

Constructions and loci

Exam questions

Foundation and Higher tiers

Please write clearly in block capitals.

Name

Class

Teacher

Time allowed: 45 minutes

Materials

For this booklet you need a black pen, a pencil, a ruler, a rubber, a protractor, a pair of compasses 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 10): you must not use a calculator.
- **Section B** (questions 11 to 14): 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 38.

Advice

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

For teacher’s use

Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
TOTAL	

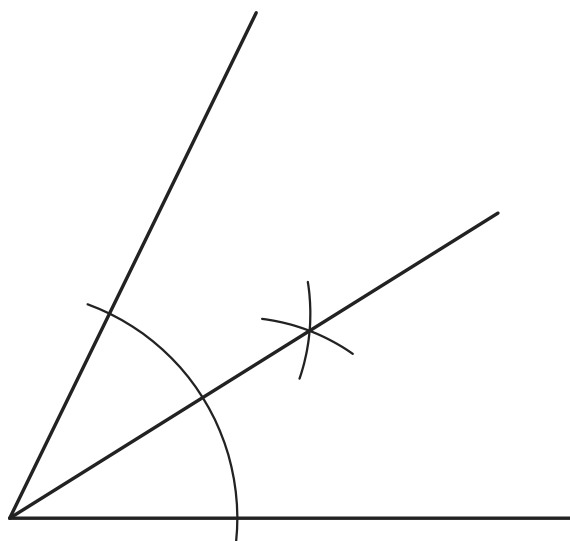
Section A



You must not use a calculator

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the box

- 1** Sanjay has used ruler and compasses to make this construction.



What has Sanjay constructed?

Circle your answer.

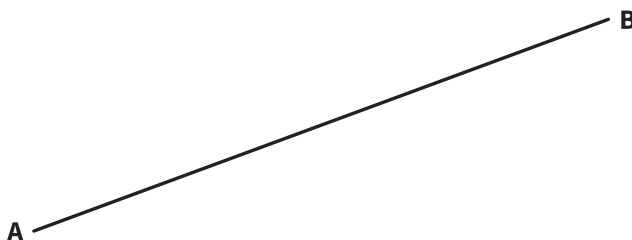
a perpendicular bisector

an angle bisector

an equilateral triangle

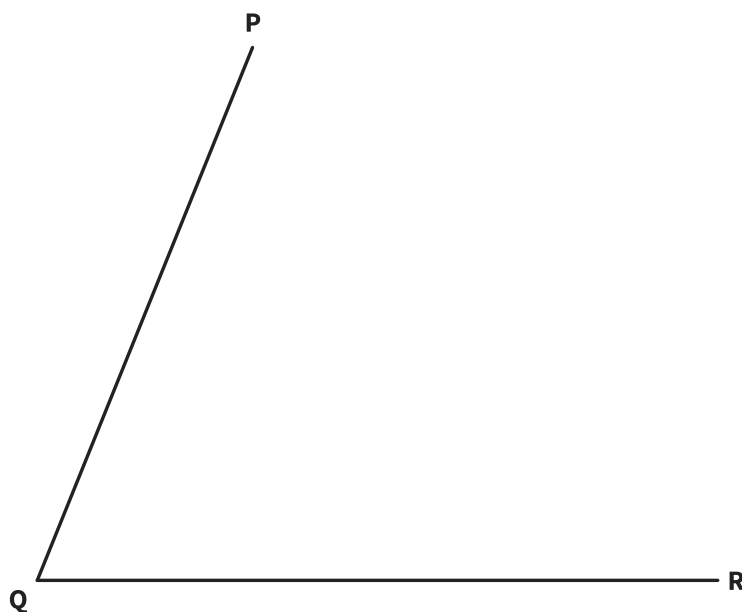
[1 mark]

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



[2 marks]

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



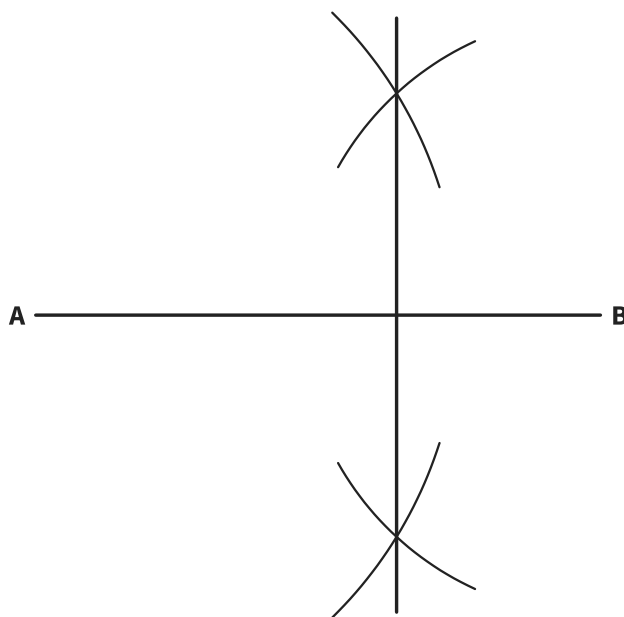
[2 marks]

- 4** The line AB is one side of triangle ABC.
 $AC = 4.5 \text{ cm}$ and $BC = 4 \text{ cm}$
- Use ruler and compasses to construct triangle ABC.
You must show all your construction lines.



[2 marks]

- 5 Ben tries to construct the perpendicular bisector of AB.
Here is his construction.



Explain what Ben has done wrong.

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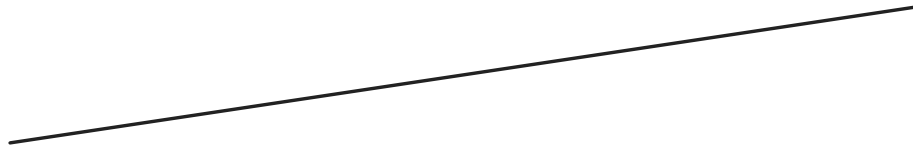
[1 mark]

6

The diagram shows a straight line and a point P.

- (a) Use ruler and compasses to construct the perpendicular from P to the line.
You must show all your construction lines.

P
•



[2 marks]

- (b) Measure the shortest distance from P to the line.
Give your answer in centimetres.

Answer _____ cm

[1 mark]

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- 7** Use ruler and compasses to construct an angle of 45° at P.
You must show all your construction lines.

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[3 marks]

- 8** (a) Circle the locus of points that are the same distance from two fixed points A and B.
a circle with centre A the perpendicular bisector of AB
a line parallel to AB

[1 mark]

- (b) The diagram shows a line segment PQ.
Draw the locus of points that are exactly 2 cm from PQ.

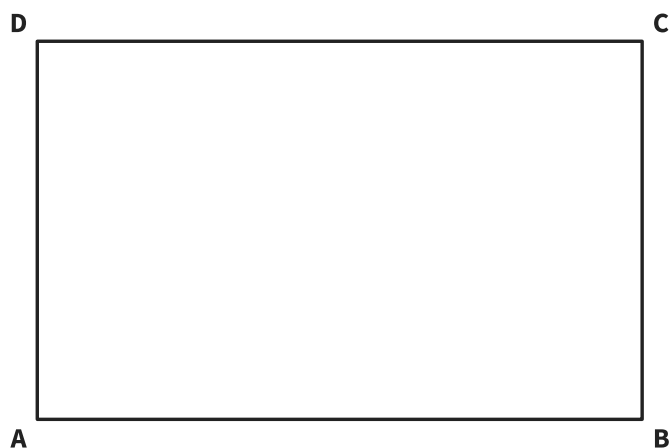


[2 marks]

- 9 The diagram shows a scale drawing of a rectangular garden ABCD.
Scale: 1 cm represents 1 m

A tree is planted in the garden.
The tree is more than 3 m from A.
The tree is nearer to AB than to AD.

Shade the region where the tree could be planted.
You must show all your construction lines.



[3 marks]

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- 10** The line AB is one side of triangle ABC.
Angle CAB = 60° and angle ABC = 45°

Use ruler and compasses to construct triangle ABC.
You must not use a protractor.
You must show all your construction lines.

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[4 marks]

Section B

You may use a calculator

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- 11** The map shows two lifeboat stations, A and B, and a buoy, C.
Scale: 1 cm represents 10 km

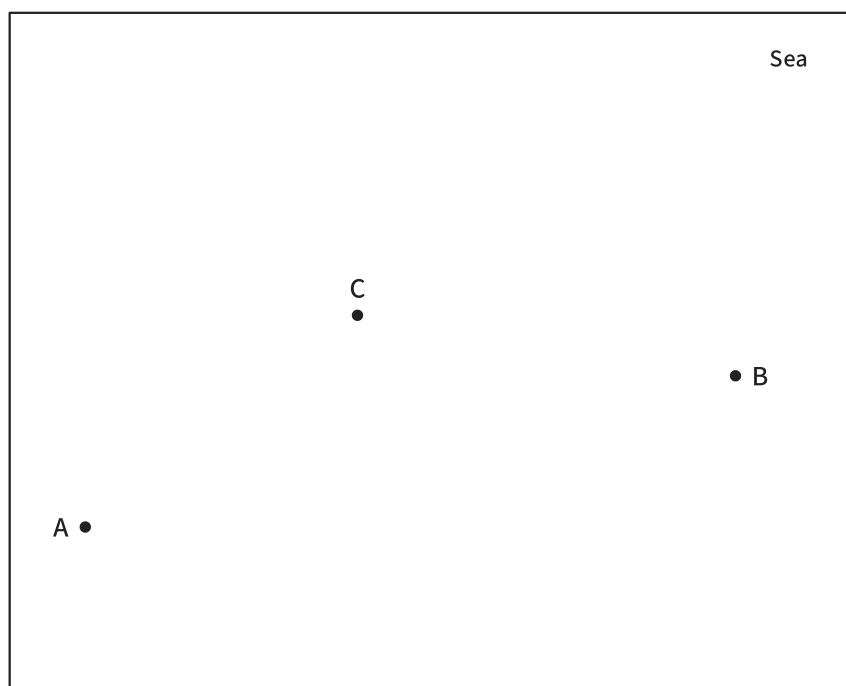
A boat is in trouble at sea.

The boat is nearer to A than to B.

The boat is less than 35 km from C.

Shade the region where the boat could be.

You must show all your construction lines.

**[3 marks]**

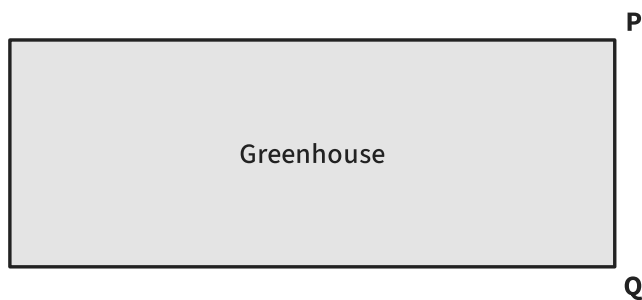
- 12** The diagram shows a scale drawing of a greenhouse.
Scale: 2 cm represents 1 m

A tap is fixed at the corner P of the greenhouse.

A hose 2.5 m long is joined to the tap.

The hose can bend round the corners of the greenhouse but cannot go through it.

Shade the region the end of the hose can reach.

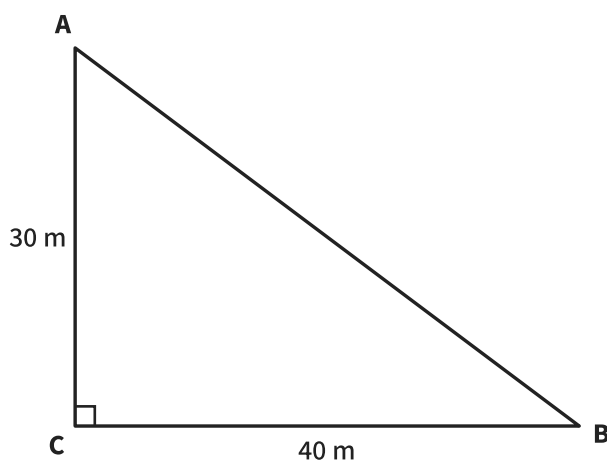


[3 marks]

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- 13** ABC is a field in the shape of a right-angled triangle.
A water trough is at C.
AB is a straight fence.

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Not drawn accurately

Work out the shortest distance from the trough to the fence AB.

Answer _____ m

[3 marks]

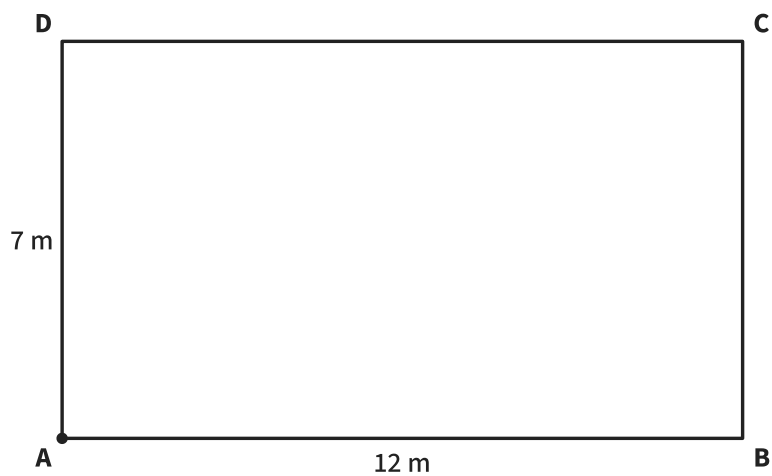
14

ABCD is a rectangular yard.

$AB = 12\text{ m}$ and $AD = 7\text{ m}$

A security light is fixed at the corner A.

The light lights up every point in the yard that is 9 m or less from A.



Not drawn accurately

Work out the percentage of the yard that is lit up.

Give your answer to 1 decimal place.

Answer _____ %

[5 marks]

END OF QUESTIONS

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