Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

For Examiner's Use

General Certificate of Secondary Education
June 2007

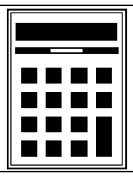
STATISTICS
Foundation Tier

3311/F

F

Thursday 21 June 2007 9.00 am to 11.00 am

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



Time allowed: 2 hours

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book.

Information
- The maximum mark for this paper is 100.
- Mark allocations 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.

For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
TOTAL	
Examiner's Initials	

You may need to use the following formulae:

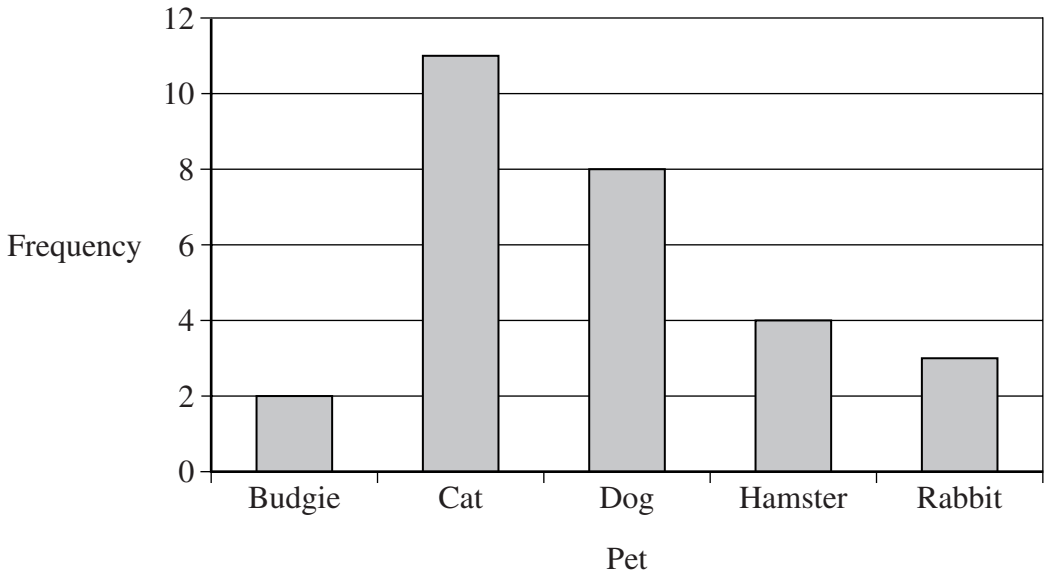
Mean of a frequency distribution $= \dfrac{\sum fx}{\sum f}$

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 The bar chart shows the favourite pet of each pupil in a Junior School class.



(a) How many pupils chose a hamster as their favourite pet?

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

(b) How many more pupils chose a cat rather than a rabbit as their favourite pet?

.....

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

(c) How many pupils are in this Junior School class altogether?

.....

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

5

2 The data show the number of televisions in 30 homes.

2	3	1	4	2	3	2	1	1	4
2	2	2	3	1	3	2	2	3	1
2	1	4	2	1	1	2	4	3	2

(a) Complete the tally chart and the frequency column.

Number of televisions	Tally	Frequency
1		
2		
3		
4		

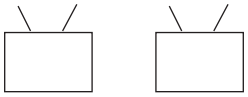
(4 marks)

(b) What is the modal number of televisions?

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

(c) Complete the pictogram to show the data in the table.

Key:  represents 4 homes.

1	
2	
3	
4	

(3 marks)

LEAVE MARGIN BLANK

3 The amount of money spent by seven customers in a DIY shop was recorded.

The values were

£5 £12 £8 £225 £20 £14 £10

(a) Find the range of these values.

.....

Answer £ ..... *(2 marks)*

(b) Find the median of these values.

.....

Answer £ ..... *(2 marks)*

(c) Will the mean be higher or lower than the median?

Tick the correct box.

Higher ☐ Lower ☐

Give a reason for your answer.

Reason .....

.....

.....

(2 marks)

Turn over for the next question

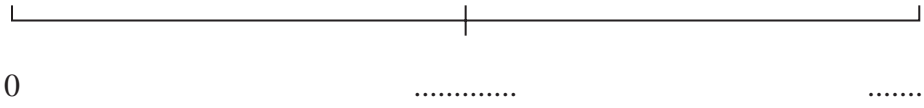
14

4 (a) A fair six-sided dice is rolled.

Events A, B and C are defined as follows.

Event A - the dice shows an even number.
Event B - the dice shows the number 6.
Event C - the dice shows the number 5 or less.

(i) Complete the labelling of the probability scale.



(1 mark)

(ii) Put arrows on the probability scale to show the probability of each event.
Label the arrows with the correct letter, A, B or C.

.....

.....

(3 marks)

(iii) Name two events from A, B and C which are mutually exclusive.
Give a reason for your answer.

Events ..... and .....

Reason .....

.....

(2 marks)

(b) A fair eight-sided dice has the numbers 1, 2, 3, 4, 5, 6, 7 and 8 on its faces.
Find the probability that the dice shows either an odd number or a number higher than 6.

.....

.....

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

5 The list gives the surnames of the 28 families living in a street.

01	Anderson	15	Joab
02	Bailey	16	Lovejoy
03	Brown	17	McKinney
04	Brownley	18	Morgan
05	Cadman	19	North
06	Cargill	20	Patel
07	Crowther	21	Paybet
08	Fenton	22	Randall
09	Fernandez	23	Shah
10	Garland	24	Singh
11	Grinling	25	Taylor
12	Halliday	26	Thorns
13	Holding	27	Wong
14	Imeson	28	Woodcock

Obtain a random sample of five different families using pairs of digits selected from the following list starting at 23.

23 39 20 09 18 23 00 14 83 75 36 62 92 01 21 33 15 22 09 08 68 27

.....

.....

.....

Family Number	Name

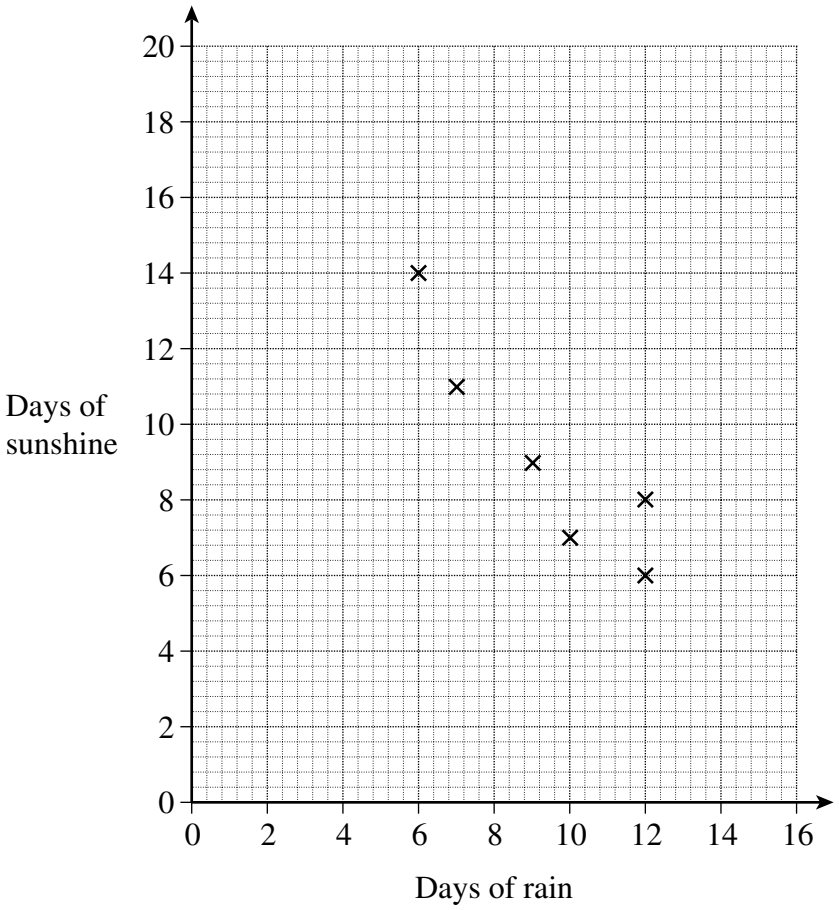
(4 marks)

12

6 The table shows the number of days of rain and the number of days of sunshine in Stokeham each April for 12 years.

Year	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Days of rain	12	10	7	12	9	6	4	7	11	15	12	8
Days of sunshine	6	7	11	8	9	14	15	10	8	4	5	11

(a) The data for the first six years have been plotted on the scatter diagram. Plot the remaining data on the scatter diagram.



(2 marks)

(b) Describe the type of correlation shown.

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

(c) The mean number of days of rain is 9.4, correct to one decimal place.

(i) Calculate the mean number of days of sunshine.

.....

.....

Answer ..... days *(2 marks)*

(ii) Use this information to help draw a line of best fit on your diagram.

(2 marks)

(d) Use your line of best fit to estimate the number of days of sunshine in an April which has

(i) 13 days of rain

Answer ..... days *(1 mark)*

(ii) 3 days of rain

Answer ..... days *(1 mark)*

(e) Which of your answers in part (d) is more reliable?
Give a reason for your answer.

More reliable .....

Reason .....

.....

.....

(2 marks)

11

7 (a) Explain the difference between a census and a sample.

.....

.....

.....

(2 marks)

(b) Amber has a calculator which can generate random numbers.

She sets it to generate random numbers from the list 1, 2, 3, 4 and 5.

(i) Write down the mean of 1, 2, 3, 4 and 5.

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

(ii) She now uses her calculator to generate a sample of 100 of these random numbers as shown in the table.

Number	**Frequency**
1	27
2	20
3	17
4	16
5	20

Calculate the mean of the sample of random numbers.

.....

.....

.....

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

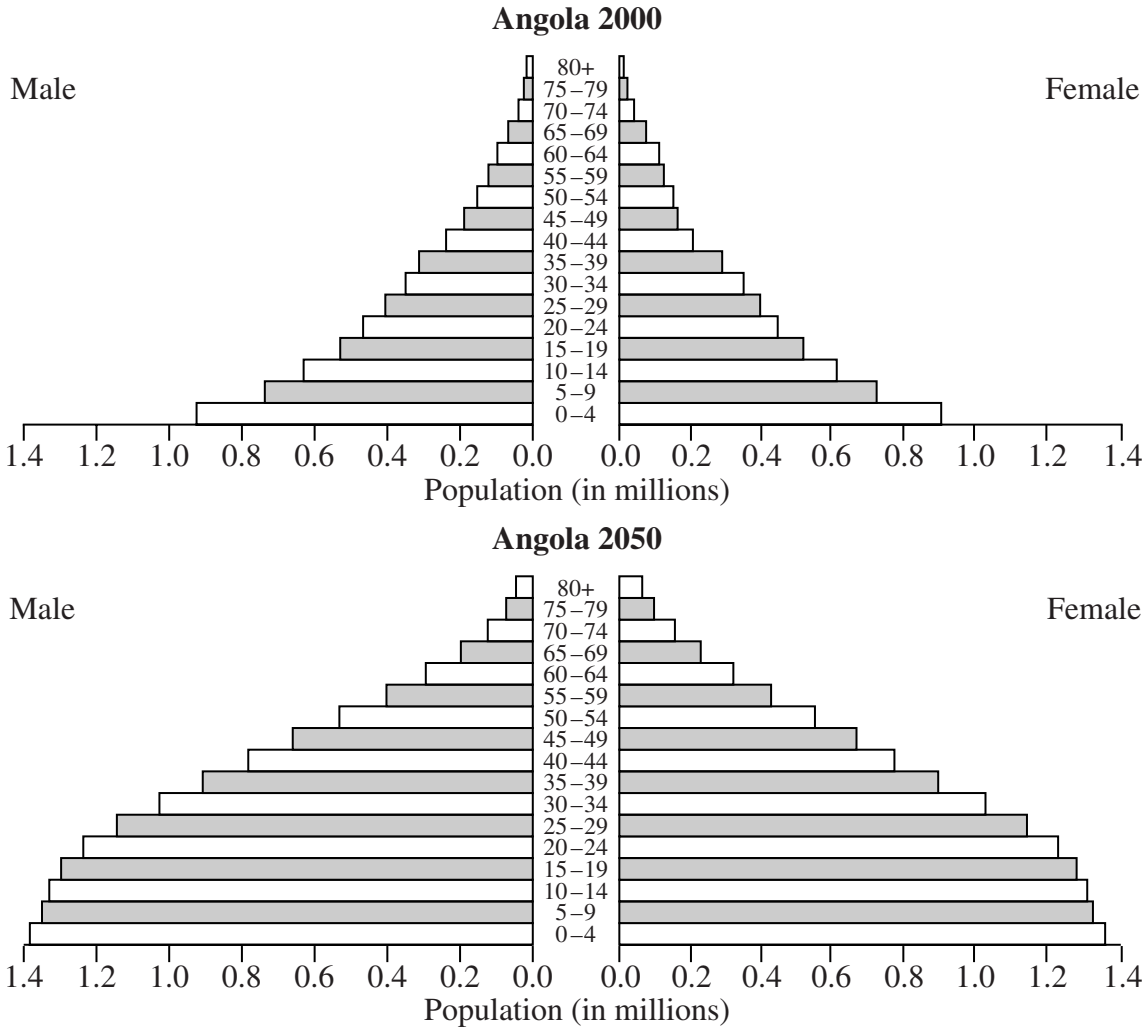
(iii) Comment on your answers to part (b)(i) and part (b)(ii).

.....

.....

(1 mark)

8 The population pyramids show the distribution of the population of Angola by age and gender for 2000 and a prediction for 2050.



(a) Give one difference between the population for 2000 and the prediction for 2050.

.....

.....

(1 mark)

(b) In the 2050 prediction which male age group will have approximately half of the number in the 30 - 34 male age group?

.....

.....

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

(c) Estimate the difference between the female population aged 10 - 14 for 2000 and the predicted value for 2050.

.....

Answer ..... millions *(2 marks)*

11

Turn over ►

9 Lydia and Roma are testing a spinner they have made to see if it is fair.

The spinner has five equal sections, one each of blue, red, green, yellow and purple.

(a) Roma spins the spinner 10 times.
It lands on red 3 times.

What is the relative frequency for red after these 10 spins?

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

(b) Lydia spins the spinner 90 times.
It lands on red 12 times.
Explain why Lydia's results should be more reliable than Roma's.

.....

.....
(1 mark)

(c) Combine Roma's and Lydia's data to estimate the probability that this spinner lands on red.

.....

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

(d) Use your result in part (c) to comment on whether or not the spinner is fair.
Give a reason for your answer.

.....

.....

.....
(2 marks)

10 The table shows some of the prices and price indices of a litre of petrol for the years 2002 – 2005.
The prices are correct to the nearest penny.

Year	Price (pence)	Index
2002	71	100
2003		109
2004	81	114
2005	95	

Take 2002 as the base year.

(a) Find the price of a litre of petrol in 2003.
Give your answer to the nearest penny.

.....

.....

Answer ..... pence *(3 marks)*

(b) Find the price index for 2005.

.....

.....

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

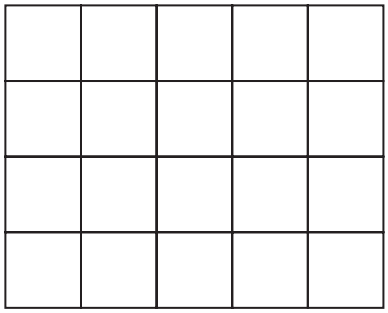
10

11 The diagram shows a rectangular field divided into small square areas.

The number in each square shows the number of sheep in that square.

5	7	11	6	3
3	6	7	4	2
0	2	4	3	1
0	0	0	2	2

(a) Use the Key provided to produce a shading (choropleth) map on the blank copy of the field below.



Key:

0 sheep

1–4 sheep

5–8 sheep

9 or more sheep

(3 marks)

(b) A sheepdog is sitting in the field.
Mark with a 'D' the likely position of the sheepdog in the field.
Give a reason for your answer.

.....

.....

(1 mark)

12 Rodney is considering opening a small restaurant in the village where he lives.

To find out the views of local people he delivers a questionnaire to every house in the village.

(a) Included in the questionnaire is a closed question asking for people's age.

(i) Explain what is meant by a *closed question*.

.....

.....

(1 mark)

(ii) Give one advantage of using a closed question for age.

.....

.....

(1 mark)

(b) Only 12% of the questionnaires are returned to Rodney.

How might Rodney have improved the response rate?

.....

.....

(1 mark)

(c) The returned questionnaires showed that some of his questions had been badly worded.

What should Rodney have done before he delivered his questionnaire to avoid this problem?

.....

.....

(1 mark)

(d) One of Rodney's questions was

"How often do you eat out at a pub or restaurant?"

Give two criticisms of this question.

Criticism 1 .....

.....

(1 mark)

Criticism 2 .....

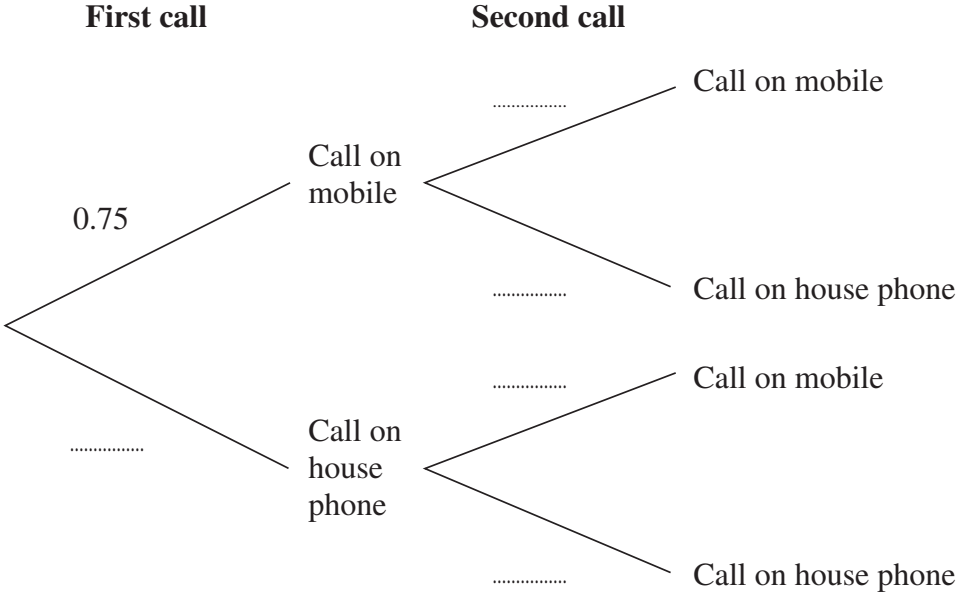
.....

(1 mark)

10

13 Danielle lives in a house which has a phone.
She also has a mobile phone.
Danielle receives 75% of all her calls on her mobile phone.

(a) (i) Complete the tree diagram to show the probabilities for the next two calls.
Assume that all calls are independent.



(3 marks)

(ii) Explain what is meant by the phrase in part (a)(i) that 'all calls are independent'.

.....

.....

(1 mark)

(b) Use the tree diagram to find the probability that the next two calls for Danielle are on her mobile phone.

.....

.....

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

14 When motorists call a particular road breakdown service, they are put into one of three categories by the operator at the switchboard.

These categories are Emergency (E), Urgent(U) and Non-Urgent(N).

Emergency and Non-Urgent categories are equally likely.
The Urgent category is four times more likely than the Emergency category.

The breakdown service wish to carry out a simulation of 20 calls to their switchboard using a fair dice.

(a) Describe how they could allocate the numbers 1, 2, 3, 4, 5 and 6 on the dice to a particular category of call.

.....

.....

.....

.....

(3 marks)

(b) Using your answer to part (a) list the type of call simulated by the following numbers on the dice using the letters E, U or N.

.....

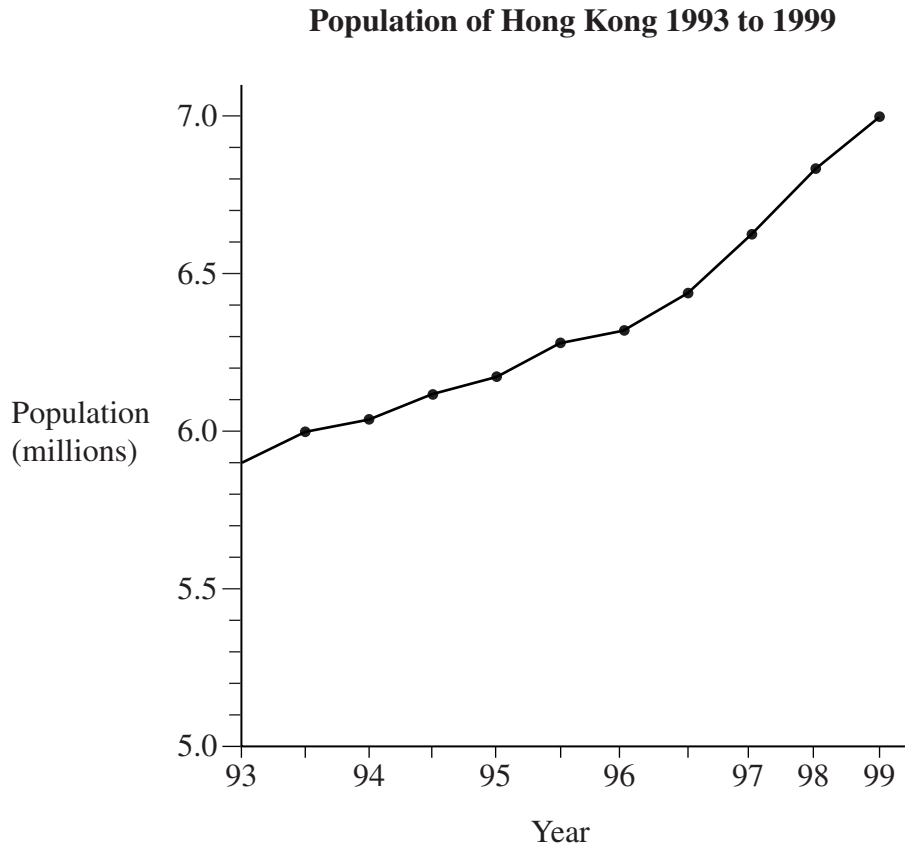
.....

5	1	4	6	4	4	2	3	2	6
1	1	3	4	2	6	6	5	4	5

(2 marks)

11

15 (a) The diagram shows the population of Hong Kong from 1993 to 1999.



Give two reasons why this diagram is misleading.

Reason 1 .....

.....

.....

Reason 2 .....

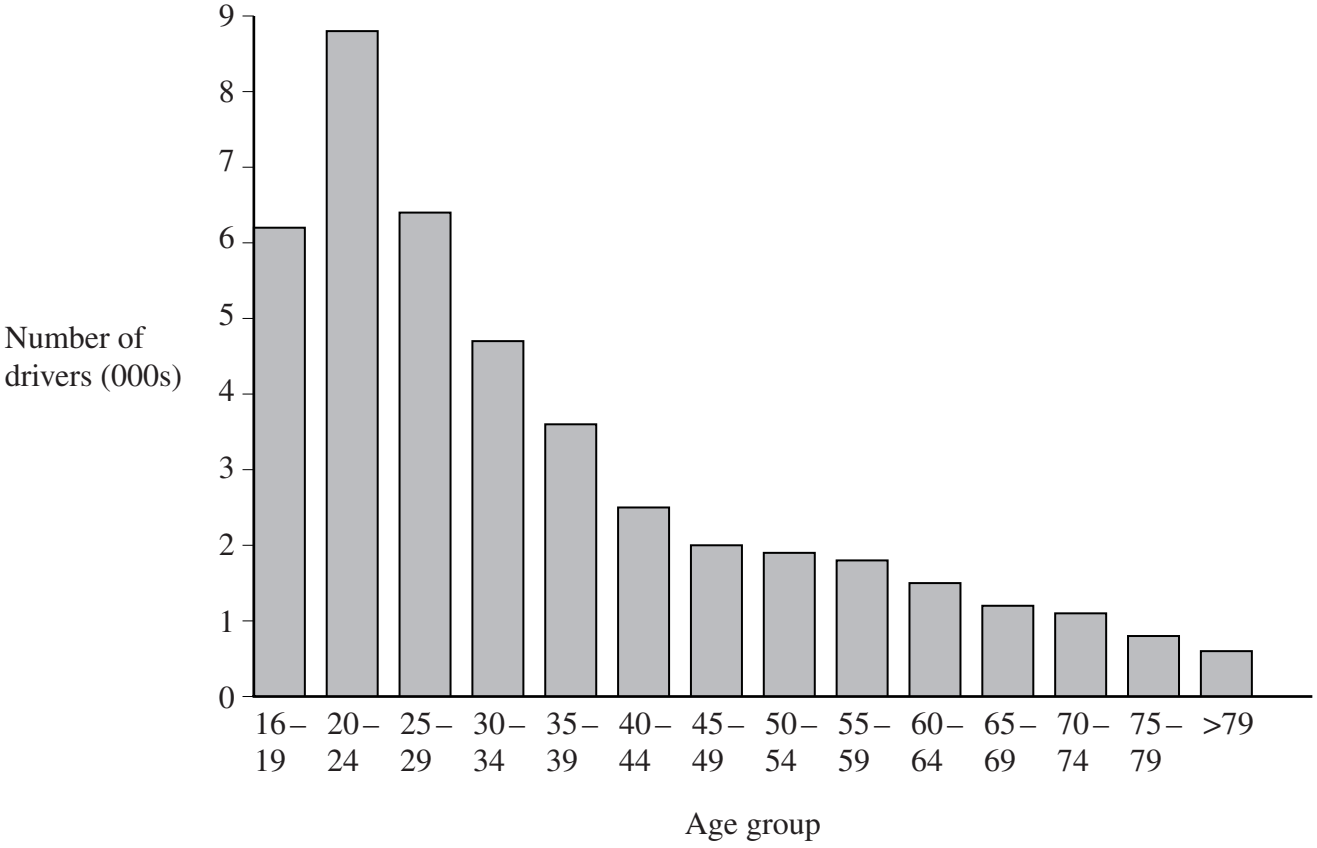
.....

.....

(2 marks)

(b) Explain why this graph does **not** show that drivers aged over 79 years are the safest on the roads.

Number of drivers in fatal crashes 1988



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(2 marks)

4

16 The table gives the size of households in Great Britain between 1971 and 2001. For example, in 1991, 34% of households consisted of two people.

	1971	1981	1991	2001
One person	17	22	27	28
Two people	33	32	34	35
Three people	19	17	16	16
Four people	17	18	16	14
Five or more people	14	11	8	7

Source: *Adapted from Social Trends 2005*

(a) What percentage of households in 1981 consisted of four people?

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

(b) Throughout the period 1971 - 2001 what size household accounted for about a third of the households?

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

(c) The total of the percentages for 1991 is 101%.

Give a possible reason for this.

.....

.....

(1 mark)

(d) The composite bar chart shows the data from the table for 1971 - 1991.

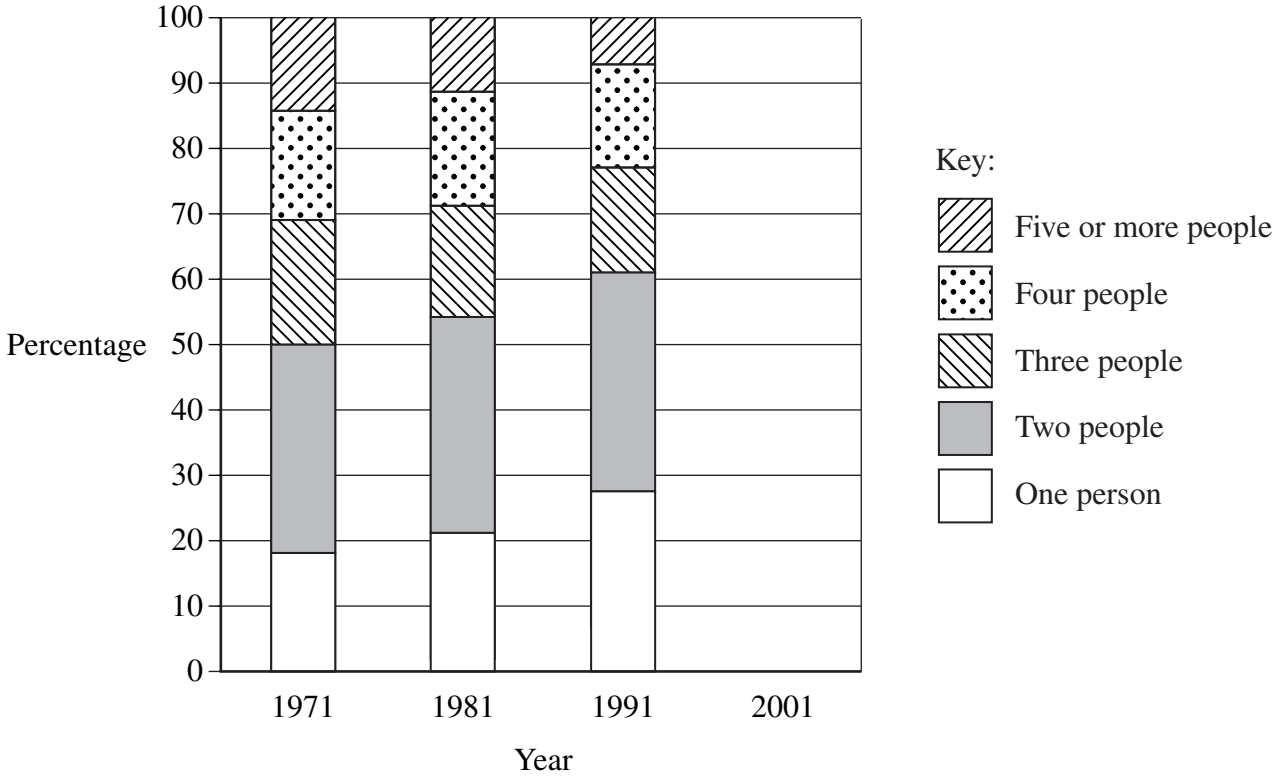
Complete the chart by drawing the bar for 2001.

.....

.....

(3 marks)

Composite bar chart for household size



(e) Use the composite bar chart to identify one similarity and one difference in the data for the year 1971 and the year 2001.

Similarity .....

.....

Difference .....

.....

(2 marks)

8

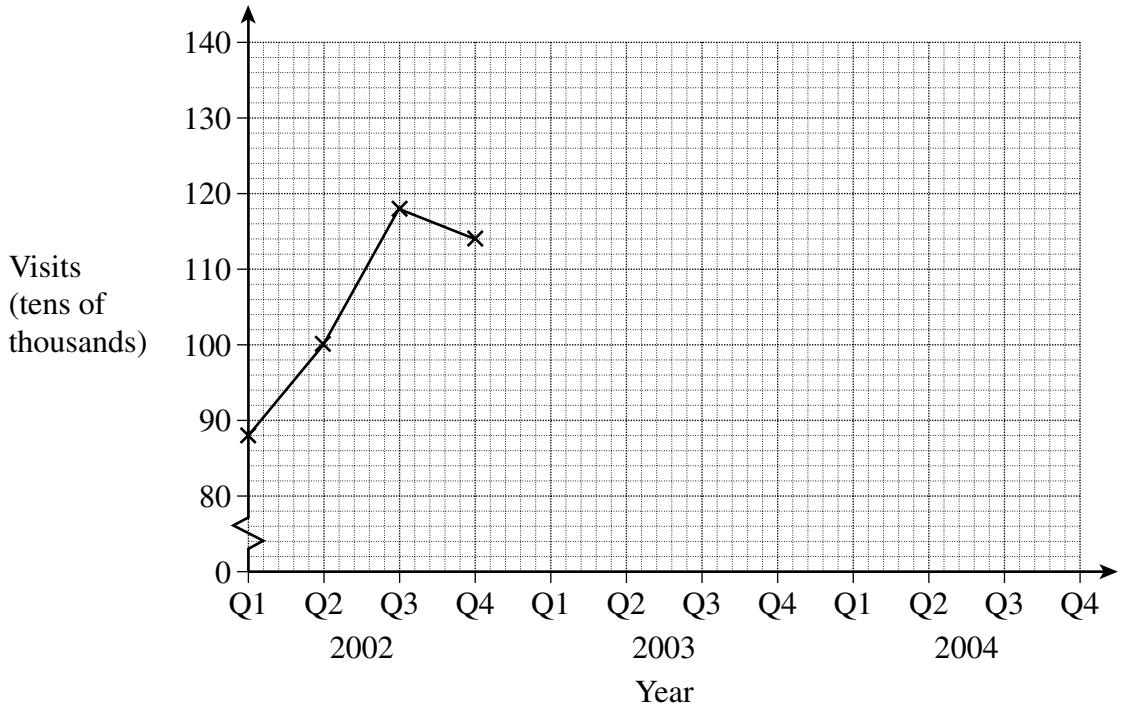
17 The table shows the number of visits to America by UK residents each quarter from 2002 to 2004.

Year	Quarter	Visits (tens of thousands)
2002	Q1	88
	Q2	100
	Q3	118
	Q4	114
2003	Q1	98
	Q2	106
	Q3	124
	Q4	118
2004	Q1	102
	Q2	116
	Q3	134
	Q4	126

Source: *Adapted from Social Trends 2005*

(a) The data for 2002 have been plotted on the time series graph. Complete the graph.

(2 marks)



(b) Describe two different patterns in the data.

Pattern 1 .....

.....

Pattern 2 .....

.....

(2 marks)

END OF QUESTIONS

4

There are no questions printed on this page