Centre Number						Paper Reference	Surname	Other Names
Candidate Number							Candidate Signature	

For Examiner's use only

For Team Leader's use only

1389

Edexcel GCSE

Statistics

Paper 1F

FOUNDATION TIER

Specimen Paper

Time: 2 hours

Materials required for the examination

Ruler graduated in centimetres and millimetres, protractor, pen, HB pencil, eraser, electronic calculator.

Items included with these question papers

Formulae sheets.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, the paper reference, your surname and other names and your signature. The paper reference is shown above.

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

Supplementary answer sheets may be used

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 8 questions in Section A and 6 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.

Edexcel
Success through qualifications

Formulae sheet

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

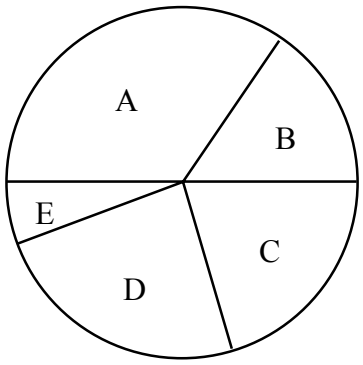
Write down your answers in the spaces provided.

You must write down all stages in your working.

Section A

Answer ALL EIGHT questions.

1. Joanne carries out a survey amongst her friends. She wishes to find out their favourite TV channel. She shows her results in the pie chart below.



Key:
A: ITV1
B: BBC2
C: Channel 4
D: BBC1
E: Channel 5

(a) Write down which is the most popular channel amongst her friends.

……

(1)

In some parts of the country, the reception for Channel 5 is not very good.

(b) Do the data suggest that Joanne's friends live in one of these areas? Explain your answer.

……...

……...

(2)

Leave blank

2. (a) State which of these variables are qualitative and which are quantitative.

(i) Weight of an orange……

(ii) Hair colour……

(iii) Number of pips in a grapefruit……

(2)

(b) State which of these data are discrete and which are continuous.

(i) Speed of a car in km per hour……

(ii) The age of a tree in years……

(iii) Number of books on a library shelf……

(2)

Leave blank

3. The nutritional information for two breakfast cereals is given below.

	Weetabix per serving	Shredded Wheat per serving
Protein	4.2g	5.2g
Carbohydrate	25.4g	30.4g
Fat	1.0g	1.0g
Fibre	3.9g	5.2g

Marathon runners need a diet high in carbohydrate and protein, but low in fat.

Which of the two breakfast cereals would you recommend a marathon runner to eat? Explain your answer.

……

……

……

……

(2)

Leave blank

4. The table shows the attitudes to the teaching of basic skills in State secondary schools in 1987. This was just before the national curriculum was introduced.

3.13 Attitudes to the teaching of basic skills in State secondary schools: by age, 1987

Great Britain — Percentages and numbers

	How well do you think state secondary schools nowadays teach young people basic skills, such as reading, writing and maths?					
	Very well	Quite well	Not very well	Not at all well	Don't know/ not answered	Weighted base (=100%) (Numbers)
Age groups (years)						
18 – 24	19	59	14	8	0	174
25 – 34	11	58	24	7	–	238
35 – 44	12	47	31	9	1	252
45 – 54	7	45	36	12	–	202
55 – 64	7	37	41	15	1	181
65 and over	7	30	42	17	3	195
All	10	46	31	11	1	1243

Source: British Social Attitudes Survey, 1987. Social Community Planning and Research.

Social Trends 20, 1990. Table 3.13

(a) Write down the type of scale used for the horizontal measurements (*Very well, quite well, etc ...*)

.....

(1)

(b) Write down the number of people surveyed.

.....

(1)

The following statement is wrong:

"*19% of those who said 'very well' were 18 – 24 years old"*

(c) Write down a correct version of this statement.

.....

.....

(1)

Leave blank

(d) Describe briefly what the table shows about how attitudes to the teaching of basic skills in state secondary schools changes with age.

.....

.....

.....

(1)

Leave blank

5. The table shows the **quarterly profits (£ millions)** recorded at the end of each quarter in the years 2001 and 2002 by a manufacturing company.

Year	Quarter	Quarterly profits (£ millions)	4-point moving averages
2001	March	4.1	
	June	4.0	
			(4.1 + 4.0 + 4.0 + 3.2) ÷ 4 = 3.825
	September	4.0	
	December	3.2	
2002			
	March	2.1	
	June	2.2	
	September	1.8	
	December	2.4	

(a) (i) Calculate the four-point moving averages for these data. The first one has been worked out for you.

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

(3)

(b) Does the graph show profits going up or going down from January 2001 to December 2002? Explain how you know.

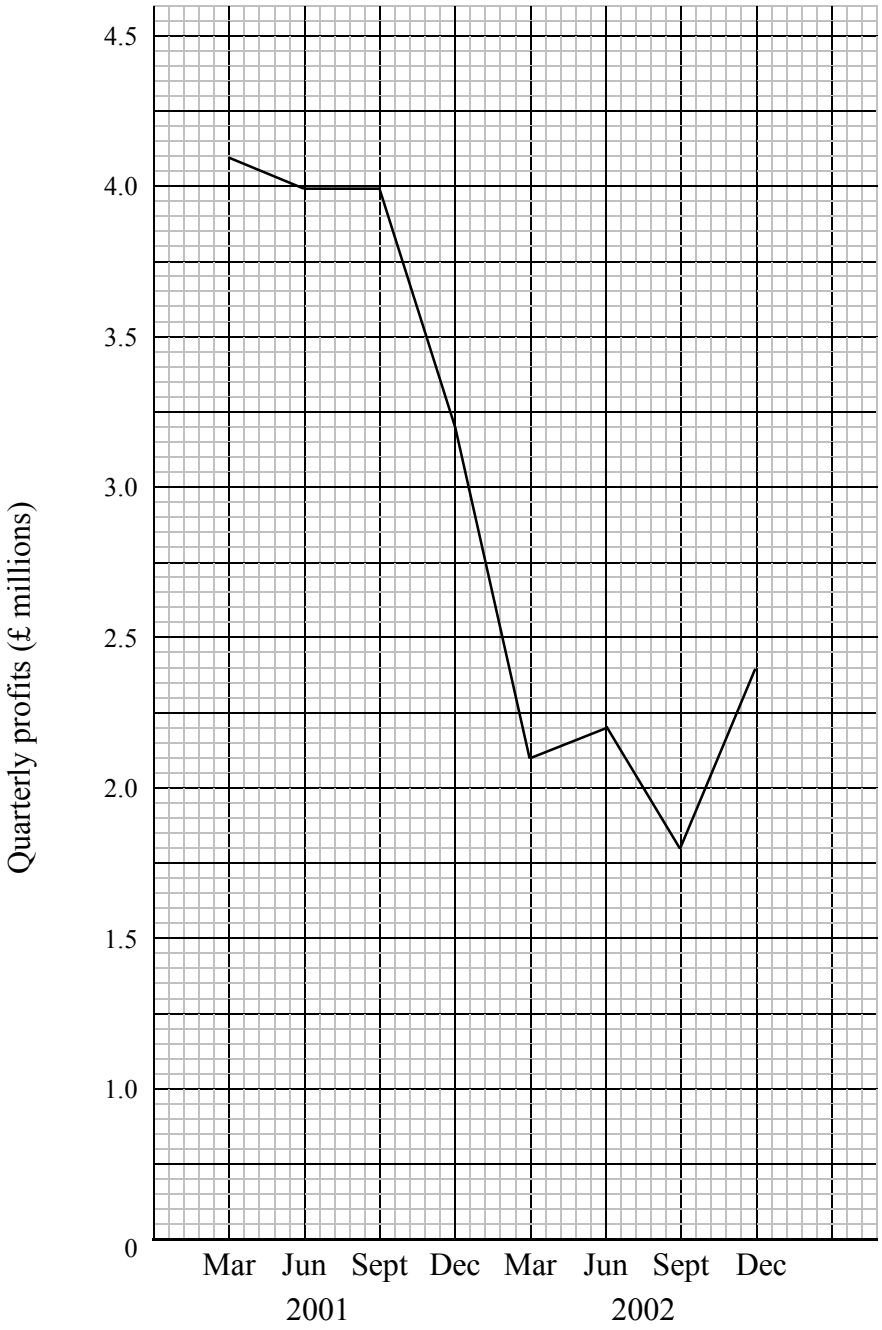
.....

.....

.....

(2)

Leave blank


Quarterly profits (£ millions)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0
Mar
Jun
Sept
Dec
Mar
Jun
Sept
Dec
2001
2002

Leave blank

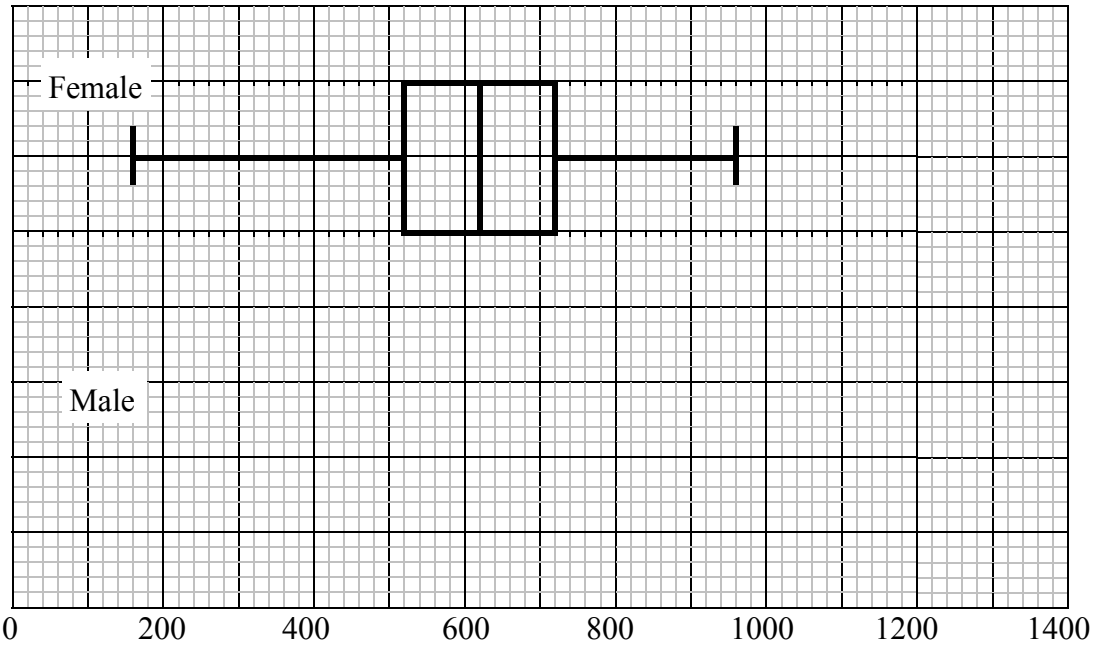
6. 178 female and 220 male adult tortoises are weighed. The summary statistics of these data are shown in the table below.

Tortoise weight (grams)

	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Female	155	520	615	718	964
Male	633	996	1121	1220	1390

The grid below shows a box plot for the female tortoises.

(a) On this grid, draw a box plot for the male tortoises.



(2)

(b) Discuss how you might use the weight of a tortoise to decide whether it is male or female.

……

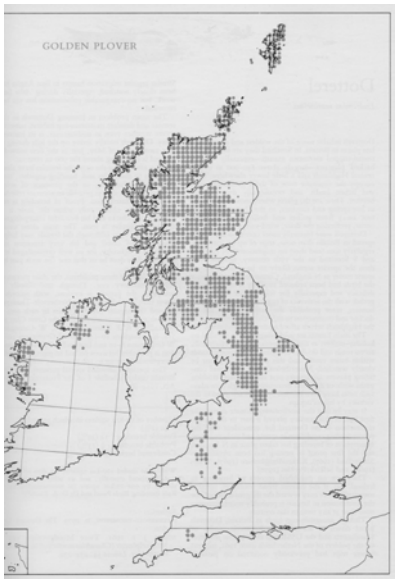
……

……

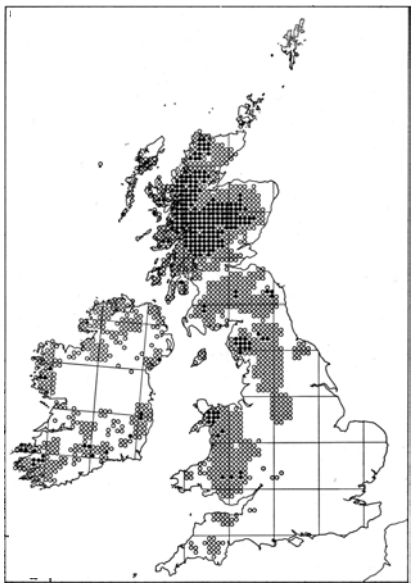
(2)

7. The diagram below shows the distribution of the *Golden Plover* birds in the UK (Map A) together with the maps B, C and D which show three possible factors that may influence positively the distribution of Golden Plovers. Heavier shading implies greater density in maps A and C, higher altitudes in Map B and higher rainfall in may C.

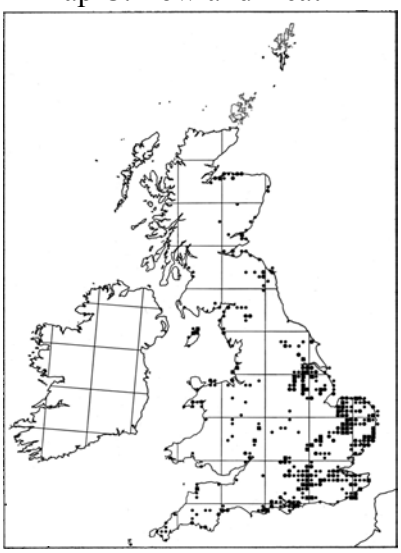
Map A: Distribution of Golden Plover



Map B: Altitude (feet)



Map C: Lowland Heath



Map D: Annual Rainfall (mm)

By looking at the maps B, C and D, and comparing them to map A above, decide which of the three factors are most likely to influence the distribution of Golden Plovers. Give a reason for your answer.

……

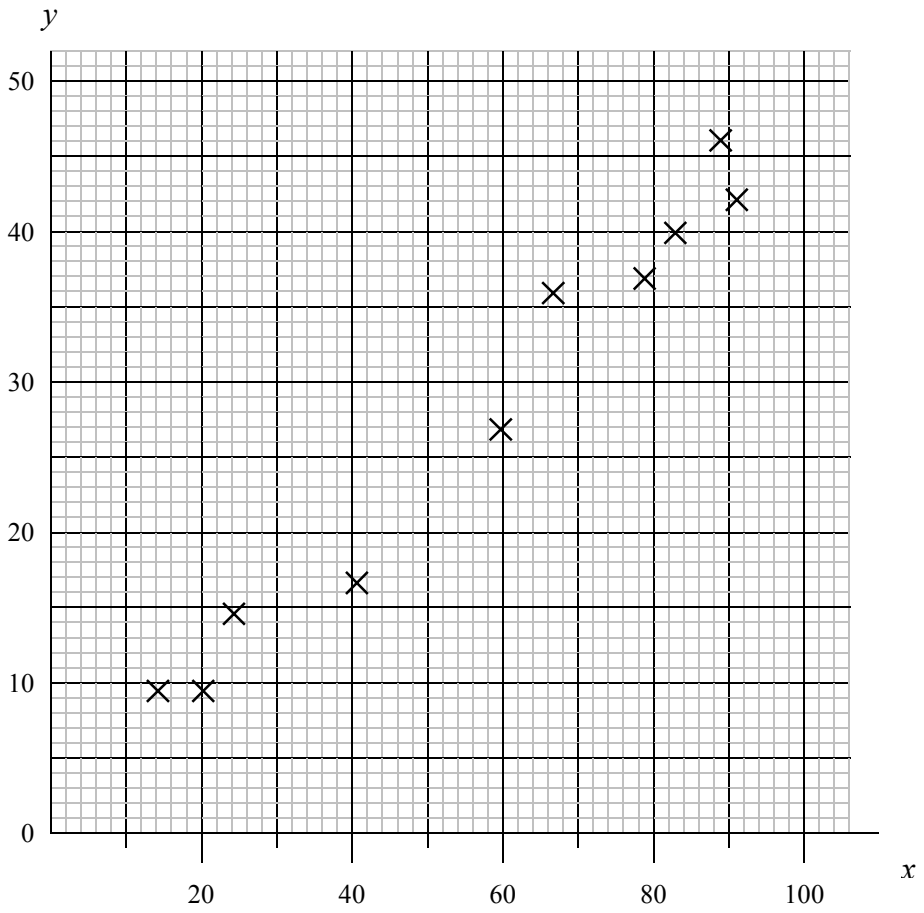
……

(2)

Source: *The Atlas of Breeding Birds of Britain and Ireland* (BTO/IWC 1976), ISBN 0903793 01 6.

Leave blank

8. Hanna measure the length, x mm, and the width, y mm, of 10 crabs of a particular species. Here is a scatter diagram of her results.



(a) Comment on the correlation between the length and width of these crabs.

……

……

(1)

The mean of the data $(\bar{x}, \bar{y}) = (56, 28)$.

(b) Plot (56, 28) on the scatter diagram.

(1)

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

(1)

Leave blank

Hanna measures another crab. It has a length 80 mm and a width 20 mm.

(d) Do you think that this crab is the same species as the other crabs? Explain your answer.

……

……

(1)

TOTAL FOR SECTION A: 28 MARKS

Leave blank

Section B

Answer ALL SIX questions.

1. The table gives four categories of household expenditure and the price index for 2003 for three of them (2002 prices = 100).

Category	Price Index 2003
Food	102
Housing	
Personal goods	97
Leisure services	101

The price index for housing increased by 5% between 2002 and 2003.

(a) State the price index for housing.

……

(1)

(b) Which category was more expensive in 2002 than in 2003? Explain how you know.

…..……

..……

(2)

The food bill for an average household in 2002 was £2500.

(c) Calculate an estimate for the amount the average household spent on food in 2003.

……

(2)

An economist wishes to use these data to predict the percentage change in housing expenditure between 2002 and 2006.

(d) Explain why his prediction may not be reliable.

..……..…

……

(1)

Leave blank

TURN OVER FOR QUESTION 2

Leave blank

2. A person is chosen at random.

The events A and B are defined as

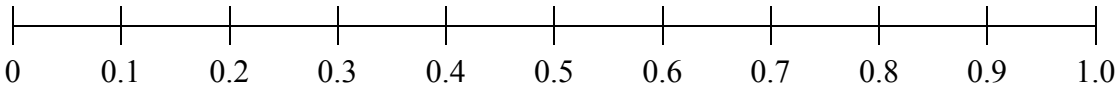
A: The person is male	B: The person was born on a weekend (Saturday or Sunday)

(It can be assumed that the population consists of equal numbers of males and females and that people are equally likely to be born on any of the 7 days of the week.)

(a) On the probability scale below, mark

(i) the probability of event A,

(ii) the probability of event B.



(2)

(b) Write down the probability that a person chosen at random was not born at the weekend.

.....

(1)

Event C is defined as

C: It will rain tomorrow

(c) Explain why it would be difficult to mark the probability of event C on the probability scale.

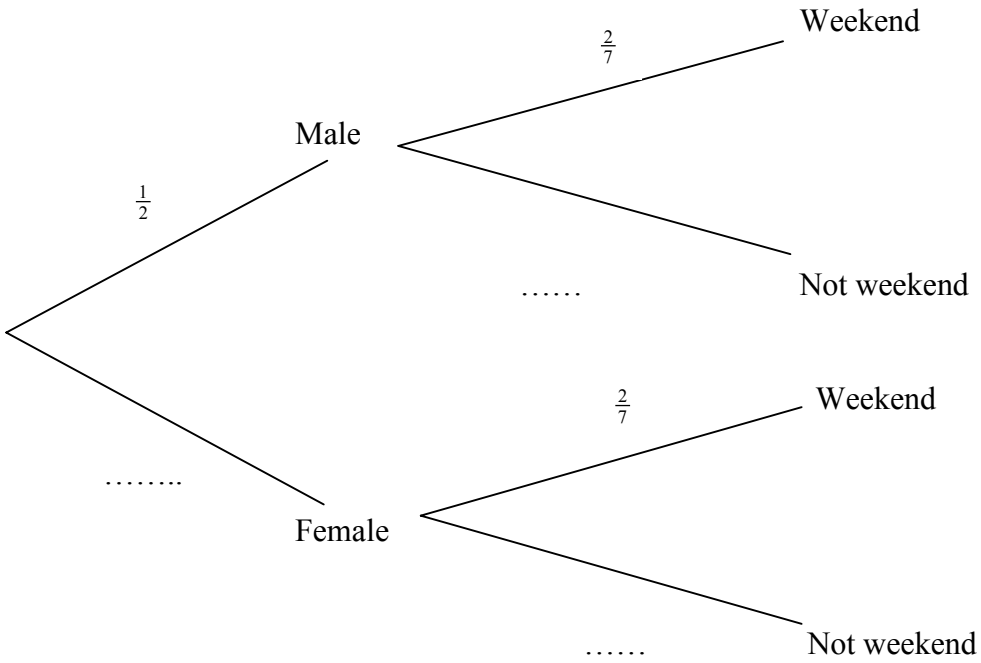
.....

.....

(1)

Leave blank

(d) Complete the tree diagram below.



(2)

(e) Work out the probability that a person chosen at random is a male who was born at the weekend. You must show all your working.

……

(1)

(f) Work out the probability that a person chosen at random is a male who was born at the weekend or a female not born at the weekend.

……

(2)

Leave blank

3. Mary is carrying out an investigation into the cost of food at her college canteen.

She asks people in the queue for canteen food

"*Do you think that canteen dinners are value for money?*"

(a) Why is her sample of people likely to be biased?

……

……

(1)

(b) Why is her question biased?

……

……

(1)

(c) Suggest two reasons for her to carry out a pilot survey.

(i) ……..

(ii) ……..

(2)

For another investigation, Mary selects a sample of 30 students from the 720 students at her college.

(d) Describe how she would select a simple random sample.

……

……

……

(2)

Leave blank

Mary cannot decide whether to interview each of the students in her sample or to send them a questionnaire.

(e) Write down one advantage and one disadvantage for each method.

(i) Interview

Advantage…..……..……..……

……..……..……

Disadvantage ……...……..…….….

…….…….……

(ii) Send questionnaire

Advantage……..…….……..……

……..……..……....

Disadvantage... ……...……..……..

...…….…….……

(4)

Leave blank

4. For each of 21 factory workers, a foreman keeps a record of how many times they are late over a two week period. The data are shown below.

5, 0, 3, 1, 0, 4, 0, 5, 3, 1, 1, 0, 0, 5, 5, 0, 2, 3, 6, 5, 2

(a) Record these data in the frequency table below.

Times Late	Tally	Frequency
0		
1		
2		
3		
4		
5		
6		

(2)

(b) What is the probability that a factory worker chosen at random from this group was late on more than 3 occasions over the period of two weeks?

……

(1)

There are 6300 employees in the factory in the local area.

(c) Using these data, estimate how many factory workers in local factories were never late over the period of two weeks. You must show all your working.

……

(2)

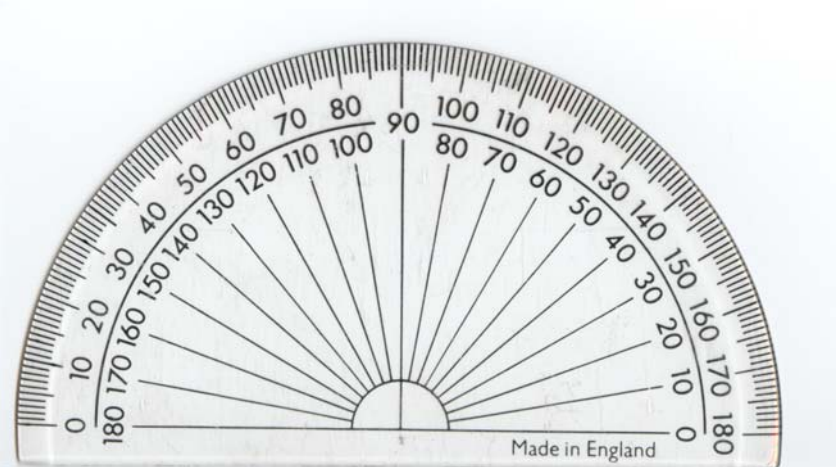
(d) Explain why your answer to (c) may not be reliable. (You may assume your calculations are accurate.)

……

……

(2)

5. A teacher asks his class of 15 students to measure, to the nearest degree, an angle using a protractor.



The results are shown in the stem and leaf diagram below.

10 | 5 means 105°

7	2 3 5
8	
9	
10	2 5 7 7 7 8 8 8 8 8
11	0

(a) Write down the mode of these data.

……

(1)

(b) Write down the median of these data.

……

(1)

(c) Work out the interquartile range of these data.

……

(2)

Leave blank

(d) Write down the size of the angle the students were trying to measure. Give a reason for your answer.

……

……

(2)

The teacher suspects that three of the students have read the wrong scale on their protractors.

(e) Write down the measurements made by these three students and suggest what they should have recorded for their measurements.

……

……

(2)

Leave blank

6. Addiction to nicotine can be measured in a number of ways. One method is to note the length of time, in minutes, between a smoker waking and smoking their first cigarette of the day.

The table below shows 100 heavy and 100 light smokers and the length of time before they light their first cigarette.

Time (x mins)	Heavy smokers	Light smokers
$0 \leq x \leq 5$	31	2
$5 < x \leq 15$	27	4
$15 < x \leq 30$	19	5
$30 < x \leq 60$	14	11
$60 < x \leq 120$	5	15
$120 < x \leq 240$	4	63

(a) Calculate an estimate of the mean time between waking and first cigarette for heavy smokers.

.....

(4)

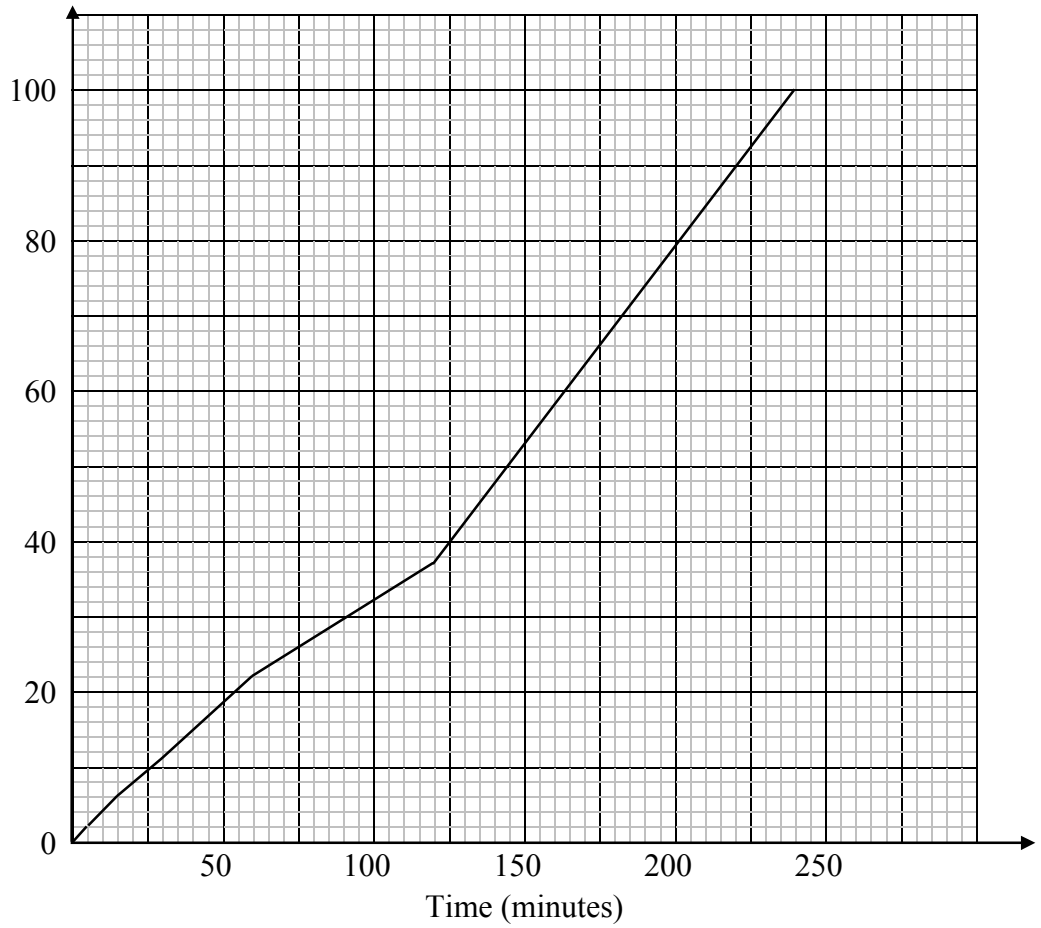
(b) Complete the column in the table for cumulative percentages for heavy smokers.

	Heavy smokers	
Time (x mins)	Percentage	Cumulative Percentage
$0 \leq x \leq 5$	31	
$5 < x \leq 15$	27	
$15 < x \leq 30$	19	
$30 < x \leq 60$	14	
$60 < x \leq 120$	5	
$120 < x \leq 240$	4	

(1)

Leave blank

The cumulative % frequency diagram for light smokers is shown on the diagram below.



(c) Draw the cumulative % frequency diagram for heavy smokers on the same diagram.

(2)

(d) Using your cumulative % frequency diagrams, obtain estimates for the median time after waking for heavy and light smokers lighting their first cigarette.

Heavy smokers…….

Light smokers..…….

(2)

Leave blank

(e) Using your diagram, estimate the percentages of heavy and light smokers who have their first cigarette within 10 minutes of waking up.

Heavy smokers…….

Light smokers..…….

(2)

(f) Summarise how heavy and light smokers differ in time between waking and having their first cigarette.

…….

…….

(1)

TOTAL FOR SECTION B: 52 MARKS

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GCSE STATISTICS DRAFT SPECIMEN MARK SCHEME – PAPER 1F

No		Working	Answer	Mark	Notes
Section A					
1	(a)		ITV1 (=A) (has largest area)	1	B1
	(b)		Channel 5 has the smallest proportion viewers which would suggest Joanne was in such an area, but her friends might not be interested in the programmes on Channel 5	2	B1 B1
2	(a)		(i) Quantitative (since it can be given a numerical value) (ii) Qualitative (non-numerical observation) (iii) Quantitative (since it can be given a numerical value)	2	B2, 1, 0
	(b)		(i) Continuous (can take any value on scale of speed) (ii) Continuous (can take any value on scale of speed) (ii) Discrete (can take whole numbers only)	2	B2, 1, 0
3			Shredded Wheat – more carbohydrate and protein, but low in fat	2	B1 B1
4	(a)		Rank	1	B1
	(b)		1243 (intersection of 'All' row and 'Number' column)	1	B1
	(c)		19% of those aged 18 – 24 said 'very well'	1	B1
	(d)		Dissatisfaction with the teaching of basic skills increases with age (as shown by 'Not very' and 'Not at all' columns)	1	B1
5	(a)	3.325, 2,875, 2.275, 2.125	(i) Attempt to calculate moving average, all correct	3	M1 A1
			(ii) Plot points on graph (visually correct)	1	B1
	(b)		Profits going down; moving averages decreasing	2	B1; B1
6	(a)		Box correct (3 points)	2	B1
			"Whiskers" correct (2 points)		B1
	(b)		Three regions are selected, reasonable values are used e.g Female if weight less than 633g Male if weight greater than 718g Unclear if weight between 633g and 718g (Special case: Two regions are selected M1, A0)	2	M1 A1

GCSE STATISTICS SPECIMEN MARK SCHEME – PAPER 1F

No		Working	Answer	Mark	Notes
7.			Altitude: the maps matches most closely to distribution map.	2	B1 B1
8.	(a)		There is a strong/linear/positive correlation	1	B1
	(b)		Plot point	1	B1
	(c)		Line that passes through $(\bar{x}, \bar{y})$.	1	B1
	(d)		No – it is unlikely to be the same species as it is very different to the other crabs.	1	B1

No		Working	Answer	Mark	Notes
Section B					
1.	(a)		105	1	B1
	(b)		Personal goods	2	B1
			Index numbers less than 100		B1
	(c)	2500×1.02	£2550	2	M1 A1
	(d)		We cannot assume the current economic conditions will be the same that far in the future	1	B1
2.	(a)		(i) Point plotted at 0.5	2	B1
			(ii) Point plotted in range 0.2 – 0.3		B1
	(b)		5/7	1	B1
	(c)		We do not know the probability that it will rain tomorrow	1	B1
	(d)		P(female) = 1/2, P(male) = 5/7	2	B1 B1
	(e)	$\frac{1}{2} \times \frac{2}{7} \left[= \frac{1}{7}, = 0.1... \right]$	Only evidence of multiplication required	1	M1
	(f)	$\frac{1}{2} \times \frac{2}{7} + \frac{1}{2} \times \frac{5}{7}$	$\frac{1}{2}$ (or equivalent)	2	M1 A1

GCSE STATISTICS DRAFT SPECIMEN MARK SCHEME – PAPER 1F

No		Working	Answer	Mark	Notes
3.	(a)		Likely to be unrepresentative – students who think that the canteen is not value for money will generally eat elsewhere.	1	B1
	(b)		This is a leading question- the respondent is invited to agree with the interviewer.	1	B1
	(c)		(i) Test if the questions are clear.	2	B1
			(ii) Tests whether the information collected is what is required.		B1
	(d)		Allocate a unique number to each member of the population.	2	B1
			Use random numbers to select the sample.		B1
	(e)		Interview	4	
			Advantages: Can make sure that questions are understood. Can return if interviewee unavailable.		B1
			Disadvantages: Questions must be asked in a way that does not influence respondent. Method is expensive. Method is time consuming.		B1
			Questionnaire		
			Advantages: A large number of people can be questioned. Method is relatively cheap. Respondent has time to answer the questions.		B1
			Disadvantages: Posted forms may get lost. There is a low return of forms. No one to ask if questions are unclear.		B1

GCSE STATISTICS SPECIMEN MARK SCHEME – PAPER 1F

No		Working	Answer	Mark	Notes
4.	(a)		Frequencies are 6, 3, 2, 3, 1, 5, 1	2	B2 (all) B1 (3 correct)
	(b)		$\frac{7}{21}\left(=\frac{1}{3}\right)$	1	B1
	(c)	$\frac{6}{21}\times 6300$	1800	2	M1 A1
	(d)		Two from: Other factories may be different Sample may be too small Sample may not be random Sample of factory workers may not be representative.	2	B1 B1
5.	(a)		108°	1	B1
	(b)		107°	1	B1
	(c)	108° – 102°	6°	2	M1 A1
	(d)		108°	2	B1 B1
	(e)	72°, 73°, 75°	Most likely as most common 108° – angle = 108°, 107° and 105°	2	M1 A1

GCSE STATISTICS DRAFT SPECIMEN MARK SCHEME – PAPER 1F

No		Working	Answer	Mark	Notes
6.	(a)	$(31 \times 2.5) + (27 \times 10) + (19 \times 22.5) + (14 \times 45) + (5 \times 90) + (4 \times 180) = 2575$ (using mid-intervals)		4	M1
		Σfx			M1
		$\frac{\Sigma fx}{100} = \frac{2575}{100}$			M1
			25.75 minutes		
	(b)		31, 58, 77, 91, 96, 100	1	B1
	(c)		Cumulative % frequency diagram:		
			Plot points at upper class boundary	2	M1
			Line segments (at least 5 points correct)		A1
	(d)		14 – 45 and 11 – 13	2	B1 B1
	(e)		44 – 46 and 4 – 5	2	B1 B1
	(f)		Heavy smokers tend to have their first cigarette after waking much sooner than light smokers	1	B1

GCSE STATISTICS SPECIMEN MARK SCHEME – PAPER 1F

Foundation Paper 1F								
Question	**Subject area**	**Spec ref**	**Mark**		**AO1**	**AO2**	**AO3**	**AO4**
Section A								
1. TV Survey	pie charts	2(b)	3					3
2. Types of data	types of data	1(b)	4			4		
3. Breakfast cereals	composite bar charts	2(b)	2					2
4. Teaching skills	data analysis	2(a)	4			1		3
5. Prices in Guernsey	moving averages	2(g)	5			1	2	2
6. Tortoise	boxplots	2(d), 3	4			2		2
7. Golden Plover	choropleth	2(b)	2			1		1
8. Crabs	scatter diagrams	2(f)	4			2		2
Section A total			**28**					
Section B								
1. Household expenditure	index numbers	2(e)	6			1	2	3
2. Birthdays	probability	4	9			1	7	1
3. College canteen	survey design, sampling strategy	1(d)	10		10			
4. Factory lates	frequency tables	2(d)	7		1	2	3	1
5. Protractor angles	stem and leaf diagrams	2(b)	8				5	3
6. Smoking	cumulative frequency	2(b)	12			2	9	1
Section B total			**52**					
Totals			**80**		**11**	**17**	**28**	**24**
			Max		13	24	35	24
			Min		11	16	21	16