General Certificate of Secondary Education
June 2008

STATISTICS
Foundation Tier

3311/F

F

AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Wednesday 18 June 2008   9.00 am to 11.00 am

For this paper you must have:
- a calculator
- mathematical instruments.

Time allowed: 2 hours

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 in the spaces provided.
- You must answer the questions in the spaces provided. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book.

Information
- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

3311/F

You may need to use the following formulae:

Mean of a frequency distribution $= \dfrac{\sum fx}{\sum f}$

Mean of a grouped frequency distribution $= \dfrac{\sum fx}{\sum f}$,

where x is the mid-interval value.

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

1 100 people were asked where they went on holiday.
The bar chart shows some of the results.

Bar chart showing where people went on holiday
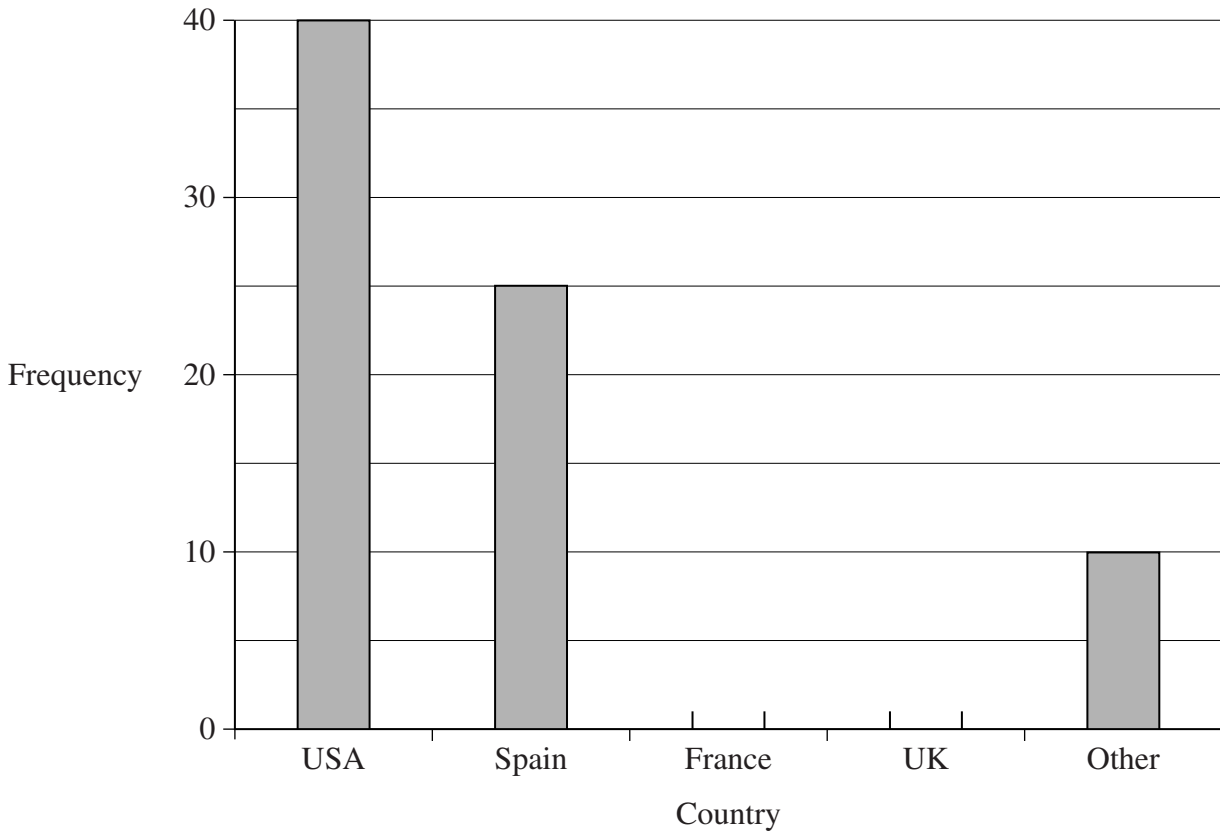
1 (a) How many people said they went to the USA?

Answer .... *(1 mark)*

1 (b) How many people said they went to Spain?

Answer .... *(1 mark)*

1 (c) Five out of the 100 people said they went to France.

1 (c) (i) Work out how many people went to the UK.

....

....

Answer .... *(2 marks)*

1 (c) (ii) Complete the bar chart.

(2 marks)

6

Turn over ▶

2 Here are some probability values.

　　0.7　　1　　0.5　　0　　0.25

Match the probabilities with the words in the table.

Word	Probability
Impossible	
Likely	
Certain	
Unlikely	
Even Chance	

(3 marks)

3 Rod went fishing six times.
The number of fish he caught was

　　3　　　5　　　6　　　8　　　11　　　x

3 (a) The range of the number of fish caught is 10.

Work out x, the largest number.

....

Answer .... *(2 marks)*

3 (b) Find the median number of fish caught.

....

Answer .... *(1 mark)*

3 (c) Do these data have a mode?
Give a reason for your answer.

....

....

(1 mark)

4 For her Statistics coursework, Mina wanted to find out how popular her local clothes shop was. She wanted to know

A   the number of females going into the shop per minute
B   the number of teenagers going into the shop per minute
C   the total number of people going into the shop per minute.

4 (a)   Which **one** of the above could be found using a data logging machine?

Answer ....   *(1 mark)*

4 (b)   The spreadsheet shows the data for the first minute the shop was open one day.

Gender (M/F)	Age
F	40
M	45
F	14
F	15
F	14
M	21
F	19
M	64
F	5
F	59

4 (b)   (i)   What are the values of A and B for these data?

Answer A ....   B ....   *(2 marks)*

4 (b)   (ii)   Use these data to estimate the proportion of people entering the shop who are female.

....

Answer ....   *(1 mark)*

4 (b)   (iii)   Give **two** reasons why this estimate may not be very accurate.

Reason 1 ....

....

Reason 2 ....

....

(2 marks)

Question 4 continues on the next page

13

Turn over ▶

4 (c) Write a suitable question that Mina could use to find out whether a person is a teenager or not.
You **must** include a response section.

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....
(2 marks)

5 The frequency table shows the number of times members of a club attended monthly meetings in one year.

Number of meetings attended	Frequency
0	1
1	3
2	6
3	2
4	13
5	11
6	17
7	15
8	19
9	16
10	8
11	4
12	10

5 (a) What is the modal number of meetings attended by the members?

Answer .... *(1 mark)*

5 (b) How many members does the club have?

....

....

Answer .... *(2 marks)*

5 (c) The total attendance for the year was 875.

Use this fact and your answer to part (b) to work out the mean number of meetings attended by each member.

....

....

Answer .... *(2 marks)*

5 (d) The data are put into a grouped frequency table.

Number of meetings attended	Frequency
0 – 3	12
4 – 6	
7 – 9	
10 – 12	

Complete the frequency column.

....

....

....

(3 marks)

5 (e) Give one advantage of using

5 (e) (i) the original frequency table

....

....

(1 mark)

5 (e) (ii) the grouped frequency table.

....

....

(1 mark)

Turn over ▶

6 20 students entered a contest to see who could complete the most press-ups in one minute.
The results were

35	41	51	38	46	32	50	39	62	57
65	43	51	51	34	58	45	33	46	48

6 (a) Complete an ordered stem and leaf diagram to show the data.
Remember to include a Key.

....

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(4 marks)

6 (b) Alan came second in the contest.
How many press-ups did he complete in one minute?

....

Answer .... *(1 mark)*

7 (a) The village of Scotter has a population of 6000.
In 2007 there were 24 births in Scotter.

Calculate the crude birth rate for Scotter in 2007.

....

....

....

Answer .... *(3 marks)*

7 (b) The village shop sells calendars at Christmas each year.
The table shows the prices of the calendar for the last three years.

Year	2005	2006	2007
Price	£8	£9	£10

Calculate an index for the price of the calendar in 2007 using 2005 as base year.

....

....

....

Answer .... *(3 marks)*

Turn over for the next question

8 Stephanie works at a local garage.
The table shows the cumulative frequencies for the number of hours of overtime worked by Stephanie each week, over a period of 60 weeks.

Number of hours	**Cumulative Frequency**
less than 1	2
less than 2	7
less than 3	10
less than 4	22
less than 5	41
less than 6	58
less than 7	60

8 (a) Draw a cumulative frequency polygon for these data on the axes below.

Cumulative
frequency

Number of hours
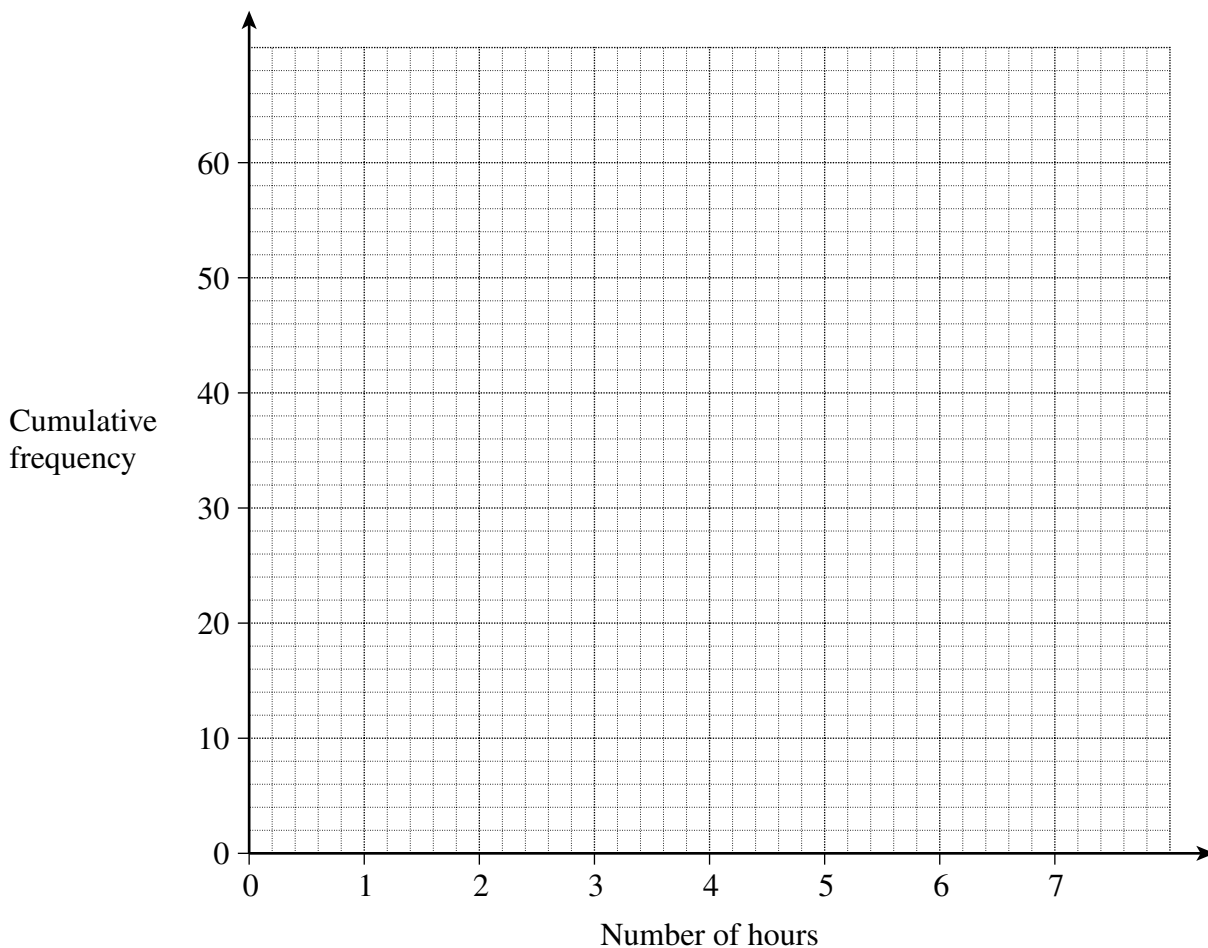
(3 marks)

8 (b) Estimate on how many weeks Stephanie worked between $4\frac{1}{2}$ and $5\frac{1}{2}$ hours overtime.

....

....

....

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

Turn over for the next question

6

Turn over ▶

9 **(a)** A fair six-sided dice is rolled.
The dice has numbers 1, 2, 3, 4, 5, 6 on its faces.

Find the probability that the dice shows

9 **(a)** **(i)** the number 4

Answer .... *(1 mark)*

9 **(a)** **(ii)** an even number.

Answer .... *(1 mark)*

9 **(b)** A second fair six-sided dice is also rolled.
This dice has numbers 0, 1, 2, 3, 4, 5 on its faces.
The numbers obtained from the two dice are **multiplied** to give a score.

9 **(b)** **(i)** Complete the table to show all possible scores.

	1	**2**	**3**	**4**	**5**	**6**
0					0	
1			3			
2		4				
3	3					
4						24
5				20		

(2 marks)

9 **(b)** **(ii)** Explain why the probability of getting a score of at least 15 is $\frac{1}{4}$.

....

....

....
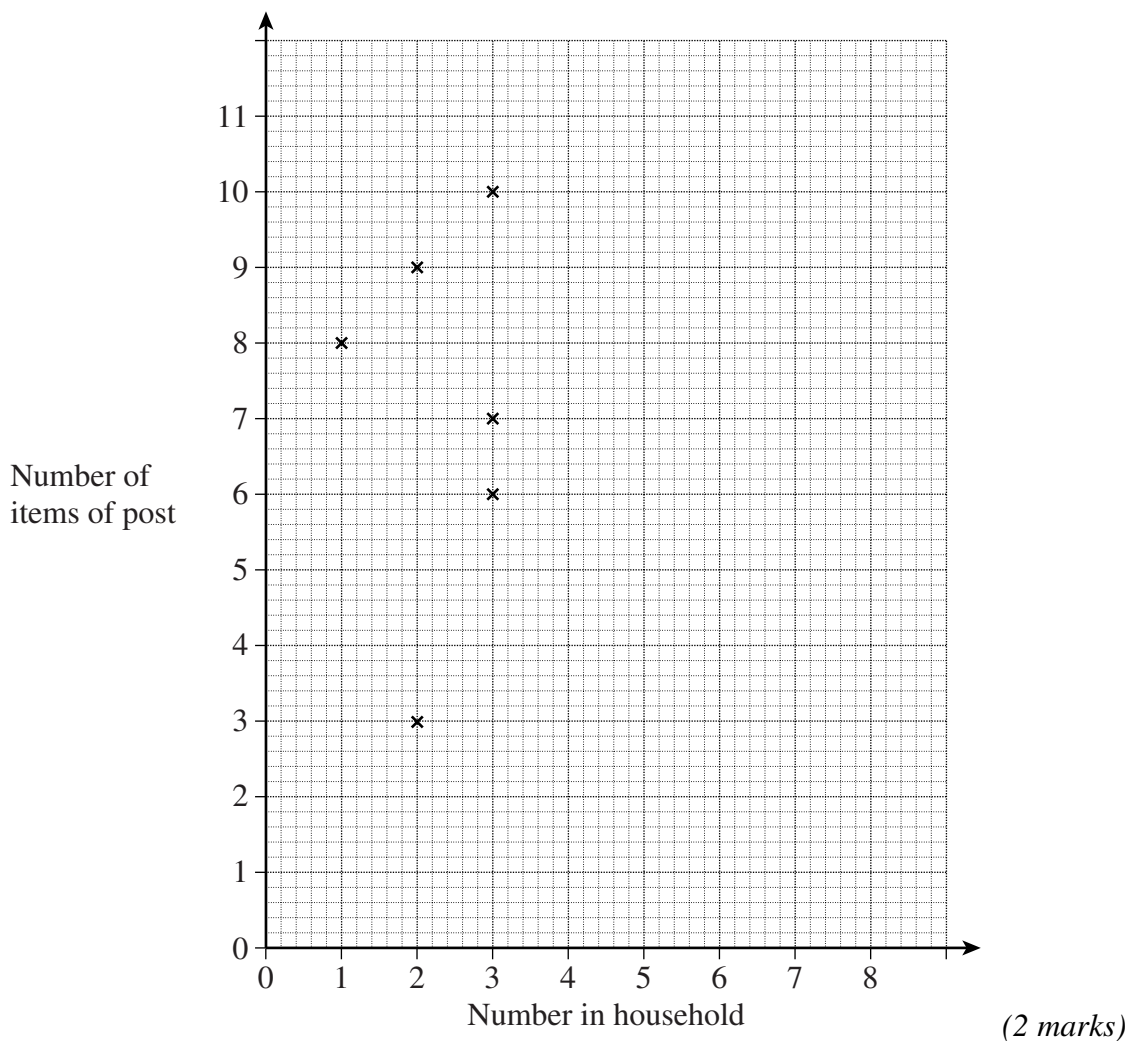
(2 marks)

10 (a) The table shows the number of people in each of 12 households and the number of items of post they received one Monday.

Number in household	1	2	2	3	3	3	4	5	5	5	7	8
Number of items of post	8	3	9	7	6	10	3	9	8	11	4	7

10 (a) (i) Complete the scatter diagram.
The information for the smallest six households has been plotted.

Number of items of post

Number in household

(2 marks)

10 (a) (ii) Explain why it is **not** appropriate to draw a line of best fit for these data.

....

....
(1 mark)

Question 10 continues on the next page

9

Turn over ▶

10 (b) The number of phone calls received by the same households that Monday is shown in this scatter diagram.

Number of phone calls

Number in household
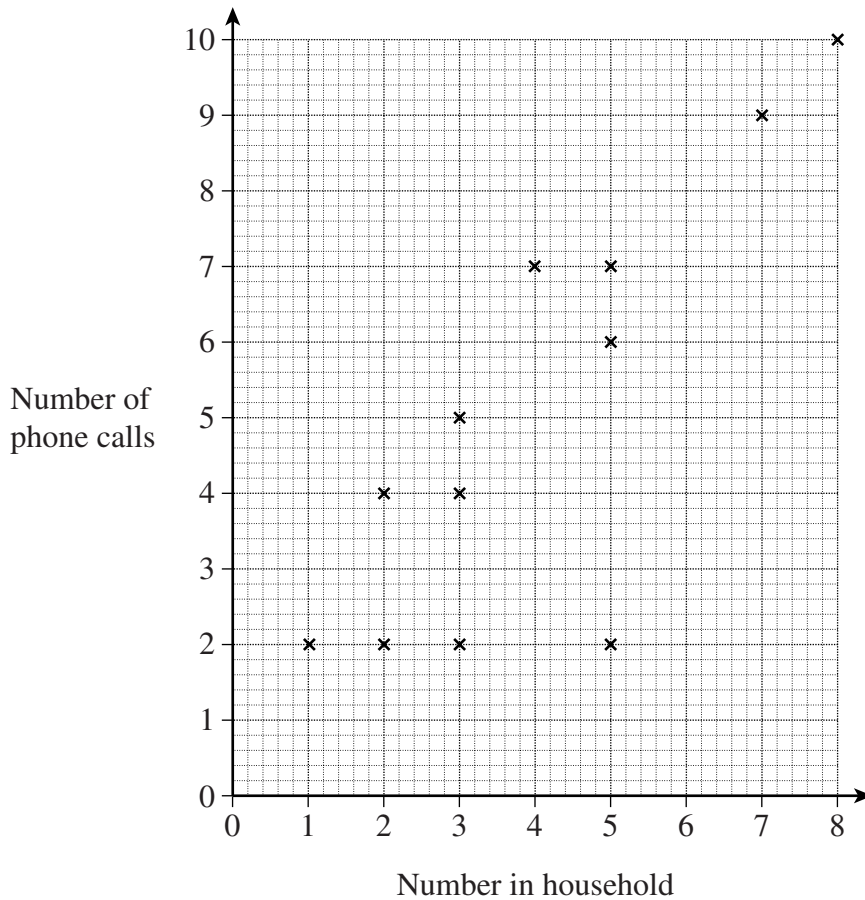
10 (b) (i) State the correlation shown in this scatter diagram.

Answer .... *(1 mark)*

10 (b) (ii) The mean number in a household is 4.
The mean number of calls received is 5.
Use this information to draw a line of best fit on the graph.

(2 marks)

10 (b) (iii) Use your line to estimate the number of phone calls received by a household of six.

Answer .... *(1 mark)*

11 The table shows information about the length of time patients had been waiting for treatment in National Health Service hospitals (NHS), by region, at the end of March 2005.

Time spent waiting for NHS treatment

	Less than 6 months (%)	6 to 12 months (%)	Longer than 12 months (%)	Number of patients (in thousands)
England	75	23	2	1012
North Yorkshire	77	22	1	122
North West	78	20	2	160
Trent	82	16	2	100
West Midlands	83	16	1	85
Eastern	75	22	3	124
London	75	22	3	129
South East	73	23	4	189
South West	75	21	3	103
Wales	68	18	14	71
Scotland	80	17	3	72

Source: Adapted from Social trends No. 35

11 (a) What percentage of patients in the South East region had been waiting 6 to 12 months for treatment?

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

11 (b) Using the percentage figures for regions of England, select the region which appears to have the shortest recorded waiting times at the end of March 2005.

Answer ....   *(1 mark)*

11 (c) Give a reason why the total for the South West Region does not equal 100%.

....

....
(1 mark)

11 (d) How many patients had been waiting for less than 6 months for treatment in the North West region?

....

....

Answer ....   *(3 marks)*

Question 11 continues on the next page

10

Turn over ▶

The multiple bar chart opposite shows the percentage waiting times for all NHS patients in England and Wales.

11 (e) Complete the multiple bar chart to show the percentage waiting times for NHS patients in Scotland.

(3 marks)

11 (f) State **two** differences in the waiting times shown in the multiple bar chart.
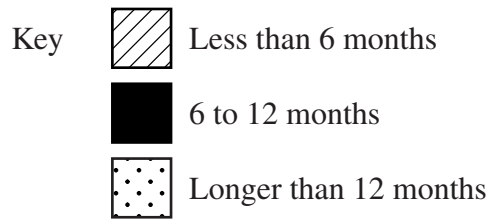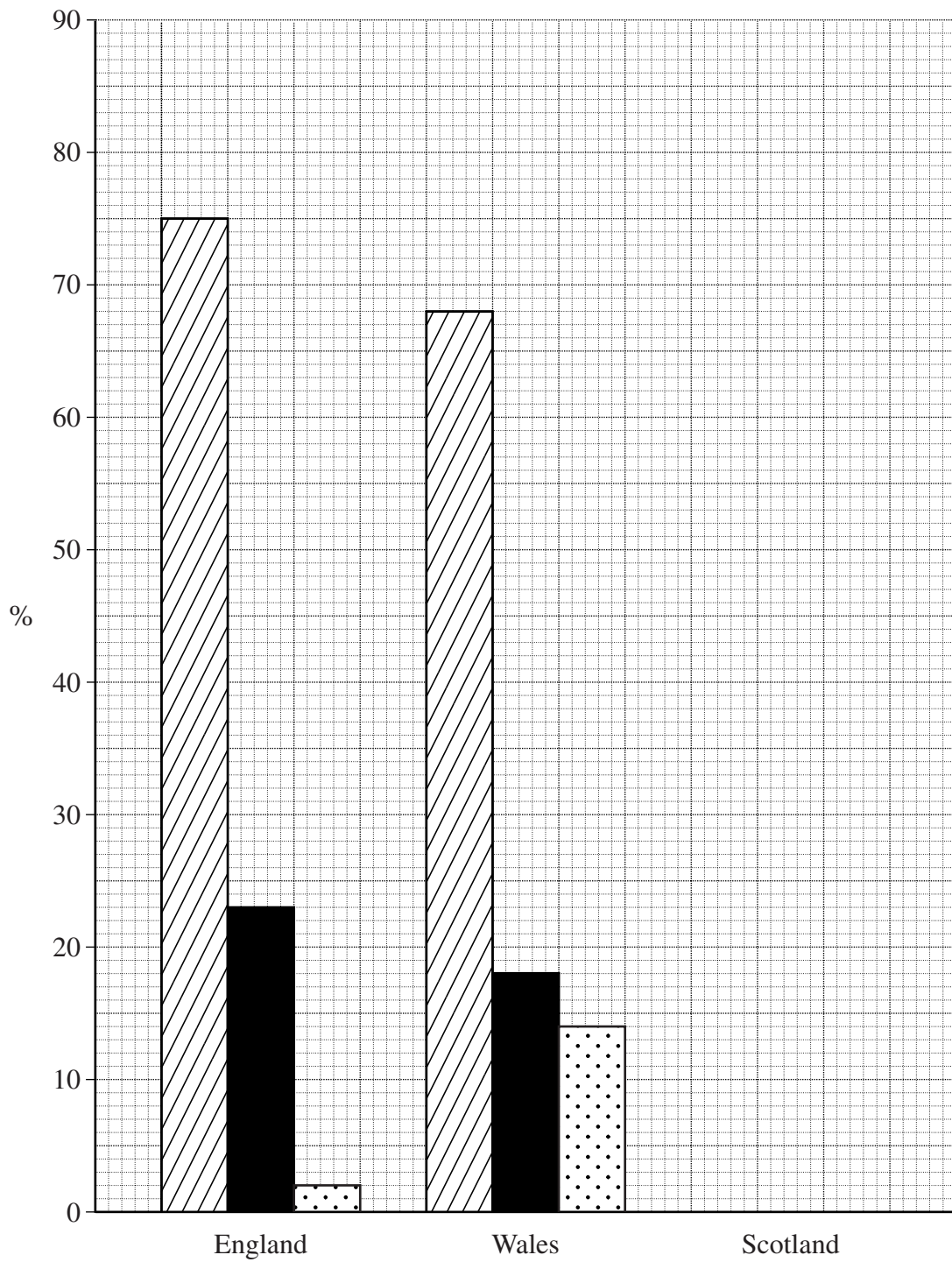
Difference 1 ....

....

Difference 2 ....

....

(2 marks)

National Health Service Waiting Times

Key

⬛ Less than 6 months

⬛ 6 to 12 months

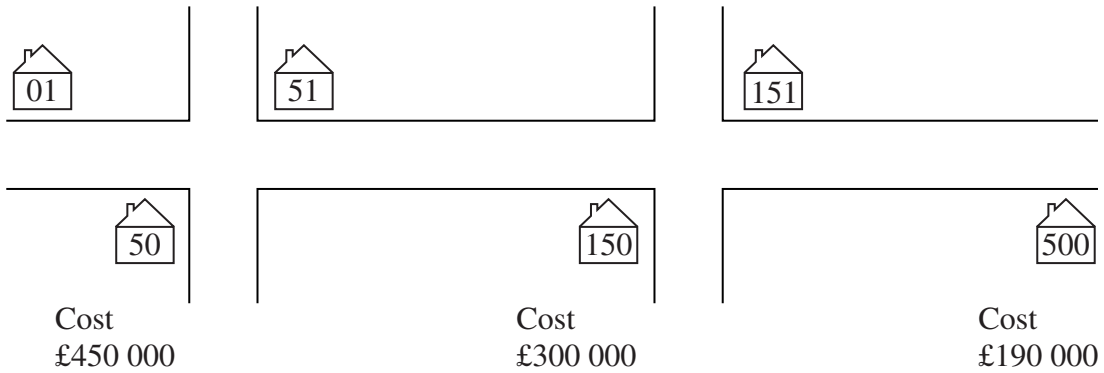⬛ Longer than 12 months

Turn over ▶

12 The diagram shows the layout of a new housing estate in Stokeville.

Houses numbered 01 to 50   cost £450 000 each

Houses numbered 51 to 150   cost £300 000 each

Houses numbered 151 to 500   cost £190 000 each

01

51

151

50

150

500

Cost
£450 000

Cost
£300 000

Cost
£190 000

The house builder agrees to undertake a sample survey to find out residents' views on introducing parking charges on the estate.

He decides to question one female from each of the houses numbered 31 to 50 on the estate.

12 (a) Give **two** reasons why this method of sampling is unsuitable.

Reason 1 ....

....

Reason 2 ....

....

(2 marks)

12 (b) At a later date the builder extends the survey by selecting a simple random sample of 50 houses from the 500 on the estate.

12 (b) (i) Explain how the sample could be chosen in this case.

....

....

....

....

(2 marks)

12 (b) (ii) Why might a stratified sample be more appropriate in this case?

....

....

(1 mark)

12 (b) (iii) In a stratified sample, how many houses costing £300 000 would be included in a sample of 50?

....

....

Answer .... *(2 marks)*

Question 12 continues on the next page

7

Turn over ▶

12 (c) One of the classification questions used in the survey was

'How much do you pay each month on your mortgage?'

under £200 ☐

£200 - £300 ☐

£300 - £700 ☐

over £700 ☐

12 (c) (i) Give **one** criticism of the response section.

....

....

(1 mark)

12 (c) (ii) Give **one** criticism of the question asked.

....

....

(1 mark)

Turn over for the next question

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2

Turn over ▶

13 Sunita is an unemployed IT consultant.

She is planning to move to the North East, North West or West Midlands region of the UK to find work.

She downloads from the Internet details of twenty-five vacancies for IT staff in each region.

A summary of the salaries in the North East and North West regions is illustrated in the box plots below.

Salaries (£000s)
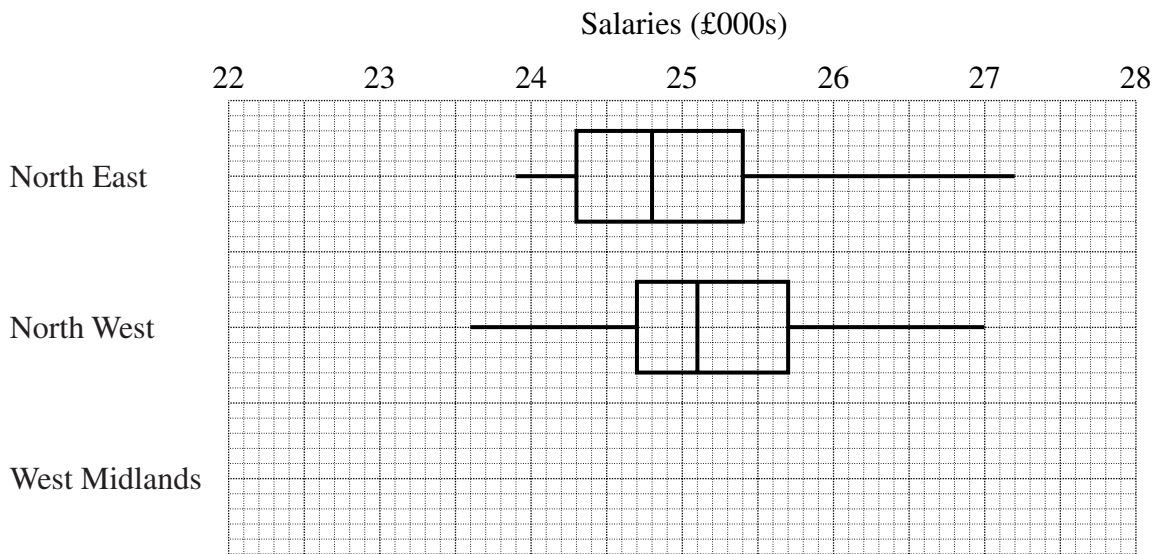
13 (a) What is the range of salaries in the North East region?

....

....

Answer £ .... *(1 mark)*

13 (b) Find the interquartile range of salaries in the North West Region.

....

....

Answer £ .... *(2 marks)*

13 (c) Sunita summarised her results from the West Midlands region.

The median salary on offer was £25 000, the lower quartile salary was £23 400, and the interquartile range was £3100.
The highest salary was £26 900 and the lowest £22 300.

Use these results to draw a box plot on the grid.

(3 marks)

....

....

13 (d) Sunita does not want to move to a region where the range in salaries exceeds £4500 or where the median salary is below £25 000.

13 (d) (i) State which region she should choose.

Answer .... *(1 mark)*

13 (d) (ii) Explain why the other two regions would **not** be selected.

Region ....

Reason ....

....

Region ....

Reason ....

....
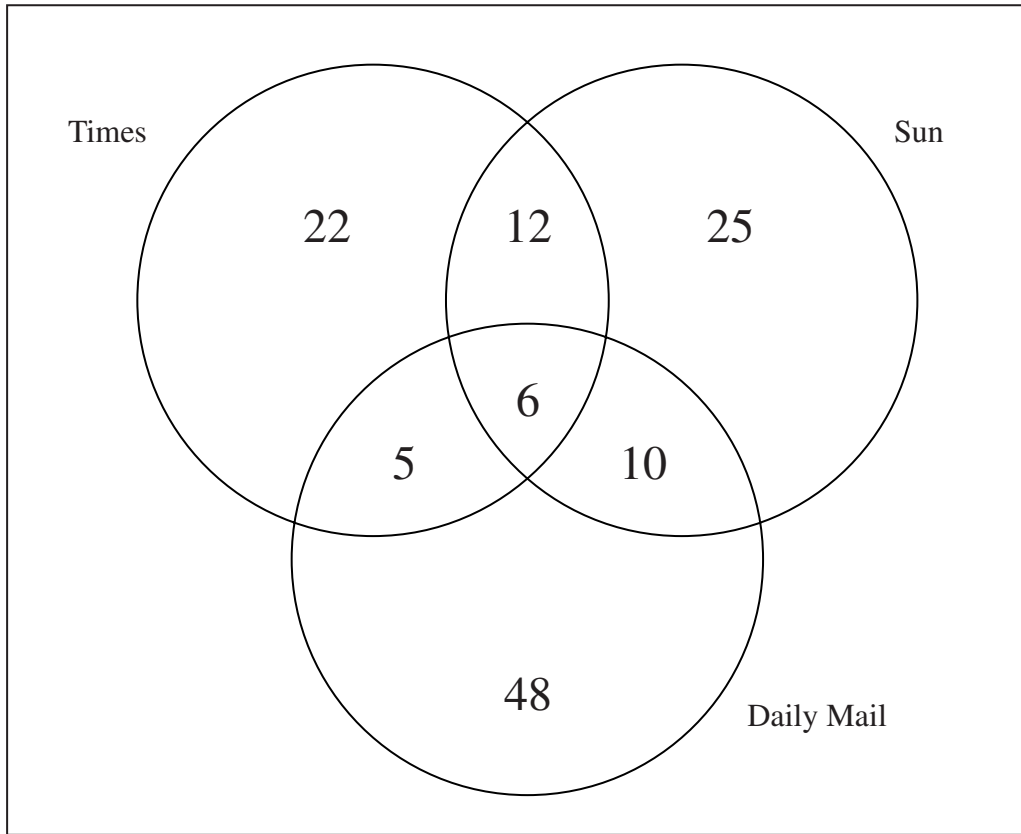
(2 marks)

Turn over for the next question

Turn over ▶

9

14 150 students were asked which daily newspaper(s) they read.

The results are shown in the diagram.

14 (a) Find the probability that a student chosen at random reads

14 (a) (i) the Times

....

Answer .... *(1 mark)*

14 (a) (ii) only one of the papers

....

....

Answer .... *(2 marks)*

14 (a) (iii) none of the three papers

....

....

....

Answer .... *(3 marks)*

14 (a) (iv) the Sun or the Times or both but not the Daily Mail.

....

....

Answer .... *(2 marks)*

14 (b) State whether each of the following variables is qualitative, discrete or continuous.

14 (b) (i) The number of pages in each newspaper.

Answer .... *(1 mark)*

14 (b) (ii) The length of time spent reading each newspaper.

Answer .... *(1 mark)*

END OF QUESTIONS

10

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