1. Here is a scatter graph. One axis is labelled “Height”.

(a) For this graph, state the type of correlation.

........................................................................................................................................................................ (1)

(b) From the list below, choose the most appropriate label for the other axis.

length of hair number of sisters length of legs GCSE French mark

........................................................................................................................................................................................................ (1)

(Total 2 marks)

2. The table below shows the Module results for 12 students.

The results show what they got in Stage 1 and Stage 2 of their examination.

<table>
<thead>
<tr>
<th></th>
<th>Stage 1</th>
<th>24</th>
<th>21</th>
<th>4</th>
<th>30</th>
<th>20</th>
<th>24</th>
<th>38</th>
<th>35</th>
<th>38</th>
<th>12</th>
<th>24</th>
<th>31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>26</td>
<td>21</td>
<td>12</td>
<td>22</td>
<td>18</td>
<td>18</td>
<td>28</td>
<td>23</td>
<td>30</td>
<td>15</td>
<td>22</td>
<td>26</td>
<td></td>
</tr>
</tbody>
</table>
The first 8 results have been plotted on the scatter diagram below.

(a) Complete the scatter diagram to show the information in the table. 

(b) Describe the relationship between the results for Stage 1 and Stage 2.

........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

(Total 3 marks)
3. Some students took a mathematics test and a science test. The scatter graph shows information about the test marks of eight students.

The table shows the test marks of four more students.

<table>
<thead>
<tr>
<th>Mark in mathematics test</th>
<th>14</th>
<th>25</th>
<th>50</th>
<th>58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark in science test</td>
<td>21</td>
<td>23</td>
<td>38</td>
<td>51</td>
</tr>
</tbody>
</table>

(a) On the scatter graph, plot the information from the table. (2)

(b) Draw a line of best fit on the scatter graph. (1)

(c) Draw the correlation between the marks in the mathematics test and the marks in the science test. (1)

(Total 4 marks)
4. The table shows the number of pages and the weight, in grams, for each of 10 books.

<table>
<thead>
<tr>
<th>Number of pages</th>
<th>80</th>
<th>130</th>
<th>100</th>
<th>140</th>
<th>115</th>
<th>90</th>
<th>160</th>
<th>140</th>
<th>105</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (g)</td>
<td>160</td>
<td>270</td>
<td>180</td>
<td>290</td>
<td>230</td>
<td>180</td>
<td>320</td>
<td>270</td>
<td>210</td>
<td>300</td>
</tr>
</tbody>
</table>

(a) Complete the scatter graph to show the information in the table. The first 6 points in the table have been plotted for you.
(b) For these books, describe the relationship between the number of pages and the weight of a book.
................................................................................................................................................
................................................................................................................................................

(1)

c) Draw a line of best fit on the scatter diagram.

(1)

d) Use your line of best fit to estimate
   (i) the number of pages in a book of weight 280 g,
       .................... pages
   (ii) the weight of a book with 120 pages.
       .................... g

(2)

(Total 5 marks)

5. The scatter graph shows information about 12 countries.

For each country, it shows the percentage of the population in farming jobs and the percentage of the population living in towns.

(a) Describe the relationship between the percentage of the population in farming jobs and the percentage of the population living in towns.
................................................................................................................................................
................................................................................................................................................

LILIAN BAYLIS TECHNOLOGY SCHOOL
(b) Draw the line of best fit on the scatter graph.

In Mathsland, the percentage of the population in farming jobs is 35%.

(c) Use your line of best fit to estimate the percentage of Mathsland’s population living in towns.

\[ \text{..............} \% \quad (1) \]

(Total 3 marks)

6. Pablo is an artist.

The scatter graph, below, gives information about the area and the cost of some of his pictures.

The table shows the area and the cost of another three of his pictures.

<table>
<thead>
<tr>
<th>Area (cm$^2$)</th>
<th>2000</th>
<th>2900</th>
<th>3260</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (£)</td>
<td>1150</td>
<td>1250</td>
<td>1500</td>
</tr>
</tbody>
</table>

(a) On the scatter graph, plot the information from the table. \( (1) \)

(b) Describe the relationship between the area of a picture and its cost.

\[ \text{..........................................................................................................................} \]

\[ \text{..........................................................................................................................} \quad (1) \]

(c) Draw a line of best fit on the scatter graph. \( (1) \)

(d) Use your line of best fit to find an estimate of the cost of a picture with an area of 2500 cm$^2$.

\[ £\text{.........................} \quad (1) \]
All Pablo’s pictures are rectangles.
One of his pictures costs £1000.
Its length is 48 cm.

(e) Use your line of best fit to find an estimate for the width of the picture.

......................... cm

(Total 6 marks)
7. Pablo is an artist.

The scatter graph, below, gives information about the area and the cost of some of his pictures.

The line of best fit has been drawn on the graph.

All Pablo’s pictures are rectangles.
One of his pictures costs £1000.
Its length is 48 cm.

Use the line of best fit to estimate the width of the picture.
Answers

1. (a) Positive 1
   (b) length of legs 1

2. (a) points 2
   Plot points
   (b) Good at 1 = good at 2 or commenting +ve correlation etc.

3. (a) Points plotted 2
   \[ B2 \text{ for 4 points plotted correctly} \]
   \[ (B1 \text{ for 2 or 3 points plotted correctly}) \]
   (b) Line drawn 1
   \[ B1 \text{ for line within overlay extending from 20 to 50 on the maths axis} \]
   (c) Positive 1
   \[ B1 \text{ for positive correlation} \]

4. (a) Plots 1
   \[ B1 \text{ cao} \]
   (b) description 1
   \[ B1 \text{ dynamic relationship or “positive” (correlation)} \]
   (c) line of best fit 1
   \[ \text{Line within overlay region, and to the extent of} \]
   (d) (i) reading 2
   \[ 280 \text{ g } \Rightarrow \]
   \[ B1 \text{ ft from single straight line of positive gradient (±1/2 square)} \]
   (ii) reading
   \[ 120 \text{ pages } \Rightarrow \]
   \[ B1 \text{ ft from single straight line of positive gradient (±1/2 square)} \]

5. (a) Negative or as urban goes up, farming goes down 1
   \[ B1 \text{ cao oe} \]
   (b) Line within tolerance.
   \[ B1 \text{ for line within overlay lines, at least 10cm in length} \]
6. (a) Correct plots
   \[ B1 \text{ c}ao \pm 1 \text{ for full square tolerance} \]

(b) Description
   \[ B1 \text{ description of relationship or correlation} \]

(c) LOBF
   \[ B1 \text{ between verticals: } (3000, 1300), (3000, 1500) \text{ and } (500, 200), (500, 400) \]

(d) (£1170)
   \[ B1 \text{ ft from lobf dep on a single straight line segment of positive gradient } \pm 1 \text{ full square (± 20)} \]

(e) (43cm)
   \[ \text{Read off at } £1000 (2080) \text{ and then } -48 \]
   \[ B2 \text{ for answers in the range } 36 - 49 \]
   \[ \text{or } M1 \text{ read off and } -48, \text{ ft from lobf dep on a single straight line segment of positive gradient } \pm 1 \text{ full square (± 20).} \]
   \[ A1 \text{ ft or } 36cm - 49cm \]

7. 43cm
   \[ \text{Read off at } £1000 (2100) \text{ and then } -48 \]
   \[ M1 \text{ read off (2000-2200) and } -48 \]
   \[ A1 43.7cm - 44.8cm \]