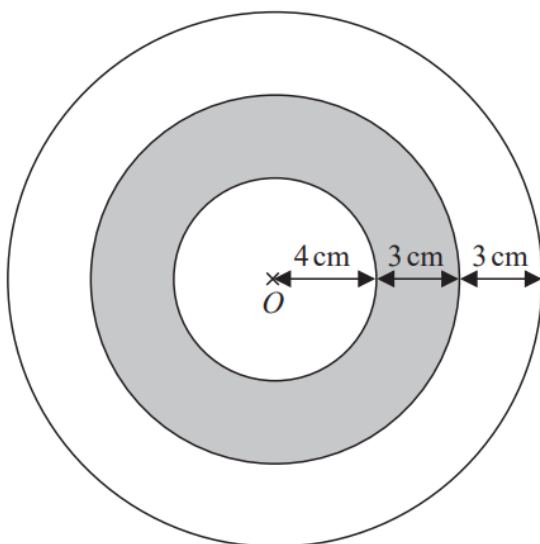
- 26 The diagram shows a square $ABCD$ with sides of length 20 cm.
It also shows a semicircle and an arc of a circle.



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

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

26 The diagram shows a logo made from three circles.



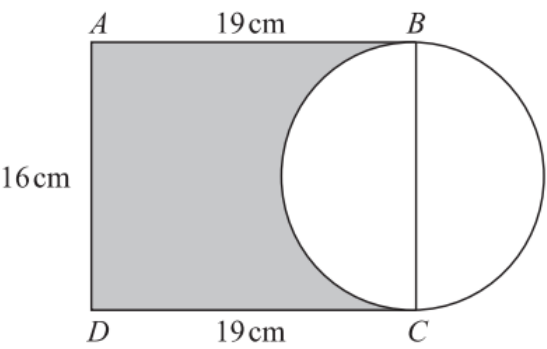
Each circle has centre O .

Daisy says that exactly $\frac{1}{3}$ of the logo is shaded.

Is Daisy correct?

You must show all your working.

27 Here is a diagram showing a rectangle, $ABCD$, and a circle.

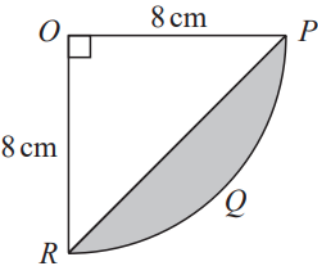


BC is a diameter of the circle.

Calculate the percentage of the area of the rectangle that is shaded.
Give your answer correct to 1 decimal place.

.....%

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

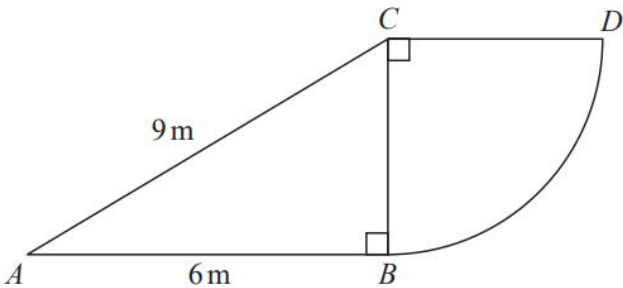


OPR is a triangle.

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

..... cm²

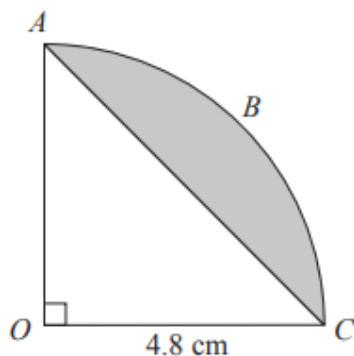
27 The diagram shows a right-angled triangle and a quarter circle.



The right-angled triangle ABC has angle $ABC = 90^\circ$
The quarter circle has centre C and radius CB .

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

..... m^2

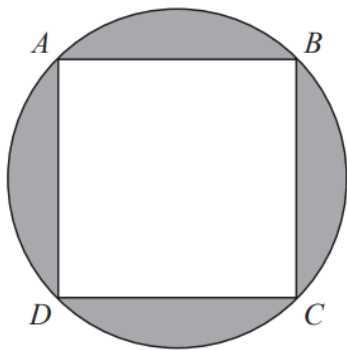


The arc ABC is a quarter of a circle with centre O and radius 4.8 cm.
 AC is a chord of the circle.

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

..... cm^2

29 A, B, C and D are points on a circle such that $ABCD$ is a square.

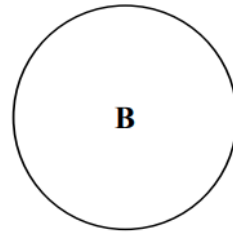
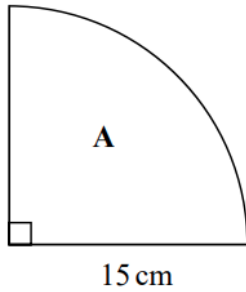


The square $ABCD$ has sides of length 3.5 cm.

Calculate the circumference of the circle.
Give your answer correct to 1 decimal place.
You must show all your working.

..... cm

- 30** **A** is in the shape of a quarter circle of radius 15 cm.
B is in the shape of a circle.



The area of **A** is 9 times the area of **B**.

Show that the radius of **B** is 2.5 cm.