Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
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12	
TOTAL	

General Certificate of Secondary Education
Higher Tier
November 2010

Mathematics 43601H

Unit 1

Tuesday 9 November 2010 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 1 and 4. 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* In a game, players try to win a coloured counter.
There are six possible colours.
The table shows the probability of winning each colour.

Colour of Counter	Probability
Yellow	0.04
Green	0.07
Brown	0.09
Blue	0.10
Pink	0.13
Black	0.14

1 (a) Which colour is twice as likely to be won as green?

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

1 (b) Work out the probability of winning yellow or brown.

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

1 (c) Tariq plays the game 160 times.

Estimate the number of times that he does **not** win.

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

2 A company makes 400 Christmas toys.
Each toy costs £4.70 to make.
One-quarter of the toys are given away to a children's home.
Three-fifths of the rest are sold for the full price of £12.
The remainder are sold at half price.

How much profit does the company make?

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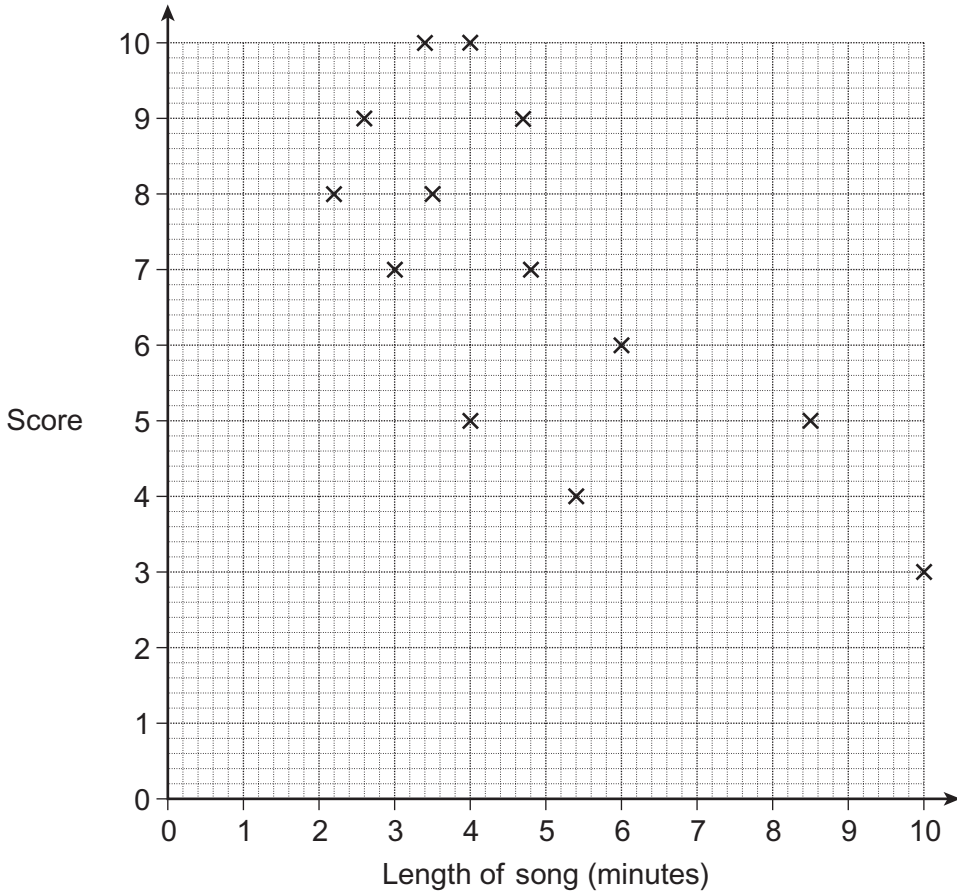
Answer £ ..... *(5 marks)*

Turn over for the next question

12

3 Freddie and Priya both like music.
Freddie gives some songs a score out of 10.
The scatter diagram shows his results.



3 (a) How long is the song that is given a score of 4?
Give your answer in minutes and seconds.

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Answer ..... minutes ..... seconds *(2 marks)*

3 (b) Freddie has this hypothesis.
He says, "The shorter the song the more I like it".

Comment on his hypothesis.

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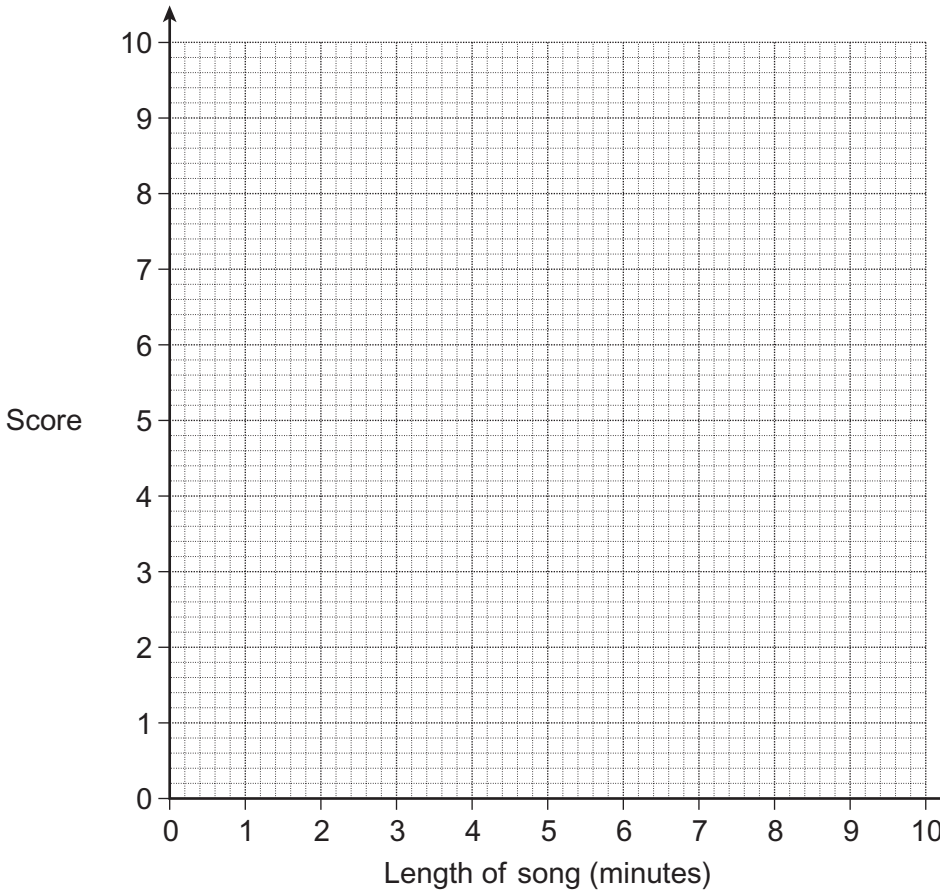
(1 mark)

3 (c) Use a line of best fit to estimate the score Freddie may give to a song of 7 minutes length.

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

3 (d) Priya also gives some songs a score out of 10.
She has a different hypothesis.
She says "The longer the song the more I like it."
Her hypothesis is strongly supported by the data she collects.

Plot points on the grid to show how the scatter diagram may look.



(1 mark)

6

4* This poster is put up in a school dinner hall.

Coming soon

***New** Healthy Eating menu*

The headteacher thinks the number of students who eat school dinners will increase by 25%.

4 (a) Design an observation sheet the headteacher can use to see if she is right.

(2 marks)

4 (b) The number of students who eat school dinners increases from 78 to 91.

Is the headteacher correct?
Show clearly how you decide.

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(3 marks)

4 (c) The headteacher carries out a survey to see if students enjoy the 'Healthy Eating' menu.

Write down a question she could ask.
Include a response section.

Question .....

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Response Section

(2 marks)

5 Peter and Alice buy a set of golf clubs for their mother.
They pay in the ratio 4 : 3
Peter pays £224.

How much does Alice pay?

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Answer £ ..... *(3 marks)*

10

6 A teacher asks 40 boys to solve a problem.
She records the time taken only if a correct answer is given.
The times are shown.

Key 5 | 9 represents 59 seconds

1	0	2	4	4	6	7	9		
2	1	1	1	3	3	7	7	8	8
3	3	4	4	8	9				
4	2	7							
5	9								

6 (a) Show that the percentage of boys who give a correct answer is 60%.

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(2 marks)

6 (b) 40 girls are given the same problem.
20 of the girls give a correct answer.
Information about the times taken by girls who give a correct answer is shown.

Time, t seconds	Frequency
$10 \leqslant t < 20$	3
$20 \leqslant t < 30$	6
$30 \leqslant t < 40$	7
$40 \leqslant t < 50$	4

Compare these times with the times taken by the boys who give correct answers.

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(5 marks)

7 (a) What is meant by a stratified sample?

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(1 mark)

7 (b) A college has part-time and full-time students as shown.

Type	Part-time	Full-time
Number of students	3420	4680

Sabine carries out a survey of the students.
She uses a sample of 90 students, stratified by type.

Work out the number of part-time students in her sample.

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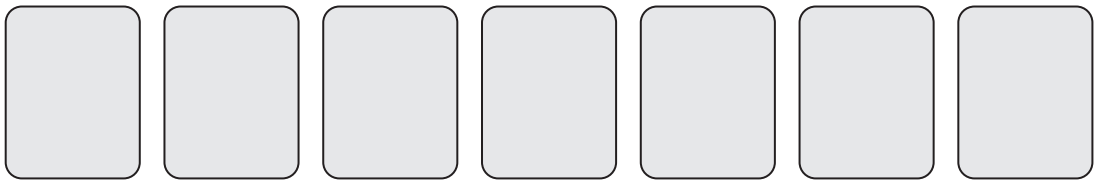
Answer ..... *(2 marks)*

8 Here are seven cards.



Each card has a number on it.
For the numbers, the lower quartile is equal to the upper quartile.

8 (a) What does this tell you, if anything, about the value of the median?

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(1 mark)

8 (b) What does this tell you, if anything, about the value of the mode?

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(1 mark)

8 (c) What does this tell you, if anything, about the value of the mean?

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(1 mark)

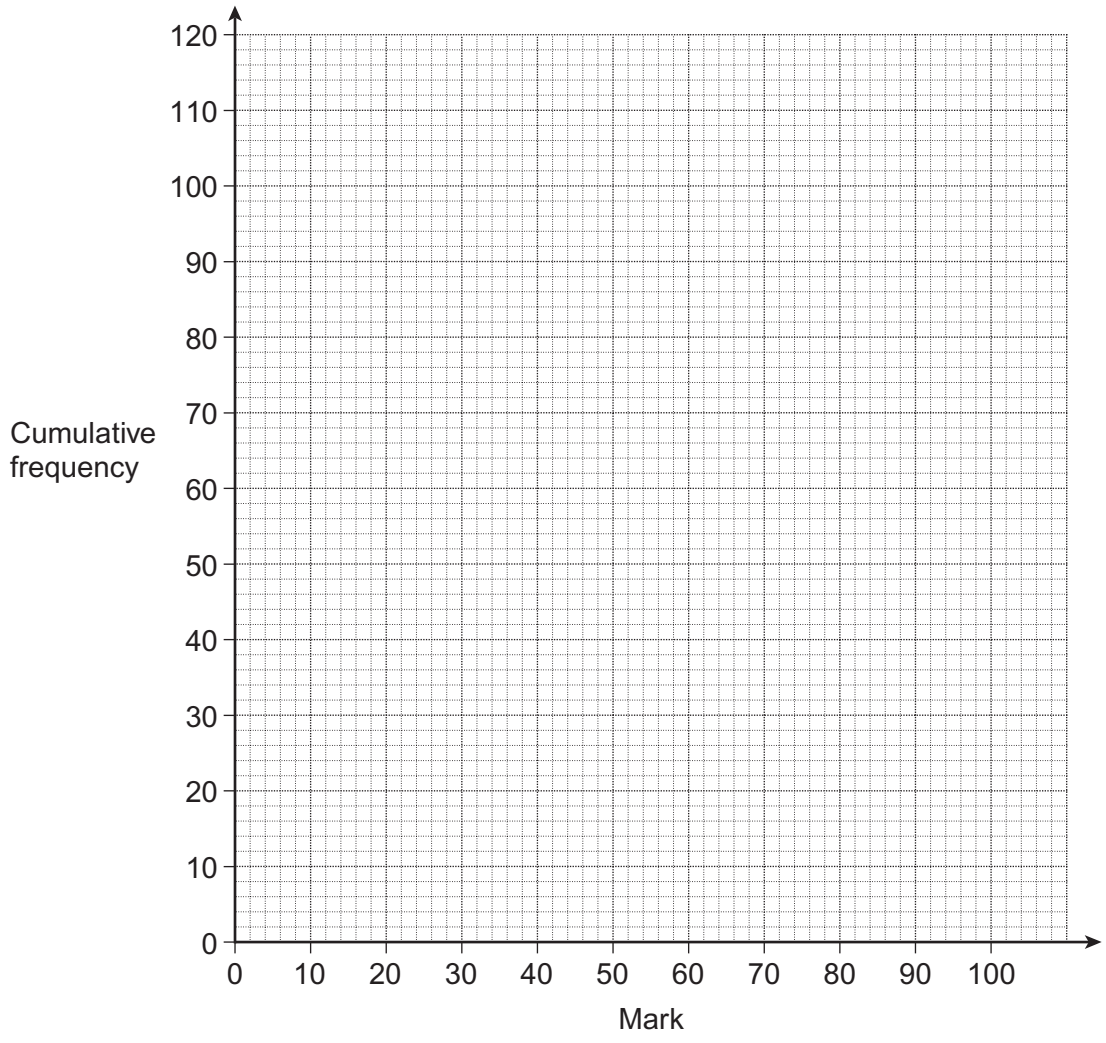
13

9 The table shows a summary of the marks scored by 120 people in a test.

Mark	Frequency
$0 < \text{mark} \leqslant 20$	8
$20 < \text{mark} \leqslant 40$	12
$40 < \text{mark} \leqslant 60$	46
$60 < \text{mark} \leqslant 80$	35
$80 < \text{mark} \leqslant 100$	19

9 (a) Three-quarters of the people pass the test.

Use a cumulative frequency graph to estimate the pass mark.



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

9 (b) Here is the table again.

Mark	Frequency
$0 < \text{mark} \leqslant 20$	8
$20 < \text{mark} \leqslant 40$	12
$40 < \text{mark} \leqslant 60$	46
$60 < \text{mark} \leqslant 80$	35
$80 < \text{mark} \leqslant 100$	19

Two of these 120 people are chosen at random.

9 (b) (i) Work out the probability that both scored **over** 60.

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

9 (b) (ii) Work out the probability that one scored **over** 80 and the other scored 80 or **under**.

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

Turn over for the next question

10

10 In human blood, the ratio of white blood cells to red blood cells is 1 : 700 where 700 is given to the nearest 100.

A man has 3×10^{13} red blood cells to one significant figure.

Calculate the minimum number of white blood cells in this man's blood.
Give your answer in standard form.

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

END OF QUESTIONS

3