AQA

General Certificate of Secondary Education
Higher Tier
November 2014

Mathematics 43601H

Unit 1

Monday 10 November 2014  9.00 am to 10.00 am

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 9 and 11. 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.
1 A secretary types letters and answers the telephone. The times spent on six days are shown on the scatter graph.

1 (a) The table shows the times spent on the next four days.

<table>
<thead>
<tr>
<th>Time on telephone (minutes)</th>
<th>275</th>
<th>150</th>
<th>125</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time typing (minutes)</td>
<td>125</td>
<td>190</td>
<td>225</td>
<td>175</td>
</tr>
</tbody>
</table>

Show these times on the scatter graph. [2 marks]
1 (b) Draw a line of best fit. [1 mark]

1 (c) On another day she spent 200 minutes on the telephone.
Use your line of best fit to estimate the time she spent typing that day.
[1 mark]

Answer ........................................................................................................ minutes

Turn over for the next question
2 (a) Match each data collection method to one set of data. [2 marks]

- Survey
- Controlled experiment
- Observation
- Data logging

- The colours of cars passing a school at lunchtime
- The number of people in each house of a street
- The number of vehicles crossing a bridge in 2014
- The reaction times of girls and boys

2 (b) Jess wants to know the number of people who live in her street. She carries out a survey.

Which two words describe the data she collects? Circle your answers. [2 marks]

Primary        Secondary        Discrete        Continuous
In a game a team scores

2 points for a win
1 point for a draw
0 points for a loss.

A team plays four games.

There are six combinations of results that score at least 5 points.

Complete the table to show these combinations.

<table>
<thead>
<tr>
<th>Number of wins</th>
<th>Number of draws</th>
<th>Number of losses</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Turn over for the next question
An outdoor centre has activities for children.

**Number of children choosing each activity**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archery</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Walking</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Sailing</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>

4 (a) Adults help with **walking** in the ratio

\[
\text{number of adults} : \text{number of children} = 1 : 5
\]

3 adults can help with walking on **Saturday**.

Is this enough?

You must show your working.

[2 marks]
4 (b) A group of people go **sailing** in the ratio

\[
\text{number of adults : number of children} = 1 : 2
\]

What fraction of the group are adults?  

[1 mark]

Answer ...........................................................................................

4 (c) On **Sunday** all the children do the activity they choose.

The ratios for each activity are shown in the table.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of adults : number of children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archery</td>
<td>1 : 3</td>
</tr>
<tr>
<td>Walking</td>
<td>1 : 5</td>
</tr>
<tr>
<td>Sailing</td>
<td>1 : 2</td>
</tr>
</tbody>
</table>

Work out the total number of adults needed for Sunday.  

[3 marks]

Answer ...........................................................................................
5. The normal price of a television is £1200
   It is reduced to £970

   Work out the percentage reduction.
   Give your answer to 1 decimal place.

   Answer ................................................. %

6. Four numbers have a mean of 10
   The median is 8
   Two of the numbers are 1 and 5

   Work out the other two numbers.

   Answer ...................... and ......................
Bag A has 2 black counters and 3 white counters. 
Bag B has 3 orange counters and 4 green counters. 

A counter is chosen at random from each bag. 

7 (a) Complete the tree diagram. 

7 (b) What is the probability of choosing a black counter and an orange counter? 

Answer: \( \frac{3}{7} \)
The table and graph show information about ticket sales.

<table>
<thead>
<tr>
<th>Type of ticket</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult (18 years and over)</td>
<td>£23.00</td>
</tr>
<tr>
<td>Child</td>
<td>£19.60</td>
</tr>
</tbody>
</table>

**Ticket sales**

![Graph showing ticket sales by age and cumulative frequency.](image-url)
How much did the 800 tickets cost altogether?

[3 marks]

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Answer £ ................................................................

Turn over for the next question
9 Amy and Ben each played a game 15 times. The stem-and-leaf diagram shows the points scored by Amy.

Key: \(3\mid 0\) represents 30 points

\[
\begin{array}{c|c}
0 & 9 \\
1 & 2 4 5 6 8 9 \\
2 & 1 3 3 5 7 8 8 \\
3 & 0 \\
\end{array}
\]

\(\star 9\) (a) Draw a box plot to represent the data. 

[4 marks]
This box plot represents the points scored by Ben.

Ben

Points

9 (b) Ben says,

“On average I have better scores than Amy.”

Is he correct?
Use the data to support your answer.

[1 mark]

9 (c) Ben says,

“I have more consistent scores than Amy.”

Is he correct?
Use the data to support your answer.

[2 marks]
10 Here is some information about tourism in 2012

<table>
<thead>
<tr>
<th>Country visited</th>
<th>Number of tourists</th>
<th>Total spent by tourists ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>$8.30 \times 10^7$</td>
<td>$5.360 \times 10^{10}$</td>
</tr>
<tr>
<td>USA</td>
<td>$6.70 \times 10^7$</td>
<td>$1.262 \times 10^{11}$</td>
</tr>
<tr>
<td>Spain</td>
<td>$5.77 \times 10^7$</td>
<td>$5.590 \times 10^{10}$</td>
</tr>
</tbody>
</table>

21% of the total spent by tourists in the USA was by Canadians.
34% of tourists in the USA were Canadians.

Work out the average amount spent per Canadian tourist in the USA.

[3 marks]

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Answer $ ...................................................................

PMT
11 (a) What is a stratified sample? [1 mark]

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11 (b) Here is some information about the age groups of people in a sports club.

<table>
<thead>
<tr>
<th>Junior</th>
<th>Adult</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>220</td>
<td>45</td>
</tr>
</tbody>
</table>

A sample of size 60, stratified by age group, is taken. Two people are chosen at random from the sample.

Work out the probability that they are both juniors. [4 marks]

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Answer .............................................................................................................
12 The histogram represents the heights of 90 firefighters.

12 (a) Which of the four bars represents the greatest number of firefighters? You must show your working. [3 marks]

Answer .................... cm ≤ height < ....................... cm
12 (b) Calculate an estimate of the mean height.
You must show your working.

[4 marks]

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Answer ................................................................. cm

12 (c) The tallest firefighter was 195.6 cm
The shortest firefighter was 170.4 cm

Both heights are given to 1 decimal place.

Work out the maximum possible difference in their heights.

[2 marks]

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Answer ................................................................. cm

END OF QUESTIONS
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