Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
2 - 3	
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10 - 11	
12 - 13	
14 - 15	
16	
TOTAL	

General Certificate of Secondary Education
Higher Tier
November 2012

Mathematics 43601H

Unit 1

Tuesday 6 November 2012 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 7 and 10. 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 In a college canteen students can choose

a starter and a main course
or
a main course and a pudding.

Starter	Main Course	Pudding
Soup	Curry Burger Pasta	Jelly Fruit

1 (a) One combination is soup and curry.

How many different combinations are there?

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

1 (b) All of the combinations are equally popular.

A student is chosen at random.

What is the probability that he has jelly?

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Answer .....…..…..…..... *(1 mark)*

1 (c) The canteen serves 270 students one Monday.

How many jellies do they expect to serve?

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Answer .....…..…..…..... *(2 marks)*

Turn over for the next question

5

2 There are 100 balls in a bag.
The balls are red, blue, green or white.

The ratio of blue to red is 5 : 1
There are twice as many blue as green.

$\frac{1}{4}$ of the balls are green.

How many white balls are in the bag?

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

3 The cars parked on a street are counted.
Here are the results for 13 days.

19	15	22	24	19	11	20
2	12	4	26	8	16	

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

Key: ……|…… represents …… cars

0	.....
1	.....
2	.....

(3 marks)

3 (b) On day 14, the cars parked are counted.
The range for **all** 14 days is 25.

How many cars were parked on day 14?
Give the **two** possible answers.

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Answer .....…..... or ….....…..... *(2 marks)*

9

Turn over ▶

4 Paula records the times she takes to run 30 marathons.

Time , t (minutes)	Frequency	Midpoint	
$200 < t \leqslant 240$	16		
$240 < t \leqslant 280$	4		
$280 < t \leqslant 320$	4		
$320 < t \leqslant 360$	0		
$360 < t \leqslant 400$	2		
$400 < t \leqslant 440$	0		
$440 < t \leqslant 480$	2		
$480 < t \leqslant 520$	2		

4 (a) Write down the modal class.

Answer ..... $< t \leqslant$ ..... *(1 mark)*

4 (b) Use midpoints to calculate an estimate of the mean time Paula takes.

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

4 (c) Paula runs each marathon in a faster time.

Which average better represents her current performance?
Tick a box.

Modal class ☐ Mean ☐

Explain your answer.

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(1 mark)

Turn over for the next question

5

5 (a) A company receives 1250 orders in December.
It has a January sale.
It receives 1430 orders in January.

Work out the percentage increase in orders.

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Answer .....…..…..…..… % *(3 marks)*

5 (b) The company sends out a questionnaire to customers.
One of the questions is

"How long did your order take to arrive?"

Write a suitable response section for this question.

(2 marks)

6 The sections of a fair spinner are red, white or blue.

6 (a) The spinner is spun 40 times.

Red	White	Blue	Total
28	9	3	40

Write down the relative frequency of the spinner landing on red.

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

6 (b) The spinner has 10 equal sections.

Work out the most likely number of sections for each colour.

Red	White	Blue	Total
			10

(2 marks)

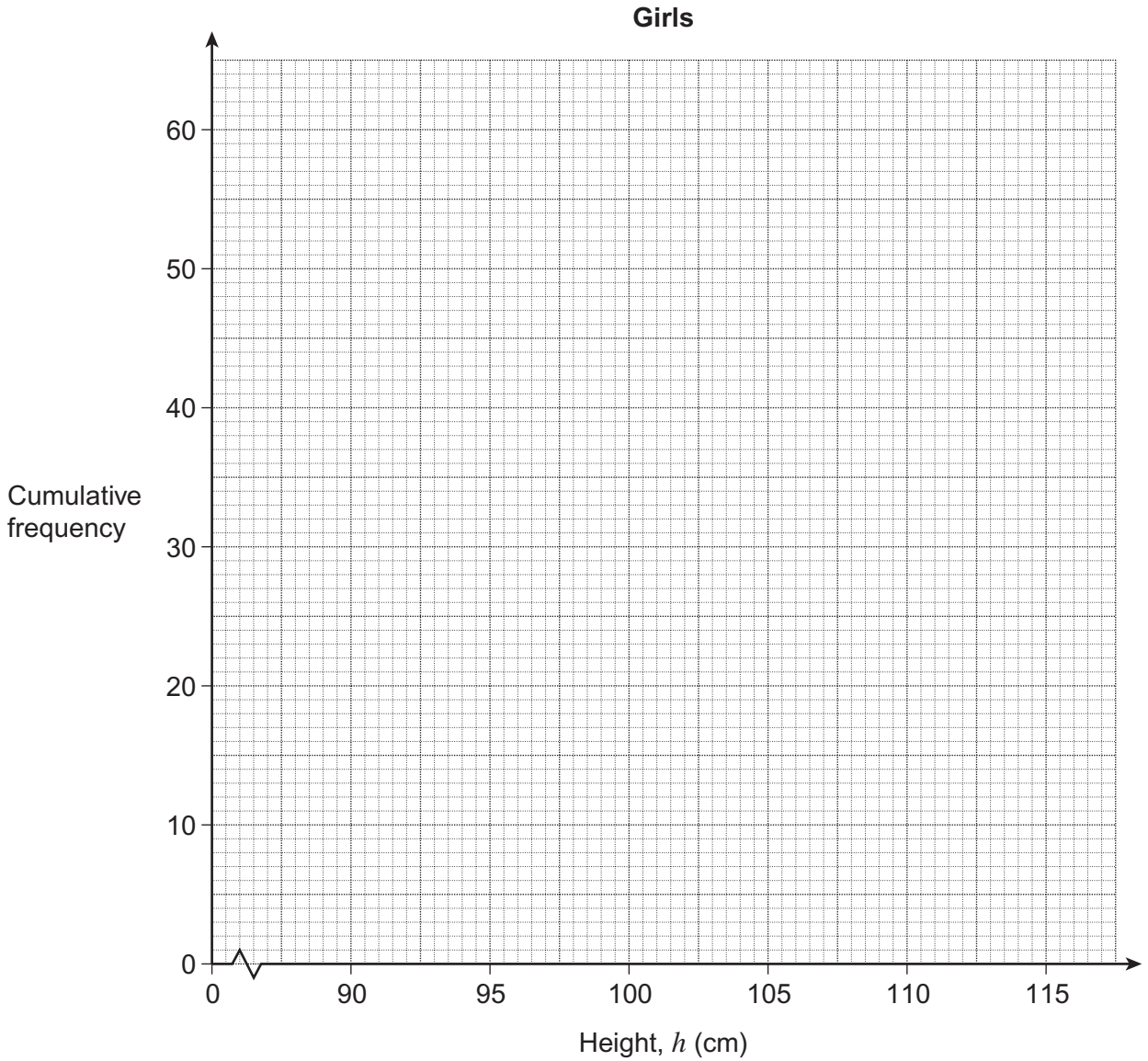
Turn over for the next question

8

***7** The table shows information about the heights of 60 girls in a nursery school.

Height, h (cm)	Frequency	Cumulative frequency
$90 < h \leqslant 95$	2	
$95 < h \leqslant 100$	8	
$100 < h \leqslant 105$	34	
$105 < h \leqslant 110$	10	
$110 < h \leqslant 115$	6	

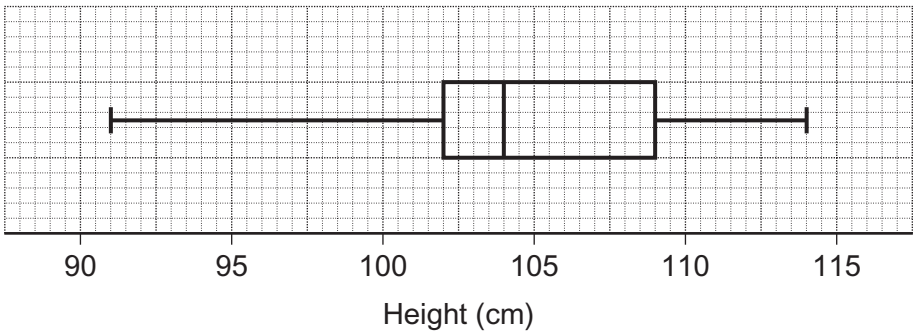
7 (a) Draw a cumulative frequency diagram for the data.



(3 marks)

7 (b) The box plot shows information about the heights of 60 boys in the nursery school.

Boys



The 60 girls and the 60 boys visit a park.
Only children whose heights are under 109 cm are allowed in the soft play area.

Estimate the total number of these children that are allowed in the soft play area.

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

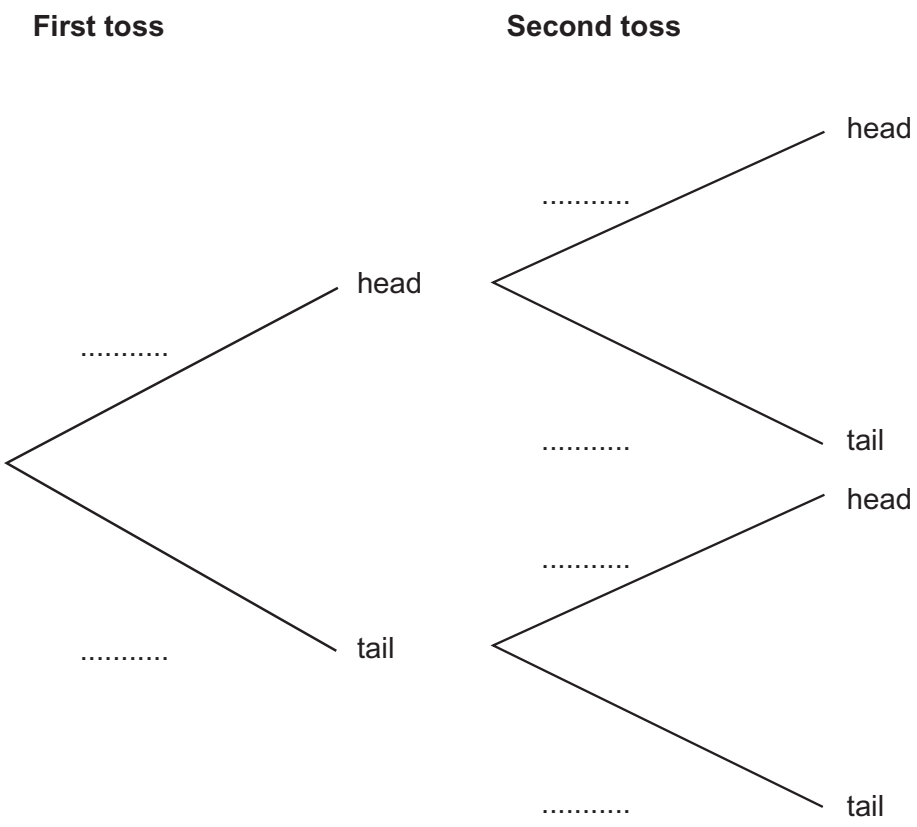
Turn over for the next question

7

8 The probability of a biased coin landing on heads is $\frac{2}{5}$

The coin is tossed twice.

Complete the tree diagram.



(3 marks)

9 Adam, Ben and Chris receive pocket money each week.

Adam and Ben receive pocket money in the ratio 10 : 9
Ben and Chris receive pocket money in the ratio 5 : 4

Work out the ratio for Adam : Chris
Give your answer in its simplest form.

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

***10** Here are two events.

A A ticket wins the National Lottery.
B A fair coin lands on heads five times in a row.

The probability of **A** happening is 7.15×10^{-8}.

How many more times likely is **B** than **A**?
Give your answer in standard form to 2 significant figures.

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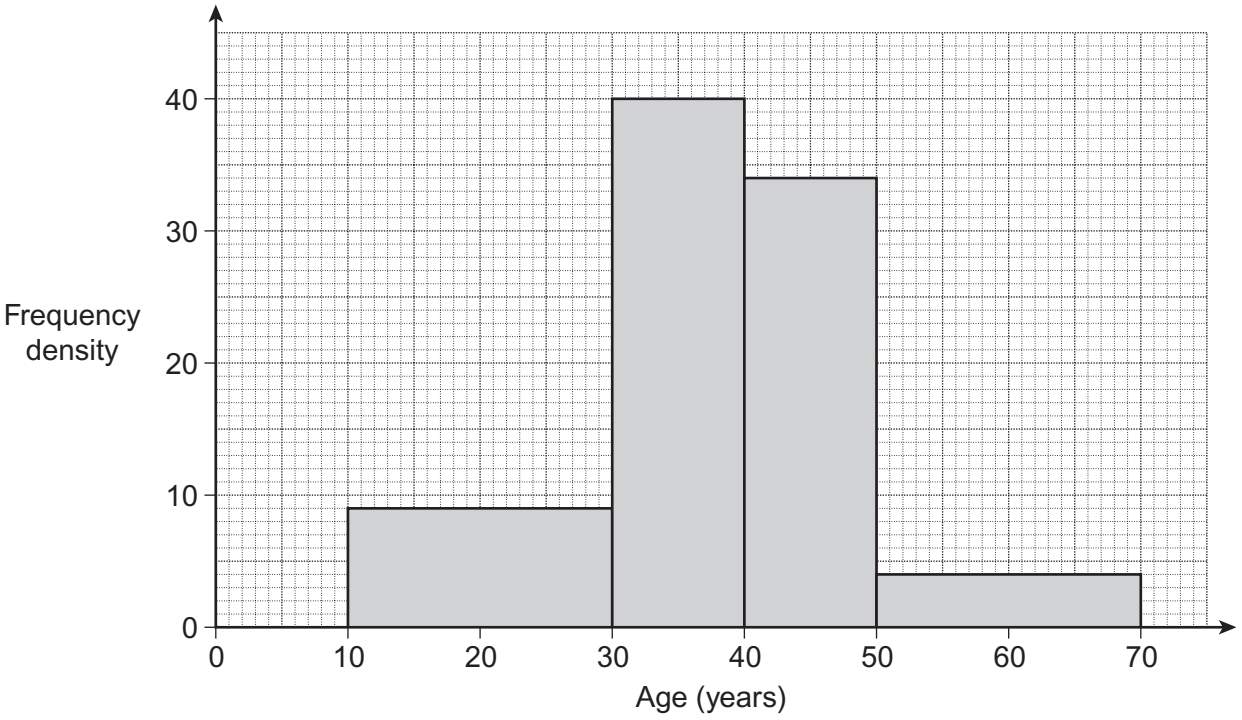
Answer ..... *(3 marks)*

9

11 The histogram shows information about 1000 members of a fan club.



11 (a) Calculate an estimate of the median age of the members of the fan club.

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

11 (b) A sample of 100 members, stratified by age, is asked about membership fees.

Complete the table.

Age, a (years)	**Number sampled**
$10 \leqslant a < 30$	
$30 \leqslant a < 40$	40
$40 \leqslant a < 50$	
$50 \leqslant a < 70$	
	Total = 100

(3 marks)

Turn over for the next question

7

12 Matthew invests some money in a building society.

His money earns 5% compound interest every year.
He wants it to be worth at least £9000 at the end of 3 years.

What is the smallest amount he can invest?

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Answer £ ..... *(4 marks)*

END OF QUESTIONS

4