# Chhetri Academy

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**GCSE MATHS**

Geometry and measures

**Edexcel 1MA1 | Subtopic collection Topic 51**

# Constructions and loci

## Higher tier

Past paper question booklet

| 27 | 2003-2025 | Higher |
| --- | --- | --- |
| question groups | available papers | tier |

### Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

**Name** _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

**7.** The diagram represents a triangular garden $ABC$.

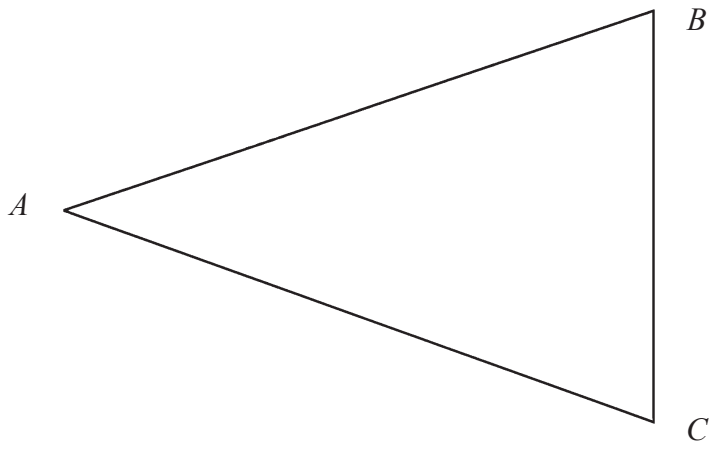
The scale of the diagram is 1 cm represents 1 m.

A tree is to be planted in the garden so that it is

nearer to $AB$ than to $AC$,
within 5 m of point $A$.

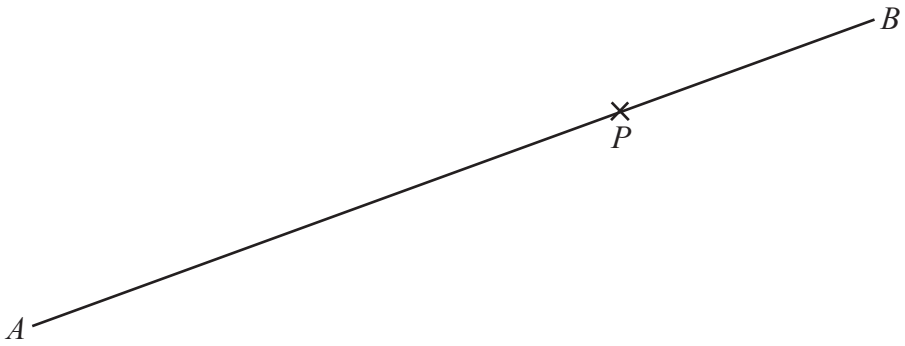
On the diagram, shade the region where the tree may be planted.

*Leave blank*



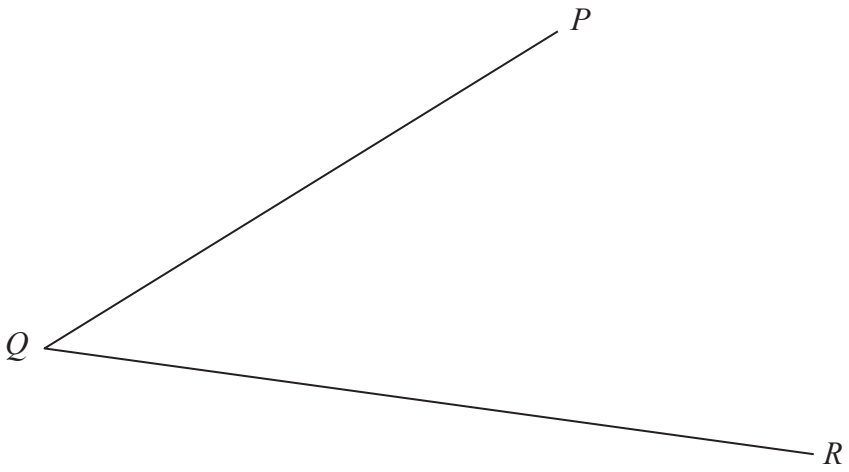

**(3)**

**5.** Use ruler and compasses to **construct** the perpendicular to the line segment $AB$ that passes through the point $P$.
You must show all construction lines.




**(2)**

**7.**




Use ruler and compasses to **construct** the bisector of angle *PQR*.
You must show all your construction lines.

**Q7**

**(Total 2 marks)**

**7.** Use ruler and compasses to **construct** an angle of 30° at $P$.
You **must** show all your construction lines.

$P$ _____

Q7

**(Total 3 marks)**

**2.** (a) Simplify $4x + 3y - 2x + 5y$

.....
**(2)**

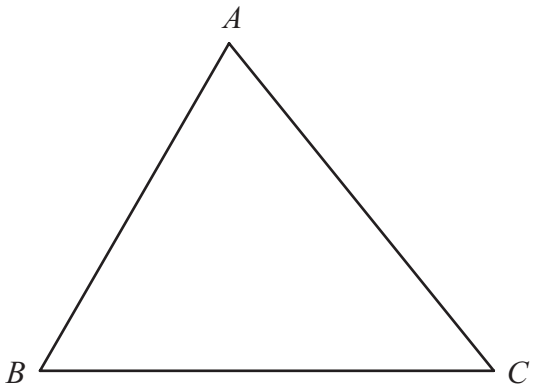
Compasses cost $c$ pence each.
Rulers cost $r$ pence each.

(b) Write down an expression for the total cost, in pence, of 2 compasses and 4 rulers.

..... pence
**(2)**
**(Total 4 marks)**

**Q2**

**12.**




*ABC* is a triangle.

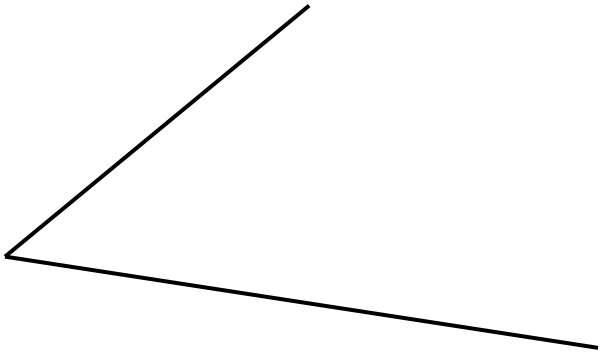
Shade the region inside the triangle which is **both**

less than 4 centimetres from the point *B*
**and** closer to the line *AC* than the line *AB*.

**Q12**

**(Total 4 marks)**

**10.** Use ruler and compasses to **construct** the bisector of this angle.
You must show all your construction lines.



Blank

Q10

**(Total 2 marks)**

**16.** Draw the locus of all points which are equidistant from the lines $AB$ **and** $AC$.



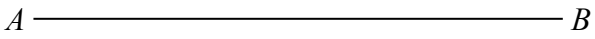

Q16

**(Total 2 marks)**

Blank

**17.** Use ruler and compasses to **construct** the perpendicular bisector of the line $AB$.

You must show all your construction lines.




**Q17**

**(Total 2 marks)**

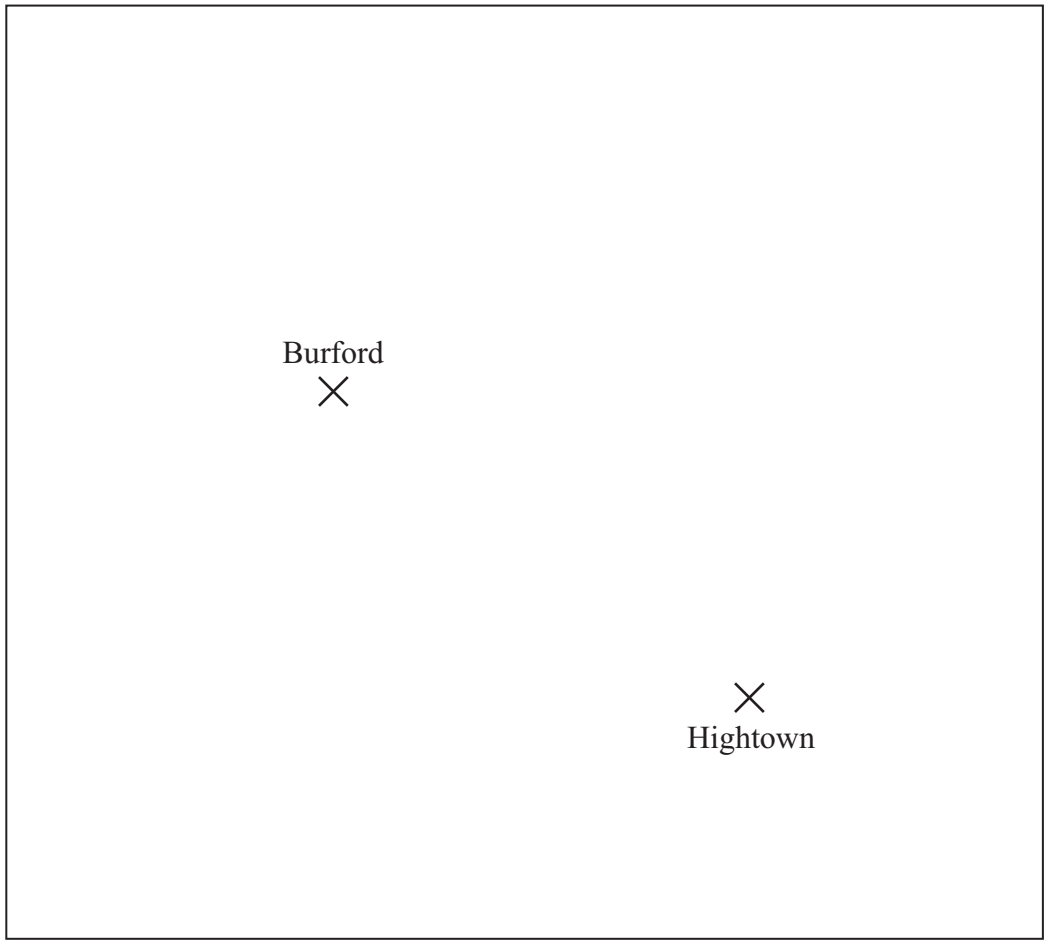
**14.** Use ruler and compasses to **construct** an angle of 30° at $P$.
You **must** show all your construction lines.




**(Total 3 marks)**

Q14

**10** Here is a map.
The map shows two towns, Burford and Hightown.




Scale: 1 cm represents 10 km

A company is going to build a warehouse.

The warehouse will be less than 30 km from Burford **and** less than 50 km from Hightown.

Shade the region on the map where the company can build the warehouse.

**(Total for Question 10 is 3 marks)**

**15** Here is a scale drawing of a rectangular garden $ABCD$.




Scale: 1 cm represents 1 metre.

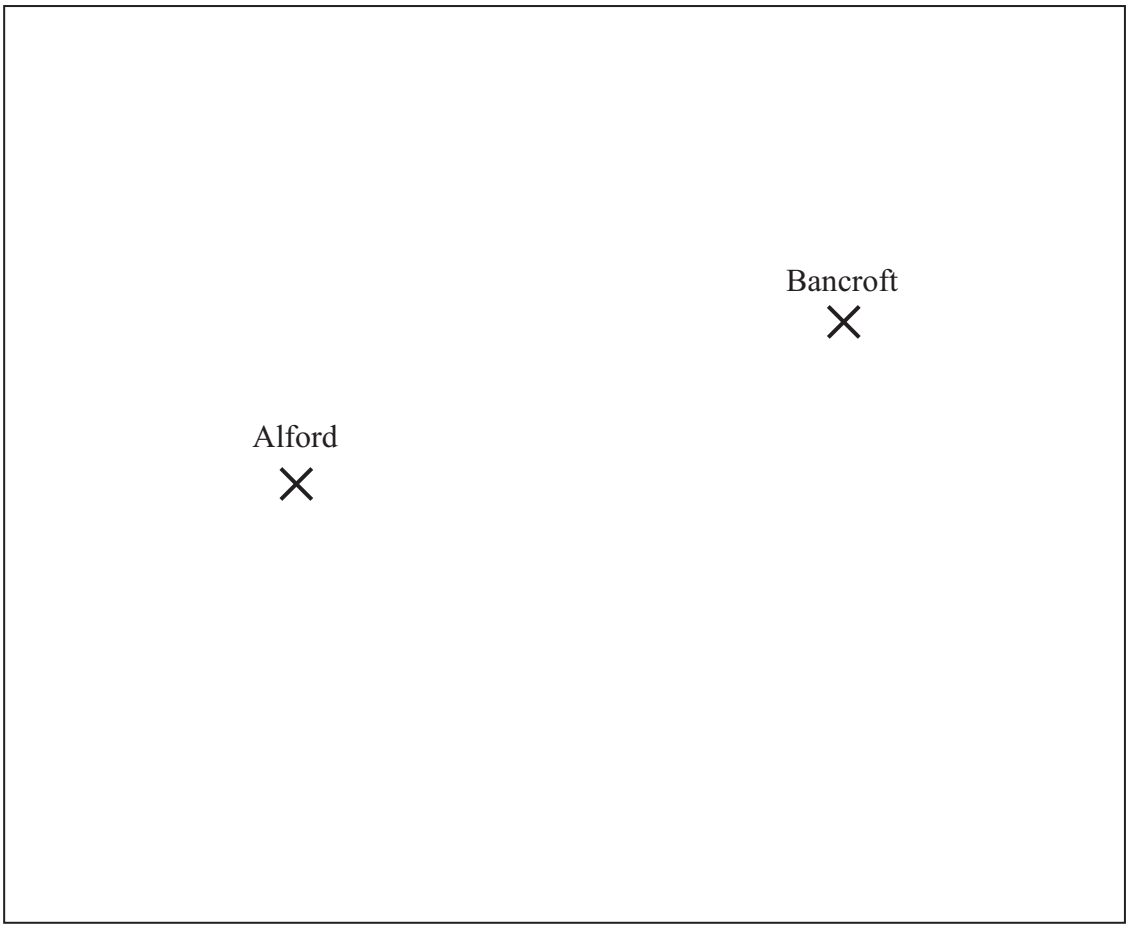
Jane wants to plant a tree in the garden

at least 5 m from point $C$,
nearer to $AB$ than to $AD$
and less than 3 m from $DC$.

On the diagram, shade the region where Jane can plant the tree.

**(Total for Question 15 is 4 marks)**

**7** The map shows the positions of two schools, Alford and Bancroft.




Scale 1 cm represents 1 km

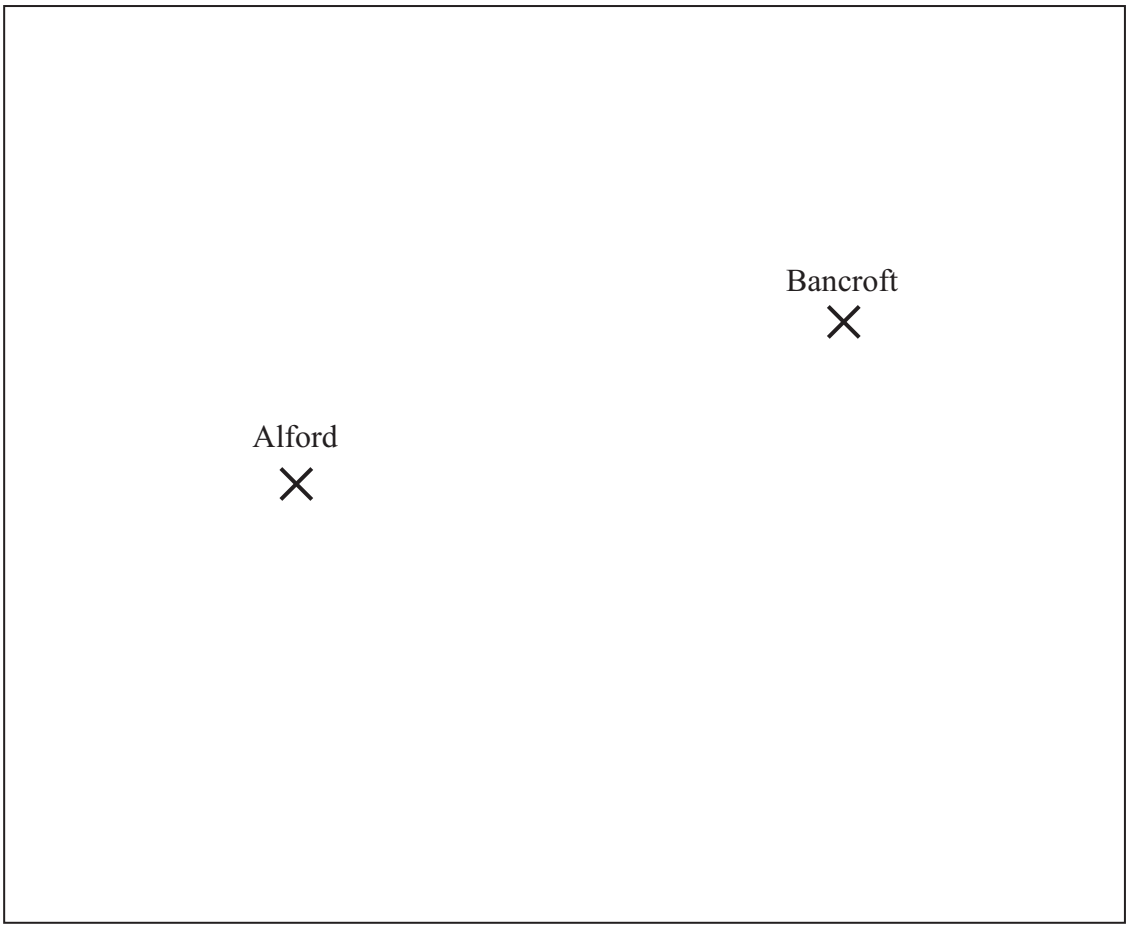
A new school is going to be built.

The new school will be less than 5 kilometres from Alford.
It will be nearer to Bancroft than to Alford.

Shade the region on the map where the new school can be built.

**(Total for Question 7 is 3 marks)**

**7** The map shows the positions of two schools, Alford and Bancroft.




Scale 1 cm represents 1 km

A new school is going to be built.

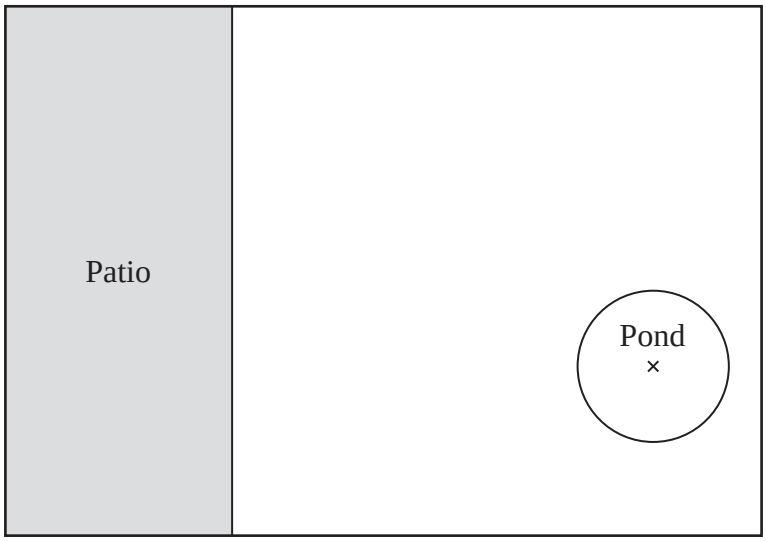
The new school will be less than 5 kilometres from Alford.
It will be nearer to Bancroft than to Alford.

Shade the region on the map where the new school can be built.

**(Total for Question 7 is 3 marks)**

**8** The diagram shows a garden in the shape of a rectangle.

The scale of the diagram is 1 cm represents 2 m.




Scale: 1 cm represents 2 m

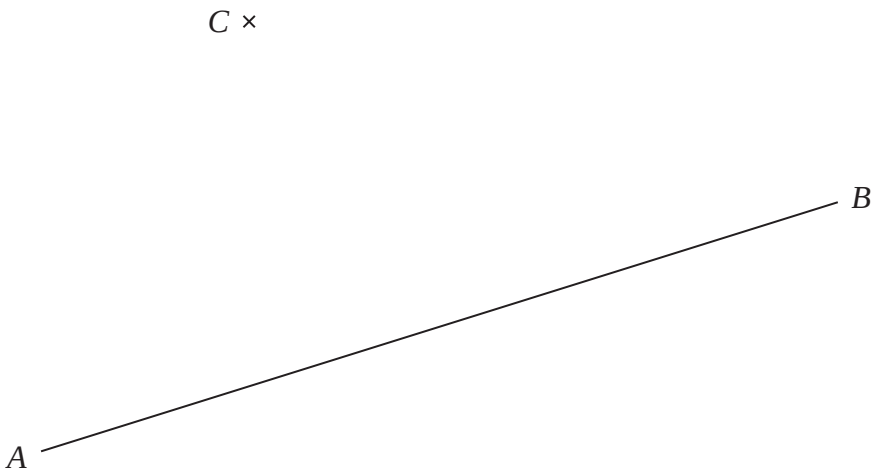
Irfan is going to plant a tree in the garden.
The tree must be

more than 3 metres from the patio
**and** more than 6 metres from the centre of the pond.

On the diagram, shade the region where Irfan can plant the tree.

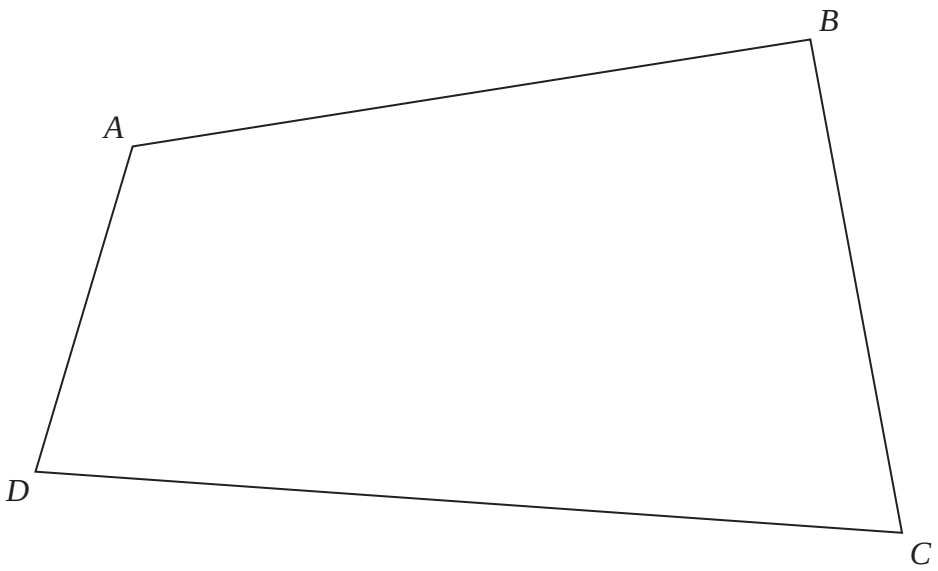
**(Total for Question 8 is 3 marks)**

**10** Use ruler and compasses to **construct** the perpendicular from point $C$ to the line $AB$.
You must show all your construction lines.




**(Total for Question 10 is 2 marks)**

**8** The diagram shows the plan of a park.



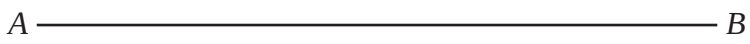

Scale: 1 cm represents 100 m

A fountain in the park is equidistant from *A* and from *C*.
The fountain is exactly 700 m from *D*.

On the diagram, mark the position of the fountain with a cross (✕).

**(Total for Question 8 is 3 marks)**

**9**




Use ruler and compasses to **construct** the perpendicular bisector of the line segment *AB*.
You must show all your construction lines.

**(Total for Question 9 is 2 marks)**

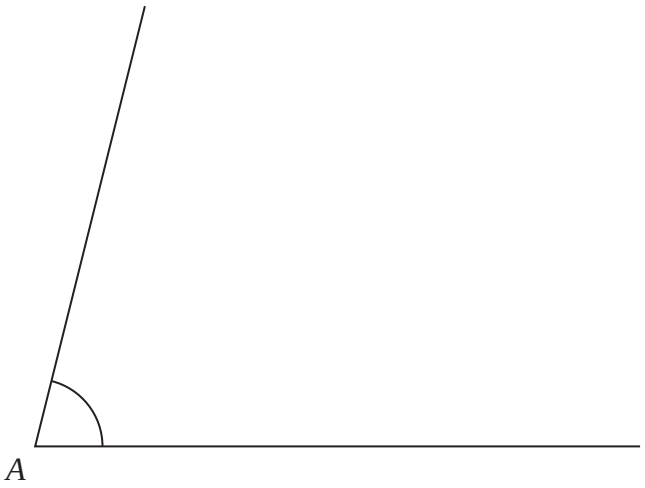
**6**




Use ruler and compasses to **construct** the perpendicular bisector of the line *AB*.
You must show all your construction lines.

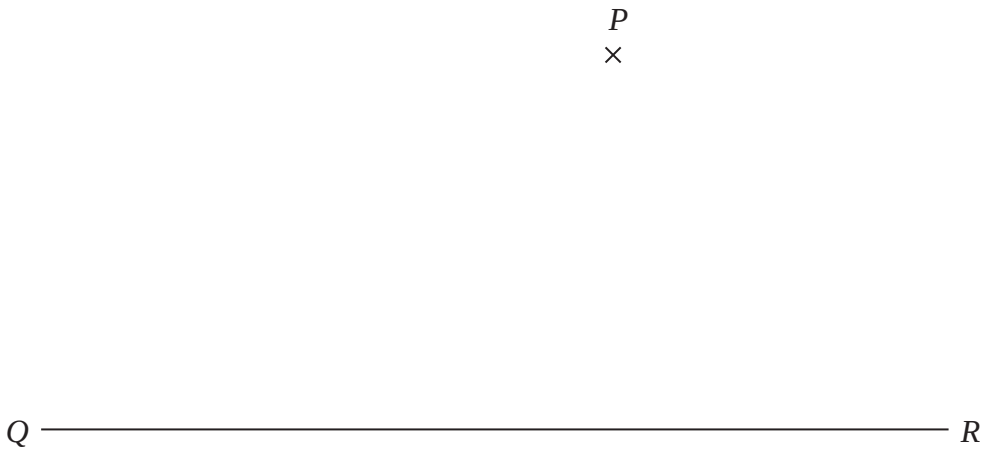
**(Total for Question 6 is 2 marks)**

**14** (a) Use ruler and compasses to bisect the angle at *A*.
You must show all your construction lines.




**(2)**

(b) Use ruler and compasses to construct the perpendicular from the point *P* to the line *QR*.
You must show all your construction lines.



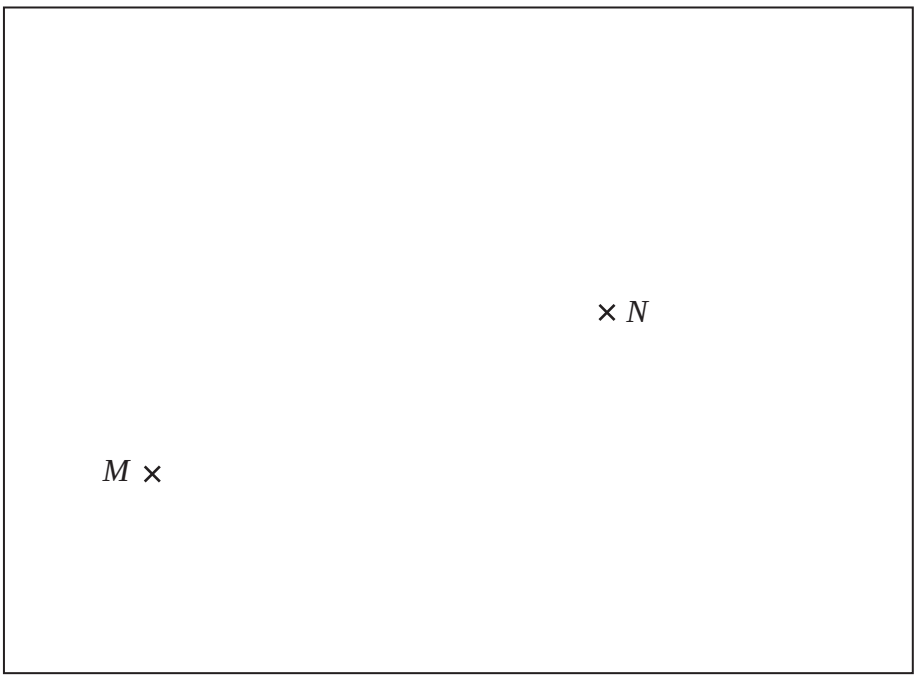

**(2)**

**(Total for Question 14 is 4 marks)**

**5** Here is a map.
The map shows two towns Marlford ($M$) and Newborough ($N$).

A company is going to build a supermarket.
The supermarket will be more than 10 km from Marlford and less than 6 km from Newborough.

Find and shade the region on the map where the company can build the supermarket.




Scale: 1 cm represents 2 km.

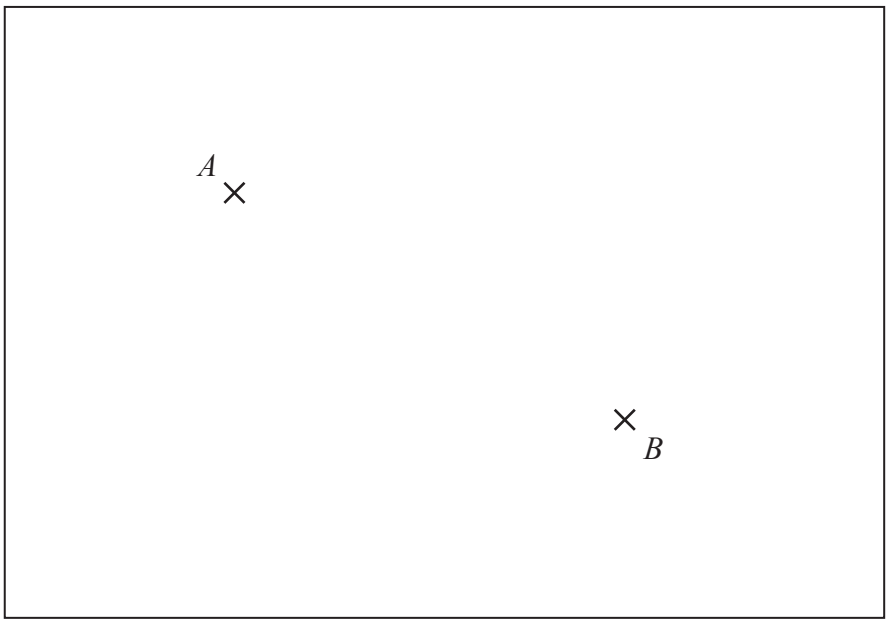
**(Total for Question 5 is 3 marks)**

**4** Use ruler and compasses to construct the perpendicular bisector of the line *AB*.
You must show all your construction lines.




**(Total for Question 4 is 2 marks)**

**7** Here is a map.
The map shows two airports, $A$ and $B$.




Scale: 1 cm represents 10 km

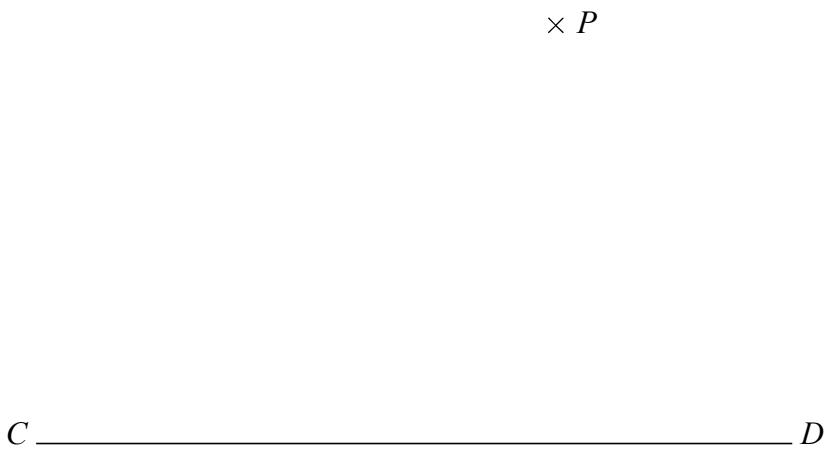
Sophie is going to have a hotel built.

The hotel
will be closer to airport $A$ than to airport $B$
will be less than 40 km from airport $B$

On the map, shade the region where the hotel can be built.

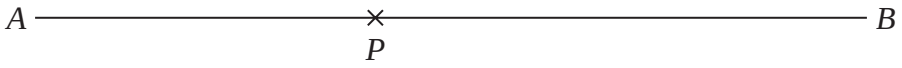
**(Total for Question 7 is 3 marks)**

**4** Use a ruler and compasses to construct the line from the point $P$ perpendicular to the line $CD$.
You must show **all** construction lines.




**(Total for Question 4 is 2 marks)**

**5** The point $P$ lies on the line $AB$.
Use ruler and compasses to construct an angle of 90° at $P$.
You must show all your construction lines.

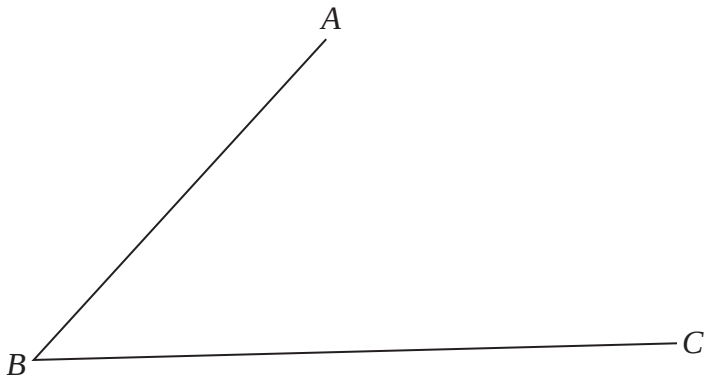



**(Total for Question 5 is 2 marks)**

## Question 26

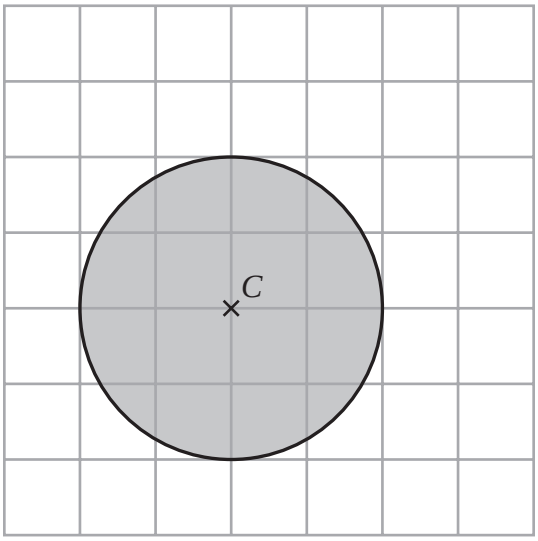


**3** Use ruler and compasses to construct the bisector of angle *ABC*.
You must show your construction lines.




**(Total for Question 3 is 2 marks)**

**4** The point $C$ is shown on a centimetre grid.




A point $P$ is at least 2 cm from the point $C$.
Nadia is asked to shade the region where point $P$ could be.

Her answer is shown on the grid.

Explain the mistake Nadia has made.

.....

.....

.....

**(Total for Question 4 is 1 mark)**