Centre No.	6	2				Paper Reference (complete below)								Surname	Initial(s)
Candidate No.						1	3	8	9	/	1	F		Signature	

Paper Reference(s)

1389

Edexcel GCSE

Statistics

Paper 1F

Foundation Tier

Friday 25 June 2004 – Morning

Time: 2 hours

Examiner's use only

Team Leader's use only

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, pen, HB pencil, eraser, electronic calculator.

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname and other names and your signature.
Answer **all** questions in the spaces provided in this question paper. **You must NOT write on the formulae page or any blank pages. Anything you write on these pages will gain NO credit.**
If you need more space to complete your answer to any question, use additional sheets.

Information for Candidates

The total mark for this paper is 80.
The marks for the various parts of questions are shown in round brackets: e.g. (**2**).
This question paper has eight questions in Section A and six questions in Section B.

Advice to Candidates

Work steadily through the paper.
Do not spend too long on one question.
Show all stages in any calculations.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

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Turn over

Edexcel
Success through qualifications

GCSE Statistics 1389

Foundation Tier Formulae

You must not write on this page.
Anything you write on this page will gain NO credit.

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

Mean of a grouped frequency distribution = $\frac{\sum fx}{\sum f}$, where x is the mid-interval value.

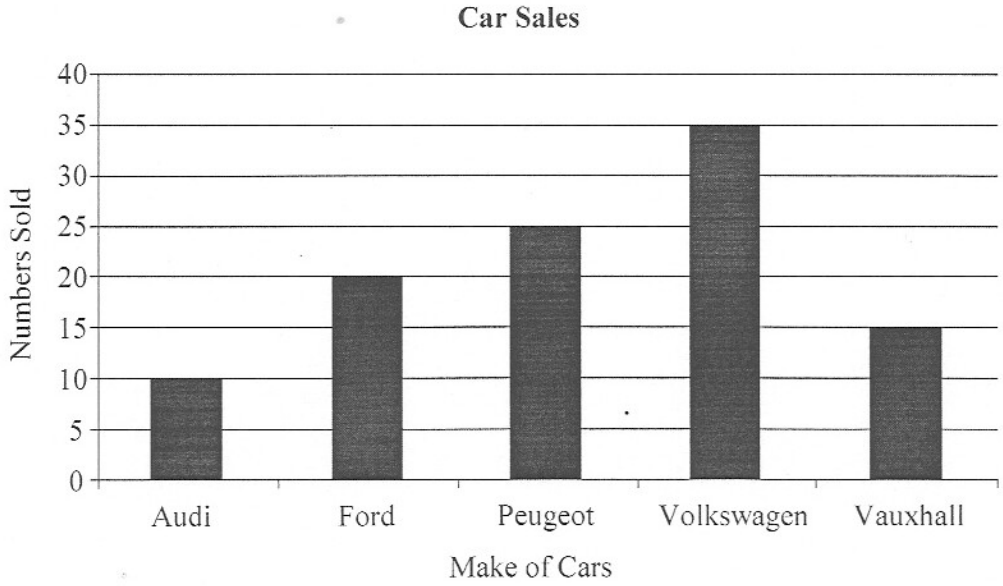
Leave blank

You must write down all stages of your working.

SECTION A

Answer ALL EIGHT questions.

1. The bar chart shows the numbers and makes of cars sold by a garage in one particular week.



(a) How many Vauxhall cars were sold by the garage?

35

(1)

(b) Which make of car did the garage sell most of?

Volkswagen

(1)

(c) What was the total number of cars sold by the garage?

10 + 20 + 25 + 35 + 15

105

(1)

Page Total

Leave blank

2. A hotel owner wants to give his guests information about the number of hours of sunshine they can expect in June.

(a) Write down one way he can collect the information if he wants to use primary data.

He would need to personally record the number of hours of sunshine each day in June

(1)

(b) Write down one way he can collect the information if he wants to use secondary data.

Download sunshine data from the internet

(1)

(c) Is the data he collects qualitative or quantitative?

Quantitative

(1)

Leave blank

3. The table below is part of a larger table that shows the examination achievements by pupils in 2001/ 2002.

Examination Achievements 2001/ 2002

	Pupils in the last year of compulsory education				
	Percentage achieving GCSE				
	5 or more grades A*-C	1-4 grades A*-C	Grades D-G only	No graded GCSEs	Total (=100%) (thousands)
United Kingdom	51.0	24.1	19.4	5.5	729.7
North East	43.9	24.8	24.8	6.5	33.3
North West	48.0	24.5	21.7	5.7	89.6
Yorkshire and the Humber	44.4	24.3	25.2	6.2	63.0
East Midlands	49.1	23.1	22.1	5.7	51.6
West Midlands	47.4	25.0	21.9	5.7	67.9
East	54.0	23.3	18.1	4.6	65.4
London	48.6	26.4	19.5	5.5	77.7
South East	55.5	22.3	17.2	5.0	95.9
South West	54.6	22.8	17.8	4.8	58.9

Source: Department of Education and Skills

(a) What percentage of pupils in the North West got 5 or more grades A*– C?

48

(1)

(b) Write down the total number of pupils in the United Kingdom in the last year of compulsory education in 2001/2002.

729700

(1)

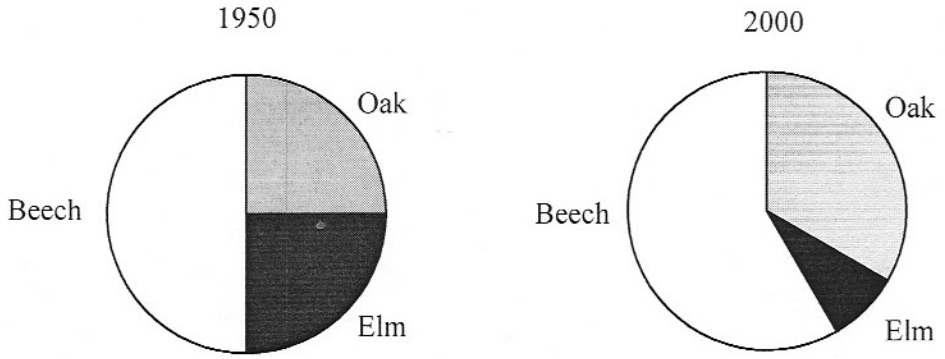
(c) Which region shown in the table had the lowest percentage of pupils with no graded GCSEs?

East

(1)

Leave blank

4. The proportions of oak, elm and beech trees in Beckham's Wood in 1950 and 2000 are shown in the pie charts below.



Between 1950 and 2000 many of the elm trees in Britain were killed by Dutch elm disease.

(a) Write down one feature in the pie charts that suggests that Beckham's Wood could be in Britain.

The number of elm trees, as a proportion of the total, fell dramatically between 1950 and 2000.

(1)

(b) Emma says

"These pie charts show that the number of beech trees in Beckham's Wood has increased between 1950 and 2000."

Emma is **wrong**.

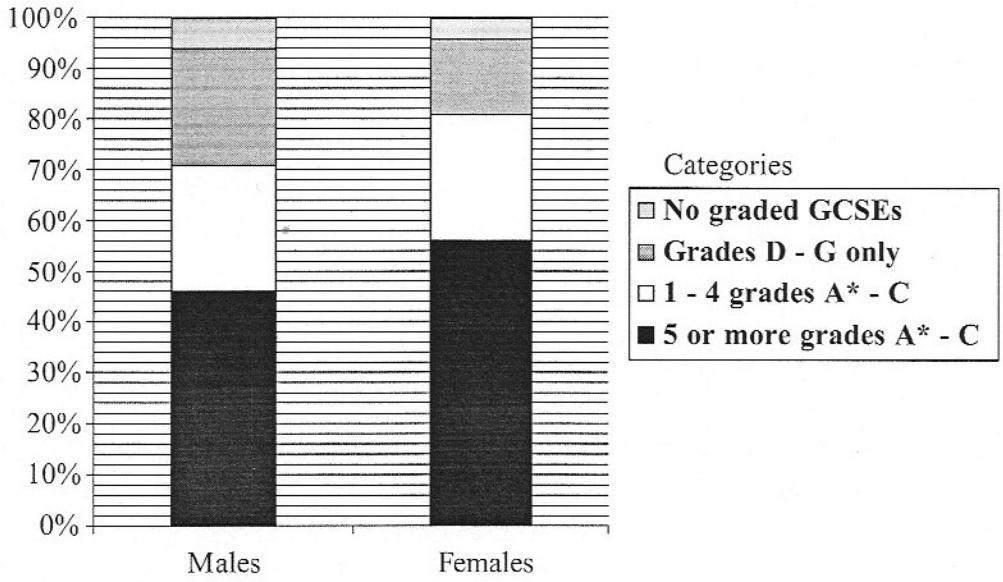
Explain why.

The charts show that the proportion of beech trees has increased. The charts do not tell us the total number.

(1)

Leave blank

5. The composite bar charts show the percentages of GCSE grades gained by males and by females in England in 2001/2002.



(a) Did males or females have the biggest percentage of 5 or more grades A* – C?

Females

(1)

(b) In which category did males and females gain the same percentage?

1-4 grades A*-C

(1)

(c) Work out the percentage of males that gained grades D – G only.

94% - 71%

23%

(1)

(d) Write down one reason why the choice of shading for the composite bar charts may be visually misleading.

"Dark colours stand out more than light colours and make these sections look bigger"

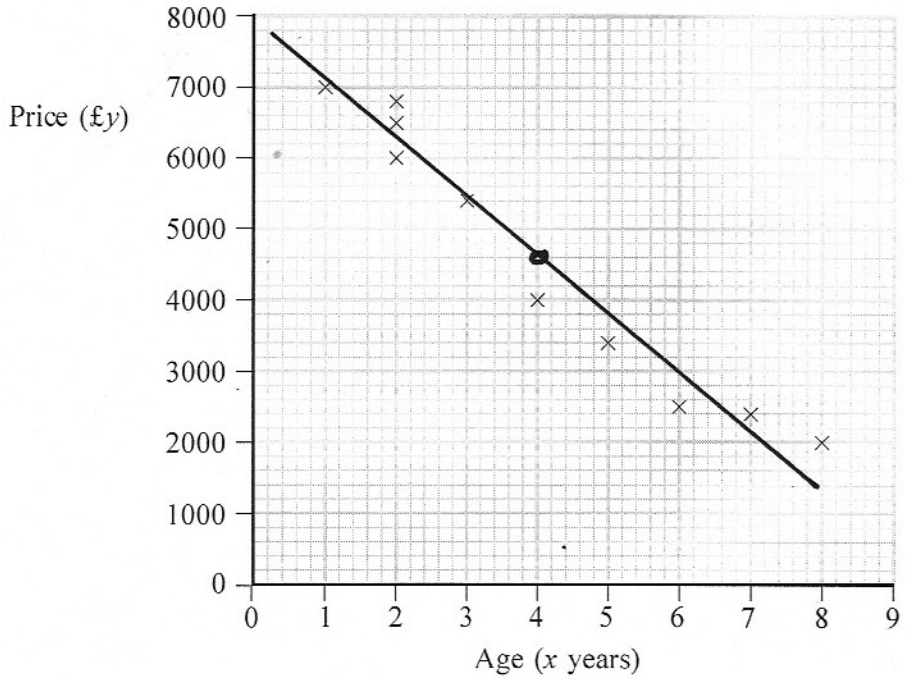
[Book section 3.10 p107]

(1)

Leave blank

6. Sangita wants to buy a second-hand boat. In a magazine she finds 10 advertisements for the type of boat she wants to buy. The scatter diagram shows the age, x years, and the price, £y, of these boats.

Boat Prices



(a) Write down the price of the boat that was 4 years old.

£ 4000

(1)

(b) Describe the correlation between the age and the price of these boats.

Negative correlation

(1)

The mean point of the data $(\overline{x}, \overline{y})$ = (4, 4600).

(c) On the scatter diagram

(i) plot the point (4, 4600),

(ii) draw a line of best fit through (4, 4600).

(2)

Sangita can afford to pay £3000 for her boat.

(d) Use your line of best fit to estimate the age of the boat that she can afford to buy.

6 years

(1)

Leave blank

7. The following table shows the population of Hambleton in 1960 and in 1980.

Hambleton

Year	1960	1980
Population	6400	7040

(a) Taking 1960 as the base year, work out the population of Hambleton in 1980 as an index number.

$\frac{7040}{6400} \times 100 = 110$

(2)

Thorpe is a town near to Hambleton.

The population of Thorpe decreased by 2% between 1970 and 1990.

(b) Taking 1970 as the base year, complete the table below.

Thorpe

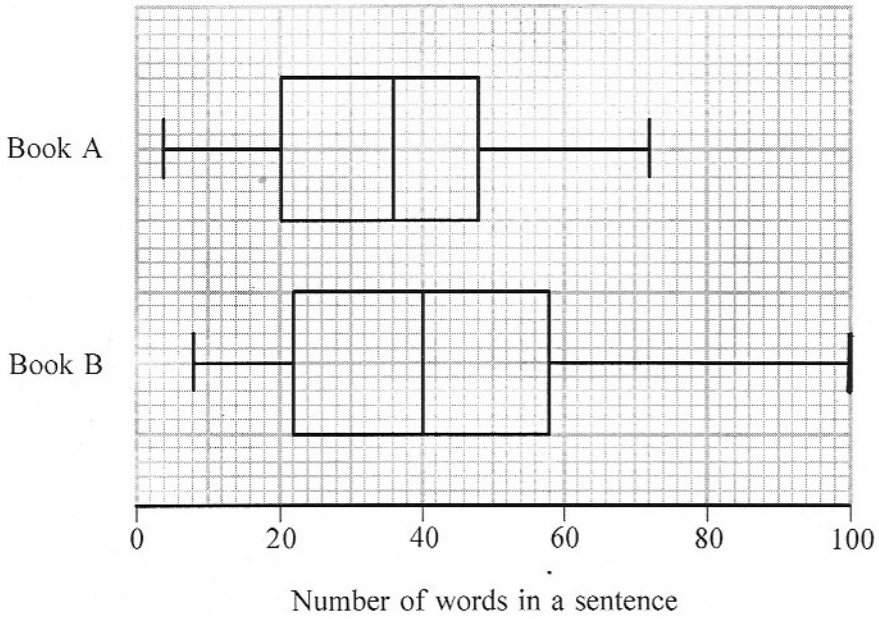
Year	1970	1990
Index number	100	98

(2)

Leave blank

8. Peter takes a random sample of sentences from Book A and from Book B. He counts the number of words per sentence.

The box plots summarise his results.



(a) Write down the median number of words per sentence for Book B.

40

(1)

(b) Work out the inter-quartile range of the number of words per sentence for Book A.

$Q_1 = 20$, $Q_3 = 48$

$IQR = 48 - 20 = 28$

28

(1)

Peter says that these books were written by different authors.

(c) Write down two ways the box plots show this.

(i) Book B has a higher median than A (40 > 36)

(ii) Book B has a wider IQR than A (36 > 28)

(2)

TOTAL FOR SECTION A: 28 MARKS

Leave blank

SECTION B

Answer ALL SIX questions.

9. The manager at McKings restaurant asked 30 customers as they left

"How many meals have you had here in the last seven days?"

The results are given below.

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

(a) Use this data to complete the table.

Number of meals	Tally	Frequency
1	𝍸 𝍸 ||||	14
2	𝍸 |||	8
3	𝍸	5
4	||	2
5	|	1

Adds to: 30 ✓

(2)

McKings served 900 customers on the day of the manager's survey.

(b) Using the results of the manager's survey, estimate how many of the 900 customers had exactly **two** meals at McKings in the last seven days. Show your working.

Relative frequency $= \frac{8}{30}$ = estimated probability.

$900 \times \frac{8}{30} = 240$

240

(2)

(c) Write down two ways in which the 30 customers might **not** be a representative sample of the people that eat at McKings restaurant.

(i) The 30 customers might not be a random sample eg. all on the same day or time

(ii) He might have chosen particular people, so not at random.

(2)

Page Total

Leave blank

10. During one milking session a farmer records the amount of milk, in litres, collected from each of his cows. The results are shown below.

12 18 26 28 28 31 34 34 34 42 43

(a) Complete the ordered stem and leaf diagram below.

Amount of Milk — Key: 1 | 2 = 12 litres

1	2 8
2	6 8 8
3	1 4 4 4
4	2 3

(2)

(b) Write down the modal amount of milk collected from the cows.

34 ..... litres

(1)

(c) Write down the median amount of milk collected from the cows.

$n = 11$, $(n+1)/2 = 12/2 = 6^{th}$ value

31 ..... litres

(1)

(d) Work out the mean amount of milk collected from the cows.

$12+18+26+28+28+31+34+34+34+42+43$
$= 330$ litres.
$330/11 = 30$

30 ..... litres

(2)

(e) Work out the inter-quartile range for the amount of milk collected from the cows.

$n = 11$. For Q_1 use $\left(\frac{11+1}{4}\right)^{th} = 3^{rd}$ value $= 26$
For Q_3 use $\frac{3(11+1)}{4} = 9^{th}$ value $= 34$

8 ..... litres

(2)

Buttercup produced 12 litres of milk.

In the next milking session Buttercup produced more than 12 litres of milk.

The amount produced by the other cows remained the same.

(f) What effect would this have on the mean amount of milk produced by all the cows? Explain your answer.

The total amount of milk has gone up, from the same number of cows ∴ the mean increases

(2)

Leave blank

11. Abbey Road MOT testing station carried out 30 MOT tests.

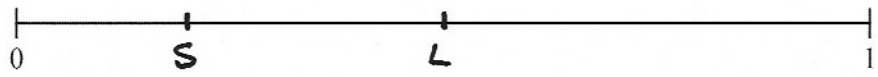
15 cars failed because of lighting faults and independently 6 cars failed because of steering faults.

A car is chosen at random from the 30 tested.

(a) On the probability scale below,

(i) use L to mark the probability that the car fails because of lighting faults,

(ii) use S to mark the probability that the car fails because of steering faults.

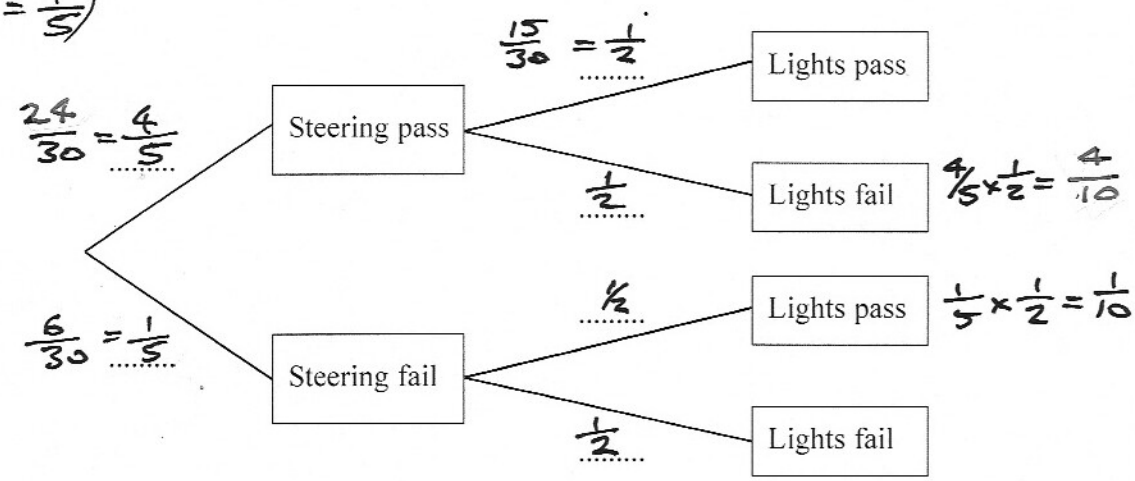


113mm long, $\frac{1}{2} \times 113 = 56.5$mm, $\frac{1}{5} \times 113 = 22.6$mm

(2)

(b) Complete the probability tree diagram below.

$\left(\frac{6}{30} = \frac{1}{5}\right)$



(2)

(c) (i) Work out the probability that the car had both steering and lighting faults.

$\frac{1}{5} \times \frac{1}{2} = \frac{1}{10}$

or $\frac{6}{30} \times \frac{15}{30} = \frac{90}{900}$

$\frac{1}{10}$

(ii) Work out the probability that the car had only one of these faults. You must show your working.

$\left(\frac{4}{5} \times \frac{1}{2}\right) + \left(\frac{1}{5} \times \frac{1}{2}\right) = \frac{4}{10} + \frac{1}{10} = \frac{5}{10} = \frac{1}{2}$

or

$\left(\frac{24}{30} \times \frac{15}{30}\right) + \left(\frac{6}{30} \times \frac{15}{30}\right) = \frac{360+90}{900} = \frac{450}{900}$

$\frac{1}{2}$

(4)

Page Total

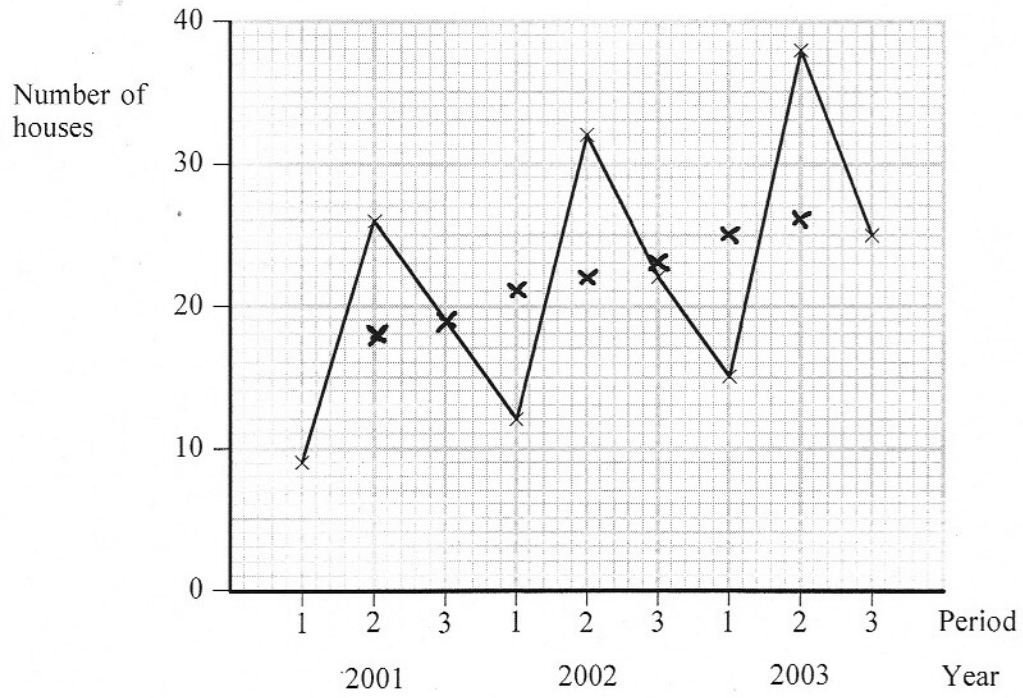
Leave blank

12. The table shows the number of houses sold by Houses Direct in successive four-month periods in the years 2001 to 2003.

Year	Period	Number of houses	Three-point moving average
2001	1	9	Not possible
	2	26	(9 + 26 + 19) ÷ 3 = 18
	3	19	(26 + 19 + 12) ÷ 3 = 19
2002	1	12	(19 + 12 + 32) ÷ 3 = 21
	2	32	(12+32+22)/3 = 22
	3	22	(32+22+15)/3 = 23
2003	1	15	(22+15+38)/3 = 25
	2	38	(15+38+25)/3 = 26
	3	25	Not possible

(a) (i) Complete the table.

(ii) Plot the moving averages on the graph below.



(4)

Leave blank

There was an increase in the number of houses sold in some areas of England in the years 2001 to 2003.

It is claimed that Houses Direct is in one of these areas.

(b) (i) Write down one reason why this claim might be true.

There is an upward trend in Houses Direct's sales so they might well be in an area that has generally increasing sales

(ii) Write down one reason why this claim might be false.

Houses Direct's increased sales could be due to some other reason eg improved advertising.

(2)

Leave blank

13. (a) Explain what a census is.

A census is a set of data obtained from every member or item in a population

(1)

(b) Give two reasons why a person may take a sample rather than a census.

(i) Cheaper

(ii) Quicker

(2)

Ashton Girls school wants to take a sample of 100 of its students to find out what they think about compulsory games. There are five year-groups in the school. Each year-group has the same number of students.

Ashton Girls school wants the sample to be representative of the whole school.

(c) Describe how the school should select the sample.

They should use stratified random sampling and take a random sample of 20 students from each year group.

(2)

The school is to ask selected students to fill in a questionnaire.

(d) Give two reasons why a pilot survey should be carried out first.

(i) It will reveal any faults in the questionnaire

(ii) It will show the likely response rate.

(2)

Leave blank

One question on the questionnaire is

"Do you agree that compulsory games are good for you?"

(e) This question is biased. Give one reason why.

It is a leading question - it suggests you should agree with the question writer. (1)

It is suggested that it might be better to interview the students rather than asking them to fill in a questionnaire.

(f) Write down one advantage and one disadvantage of interviewing the students.

Advantage Misunderstood questions can be explained

Disadvantage Time consuming.

(2)

Leave blank

14. The table gives information about the typing speed, in words per minute, of a random sample of 60 typists at a typing agency.

Typing speed	Number of typists f	Mid-interval value x	fx
$30 < x \leq 40$	10	35	350
$40 < x \leq 50$	22	45	990
$50 < x \leq 60$	14	55	770
$60 < x \leq 70$	10	65	650
$70 < x \leq 80$	4	75	300
		Total	3060

(a) Work out an estimate for the mean typing speed.

Using mean = $\frac{\Sigma fx}{\Sigma f}$ from the formula sheet;

$\frac{3060}{60} = 51$ wpm.

51

(4)

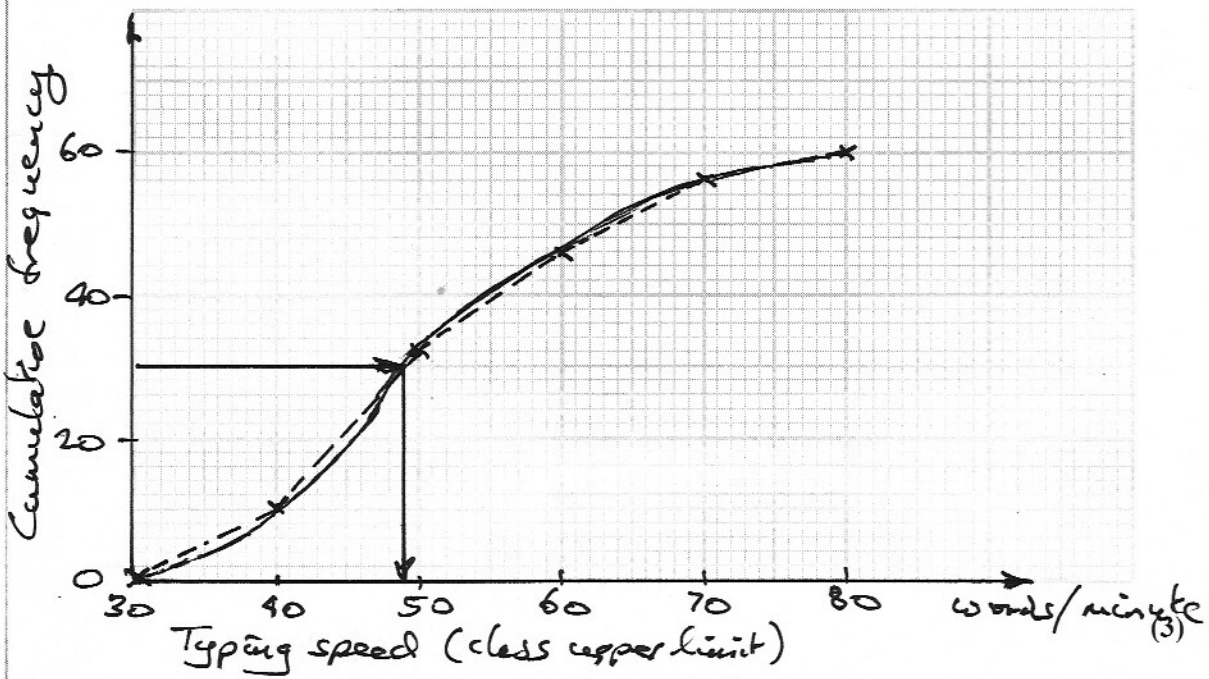
(b) Use the information in the table above to complete the cumulative frequency table below.

Typing speed	Cumulative frequency
$30 < x \leq 40$	10
$30 < x \leq 50$	32
$30 < x \leq 60$	46
$30 < x \leq 70$	56
$30 < x \leq 80$	60

(1)

Leave blank

(c) Draw a cumulative frequency diagram to represent this information.



(3)

(d) Use your cumulative frequency diagram to find an estimate of the median typing speed.

49

(2)

The agency manager claims that the average speed of his typists is 50 words per minute.

(e) Do you think that this claim is justified? Write down two reasons for your answer.

Yes

Reason 1 The mean (51) is more than 50 so he is not exaggerating.

Reason 2 The median = 49 so nearly half of them are >50 wpm (actually 28/60). This is not an exact value (sample not census) so sensible to round to 1 significant figure.

(2)

TOTAL FOR SECTION B: 52 MARKS

TOTAL FOR PAPER: 80 MARKS

END

Page Total