Centre Number						Candidate Number				
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For Examiner's Use	
Examiner's Initials	
Pages	Mark
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12 – 13	
TOTAL	

General Certificate of Secondary Education
Higher Tier
November 2011

Mathematics 43601H

Unit 1

Wednesday 9 November 2011 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 6 and 7. 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 Olivia usually drives home from work.
Some of her journey times are shown.

Week 1

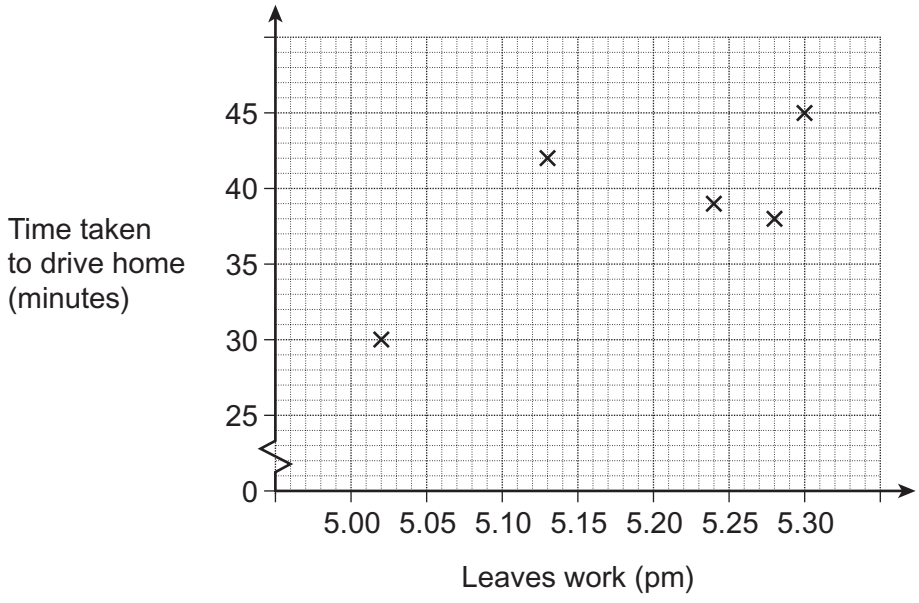
	Mon	**Tue**	**Wed**	**Thu**	**Fri**
Leaves work (pm)	5.13	5.24	5.30	5.28	5.02
Arrives home (pm)	5.55	6.03	6.15	6.06	5.32
Time taken (minutes)	42	39	45	38	30

Week 2

	Mon	**Tue**	**Wed**	**Thu**	**Fri**
Leaves work (pm)	5.15	5.18	5.20	5.07	5.10
Arrives home (pm)	5.49	5.50	5.57	5.40	7.11
Time taken (minutes)	34	32	37	33	121

1 (a) On Friday of week 2 Olivia walked home.

Complete the scatter diagram for the **four** days she drives home in week 2.



(2 marks)

1 (b) Estimate the time Olivia would have arrived home on Friday of week 2 if she had driven.
Use your scatter diagram to show how you decide.

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

1 (c) Olivia wants to survey workmates about their journey times home.

Write a suitable question.
Include a response section.

Question

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Response

(3 marks)

8

2 Liz is buying a new car and selling her old car.
Here are three offers for the same model of new car.

Offer 1
New car £11 100
If old car given to garage
$\frac{1}{3}$ off

Offer 2
New car £12 000
If old car given to garage
40 % off

Offer 3
New car
£294 per month for 3 years
If old car given to garage
get £3375 cashback

Which offer is best?
You **must** show your working.

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

3 Here is a list of numbers.

0 3 5 7 12 29

Find **three** numbers from the list with the range double the median.
Write down the values of the range and median.

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Answer ..... , ... and .....

Range = ... Median = ... *(3 marks)*

Turn over for the next question

8

4 People in a town voted in an election.
The probability a vote was given to a particular party is shown.
One value is missing.

Party	Probability
Conservative	0.41
Labour	0.24
Liberal Democrat	0.22
UKIP	
Other	0.04

4 (a) Complete the table.

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(2 marks)

4 (b) Write Labour votes to Liberal Democrat votes as a ratio.
Give your answer in its simplest form.

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

4 (c) There are 15 000 people in the town.
8000 voted.

How many people in the town did **not** vote Conservative?

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

5 Ten discs numbered 1 to 10 are in a bag.
Two discs are taken out.

The mean value of the remaining discs is 5.

Which two discs could have been taken out?
Work out **one** possible answer.

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

Turn over for the next question

11

***6** The stem-and-leaf diagram shows the number of strawberries in each of 19 punnets.

Key: 2 | 8 represents 28 strawberries

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

6 (a) Draw a box plot to show the data.

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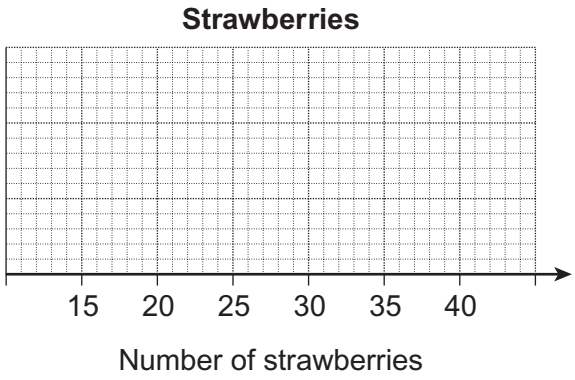

(5 marks)

6 (b) Data was also recorded for the number of raspberries in each of 19 punnets.

Raspberries

Median	36
Interquartile range	7

Compare the distribution of strawberries and raspberries.

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(3 marks)

***7** It is estimated that there are 7 500 000 000 000 000 000 grains of sand on the world's beaches.

(Source University of Hawaii)

7 (a) Write this number in standard form.

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

7 (b) This number is 10% higher than the previous estimate.

Calculate the previous estimate.
Give your answer in standard form to two significant figures.

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

12

8 Some animals are **twice** as likely to have male babies as female babies.

8 (a) Explain why the probability of a male baby is $\frac{2}{3}$.

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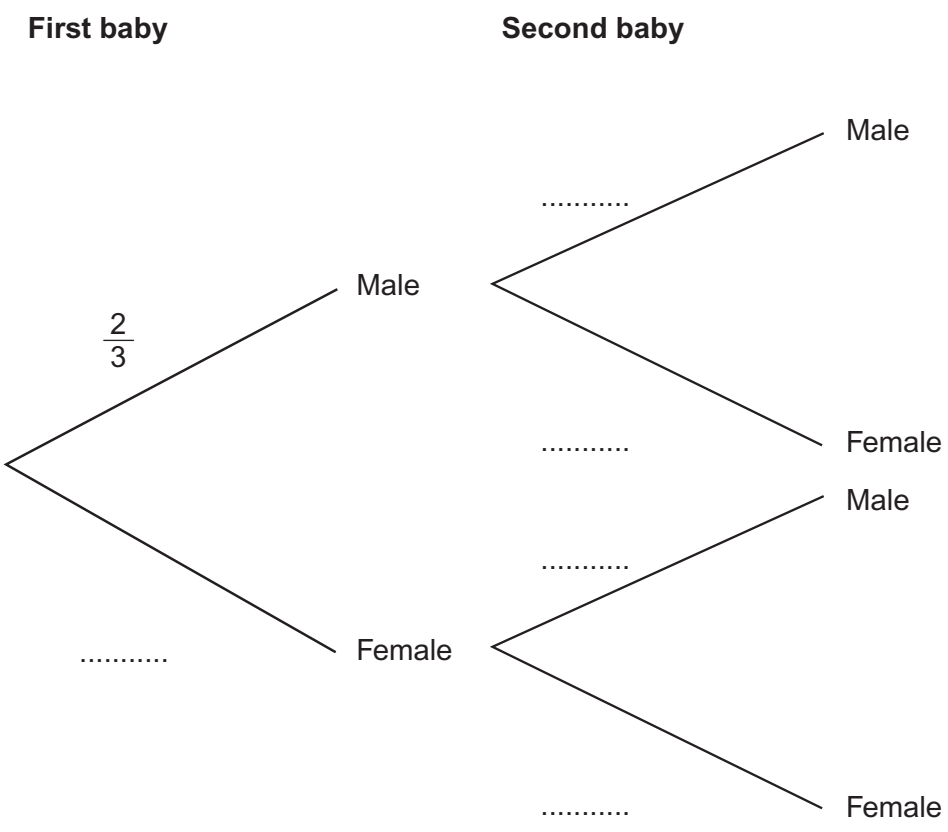
(1 mark)

8 (b) One of these animals is expecting two babies.

Complete the tree diagram to show all possible outcomes.



(2 marks)

8 (c) A scientist wants to predict the likely outcomes for the babies' genders.

Which is more likely, two of the same gender or one of each?
You **must** show your working.

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

Turn over for the next question

7

9 The police want to know how many cars exceed the speed limit.
An officer stands with a speed gun and records the speeds of 1000 consecutive cars.

9 (a) Identify **one** possible source of bias for this experiment.

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(1 mark)

9 (b) The grouped frequency table represents the speeds of the 1000 cars.

Speed, *s* (mph)	**Frequency**
$18 \leqslant s < 20$	80
$20 \leqslant s < 25$	440
$25 \leqslant s < 30$	360
$30 \leqslant s < 40$	120

On the grid opposite, show the data on a histogram.

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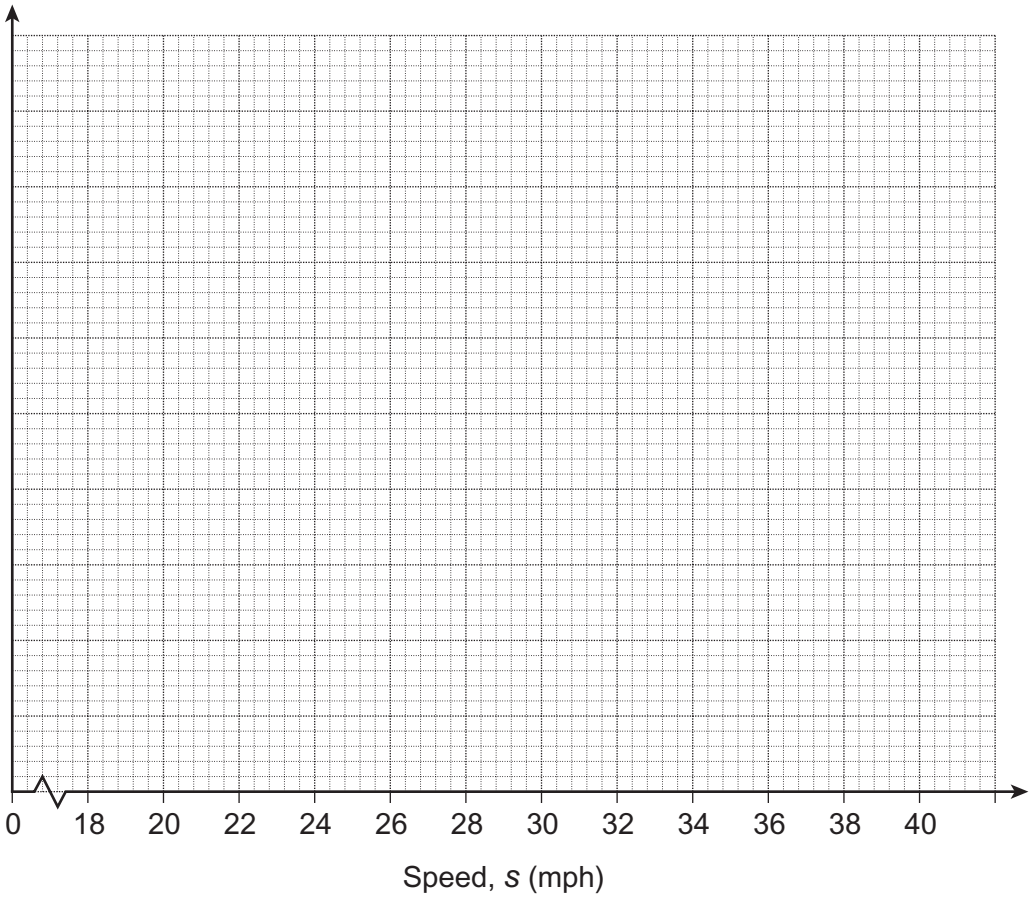

(4 marks)

9 (c) The speed limit for the road is 30 miles per hour.
Two cars are chosen at random from the 1000 cars.

Estimate the probability that **both** cars are at least 10% above the speed limit.

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

END OF QUESTIONS

8

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