Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 – 3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
TOTAL	

General Certificate of Secondary Education
Higher Tier
March 2012

Mathematics 43601H

Unit 1

Monday 5 March 2012 1.30 pm to 2.30 pm

H

For this paper you must have:
- a calculator
- mathematical instruments.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 54.
- The quality of your written communication is specifically assessed in Questions 1 and 8. These questions are indicated with an asterisk (*)
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

Advice
- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

***1** Anna hits some old tennis balls.
The speeds (mph) of the balls are shown.

46	55	64	48	51
57	65	60	53	72
61	59	52	53	49

1 (a) Show the data in an ordered stem-and-leaf diagram.
Remember to complete the key.

Key: ..... | ..... represents ..... mph

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(4 marks)

1 (b) Work out the median speed.

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Answer ..... mph *(1 mark)*

1 (c) Anna hits some new tennis balls.
The median speed of the new balls is 59 mph.

She says the speeds of the new balls are at least 5% faster than the old balls.

Is she correct?
You **must** show your working.

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(3 marks)

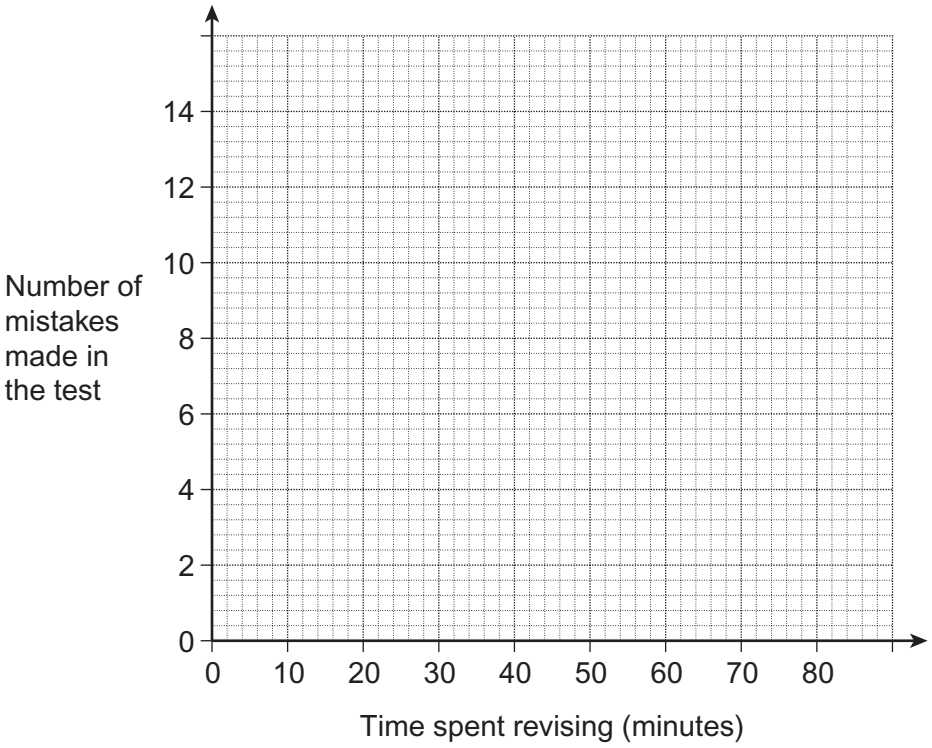
Turn over for the next question

8

2 Six pupils took a spelling test.

Time spent revising (minutes)	10	15	35	40	45	50
Number of mistakes made in the test	14	11	5	5	2	3

2 (a) Plot the data on the scatter diagram.



(2 marks)

2 (b) A pupil revised for 25 minutes.

Use a line of best fit to estimate the number of mistakes he made.

Answer ..... *(2 marks)*

2 (c) Another pupil in the class revised for 75 minutes.

Did she make any mistakes?
Tick a box.

Yes ☐ No ☐ Cannot tell ☐

(1 mark)

3 (a) Some boys and girls are asked if they can whistle.

There are 30 boys
There are three times as many girls.

40% of the girls can whistle.

Boys that can whistle : girls that can whistle = 2 : 3

Complete the two-way table.

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	Boys	**Girls**
Can whistle		
Cannot whistle		
Total	**30**	

(5 marks)

3 (b) Jack wants to know how many people in the UK can whistle.

Explain why using the data from this group might give a biased result.

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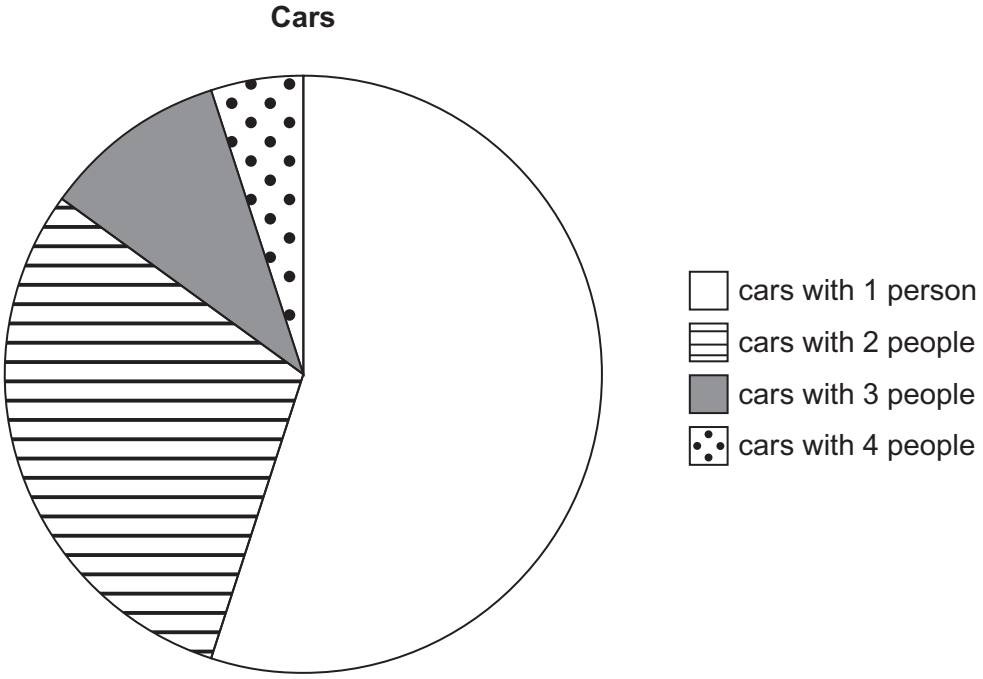
(1 mark)

11

4 A council sets this target to reduce traffic.

> More than 40% of cars should have 2 or more people in them.

The council collects data.



Is the target met?
Show how you decide.

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(3 marks)

5 Oscar and Erik want to find out who can solve puzzles faster.
They each solve five puzzles.

Here are Oscar's times in seconds.

10.03 9.78 10.61 12.90 10.08

The table gives information about Erik's times in seconds.

Fastest time	9.15
Slowest time	10.45
Mean of five times	10.23

The fastest and slowest times are **not** used.
The winner is the one with the lower mean of the other three times.

Who wins?
You **must** show your working.

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(5 marks)

8

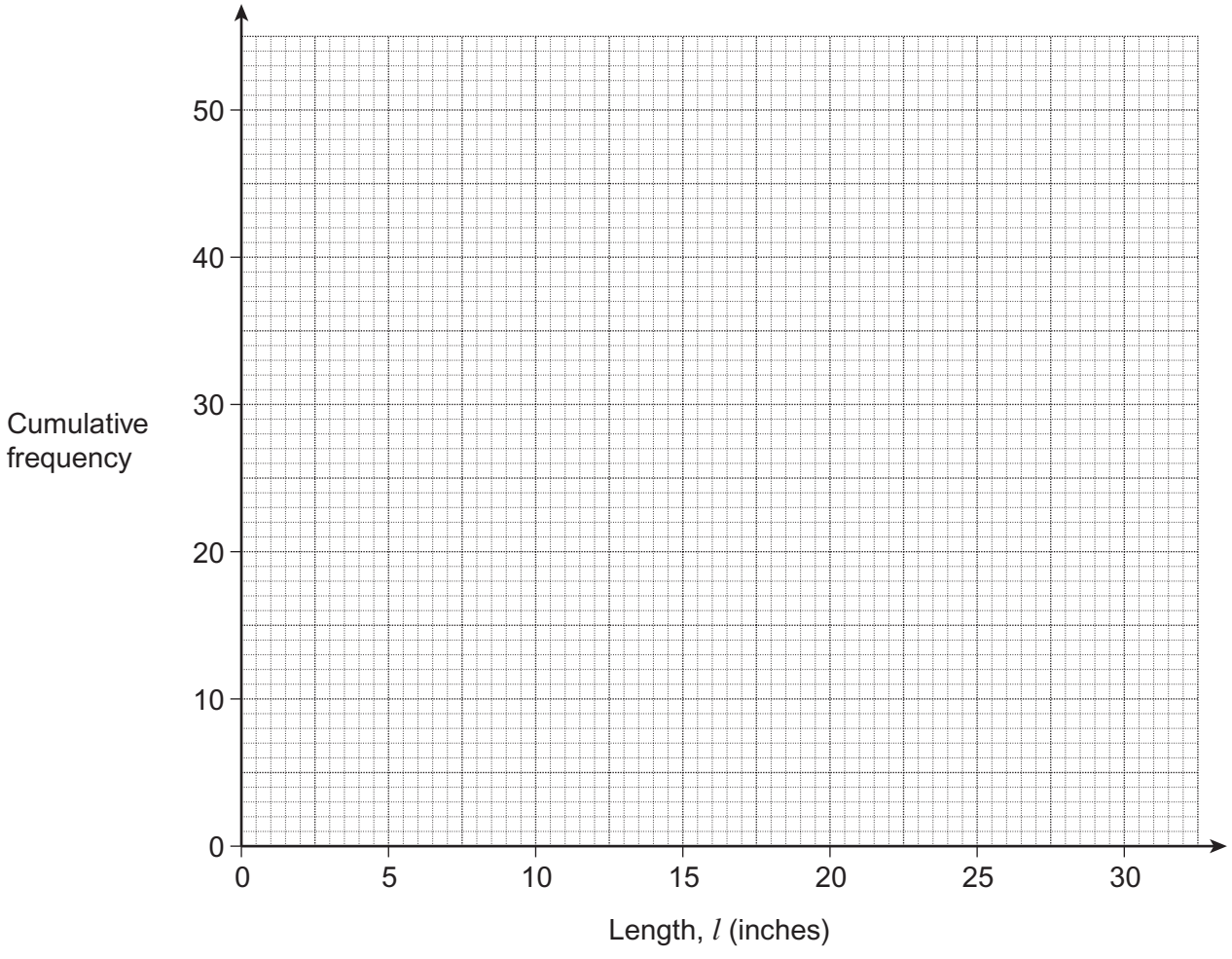
6 A fisherman catches 50 fish.
The table shows information about the lengths of the fish.

Length, l (inches)	Frequency	Cumulative frequency
$5 < l \leqslant 10$	6	6
$10 < l \leqslant 15$	20	26
$15 < l \leqslant 20$	13	
$20 < l \leqslant 25$	8	
$25 < l \leqslant 30$	3	

6 (a) Complete the table.

(1 mark)

6 (b) Draw a cumulative frequency diagram for the data.



(3 marks)

6 (c) The fisherman can only sell fish that are longer than 12 inches.

Work out an estimate for the fraction of fish that he can sell.

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Answer ..... *(3 marks)*

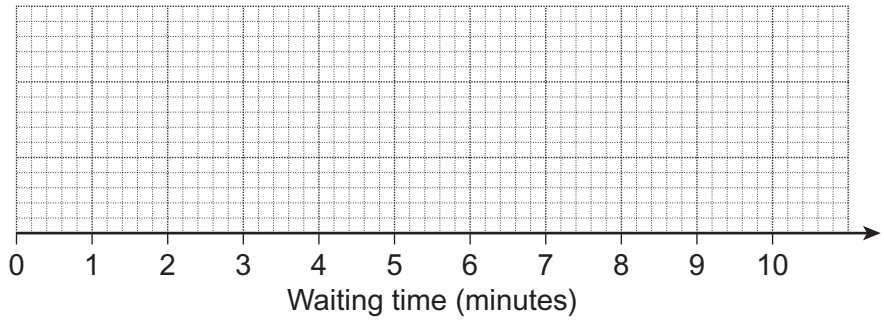
Turn over for the next question

7

7 (a) Here is information about waiting times, in minutes, at a school canteen.

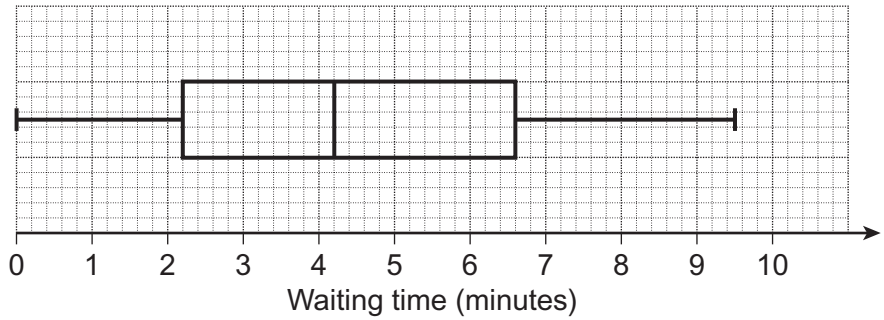
Minimum	Lower quartile	Median	Upper quartile	Maximum
0	2.2	4.2	7.6	9.5

Draw a box plot to show this information.



(2 marks)

7 (b) A new queueing system is introduced.
This box plot shows information about waiting times with the new system.



Compare the waiting times of the new system with the old system.

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(2 marks)

7 (c) The table shows the year groups of some students who use the canteen.

Year 11	Year 12	Year 13	Total
205	134	111	450

Mr Patel wants to survey 50 of these students stratified by year group.

How many **more** Year 11 students than Year 12 students should he survey?

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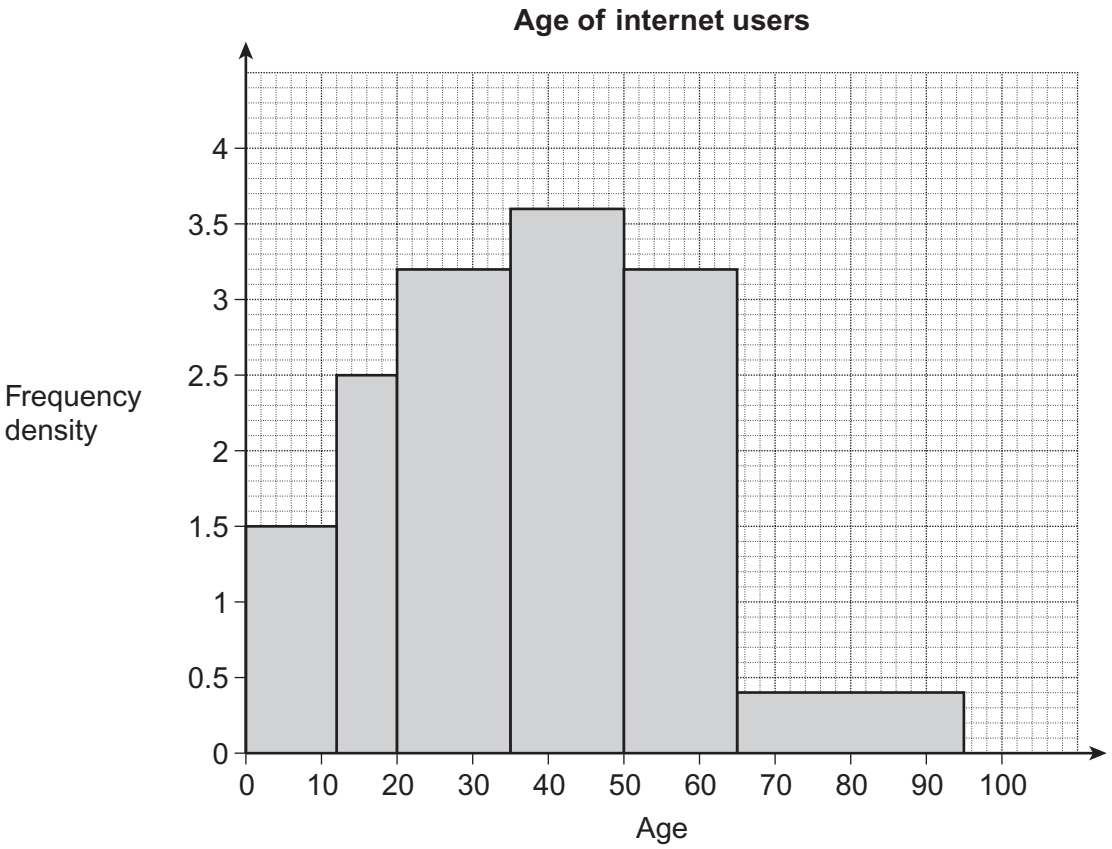
Answer ..... *(3 marks)*

Turn over for the next question

7

8 (a) The histogram shows information about 200 internet users.



How many of these internet users are aged under 20?

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Answer ..... *(3 marks)*

***8 (b)** This question is about internet users in the UK.

In the last five years, the number has increased by 82%, correct to two significant figures.
There are now 30 million, to the nearest million.

Work out the maximum number of internet users five years ago.

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Answer ..... *(4 marks)*

Turn over for the next question

7

9 Ten different names are put into a computer.
One of the names is Jaspal.

9 (a) On Monday, the computer chooses two names at random.
The computer is set so that the same name **can** be chosen twice.

Show that the probability that Jaspal is chosen at least once is $\frac{19}{100}$

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(3 marks)

9 (b) On Tuesday, the computer chooses two names at random.
The computer is set so that the same name **cannot** be chosen twice.

Work out the probability that Jaspal is chosen now.

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Answer ..... *(3 marks)*

END OF QUESTIONS

6

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED