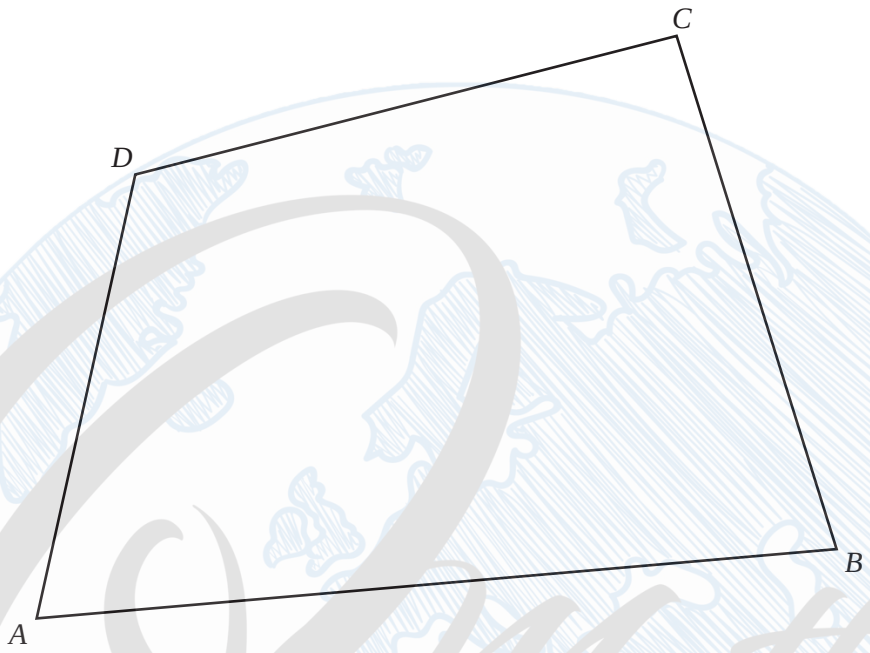
Geometric Constructions

5



The diagram shows an area of land *ABCD* used for a shop, a car park and gardens.

(a) **Using a straight edge and compasses only**, construct

(i) the locus of points equidistant from *C* and from *D*, [2]

(ii) the locus of points equidistant from *AD* and from *AB*. [2]

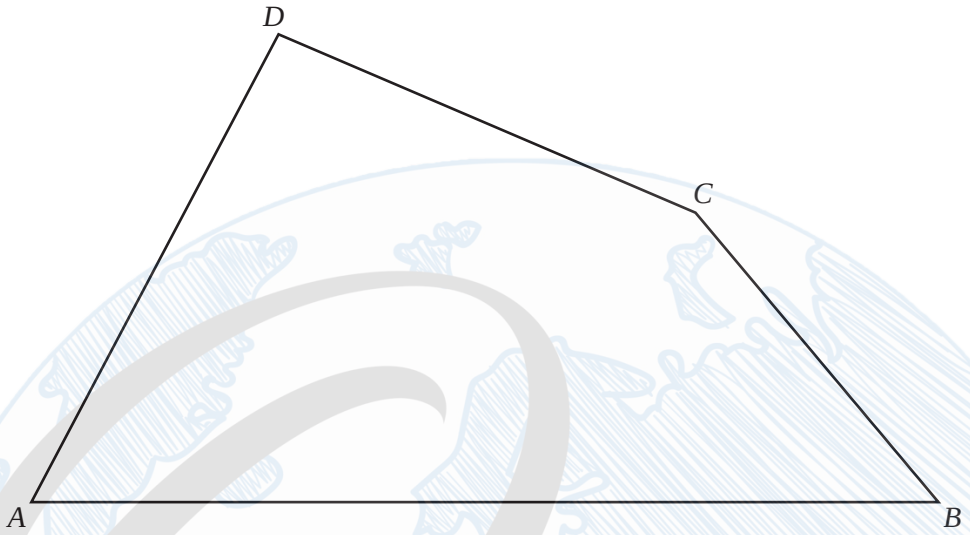
(b) The shop is on the land nearer to *D* than to *C* **and** nearer to *AD* than to *AB*.

Write the word SHOP in this region on the diagram. [1]

(c) **(i)** The scale of the diagram is 1 centimetre to 20 metres.
The gardens are the part of the land less than 100 m from *B*.
Draw the boundary for the gardens. [1]

(ii) The car park is the part of the land not used for the shop and not used for the gardens.
Shade the car park region on the diagram. [1]

8



(a) Draw accurately the locus of points, inside the quadrilateral *ABCD*, which are 6 cm from the point *D*. [1]

(b) **Using a straight edge and compasses only,** construct

(i) the perpendicular bisector of *AB*, [2]

(ii) the locus of points, inside the quadrilateral, which are equidistant from *AB* and from *BC*. [2]

(c) The point *Q* is equidistant from *A* and from *B* **and** equidistant from *AB* and from *BC*.

(i) Label the point *Q* on the diagram. [1]

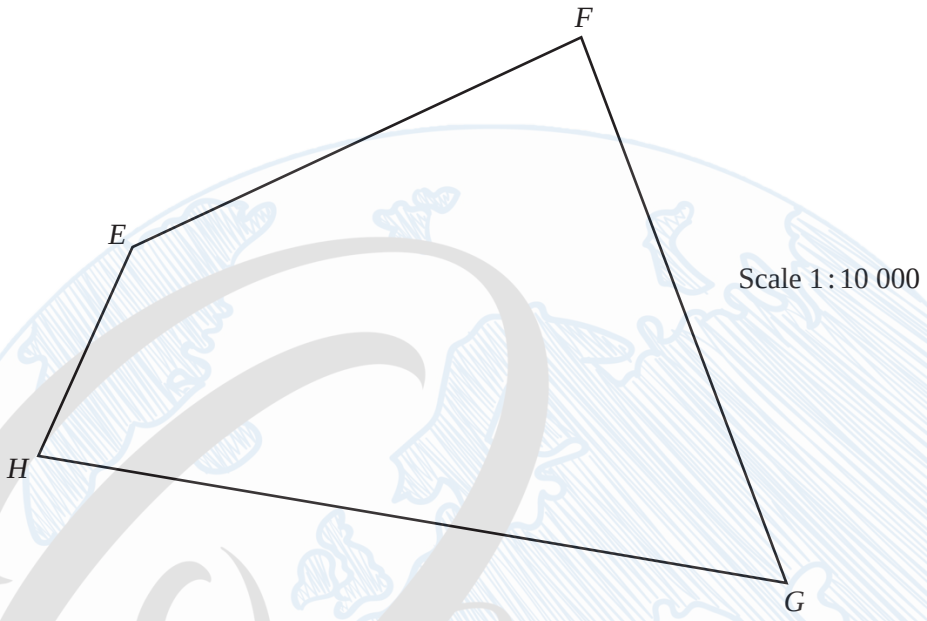
(ii) Measure the distance of *Q* from the line *AB*.

Answer(c)(ii) ..... cm [1]

(d) On the diagram, shade the region inside the quadrilateral which is

- less than 6 cm from *D*
  and
- nearer to *A* than to *B*
  and
- nearer to *AB* than to *BC*. [1]

9



The diagram is a scale drawing of a park *EFGH*. The scale is 1 : 10 000.

A statue is to be placed in the park so that it is

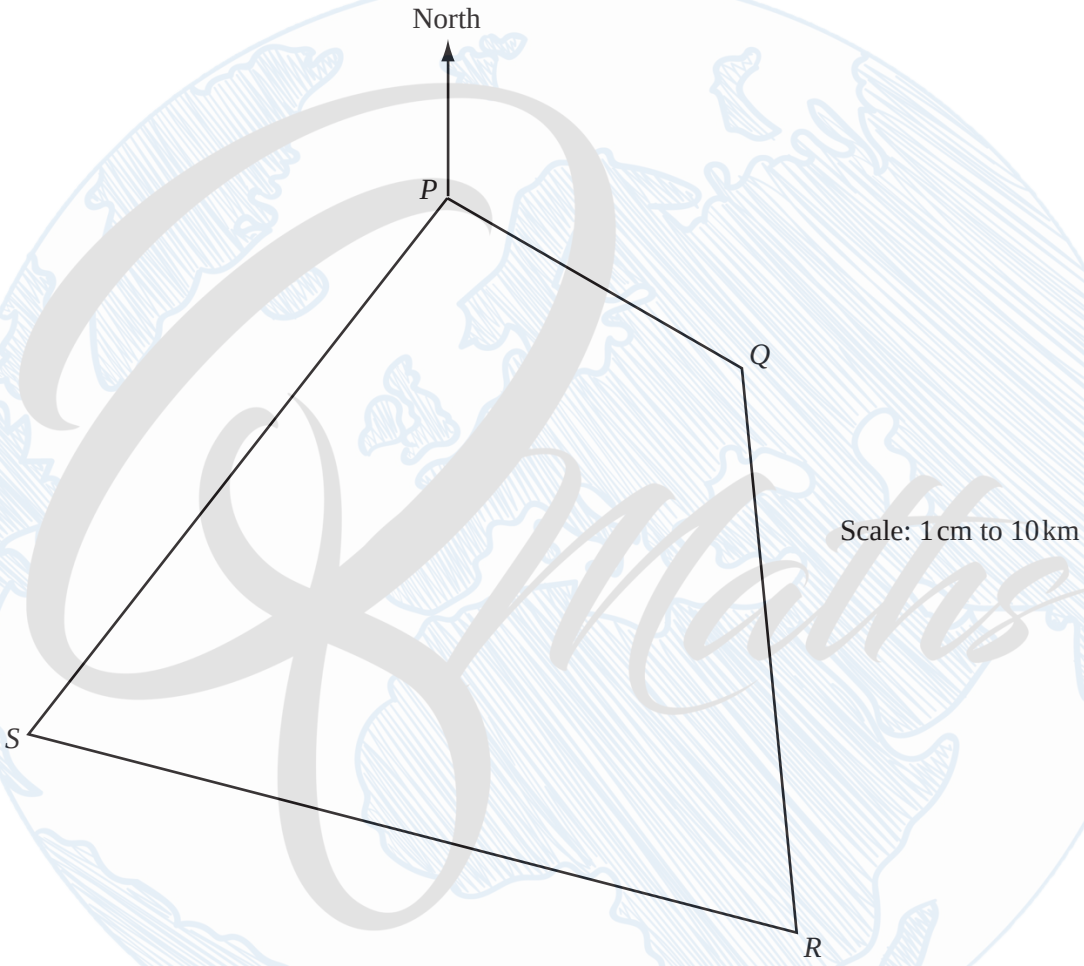
- nearer to *G* than to *H*
- nearer to *HG* than to *FG*
- more than 550 metres from *F*.

Construct accurately the boundaries of the region *R* in which the statue can be placed.

Leave in all your construction arcs and shade the region *R*. [7]

2 (a) In this question show all your construction arcs and use only a ruler and compasses to draw the boundaries of your region.

This scale drawing shows the positions of four towns, P, Q, R and S, on a map where 1 cm represents 10 km.



A nature reserve lies in the quadrilateral $PQRS$.
The boundaries of the nature reserve are:

- equidistant from Q and from R
- equidistant from PS and from PQ
- 60 km from R
- along QR

(i) Shade the region which represents the nature reserve. [7]

(ii) Measure the bearing of S from P.

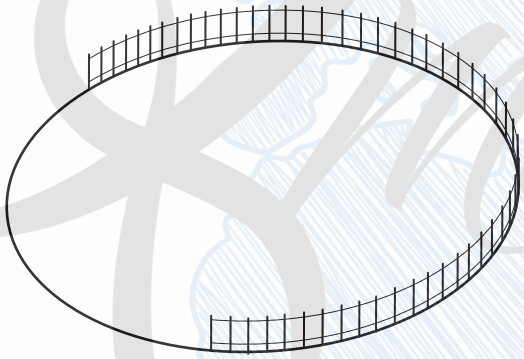
Answer(a)(ii) ..... [1]

(b) A circular lake in the nature reserve has a radius of 45 m.

(i) Calculate the area of the lake.

Answer(b)(i) ..... m^2 [2]

(ii)



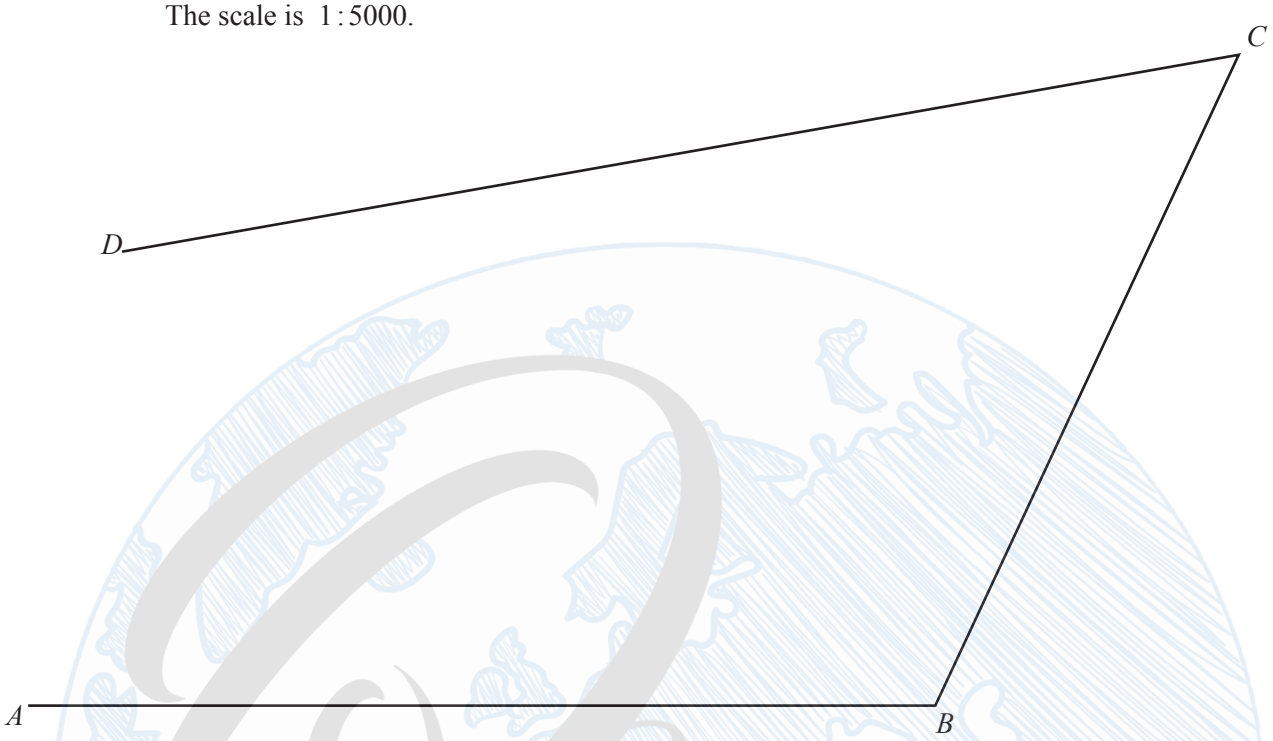
NOT TO SCALE

A fence is placed along part of the circumference of the lake.
This arc subtends an angle of 210° at the centre of the circle.

Calculate the length of the fence.

Answer(b)(ii) ..... m [2]

10 The diagram is a scale drawing of three straight roads, AB, BC and CD.
The scale is 1 : 5000.



(a) Find the actual length of the road BC
Give your answer in metres.

Answer(a) ..... m [2]

(b) Another straight road starts at M, the midpoint of AB.
This road is perpendicular to AB and it meets the road CD at X.

Using a straight edge and compasses only, construct MX. [2]

(c) There is a park in the area enclosed by the four roads.

The park is

- less than 290 m from B

and

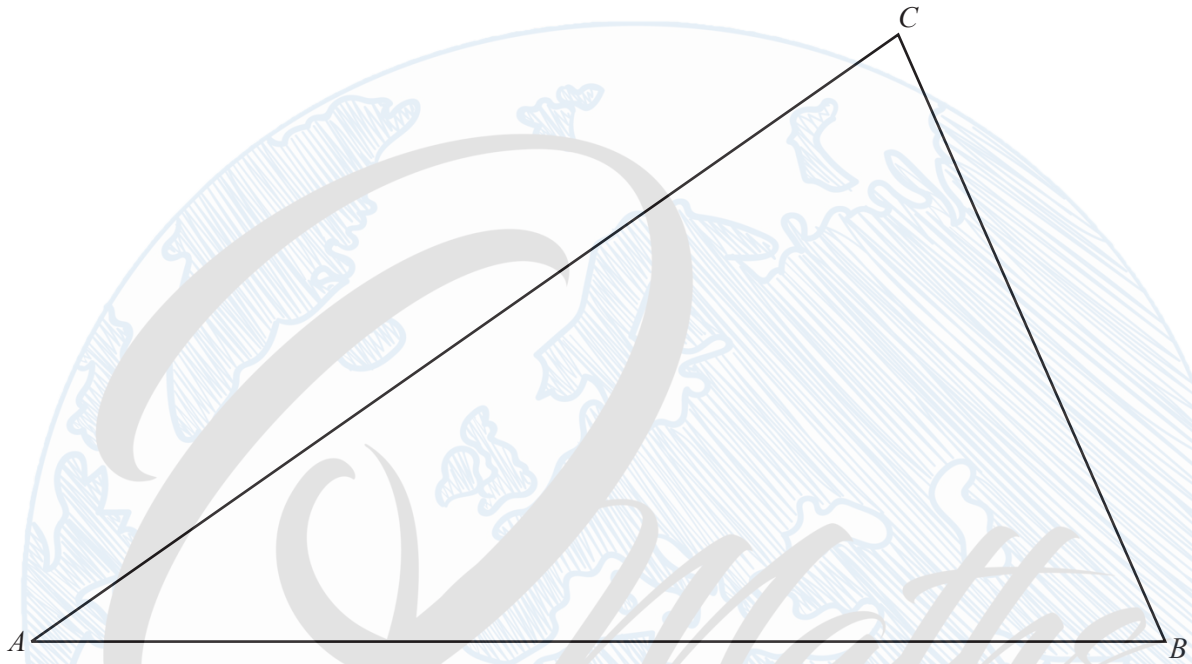
- nearer to CD than to CB.

Using a ruler and compasses only, construct the boundaries of the park.

Leave in all your construction arcs and label the park P [5]

2 **In this question use a ruler and compasses only.**
Show all your construction arcs.

The diagram shows a triangular field *ABC*.
The scale is 1 centimetre represents 50 metres.



Scale : 1 cm to 50 m

(a) Construct the locus of points that are equidistant from *A* and *B*. [2]

(b) Construct the locus of points that are equidistant from the lines *AB* and *AC*. [2]

(c) The two loci intersect at the point *E*.

Construct the locus of points that are 250 m from *E*. [2]

(d) Shade any region inside the field *ABC* that is

- more than 250 m from *E*

and

- closer to *AC* than to *AB*. [2]

2 The scale drawing shows two boundaries, *AB* and *BC*, of a field *ABCD*.
The scale of the drawing is 1 cm represents 8 m.

Scale: 1 cm to 8 m

(a) The boundaries *CD* and *AD* of the field are each 72 m long.

(i) Work out the length of *CD* and *AD* on the scale drawing.

..... cm [1]

(ii) **Using a ruler and compasses only**, complete accurately the scale drawing of the field. [2]

(b) A tree in the field is

- equidistant from *A* and *B*

and

- equidistant from *AB* and *BC*.

On the scale drawing, construct two lines to find the position of the tree.
Use a straight edge and compasses only and leave in your construction arcs. [4]