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**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS SYLLABUS A**

J512/01

Paper 1 (Foundation Tier)

**Monday 6 June 2011
Afternoon**

Duration: 2 hours

Candidates answer on the question paper.

OCR supplied materials:
None

- Other materials required:**
- Geometrical instruments
 - Tracing paper (optional)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

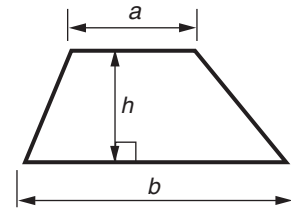
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **100**.
- This document consists of **24** pages. Any blank pages are indicated.

WARNING

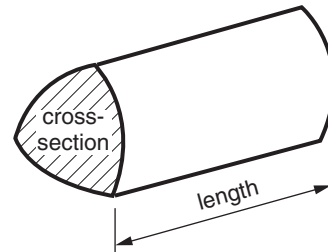
No calculator can be used for this paper

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2} (a + b)h$




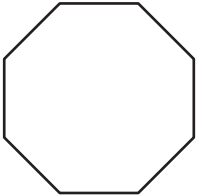
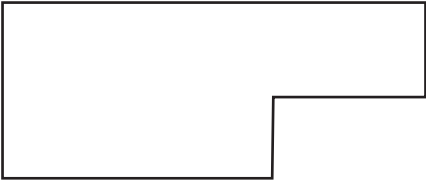
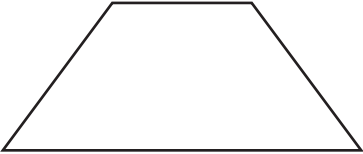
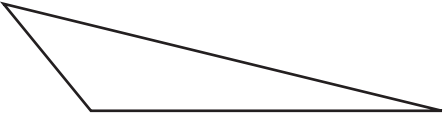
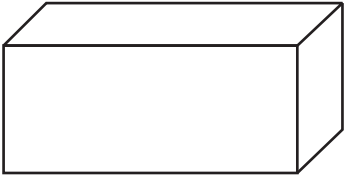
Volume of prism = (area of cross-section) \times length



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1 For each of these shapes three possible names are given.

Put a tick (✓) beside the correct mathematical name.
The first one has been done for you.

	<p>square</p> <p>circle</p> <p>rectangle ✓</p>
	<p>octagon</p> <p>decagon</p> <p>hexagon</p>
	<p>octagon</p> <p>pentagon</p> <p>hexagon</p>
	<p>trapezium</p> <p>rhombus</p> <p>arrowhead</p>
	<p>isosceles triangle</p> <p>equilateral triangle</p> <p>scalene triangle</p>
	<p>cube</p> <p>cuboid</p> <p>cone</p>

[5]

- 2 Carlos did a survey to find out what fruit people liked. Some of his results are shown in the table.

Fruit	Tally	Frequency
Strawberry		3
Orange		
Apple		
Pear		7
Mango		

(a) Complete the four spaces in the table. [2]

(b) Which fruit was the most popular?

(b) _____ [1]

(c) How many more people liked mango than strawberry?

.....

(c) _____ [1]

Carlos asked 50 people in his survey.

Twelve people did not answer, some people gave the name of one fruit and all the rest gave the names of two fruits.

(d) How many people gave the names of two fruits?

.....

.....

(d) _____ [3]

3 Work out.

(a) $166 + 383$

.....
.....

(a) _____ [1]

(b) $707 - 123$

.....
.....

(b) _____ [1]

(c) $144 \div 8$

.....
.....

(c) _____ [1]

(d) 46×27

.....
.....
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.....
.....
.....
.....
.....

(d) _____ [3]

- 4 (a) Put a ring round each of the two fractions that are equivalent to $\frac{1}{4}$.

$$\frac{21}{24} \quad \frac{3}{12} \quad \frac{21}{84} \quad \frac{4}{7} \quad [2]$$

- (b) Put a ring round each of the two terms that are equivalent to 0.75.

$$75\% \quad 7.5\% \quad \frac{5}{7} \quad \frac{3}{4} \quad \frac{75}{10} \quad [2]$$

- (c) Put a ring round each of the two terms that are equivalent to 30%.

$$0.03 \quad 0.3 \quad \frac{1}{3} \quad \frac{15}{20} \quad \frac{3}{10} \quad [2]$$

- 5 (a) The first three even numbers are 2, 4 and 6.

Write down the next two even numbers.

(a) _____ [1]

- (b) 17 is an odd number.

Write down the odd numbers that come immediately before and immediately after 17.

.....

(b) _____ [2]

- 6 A recipe book gives this rule to find the cooking time for a leg of lamb.

$\begin{array}{l} \text{cooking time in} \\ \text{minutes} \end{array} = 30 \times \text{weight in pounds} + 30$
--

- (a) Dave is cooking a leg of lamb.
It weighs 4 pounds.

Work out the cooking time in minutes.

.....

.....

.....

.....

(a) _____ minutes [2]

- (b) Ann is cooking a larger leg of lamb.
It weighs $8\frac{1}{2}$ pounds.

Work out the cooking time.
Give your answer in hours and minutes.

.....

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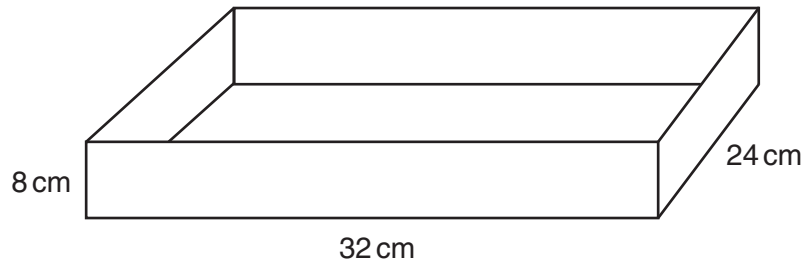
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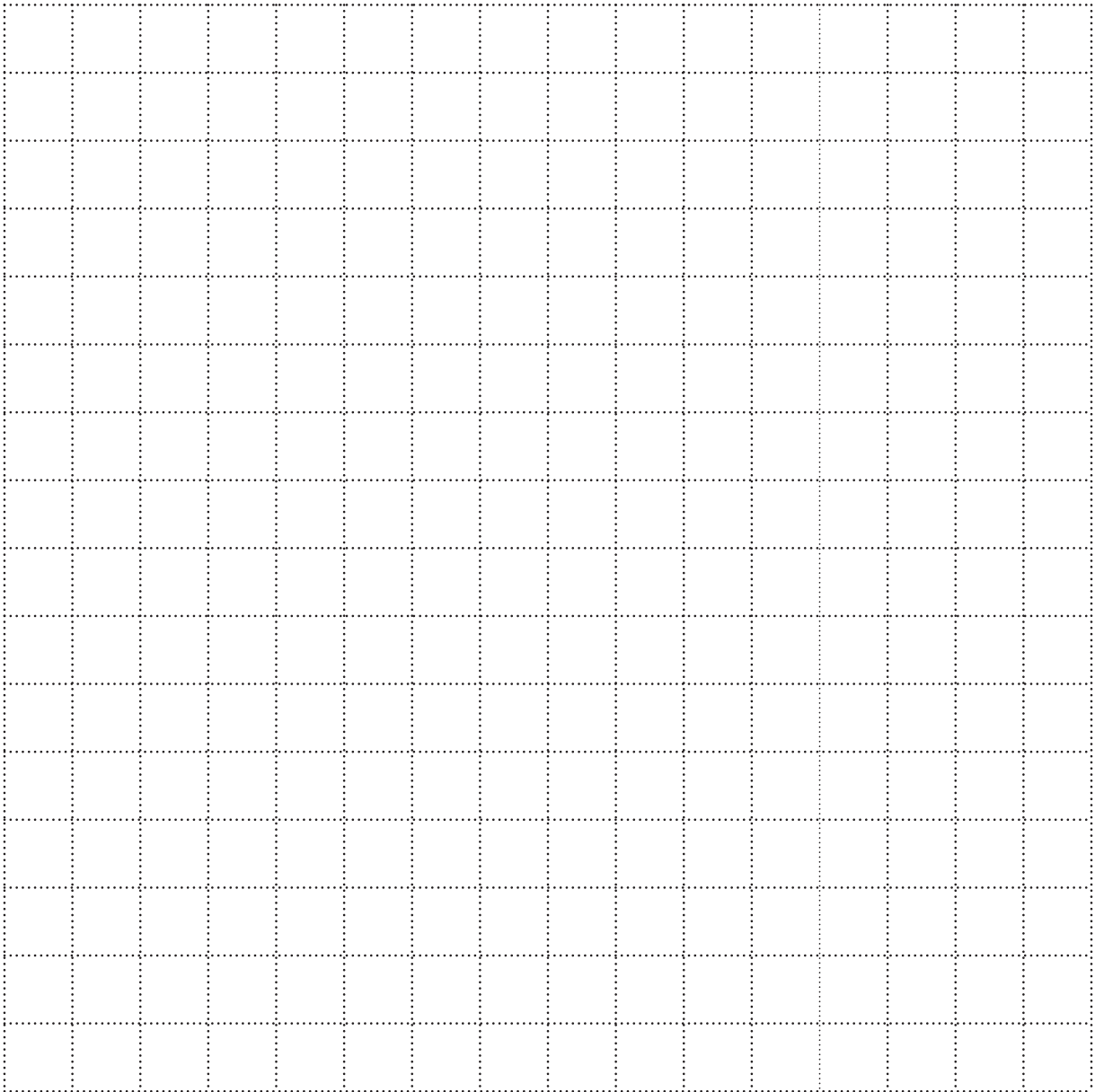
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(b) _____ hours _____ minutes [3]

- 7 Jo keeps the paper for her printer in an open-top box. Its base is a rectangle and its height is 8 cm.



- (a) Use the centimetre grid below to draw a net of this box.
Use a scale of 1 cm to represent 4 cm.



[3]

(b) Jo has 400 sheets of paper.

(i) 15% of the sheets are yellow.

Work out how many yellow sheets Jo has.

.....
.....

(b)(i) _____ [2]

(ii) Each sheet of Jo's paper is 0.08 mm thick.

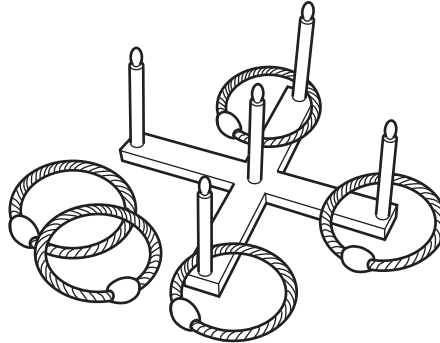
What is the height of her pile of 400 sheets?

.....
.....

(ii) _____ mm [2]

8 Sam and Lizzie are playing a game in their garden.

On each turn they throw five rings and count how many they get over a peg.
The picture shows a game in which Lizzie has scored 3.



(a) Lizzie plays ten times.
Here are her scores.

0 0 0 0 1 1 2 2 3 5

(i) What is the median of Lizzie's scores?

.....

(a)(i) _____ [1]

(ii) Lizzie plays for an eleventh time.

Explain why the median of her scores will not change.

_____ [1]

(b) Sam plays ten times.
Here are his scores.

1 1 2 2 2 3 3 4 5 5

(i) Work out the mean of Sam's scores.

.....
.....
.....
.....
.....

(b)(i) _____ [3]

Sam plays for an eleventh time.

(ii) What is the largest amount by which he can improve his mean score?

.....
.....
.....
.....
.....

(ii) _____ [3]

9 (a) What is the square of 1?

.....

(a) _____ [1]

(b) Work out.

(i) $2^3 + \sqrt{9}$

.....

.....

(b)(i) _____ [2]

(ii) $\sqrt[3]{125}$

.....

(ii) _____ [1]

(iii) 0.8×0.5

.....

(iii) _____ [1]

(c) (i) Ken thinks that 21 is a prime number.

Give a reason why he is wrong.

_____ [1]

(ii) Write down the next prime number **after** 13.

.....

(c)(ii) _____ [1]

10 Here is part of the train timetable for the Esk Valley railway line in Yorkshire.

Whitby to Middlesbrough

Whitby	–	–	–	0852	–	1241
Grosmont	–	–	–	0909	–	1258
Danby	–	–	–	0930	–	1319
Battersby	–	–	–	0953	–	1342
Nunthorpe	0719	0830	0916	1005	1216	1354
Middlesbrough	0729	0843	0929	1018	1228	1407

Middlesbrough to Whitby

Middlesbrough	1449	1647	1740	1754	1949	2044
Nunthorpe	1503	1659	1751	1808	2003	2055
Battersby	–	–	1803	–	–	2111
Danby	–	–	1825	–	–	2129
Grosmont	–	–	1846	–	–	2150
Whitby	–	–	1907	–	–	2211

Malcolm catches the 0852 from Whitby to Middlesbrough.
 When he returns from Middlesbrough he catches the 1754 to Nunthorpe where he meets a friend.
 He then catches the next train from Nunthorpe to Whitby.

How many minutes does he spend altogether on these three train journeys?

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.....

.....

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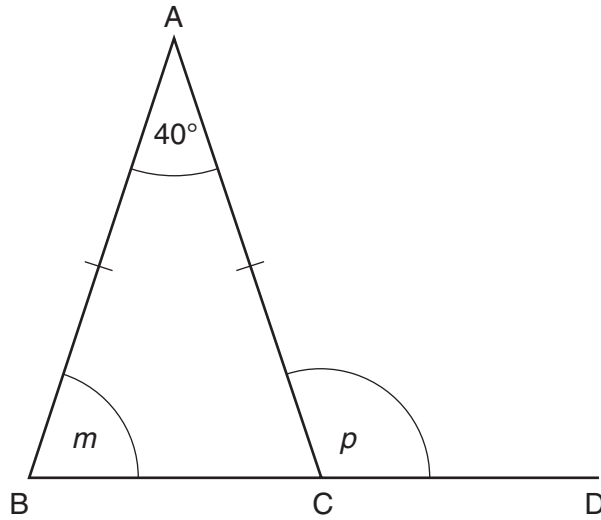
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_____ minutes [3]

11



NOT TO SCALE

Triangle ABC is isosceles with angle $A = 40^\circ$.
BCD is a straight line.

(a) Calculate the size of angle m .

.....

(a) _____ ° [2]

(b) Calculate the size of angle p .
Give a reason for your answer.

.....

$p =$ _____ ° because _____

_____ [2]

12 This stem and leaf diagram shows the heights in centimetres of some cactus plants. The shortest plant is 2.3 cm high.



Key: ____ | ____ represents _____ cm

(a) Complete the key. [1]

(b) Another cactus plant is 3.8 cm high.

Add this height to the stem and leaf diagram. [1]

The diagram is now complete.

(c) How many plants are now represented in the diagram?

.....
(c) _____ [1]

(d) What is the range of the heights of the plants?

.....
(d) _____ cm [1]

(e) What is the modal height?

.....
(e) _____ cm [1]

13 (a) Solve.

(i) $10x = 420$

.....

(a)(i) _____ [1]

(ii) $y - 7 = 29$

.....

(ii) _____ [1]

(b) Simplify.

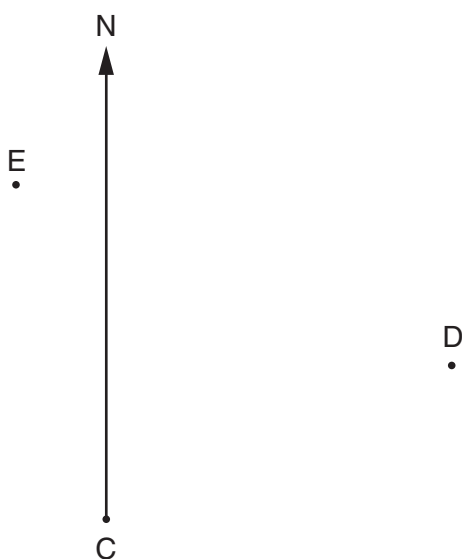
$$t \times t \times t \times t \times t$$

.....

(b) _____ [1]

14 This diagram shows three towns C, D and E.

The scale is 1 cm represents 20 miles.



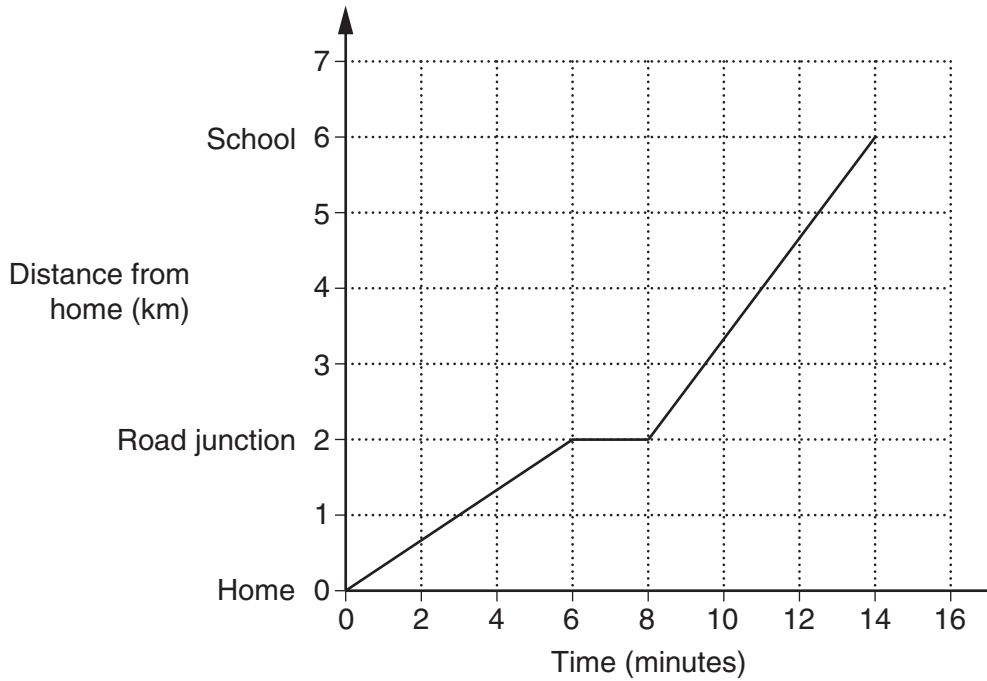
Complete these sentences.

(a) The bearing of town D from town C is _____°. [1]

(b) The bearing of town E from town C is _____°. [1]

(c) The distance from town D to town E is _____ miles. [2]

- 15 Laura's mum drove her to school one morning. The graph represents their journey.



Complete this description of their journey from home to school.

.....

.....

.....

.....

From home to the road junction they travelled at a constant speed of _____ km/h.

When they reached the road junction they _____ for _____ minutes.

After the road junction they travelled at a _____ speed of _____ km/h until they reached school.

[6]

16 Solve.

(a) $\frac{x}{2} = 8$

.....
.....

(a) _____ [1]

(b) $3(2x - 5) = 30$

.....
.....
.....
.....

(b) _____ [3]

- 17 (a) Tom had £50.
He bought a bike for £46.

What percentage of the £50 did Tom spend on the bike?

.....
.....
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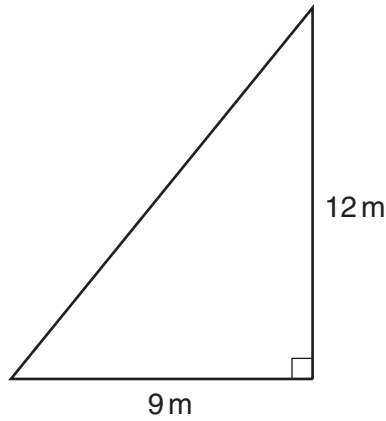
(a) _____ % [2]

- (b) A company makes pork pies in two sizes.
The smaller pork pies each weigh 820 g.
The larger pork pies weigh $17\frac{1}{2}\%$ more than the smaller ones.

Work out the weight of one of the larger pork pies.

.....
.....
.....
.....
.....

(b) _____ g [3]



NOT TO SCALE

(a) (i) Work out the area of this triangle.

.....

.....

.....

(a)(i) _____ m² [2]

(ii) Change your answer to part (a)(i) to an area in cm².

.....

.....

.....

(ii) _____ cm² [1]

(b) Work out the length of the hypotenuse of the triangle.

.....

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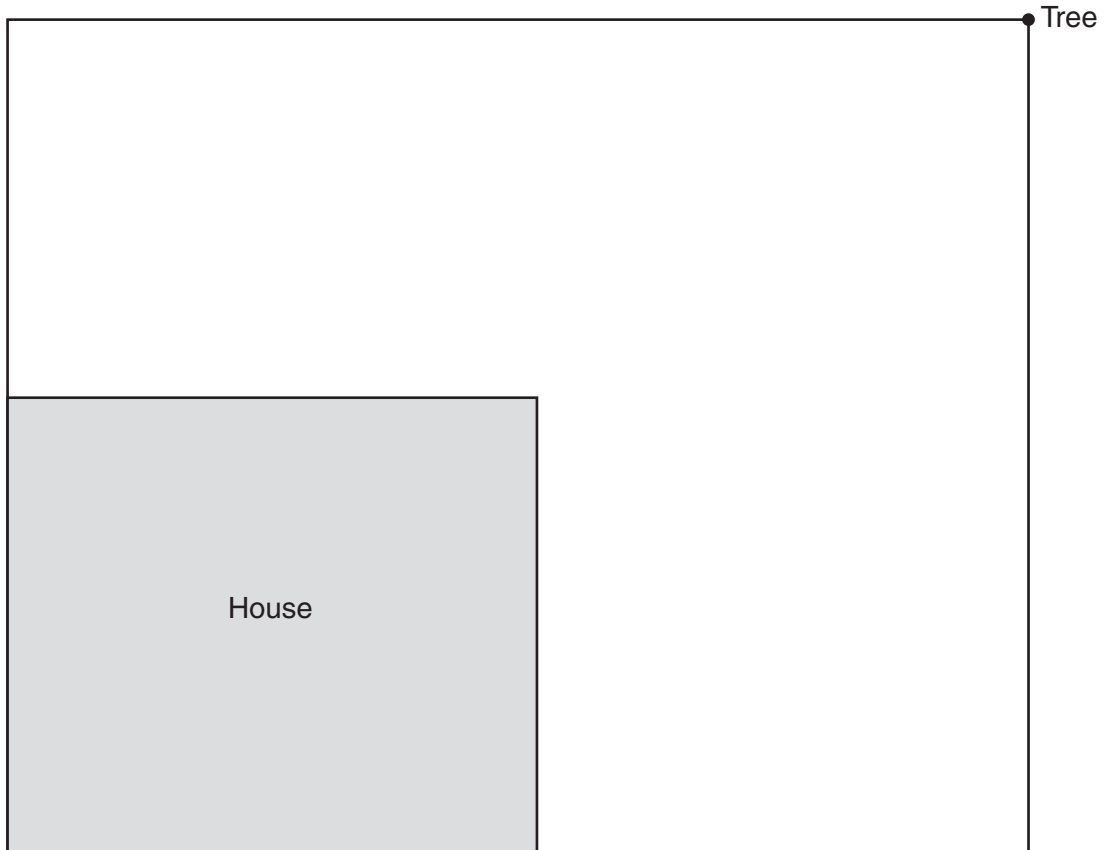
(b) _____ m [3]

TURN OVER FOR QUESTION 19

19 Use ruler and compasses in this question.

The diagram is a scale drawing of a house and its garden.
There is a tree in one corner of the garden.

The scale is 1 cm represents 2 m.



A second tree is to be planted in the garden.
It must be

- more than 8 m from the house,
- more than 12 m from the first tree.

On the diagram construct accurately and shade the regions where the second tree can be planted.

[6]

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