Write your name here

Surname		Other names	

**Grade One Paper
Level 1 / Level 2 GCSE
(9–1)**

Centre Number

Candidate Number

Mathematics

Construction and Loci

achildsguideto

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Paper Reference

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

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*.
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**

Information

- The total mark for this paper is 57
- 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.

Q1 **It is important that all lines are measured accurately as this is where you gain or lose marks.**

ABCD is a garden.

A 4m wide patio needs laying from AB. The edge of the patio runs parallel to line AB. Draw the edge of the patio. (2)

A tree is planted in the garden. The tree is 3.5m from point C and 4m from point D. Mark on the diagram where the tree will be planted. (2)

The canopy of the tree will spread 2m from the trunk of the tree. Draw the expected growth on the tree. (2)

A   D

B   C

Scale 2cm:1m

Q2 Three towns are located in the countryside. The Fire Brigade need to place a fire station in the area so that it can get to all three towns in the same amount of time. The council have agreed to build three direct roads from the fire station to each town.

Mark on the map below where the fire station should be built to give the same coverage to each town shown on the map.

Roads cost £45000 per mile to lay. How much will the council have to pay for the roads laying?

A _____ D

Addington

⊕

Clecton ⊕

⊕

Burlingham

B _____ C

Scale 2cm:1mile

(6)
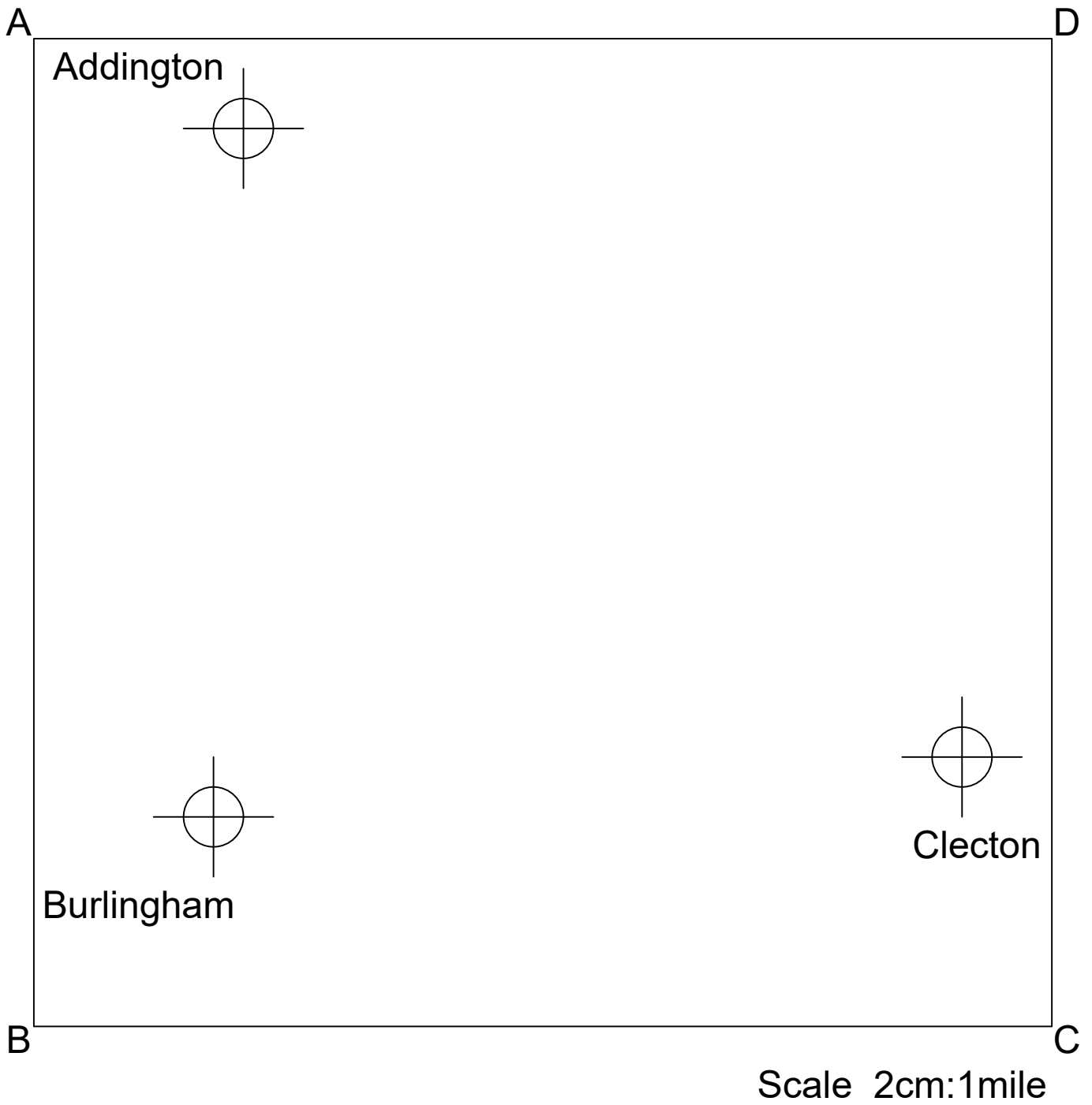
Q3   Cyril has a triangular garden ABC.

He wants to plant a circular lawn 12m in diameter in the centre of the garden.

He wants a path 50cm wide to run round the outside of his lawn.

The rest of the garden will be flowerbeds.

Draw on the plan below the lawn and path.

A

B

Scale 2:300   C
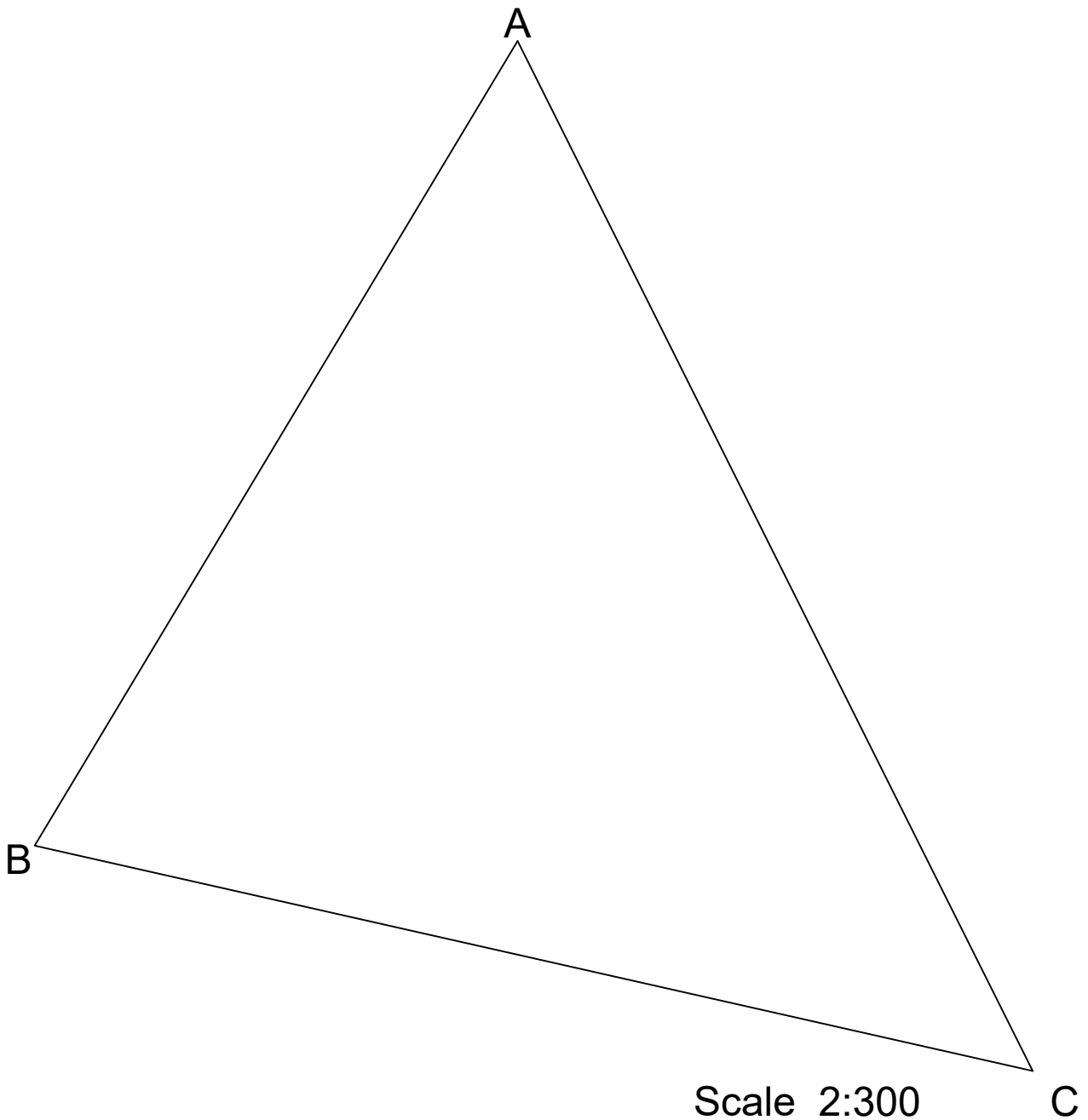
(8)

Q4   Billy needed to hang a painting on his wall. The painting was 108cm long and 72 cm high. Billy wanted the painting to be in the centre of his wall in terms of width but wanted the centre of the painting to be at his eye level when he was standing. His eyes were 5 feet 2 inches above the ground when he was standing.
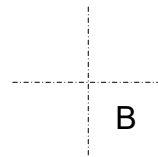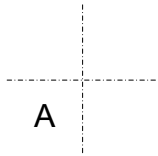
There are 2.54 cm in one inch.

Draw where the painting should be hung.

A────────────────────────────────D

B────────────────────────────────C
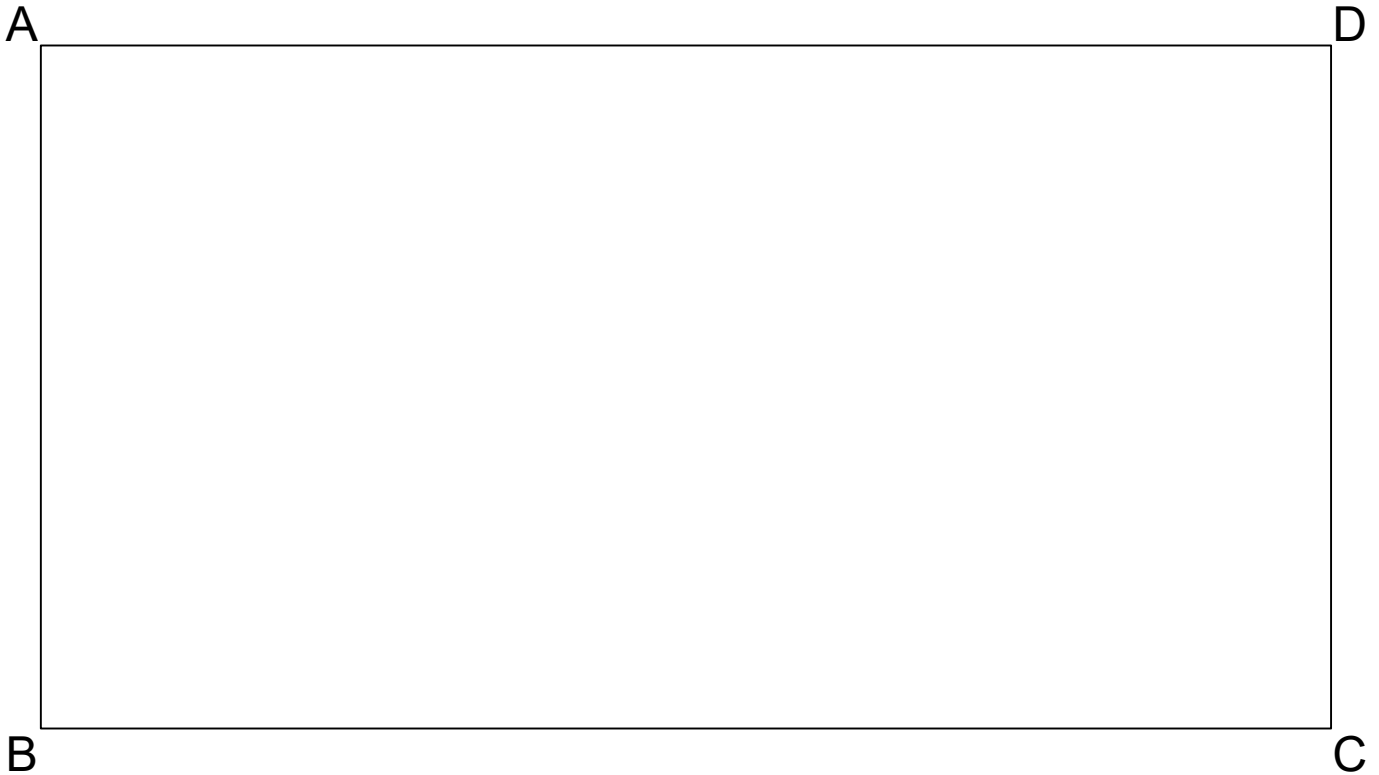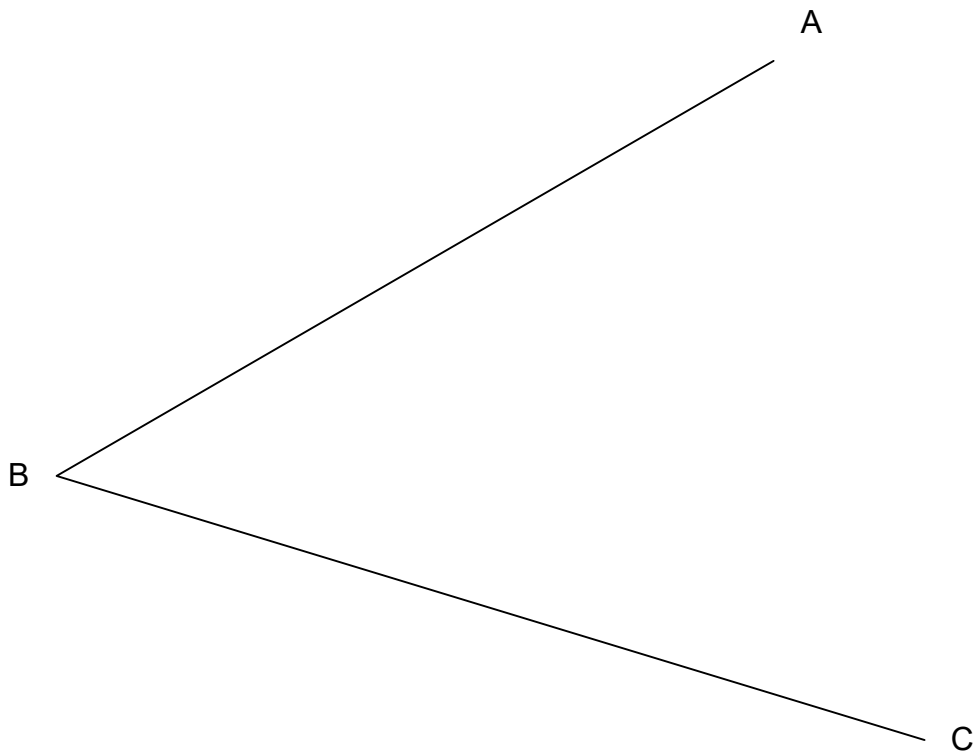
Scale 1:20

(4)

Q5   Draw the locus of all the points which are equidistant from points A and B.
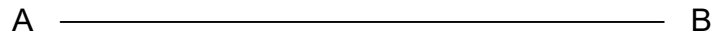
A

B

(2)

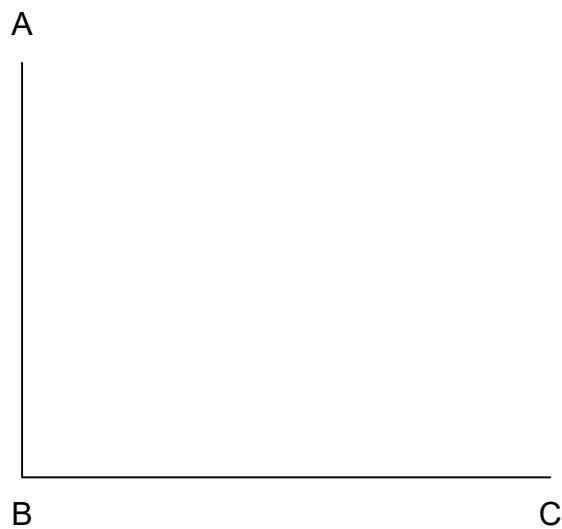**Q6**   Draw the locus of all the points which are equidistant of lines AB and BC.

A

B

C

(2)

Q7   Draw a locus of all the points which are exactly 2.5 cm away from the line AB.

A ———————————————— B
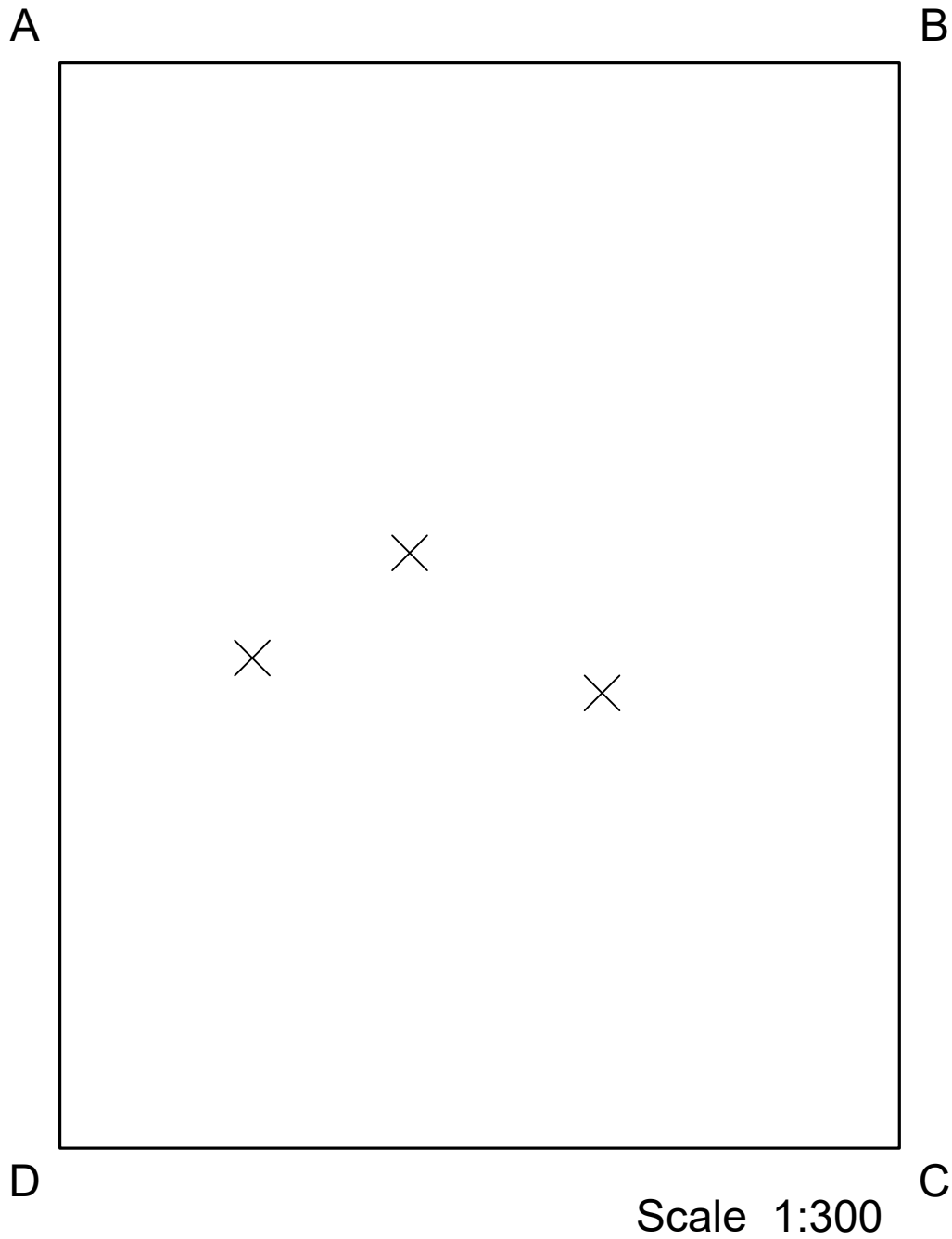
(3)

Q8   Draw a locus of all the points which are exactly 3cm from line ABC.

A

B   C

(3)

Q9   ABCD is a field with a golf green and hole cut out of it.

The centre of the green is 21m from D and 24.3m from C.

The green is a circle of radius 10.8m.

On the map shown below, the position of three golf balls is marked.

Which of the balls, if any, have landed on the green?

A   B

D   C
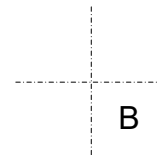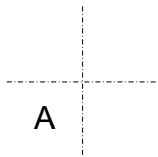
Scale 1:300

(4)

Q10   A boat is sailing along the coast.

There are a couple of sandbanks marked with buoys A and B.

The skipper knows that he has to be within 20m of buoy A. He also knows that he needs to closer to Buoy B than A.

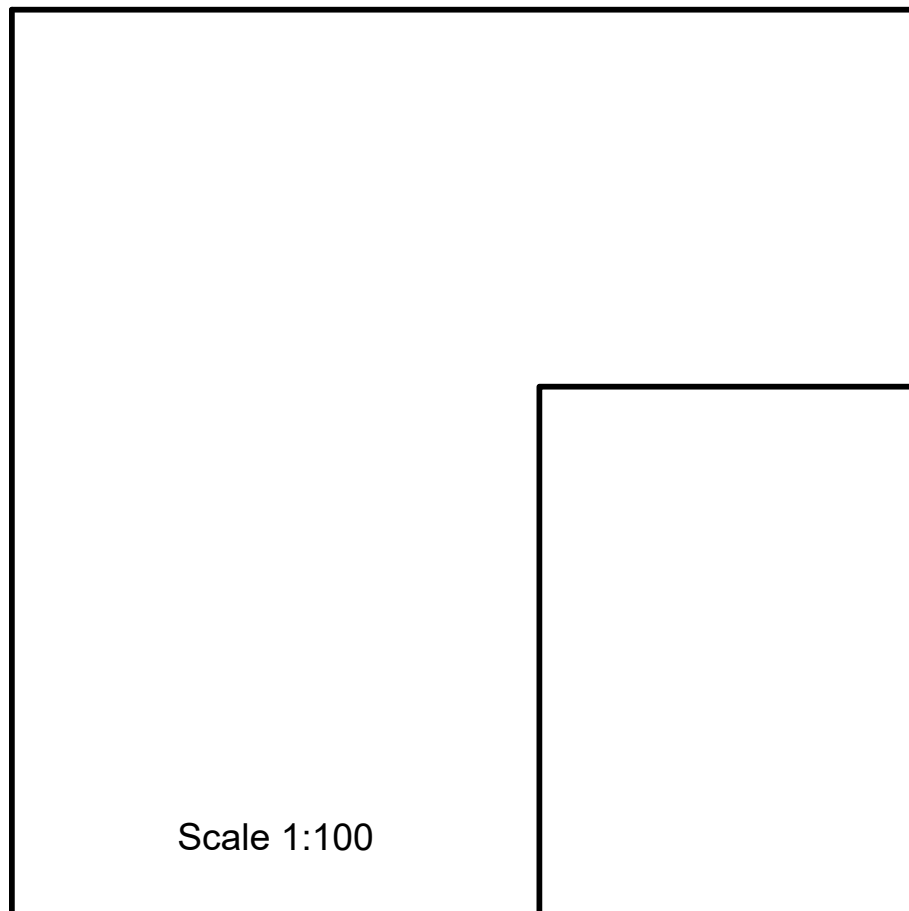Shade in the region where it is safe for him to steer his boat.

A

B

SCALE 1:200

(4)

Q11   Below is the plan of a building.

Around the building there is a piece of mown grass 1.5m wide. Then there is a path which is 80cm wide.

Add the path to the plan of the building below.

Scale 1:100

(6)

Q12   Below is a line. Construct an equilateral triangle with each side being the distance of that line.

_____

(3)

Q13
$$\frac{\sqrt[3]{64} \times \sqrt{64} \times 64}{64^2} =$$

(2)

Q14   In the equation below, find the value of a.

$$\frac{\sqrt[3]{a} \times \sqrt[2]{a} \times a}{a^2} = \frac{1}{3}$$

(4)

Q15   Solve the Sudoku below.

					7		3	5
		1	2		4			
	7				6			
				8	1			
		6						3
	3	2						9
9			5					
1						4		
		4	6				2	