

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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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.



N 0 V 1 1 4 3 6 0 1 H 0 1

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

- 1 Olivia usually drives home from work.  
Some of her journey times are shown.

**Week 1**

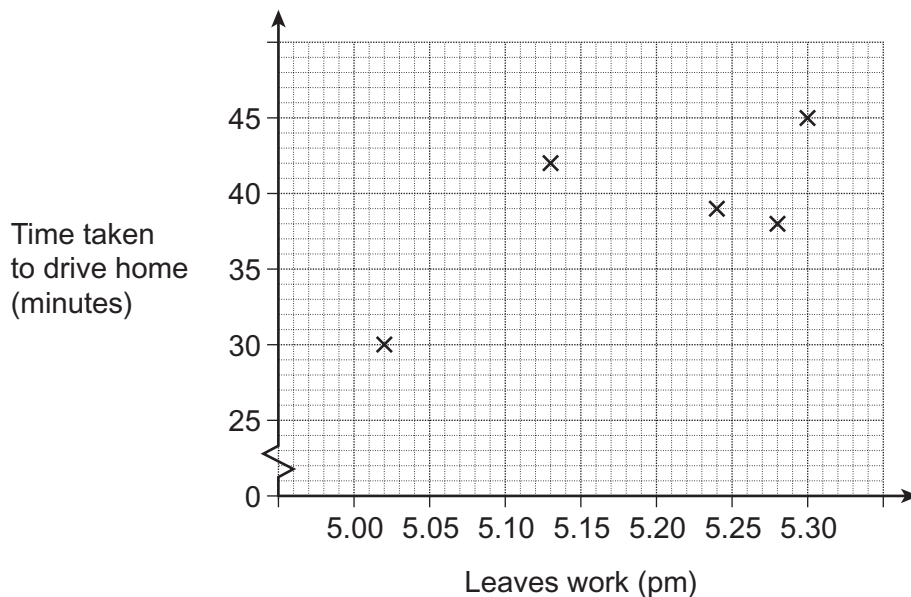
	Mon	Tue	Wed	Thu	Fri
Leaves work (pm)	5.13	5.24	5.30	5.28	5.02
Arrives home (pm)	5.55	6.03	6.15	6.06	5.32
Time taken (minutes)	42	39	45	38	30

**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

.....  
.....

Response

(3 marks)

8

Turn over ►



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**



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.

.....  
 ..... (2 marks)

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

.....  
 .....  
 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**



\*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		

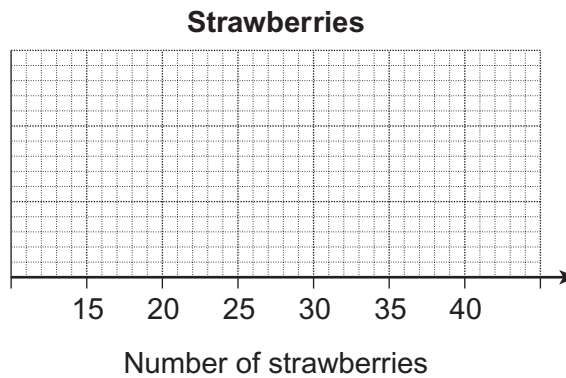
6 (a) Draw a box plot to show the data.

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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
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Turn over ►



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

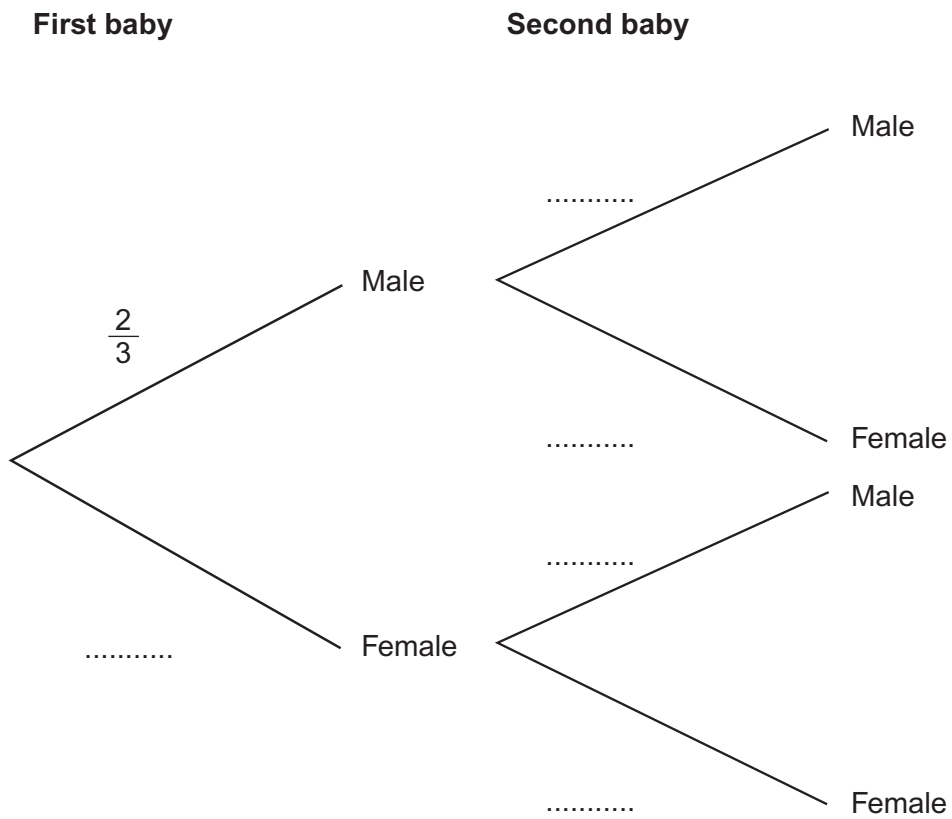
8 (a) Explain why the probability of a male baby is  $\frac{2}{3}$ .

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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

**Turn over ►**



**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)

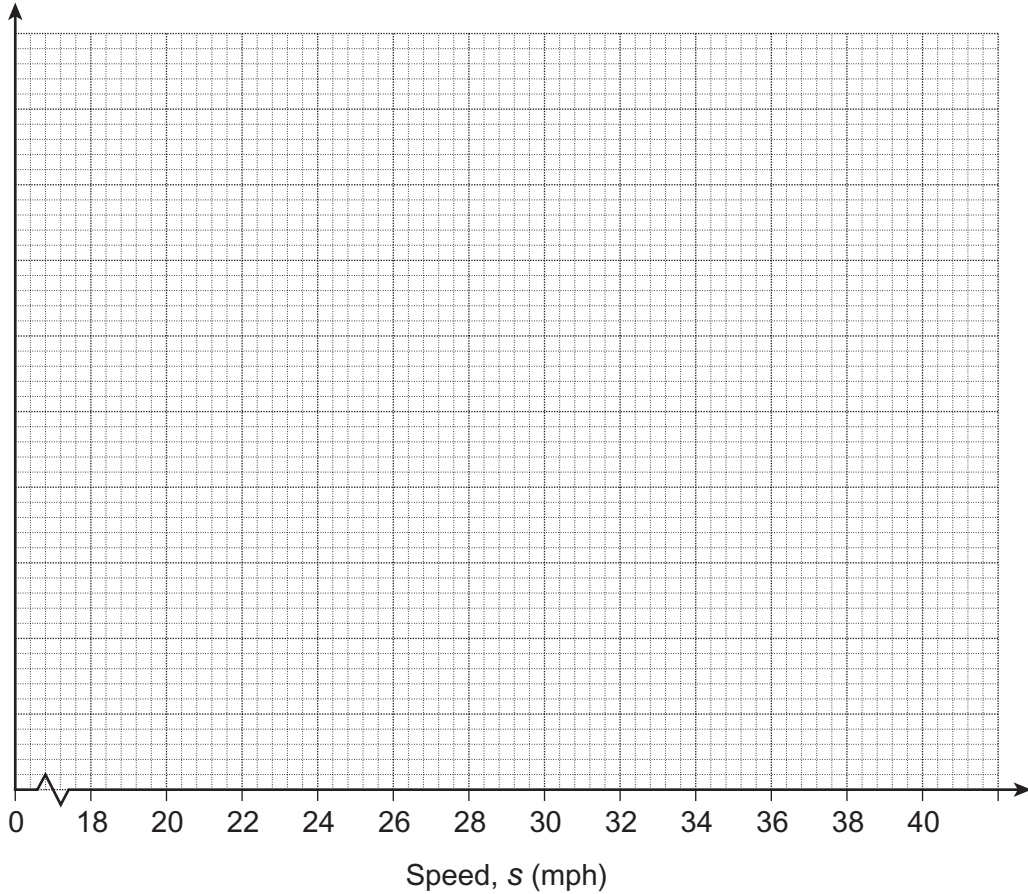
**9 (b)** The grouped frequency table represents the speeds of the 1000 cars.

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



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