Mathematics

Unit 1

Wednesday 6 November 2013 9.00 am to 10.00 am

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.
Each day a taxi driver records the distance he travels. He also records the amount of fuel his car uses.

<table>
<thead>
<tr>
<th>Distance (km)</th>
<th>87</th>
<th>122</th>
<th>97</th>
<th>90</th>
<th>105</th>
<th>100</th>
<th>135</th>
<th>116</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel (litres)</td>
<td>8.3</td>
<td>13.0</td>
<td>9.5</td>
<td>9.4</td>
<td>11.2</td>
<td>9.9</td>
<td>14.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

1 (a) Complete the scatter graph. The first three points have already been plotted.

Answer all questions in the spaces provided.
1 (b) Draw a line of best fit.  

(1 mark)

1 (c) Use your line of best fit to predict the fuel used to travel 110 km.

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Answer ............................................................. litres  

(1 mark)

Turn over for the next question
Here is some information about 50 houses.

<table>
<thead>
<tr>
<th>Number of bedrooms</th>
<th>Number of houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total = 50</strong></td>
<td></td>
</tr>
</tbody>
</table>

Show that the mean number of bedrooms is less than 3.

(3 marks)
3 Jake works in a bookshop.
People can pay by cash, card or token.

He wants to know if men and women pay in different ways.

Design an observation sheet for him.

(2 marks)
A company sells items online and in a shop. This chart shows information about its sales.

4 (a) The table shows the sales for 2011.

<table>
<thead>
<tr>
<th>Sales (£ thousands)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>152</td>
</tr>
<tr>
<td>Shop</td>
<td>48</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
</tr>
</tbody>
</table>

Show the information for 2011 sales on the chart.

(3 marks)
4 (b) Work out the ratio of online sales to shop sales for 2008.
Give your answer in its simplest form.

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Answer ................ : ............

(2 marks)

4 (c) In 2012 online sales : shop sales = 3 : 1

What fraction of the 2012 sales were online?

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

(1 mark)

Turn over for the next question
The pie chart shows information about the number of magazines sold in four countries.

30,000 magazines were sold in Wales.

How many magazines were sold in total?

Answer ............................................................................................................ (3 marks)
Amina asks 50 people,

“What is your favourite pet? Choose from cat, dog, rabbit or other.”

6 (a) Which two words describe the type of data she collects from each person? Circle your answers.

qualitative      continuous      primary      secondary

(1 mark)

6 (b) Which two diagrams could she use to represent the data? Circle your answers.

scatter graph      pie chart      bar chart      stem-and-leaf

(1 mark)

Turn over for the next question
In a survey people had to choose A, B, C or D.

The percentages for B, C and D are shown.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
<td>35%</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
</table>

150 people chose B.

How many people chose A?

Answer .............................................................................. (4 marks)
David invests £5000 in a savings account. The account pays 3.2% compound interest per year.

Work out the value of his investment after 3 years. Give your answer to the nearest penny.

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Answer £............................... (4 marks)

Turn over for the next question
The table shows information about the marks of 500 students.

<table>
<thead>
<tr>
<th>Mark, $m$</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$15 &lt; m \leq 40$</td>
<td>80</td>
</tr>
<tr>
<td>$40 &lt; m \leq 60$</td>
<td>220</td>
</tr>
<tr>
<td>$60 &lt; m \leq 80$</td>
<td>125</td>
</tr>
<tr>
<td>$80 &lt; m \leq 100$</td>
<td>75</td>
</tr>
</tbody>
</table>

**9 (a)** Complete the cumulative frequency column.  

(1 mark)

**9 (b)** Show the information on a cumulative frequency graph.  

(3 marks)
9 (c) The top 10% of the students are awarded a distinction.

Estimate the mark needed for a distinction.

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

Turn over for the next question
The probability of rolling a six on a biased dice is \( \frac{1}{5} \).

The dice is rolled twice.

10 (a) Complete the tree diagram.

![Tree Diagram](image)

10 (b) Work out the probability of rolling exactly one six.

Answer: \( \frac{2}{5} \) (2 marks)
Here is a list of numbers.

\[
\begin{align*}
1\ 000\ 000 & \quad 4.6 \times 10^4 & \quad 63\ 000 & \quad 5 \times 10^3 & \quad 1.7 \times 10^5
\end{align*}
\]

Work out the range.
Write your answer in standard form.

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

Turn over for the next question
12 240 people visited a museum. The cumulative frequency table shows information about their ages.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Cumulative frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 4</td>
<td>0</td>
</tr>
<tr>
<td>≤ 12</td>
<td>65</td>
</tr>
<tr>
<td>≤ 19</td>
<td>175</td>
</tr>
<tr>
<td>≤ 64</td>
<td>215</td>
</tr>
<tr>
<td>≤ 80</td>
<td>240</td>
</tr>
</tbody>
</table>

12 (a) The museum has four types of ticket.

<table>
<thead>
<tr>
<th>Ticket type</th>
<th>Child</th>
<th>Teenager</th>
<th>Adult</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>5 to 12</td>
<td>13 to 19</td>
<td>20 to 64</td>
<td>65 and over</td>
</tr>
</tbody>
</table>

Show that 110 teenagers visited the museum.

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(1 mark)

12 (b) The owner wants a sample of size 30, stratified by ticket type.

How many teenagers should be in the sample?

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Answer ................................................................................................................. (3 marks)
The table and histogram give some information about the heights of 120 children.

<table>
<thead>
<tr>
<th>Height, $h$ (cm)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$40 &lt; h \leq 60$</td>
<td>30</td>
</tr>
<tr>
<td>$60 &lt; h \leq 70$</td>
<td>20</td>
</tr>
<tr>
<td>$70 &lt; h \leq 75$</td>
<td></td>
</tr>
<tr>
<td>$75 &lt; h \leq 95$</td>
<td>50</td>
</tr>
<tr>
<td>$95 &lt; h \leq 105$</td>
<td></td>
</tr>
</tbody>
</table>

Total $= 120$

13 (a) Complete the table and the histogram. (3 marks)

13 (b) Calculate an estimate of the upper quartile of the heights of the 120 children.

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Answer ................................................................ cm (2 marks)
Here are the histograms for four different sets of data. Each set of data has the same number of values.
Here are the box plots for the same four sets of data.

Box plot A

Box plot B

Box plot C

Box plot D

Complete the table to match each box plot to a histogram.

<table>
<thead>
<tr>
<th>Histogram</th>
<th>Box plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

(3 marks)

END OF QUESTIONS
There are no questions printed on this page