Centre Number						Candidate Number				
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Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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TOTAL	

General Certificate of Secondary Education
Higher Tier
June 2013

Mathematics 43601H

Unit 1

Monday 17 June 2013 9.00 am to 10.00 am

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 2 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 book.

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

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

1 A restaurant owner gives this survey to her customers.

Question: How many take-aways did you have last month?

Response:
Tick a box

☐ 5 to 10 ☐ 10 to 15 ☐ 15 to 20 ☐ over 20

Write **two** criticisms of the response section.

Criticism 1 .....

.....

Criticism 2 .....

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(2 marks)

*2 On average it takes 47 lessons to pass the driving test.

Driving school A

First 5 lessons £75

then £21 per lesson

Driving school B

Normal price £23 per lesson

Special offer

15% off normal price

Which is cheaper for 47 lessons?
You **must** show your working.

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Answer ..... *(5 marks)*

7

3 (a) Here is information about animals in a rescue centre.

- Half of the dogs are male.
- 25% of the rabbits are female.
- There are 20 more males than females altogether.

Complete the two-way table.

	Dog	**Cat**	**Rabbit**	**Total**
Male				
Female				
Total	42	18	20	80

(4 marks)

3 (b) 42 of the 80 animals are dogs.

What percentage of the animals are dogs?

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

4 A researcher wants to compare the ages of viewers of BBC 1 and Sky 1.

4 (a) Write a suitable hypothesis.

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(1 mark)

4 (b) He writes a plan to investigate the hypothesis.

Use the Data Handling Cycle to put his plan in the correct order.

A Work out the mean age for each channel.

B Select some television viewers to ask.

C Compare the results and comment on the hypothesis.

D Collect data about the ages of the television viewers.

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

Turn over for the next question

9

5 Chen records his journey times to college.

Time, t (minutes)	Frequency
$25 < t \leqslant 30$	12
$30 < t \leqslant 35$	18
$35 < t \leqslant 40$	24
$40 < t \leqslant 45$	6
	Total = 60

5 (a) Calculate an estimate of his mean journey time.

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

5 (b) Explain why your answer to part (a) is an estimate.

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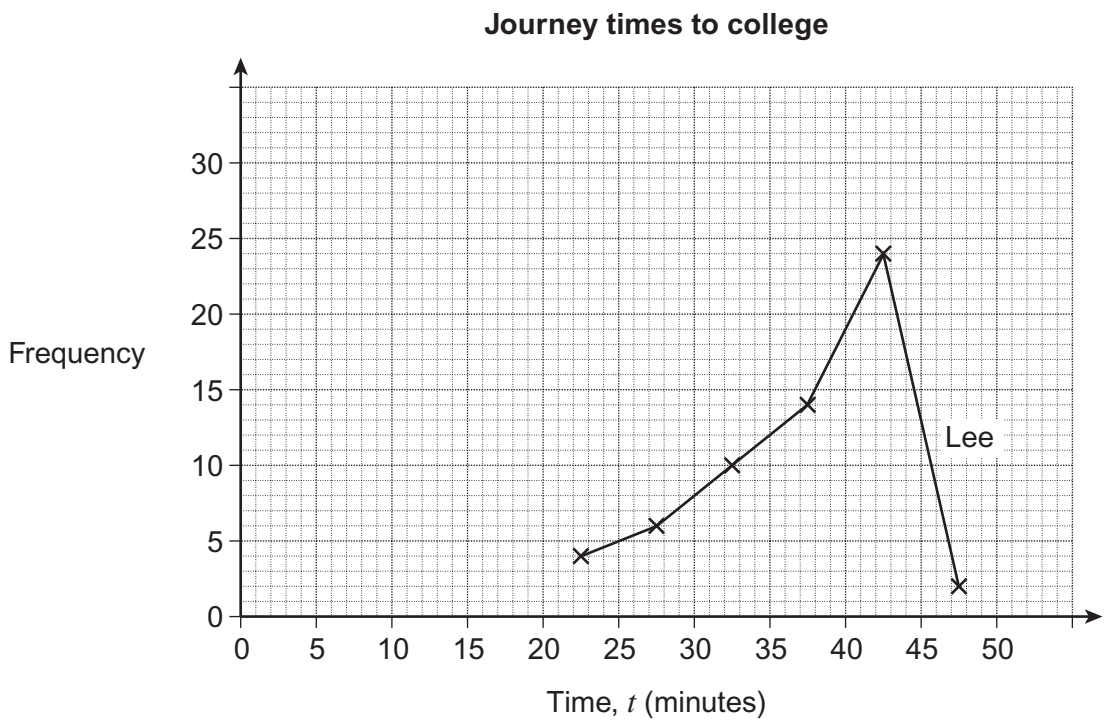
(1 mark)

5 (c) The frequency polygon shows Lee's journey times to college.



On the same grid, draw a frequency polygon for Chen's journey times.

(2 marks)

5 (d) An estimate of Lee's mean journey time is 37 minutes.

Compare the journey times for Lee and Chen.

Comparison 1 .....

.....

Comparison 2 .....

.....

(2 marks)

9

Turn over ▶

6 A play area has thousands of coloured balls.
They are white, pink or yellow.

Sam picks 10 balls at random.
The table shows some of her results.

	white	**pink**	**yellow**
Frequency	4		
Relative frequency		0.1	

6 (a) Complete the table.

(3 marks)

6 (b) Sam uses her results to estimate the proportion of white balls in the play area.

How could she make her estimate more reliable?

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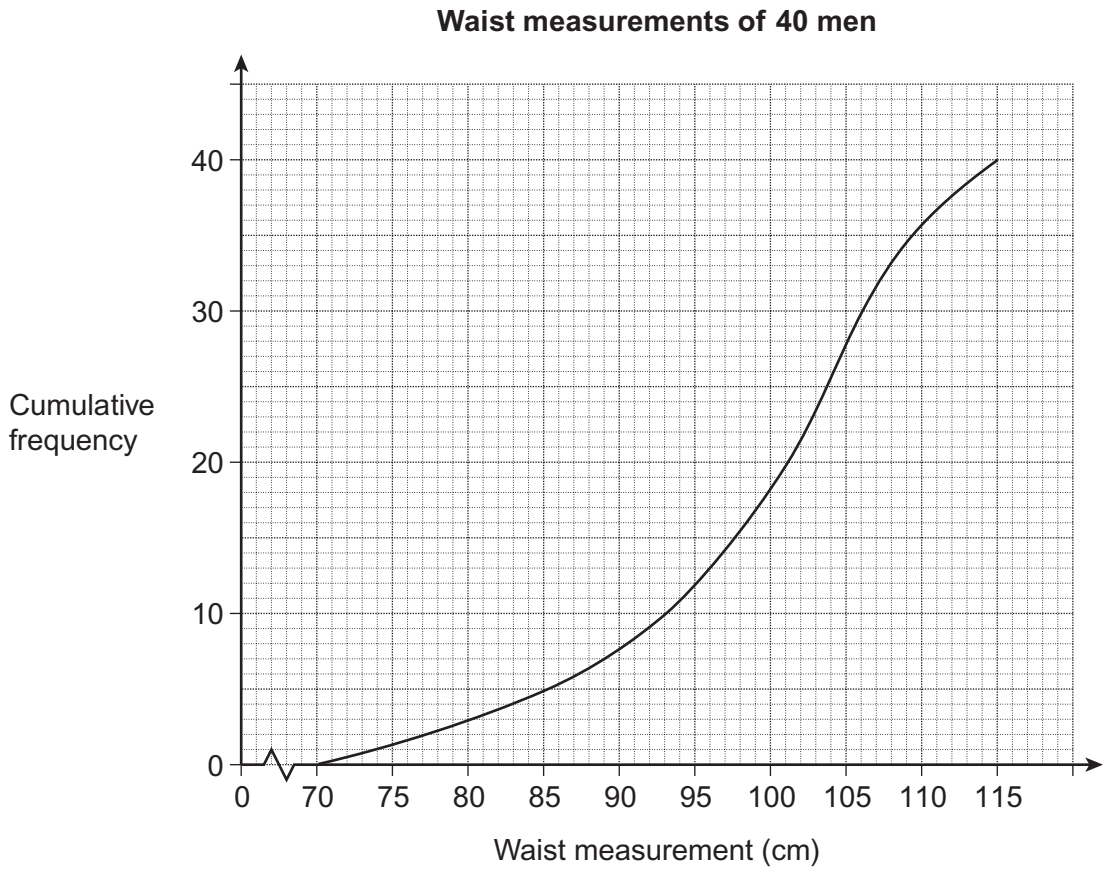
(1 mark)

7



7 (a) How many men have a waist measurement of 85 cm or less?

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

7 (b) What is the median waist measurement?

Answer ..... cm *(1 mark)*

7 (c) What is the interquartile range of the waist measurements?

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

8

8 There were 17 million families in the UK in 2006.

***8 (a)** The mean number of children per family was 1.8

How many children were there in the UK?
Give your answer in standard form.

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

8 (b) The total income of families in the UK was £5.6×10^{11}

What was the mean income per family?
Give your answer to an appropriate degree of accuracy.

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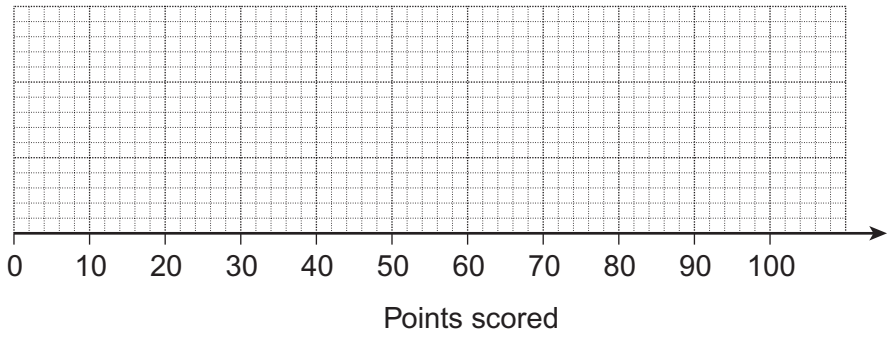
Answer £ ..... *(3 marks)*

9 (a) Here is some information about the points scored in a quiz.

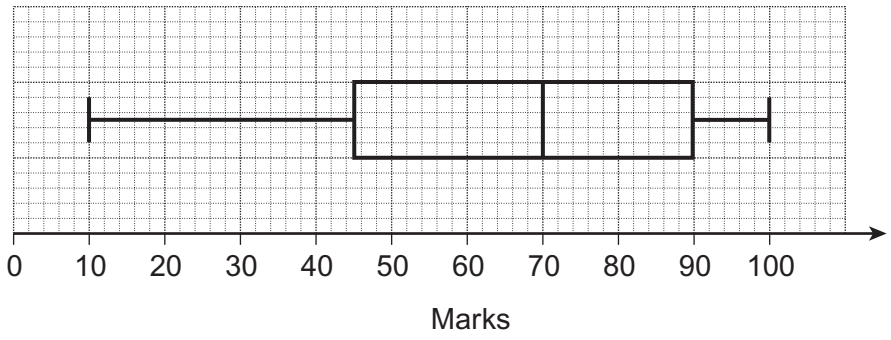
Minimum	Lower quartile	Median	Upper quartile	Maximum
15	20	50	80	90

Show this information on a box plot.



(2 marks)

9 (b) This box plot represents the marks gained by students in an exam.



Nobody gained exactly 45, 70 or 90 marks.
120 students gained **less than** 90 marks.

How many students gained **more than** 70 marks?

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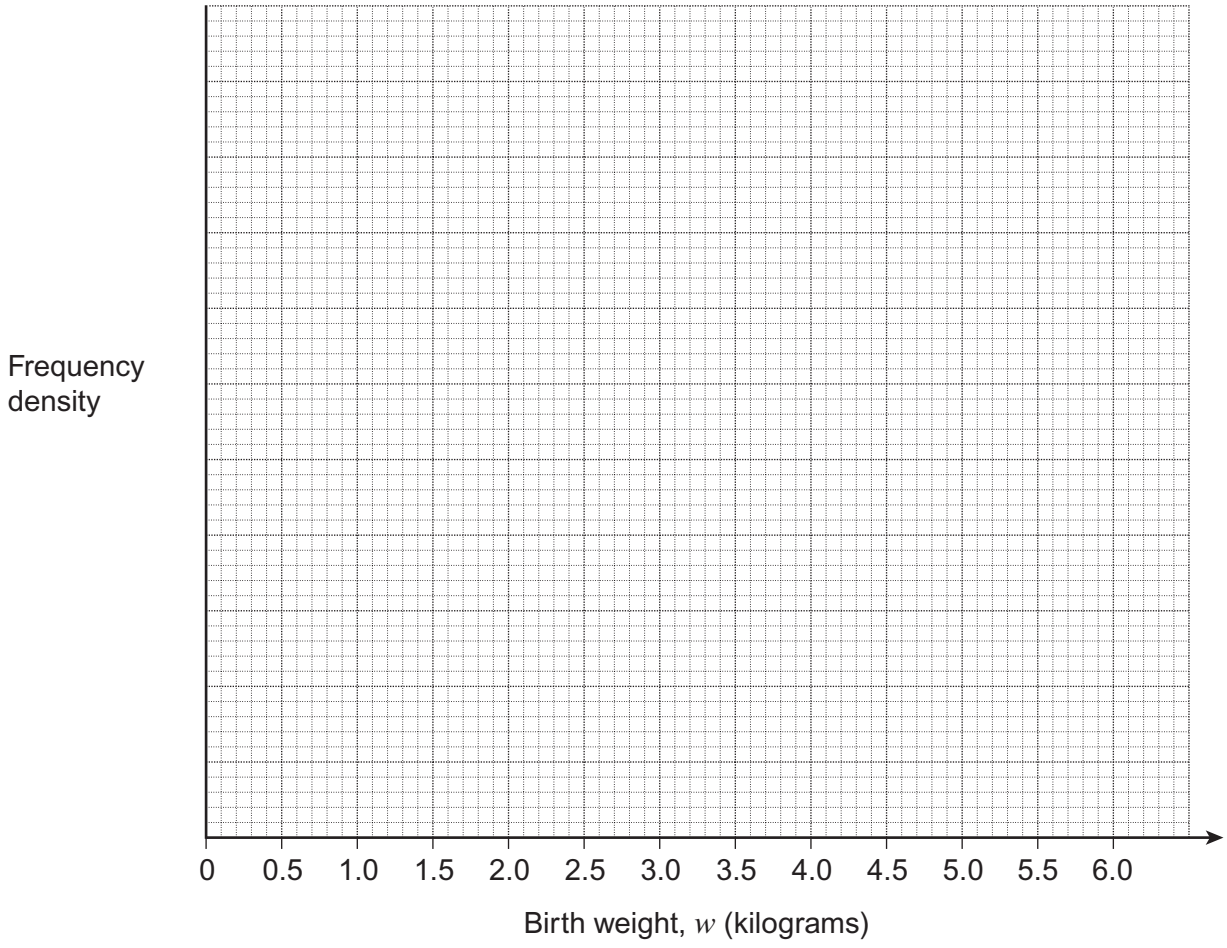
Answer ..... *(3 marks)*

10

10 The grouped frequency table represents the birth weights of 1000 babies.

Birth weight, w (kilograms)	**Frequency**
$1.0 \leqslant w < 2.5$	45
$2.5 \leqslant w < 3.5$	490
$3.5 \leqslant w < 4.5$	270
$4.5 \leqslant w < 6.0$	195

10 (a) Show the data on a histogram.



(4 marks)

10 (b) Babies under 2.5 kg have a low birth weight.

Two of the 1000 babies are chosen at random.

Work out the probability that **both** babies have a low birth weight.
You **must** show your working.

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

11 A home gym can take a maximum load of 145 kg of weight plates.
Each weight plate is 10 kg to the nearest kilogram.

Work out the **greatest** number of weight plates that can be safely loaded on the gym.
You **must** show your working.

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

END OF QUESTIONS

11

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