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Centre Number						Candidate Number					
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General Certificate of Secondary Education  
June 2004



**STATISTICS**  
**Foundation Tier**

3311/F

**F**

Friday 25 June 2004 9.00 am to 11.00 am

<p><b>In addition to this paper you will require:</b></p> <ul style="list-style-type: none"> <li>• a calculator</li> <li>• mathematical instruments.</li> </ul>	
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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	

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 booklet.

**Information**

- The maximum mark for this paper is 100.
- Mark allocations are shown in brackets.
- Additional answer paper and graph paper will be issued on request and must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

**Advice**

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

You may need to use the following formulae:

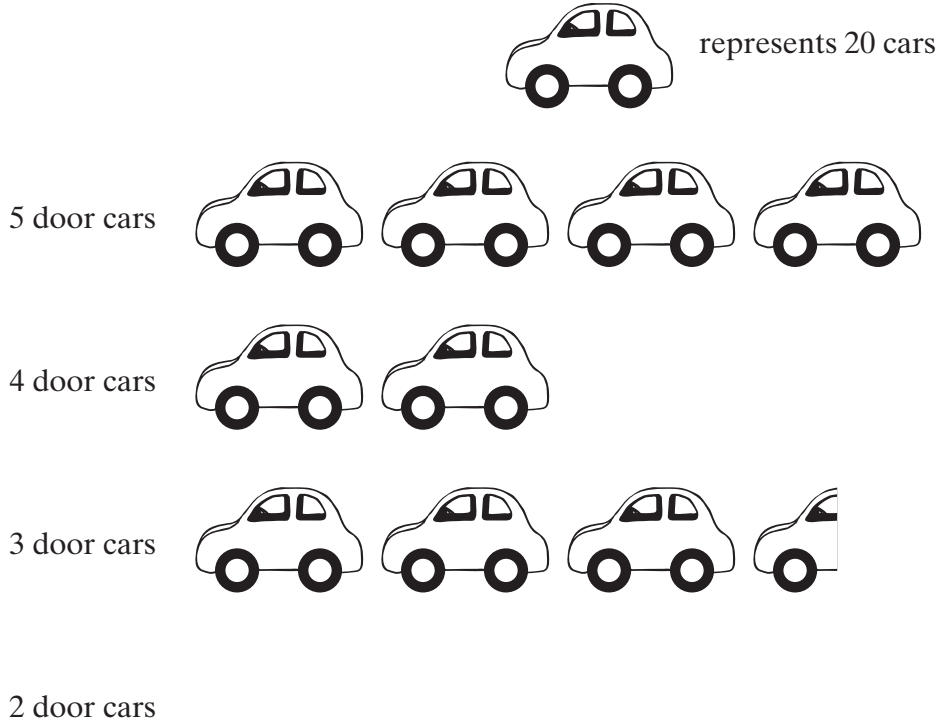
$$\text{Mean of a frequency distribution} = \frac{\sum fx}{\sum f}$$

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

where  $x$  is the mid-interval value.

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

1 The pictogram shows the numbers of cars sold by a garage in 2002.



(a) How many 5 door cars were sold?

Answer ..... (1 mark)

(b) What was the total number of 3 door and 4 door cars sold?

.....

Answer ..... (2 marks)

(c) The garage sold fifteen 2 door cars.

Complete the pictogram. (1 mark)

(d) A pictogram was drawn to show the sales in 2003. The same key was used.

The total number of cars sold was shown by 17 complete symbols and a half symbol.  
Find the total number of cars sold in 2003.

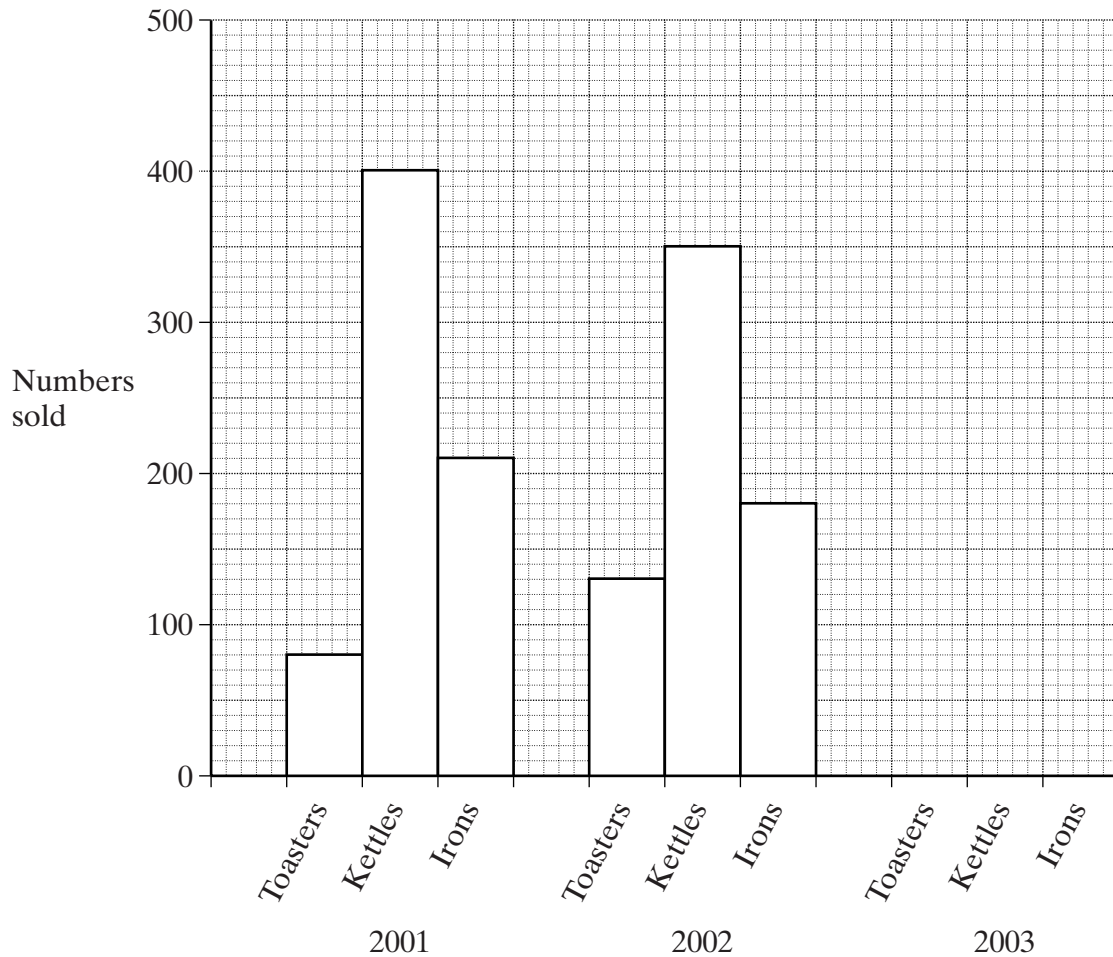
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.....

Answer ..... cars (2 marks)

Turn over ►

- 2 An electrical store keeps a record of the number of toasters, kettles and irons sold each year.

The numbers for 2001 and 2002 are shown in the multiple bar chart.



- (a) The numbers sold in 2003 were

Toasters	150
Kettles	500
Irons	110

Draw the multiple bar chart for 2003.

(3 marks)

(b) (i) How many toasters were sold in 2001?

Answer ..... (1 mark)

(ii) How many **more** kettles were sold in 2003 than in 2002?

.....  
.....

Answer ..... (2 marks)

(c) Describe **two** changes in the pattern of sales from 2001 to 2003.

Change 1 .....  
.....

Change 2 .....  
.....

(2 marks)

**TURN OVER FOR THE NEXT QUESTION**

3 The table below gives the results of a survey carried out on a housing estate.

		Number of adults in household				
		1	2	3	4	Total
Number of children in household	0	90	125	31	9	255
	1	9	40	15	6	70
	2	20	22	10	4	56
	3	12	7	4	0	23
	4	8	0	1	0	9
	Total	139	194	61	19	

For example, 40 households have 2 adults and 1 child.

(a) How many households

(i) have 3 adults and 2 children?

Answer ..... (1 mark)

(ii) have 2 adults?

Answer ..... (1 mark)

(iii) took part in the survey?

.....  
.....

Answer ..... (2 marks)

(b) For this survey what is the greatest number of people in a household?

.....

Answer ..... (2 marks)

(c) A new sports centre is to open on the estate.

A questionnaire sent to all adults on the estate includes the following question.

*‘How many hours each week would you plan to spend at the sports centre?’*

Design a response section for this question.

.....

.....

.....

.....

(2 marks)

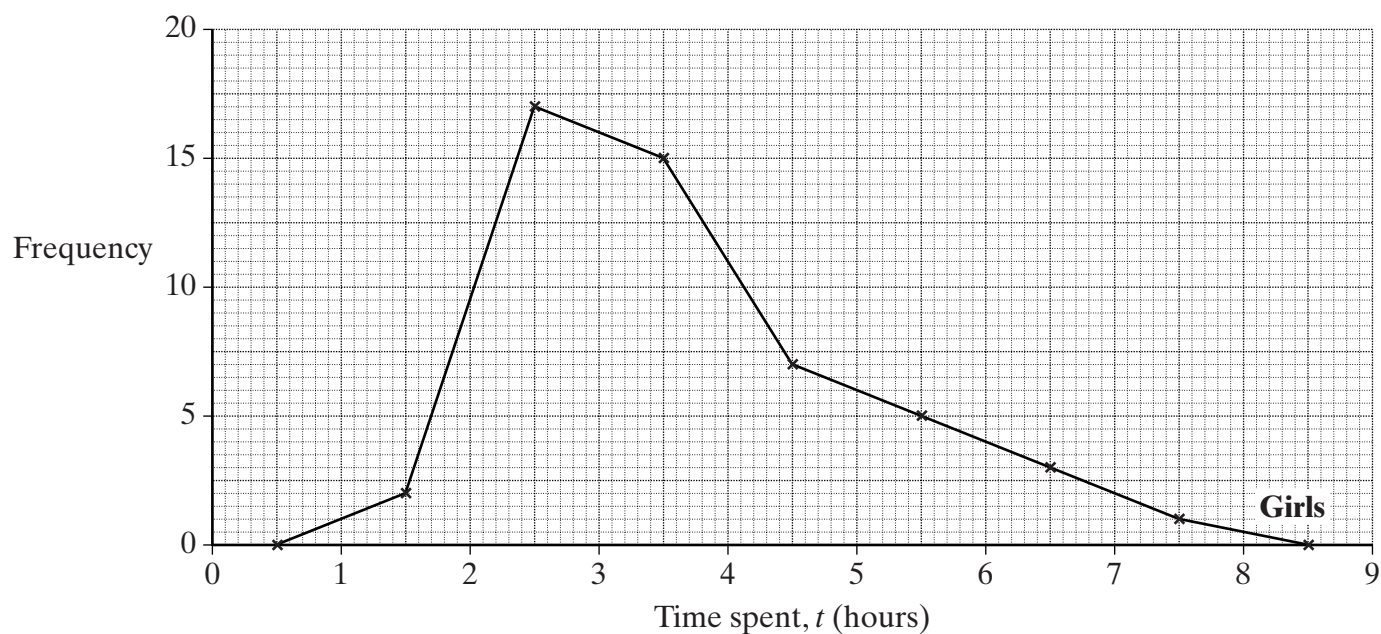
**TURN OVER FOR THE NEXT QUESTION**

- 4 A survey of 50 boys and 50 girls recorded the time they spent using the school computers last week.

The time spent,  $t$  (hours) by each of the **boys** is given in the following table.

Time spent, $t$ (hours)	Frequency
$1 \leq t < 2$	1
$2 \leq t < 3$	4
$3 \leq t < 4$	5
$4 \leq t < 5$	9
$5 \leq t < 6$	12
$6 \leq t < 7$	16
$7 \leq t < 8$	3

The frequency polygon below shows the times for the 50 **girls**.





(a) Draw a frequency polygon for the **boys'** times on the same graph. (3 marks)

(b) What is the modal class for the **boys'** times?

Answer ..... (1 mark)

(c) Write down

(i) the number of **boys** who spent less than 4 hours last week using the school computers,

Answer ..... (1 mark)

(ii) the number of **girls** who spent less than 4 hours last week using the school computers.

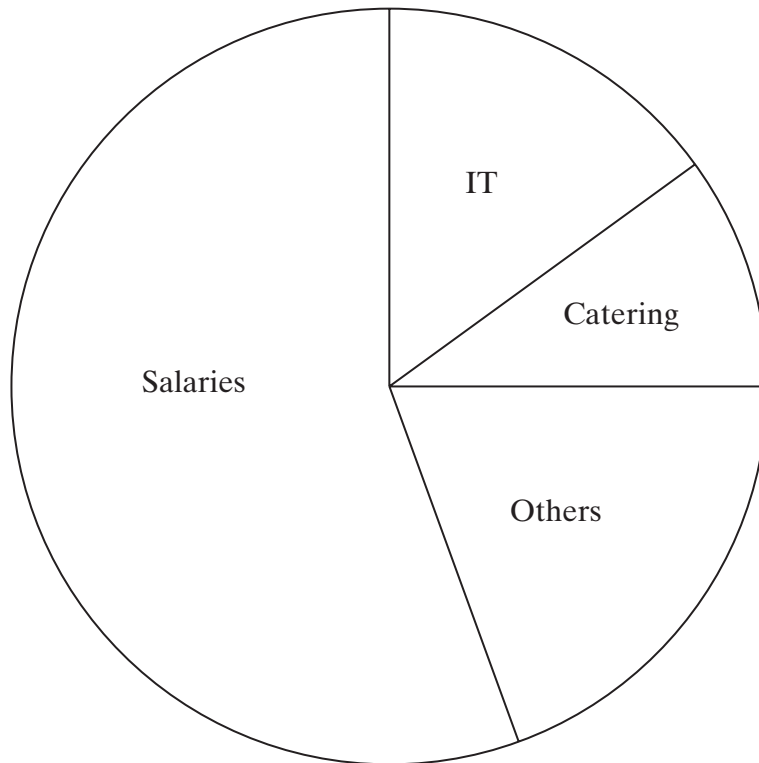
Answer ..... (2 marks)

(d) Describe the skewness of the **girls'** distribution.

Answer ..... (1 mark)

**TURN OVER FOR THE NEXT QUESTION**

5 The pie chart shows how a college spent its money last year.



(a) Three of the angles are given in the table.

	Angle (degrees)
Salaries	
IT	54
Catering	36
Others	70

Find the angle for Salaries.

.....  
 .....

Answer ..... (2 marks)

(b) Last year the college spent £2 million on Catering.

(i) Find the total amount the college spent.

.....  
.....

Answer £ ..... (2 marks)

(ii) Calculate the amount spent on IT.

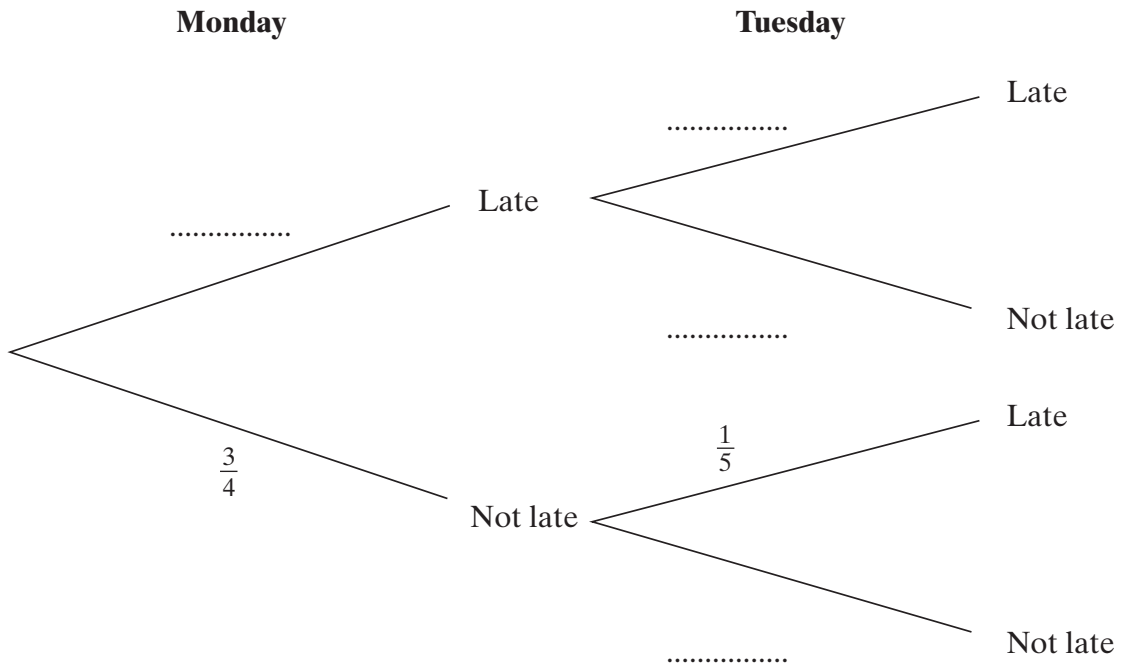
.....  
.....  
.....

Answer £ ..... (3 marks)

**TURN OVER FOR THE NEXT QUESTION**

- 6 The probability that John will arrive home late from school on any Monday is  $\frac{1}{4}$ .  
The probability that he will arrive home late from school on any Tuesday is  $\frac{1}{5}$ .  
The events are independent.

(a) Complete the tree diagram below.



(3 marks)

(b) Find the probability that next week he will arrive home late

(i) on both Monday and Tuesday,

.....

.....

Answer ..... (2 marks)

(ii) on only **one** of these days.

.....

.....

.....

Answer ..... (3 marks)

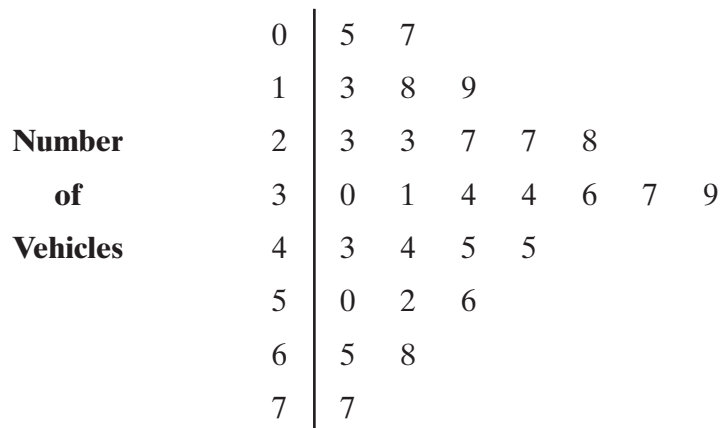
- 7 (a) A ticket machine records the number of vehicles entering a town centre car park each hour during the day.

What type of data collection procedure is used in this case?

Answer ..... (1 mark)

- (b) Judith was asked to record the number of vehicles parked in the car park at 9 o'clock each morning for 27 days.

Her results are given in the stem and leaf diagram below.



Key: 5 | 2 denotes 52 vehicles

Use the diagram to find

- (i) the range,

.....

Answer ..... (1 mark)

- (ii) the median,

.....

.....

Answer ..... (2 marks)

- (iii) the interquartile range.

.....

.....

Answer ..... (3 marks)

**Turn over** ▶

8 A packet contains sweets. Some of the sweets are red.

A random sample of 3 sweets is chosen from the packet and the number of red sweets is recorded.

The sample is then replaced. Another sample is then taken.

The number of red sweets in each of 25 samples is given below.

1 2 2 1 2  
 1 2 2 2 2  
 2 0 2 0 1  
 1 0 0 1 1  
 1 1 1 1 3

(a) Complete the frequency table below.

Number of red sweets in each sample	Frequency
0	
1	
2	
3	

(2 marks)

(b) For this data

(i) write down the mode,

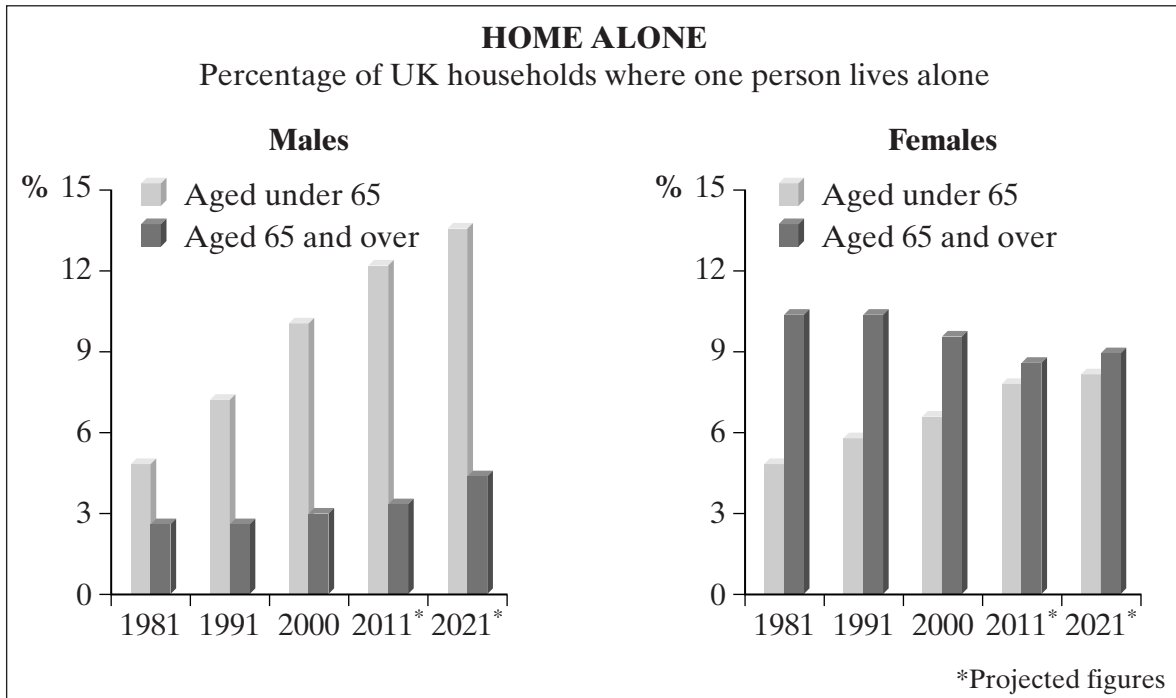
Answer ..... (1 mark)

(ii) calculate the mean.

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

Answer ..... (3 marks)

9 The diagrams show the percentage of UK households where one person lives alone.



Source: adapted from Social Trends

(a) Give **one** criticism of these diagrams.

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

(b) What is the projected percentage of males aged under 65 who will be living alone in the UK in 2011?

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

(c) Which year has the largest difference between the percentage of females aged under 65 and those aged 65 and over living alone?

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



(d) The diagrams have been based on information obtained from the National Census. Give **one** difference between a census and a sample.

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

10 The number of pupils in each unit area of a playground is shown below.

2	3	4	8	9	7	8	4
3	4	8	10	12	14	10	7
3	7	9	8	13	15	12	8
0	1	4	7	8	10	6	3
0	0	3	2	4	2	1	0

(a) Complete the choropleth map using the given key.

<b>Number of pupils</b>	
0 - 5	
6 - 10	
11 - 15	


(2 marks)

(b) There is a teacher in the playground.  
Where do you think the teacher is?

Explain your answer.

.....

.....

(1 mark)



11 Five cards numbered 1 to 5 are shown.



Two cards are drawn at random without replacement.

The numbers on the two cards are added.

Find the probability that the total of the two numbers is 5.

.....

.....

.....

.....

.....

Answer ..... (4 marks)

12 The table below shows the prices of two items in 1990 and 2001.

Item	Price (pence)		Price index for 2001 relative to 1990
	1990	2001	
Milk (litre)	40	55	P
Butter (per pack)	64	Q	125

(a) Show that the value of P is 137.5

.....

.....

.....

(2 marks)

(b) Calculate the value of Q.

.....

.....

Answer ..... (3 marks)

Turn over ►

13 A survey of the eating habits of pupils at a school is to be carried out.

(a) Give **one** reason why it might be useful to undertake a pilot survey.

.....  
.....

*(1 mark)*

(b) Give **one** reason why each of the following methods would **not** give random results.

(i) Standing outside the school canteen on a Monday lunchtime questioning pupils as they arrive.

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

*(1 mark)*

(ii) Sending a questionnaire to every pupil on the school register whose surname begins with S.

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

*(1 mark)*

(c) Describe a method of choosing a random sample of pupils from the school.

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

*(2 marks)*

- (d) The school canteen keeps a daily record of its customers.

State whether each of the following variables is qualitative, discrete or continuous.

- (i) The number of pupils served.

Answer ..... (1 mark)

- (ii) The age of the pupils served.

Answer ..... (1 mark)

**TURN OVER FOR THE NEXT QUESTION**

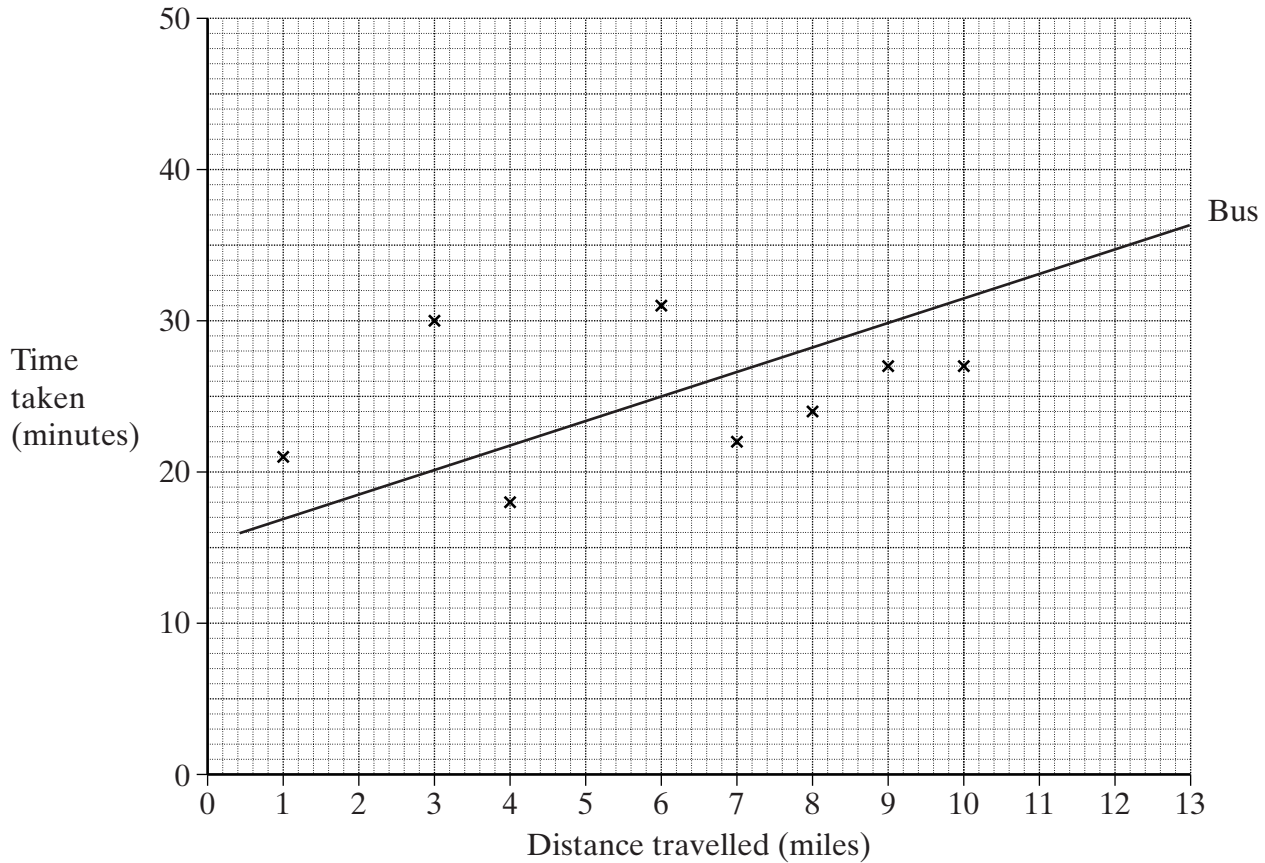
7

**Turn over** ►

14 Sixteen different journeys made through a city centre were timed.

Eight of the journeys were by bus.

The distance travelled and time taken for the bus journeys have been plotted on the scatter diagram below and the line of best fit has been drawn.



The other eight journeys were by car.

The distance travelled and time taken for the car journeys are shown in the table.

<b>Distance travelled (miles)</b>	6	7	2	10	5	9	1	8
<b>Time taken (minutes)</b>	18	23	11	36	18	31	7	32

(a) Plot the car journey values on the scatter diagram. (2 marks)

(b) The mean distance travelled by car was 6 miles.  
Calculate the mean time taken for the car journeys.

.....  
.....

Answer ..... minutes (2 marks)

(c) Draw a line of best fit for the car journeys on the scatter diagram. (2 marks)

(d) Estimate the time taken for

(i) a 12 mile car journey,

Answer ..... minutes (1 mark)

(ii) a 2 mile bus journey.

Answer ..... minutes (1 mark)

(e) Which of these estimates is likely to be more reliable?  
Give a reason for your answer.

More reliable .....

Reason .....

.....  
.....

(2 marks)

(f) Use the graph to find the shortest distance at which it becomes quicker to travel by bus rather than car.  
Give a reason for your answer.

Shortest distance .....

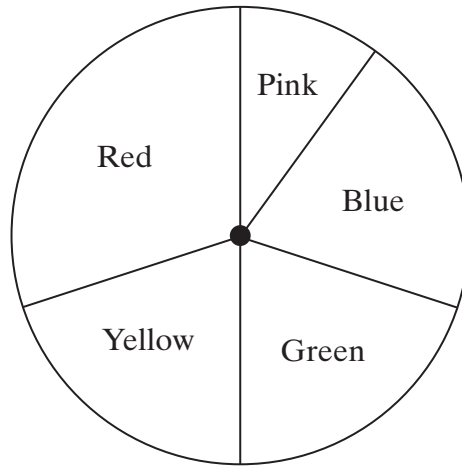
Reason .....

.....

(2 marks)

Turn over ▶

15 A spinner has five coloured sections as shown.



(a) In a simulation

- 0 represents Pink (P)
- 1 and 2 represent Blue (B)
- 3 and 4 represent Green (G)
- 5 and 6 represent Yellow (Y)
- 7, 8 and 9 represent Red (R)

Use the random numbers below to complete a simulation of twenty spins.

4	3	8	2	7	2	6	8	9	3	2	1	5	0	0	8	5	2	2	6
G	G	R																	

(2 marks)

(b) Use this simulation to estimate

(i) the probability of Red,

.....

Answer ..... (1 mark)

(ii) the expected number of Reds in 100 spins.

.....

.....

Answer ..... (2 marks)

- (c) Explain how you would expect the probability of Red in part (b)(i) to change if the simulation is carried out 1000 times.

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*(2 marks)*

**END OF QUESTIONS**

**THERE ARE NO QUESTIONS PRINTED ON THIS PAGE**