Centre No.					Раре	er Refer	ence			Surname	Initial(s)
Candidate No.			1	3	8	9	/	1	H	Signature	

Paper Reference(s)

1389/1H

Edexcel GCSE

Statistics

Paper 1H

Higher Tier

Friday 17 June 2005 – Afternoon

Time: 2 hours 30 minutes

Materials required for examination

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

Items included with question papers

Ni

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and 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.

'f you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). This question paper has 8 questions in Section A and 9 questions in Section B. The total mark for this paper is 100.

There are 28 pages in this question paper. Any blank pages are indicated.

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.

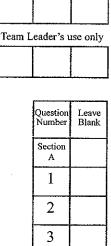
Return at the end to those you have left out.

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Examiner's use only

Turn over



GCSE Statistics 1389

Higher 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

$$= \frac{\sum fx}{\sum f}, \text{ where } x \text{ is the mid-interval value.}$$

Variance

$$=\frac{\sum (x-\overline{x})^2}{n}$$

Standard deviation (set of numbers)

$$\sqrt{\left[\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2\right]}$$

or

$$\sqrt{\left[\frac{\sum (x-\overline{x})^2}{n}\right]}$$

where \overline{x} is the mean of the set of values.

Standard deviation (discrete frequency distribution)

$$\sqrt{\left[\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f}\right)^2\right]}$$

or

$$\sqrt{\left[\frac{\sum f(x-\overline{x})^2}{\sum f}\right]}$$

Spearman's Rank Correlation Coefficient

$$1-\frac{6\sum d^2}{n(n^2-1)}$$

Leave blank

SECTION A

Answer ALL the questions. Write down your answers in the spaces provided.

You must write down all stages in your working.

1. There are 90 black cows and 10 brown cows in a herd of 100 cows.

qualitative

(a) Use the best word from the list to complete each sentence below.

continuous

(i) The colours of the cows are
(ii) The numbers of cows are
The farmer wants to work out the average amount of milk produced per cow by the herd of cows.
He will take a 10% stratified sample.
(b) Write down how he could do this.
(2)

quantitative

Q1

(Total 4 marks)

primary



2. A town council wants to know what people think about how the council uses the council tax.

It will take a sample of all the people who pay council tax.

- (a) Which of the following sample frames would be most suitable?
 - A The list of names in a telephone directory
 - B A list of all council tax payers
 - C A list of residents of one street
 - D The electoral roll

(1)

The population of the town is very large.

The council will take a sample of 1000 people.

- (b) Which one of the following sampling methods is the most suitable?
 - A Convenience sampling
 - B Systematic sampling
 - C Cluster sampling

(1)

Q2

(Total 2 marks)



3. There are 30 people eating in a restaurant.

Each person chooses a first course of fish or meat or vegetarian, and a second course of cake or ice cream or cheese.

The numbers of people eating each combination of first and second course are given in the table.

Choice of meals

		Second course					
		Cake	Ice cream	Cheese			
	Fish	4	4	3			
First course	Meat	5	3.	4			
	Vegetarian	2	3	2			

One of the 30 people is chosen at random.

- (a) Write down the probability that this person eats
 - (i) fish for their first course and cake for their second course,

(ii) ice cream for their second course, given their first course was vegetarian.

•	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•		•		•	•
																					1	ľ	2	j,)

John says that people are equally likely to have fish or meat or vegetarian for their first course.

(b) Does the data given support this idea? Give a reason for your answer.

(2)

(Total 4 marks)



Q3

4. The table gives some information about the number of male and female car drivers killed or injured in the UK in 1994.

It also shows the percentage of those killed or injured in each of the three age groups.

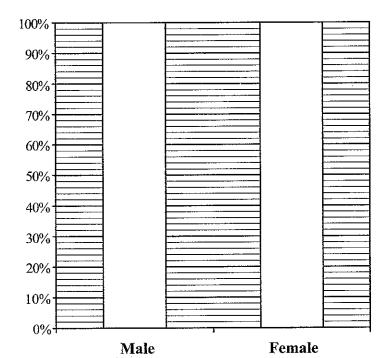
Males and females killed or injured

	Age	e of driver	(years)	Number killed or		
	17–21	22–39	40 and over	injured		
Males	18%	48%	34%	70 100		
Females	16%	52%	32%	54 700		

Source: Social Trends 1996

(a) Use information from the table to complete the composite bar charts below.

Percentages of male and female car drivers killed or injured



Key	
17–21	
22–39	
40 and over	

(3)

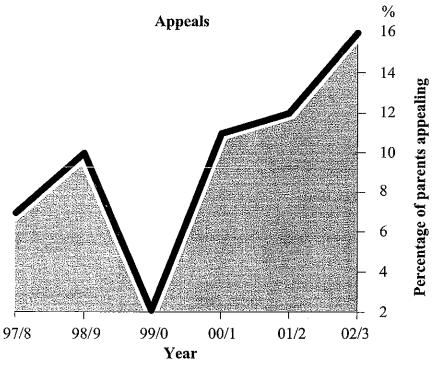
(b) Calculate the number of male drivers aged 17-21 who were killed or injured.

(2)

(Total 5 marks)

Parents can appeal against the secondary school their children are sent to.

This graph, from the Times Educational Supplement, shows information about appeals from 1997 to 2002.



Source: Sendist

(a)	Write down two reasons why this graph could be misleading.
	(2)
(b)	Does the graph show that the number of parents appealing in 2000/2001 was greater than the number appealing in the year 1999/2000? Give a reason for your answer.

Q5

(1)

(Total 3 marks)

6. Zenith Engineering makes stainless steel.

The raw materials for making stainless steel are steel, chromium and nickel.

Stainless steel is made with 74% steel, 18% chromium and 8% nickel.

The table shows the price, in pounds per ton, for chromium and nickel in the years 2000 and 2003.

Metal prices

	Ye	ar
	2000	2003
Chromium (£/ton)	41 500	43 575
Nickel (£/ton)	8 000	8 240

(a) Taking 2000 as the base year, calculate the index numbers for the price of chromium and nickel in 2003.

Metal	Index 2000	Index 2003
Steel	100	102
Chromium	100	
Nickel	100	

Chromium

Nickel

(3)

The index number for the price of steel in 2003 was 102.

Zenith Engineering wants to find out the weighted index number for the price of the raw materials for stainless steel.

(b) Calculate this number.

(3)

(c) Write down the percentage by which the price of raw materials for stainless steel went up between 2000 and 2003.

(1)

(Total 7 marks)

Q6

7. Peter is a supporter of Valley United football club.

Valley United have played 40 games.

The table shows the number of games won, lost and drawn.

Result	Won	Lost	Drawn
Number of games	20	14	6

Peter wants to simulate the results of Valley United's next 10 games.

He uses random numbers between 00 and 99.

The table below shows the numbers he gives to each result.

Result	Won	Lost	Drawn
Numbers given	00-49	50-84	85–99

(a)	Explain	why	he	gives	the	numbers	00-49	to	the	games	won
-----	---------	-----	----	-------	-----	---------	-------	----	-----	-------	-----

| The state of the

(1)

Peter uses the following random numbers to simulate the results of the 10 games.

55 06 80 67 91 64 79 52 33 89

(b) Complete the table to show the results of the simulation.

Result	Won	Lost	Drawn
Number of games			

(1)

(c) (i) How does Peter's simulated result compare with the expectation based on the first 40 games?

.....

(ii) How could Peter improve his simulation?

 •••••••	• • • • • • • • • • • • • • • • • • • •	

(2)

(Total 4 marks)

Q7

TOTAL FOR SECTION A: 35 MARKS

SECTION B

Answer ALL the questions. Write your answers in the spaces provided.

You must write down all stages in your working.

Ten schools each entered a team of boys and a team of girls in a swimming gala.

The table shows the points scored by the boys' teams and by the girls' teams for each of the ten schools.

School	Boys' team points	Girls' team points	Boys' team rank	Girls' team rank	
A	19	15			
В	11	11			
С	16	7			
D	3	3			
Е	. 13	5			
F	18	17			
G	7	4			
Н	5	1		·	
I	14	2			
J	1	0			

(a) Work out Spearman's rank correlation coefficient. You may use the table for some of your working.

(4)

- (b) (i) Describe this correlation.
 - (ii) Write down what you conclude about the relationship between the teams of boys and the teams of girls in the same school.

(Total 6 marks)



2. The table gives the life expectancy at birth, in years, for men and women born in 1960, 1970, 1980 and 1989.

	Life expectancy at birth								
		M	en				Wo	men	
Country		Ye	ar				Ye	ar	
	1960	1970	1980	1989		1960	1970	1980	1989
Belgium	67.7	67.8	70.0	72.4		73.5	74.2	76.8	79.0
Denmark	70.4	70.1	71.4	72.0		74.4	75.9	77.2	77.7
Germany				71.8			-		78.4
Greece	67.3	70.1	72.2	72.6		70.4	73.6	76.6	77.6
Spain	67.4	69.2	72.5	73.1		72.2	74.8	78.6	79.6
France	66.9	68.4	70.2	72.5		73.6	75.9	78.4	80.7
Ireland	68.1	68.8	70.1	71.0		71.9	73.5	75.6	76.7
Italy	67.2	69.0	70.6	72.6		72.3	74.9	77.4	79.1
Luxemburg	66.5	67.2	69.1	70.6		72.2	73.4	75.9	77.9
Netherlands	71.5	70.7	72.7	73.7		75.3	76.5	79.3	80.0
Portugal	61.2	64.2	67.7	70.7		66.9	70.8	75.2	77.6
UK	67.9	68.7	70.2	72.4		73.7	75.0	76.2	78.1

Source: Europe in Figures, 3rd edition

A woman	was	born	in	Ireland in	1980.

(b) Work out the increase in life expectancy at birth, from 1960 to 1989, for men born in the UK.

..... years (1)

Vork out the difference between them.	
vears	
(1)	
Write down the way life expectancy at birth in these countries changed from 1960 to	
989.	
(1)	
Compare the life expectancy at birth for men and women.	
. 10	
*1	
(4)	(
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	Vrite down the way life expectancy at birth in these countries changed from 1960 to 989. (1) Compare the life expectancy at birth for men and women.

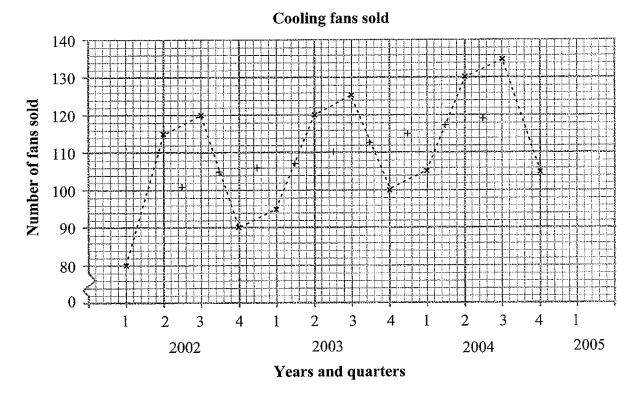


3. The table shows the number of cooling fans sold by Breeze Engineering each quarter, for the years 2002 to 2004.

		Quarter					
Year	1	2	3	4			
2002	80	115	120	90			
2003	95	120	125	100			
2004	105	130	135	105			

The data has been plotted as a time series.

The 4-point moving averages are also shown.



(a) Draw a trend line on the diagram for this data.

(1)

(b) Write down what the trend line shows about the number of cooling fans sold between the years 2002 and 2004.

.....

(1)

(C) Wi	rite down a reason why.
,	
•••	······································
•••	
	(1)
The va	lue of the average seasonal effect for the first quarter is -13.8
(d) Ca	lculate the predicted sales for the first quarter of 2005.
(4)	the predicted bases for the thot quarter of 2000.
	(2)
(e) (i)	(2)
(e) (i)	(2) Write down two assumptions you made when predicting the sales for the first
	(2) Write down two assumptions you made when predicting the sales for the first
	Write down two assumptions you made when predicting the sales for the first quarter of 2005.
(e) (i)	Write down two assumptions you made when predicting the sales for the first quarter of 2005.
	Write down two assumptions you made when predicting the sales for the first quarter of 2005.
	Write down two assumptions you made when predicting the sales for the first quarter of 2005. How reasonable are these assumptions?
	Write down two assumptions you made when predicting the sales for the first quarter of 2005. How reasonable are these assumptions? (3)
	Write down two assumptions you made when predicting the sales for the first quarter of 2005. How reasonable are these assumptions?
	Write down two assumptions you made when predicting the sales for the first quarter of 2005. How reasonable are these assumptions? (3)
	Write down two assumptions you made when predicting the sales for the first quarter of 2005. How reasonable are these assumptions? (3)

4. The weights, to the nearest kilogram, of 19 pigs were:

36 38 30 31 38 43 55 38 37 30 48 41 33 25 34 43 37 40 36

(a) Find the inter-quartile range of the weights.

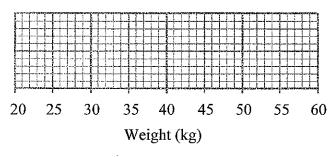
..... kg

(b) Find any weights that are outliers.

..... kg (2)

The median of the data is 37 kg.

(c) Draw a box plot for this data.



(2)

(d) Name a distribution that could be used to model the weight of these pigs. Give a reason for your choice.

Give a reason for your choice.

(2)

The weight of a full-grown pig is about 45 kg.

(e) What does this suggest about the 19 pigs?

•

(1)

Q4

(Total 9 marks)



A machine fills packets with roast peanuts.
Bob takes a sample of 10 packets every hour.
The mean weights of the samples are normally distributed with a mean of 106 grams as standard deviation of 2 grams.
a) Write down the percentage of the samples that are likely to have a sample mean less than 100 grams.
b) Write down the percentage of the samples that are likely to have a sample mean more than 110 grams.
(
Bob sets up a quality assurance chart for means.
c) Write down one reason why Bob uses a quality assurance chart.
The chart has a lower action limit of 100 grams. d) One sample mean is less than 100 grams. What should Bob do?
(1
e) Why should Bob also have an upper action limit?
······································
What other sort of quality assurance chart is Bob likely to use?
·



6. Town Clinic recorded the blood group of each of 60 blood donors.

The table shows information about the donors.

Blood group	Frequency
A	20
О	24
В	10
AB	6

A pie chart is drawn to show this information.

The angle for blood group AB is 36°.

(a) Show how the 36° angle was worked out.

(b) Complete the table below.

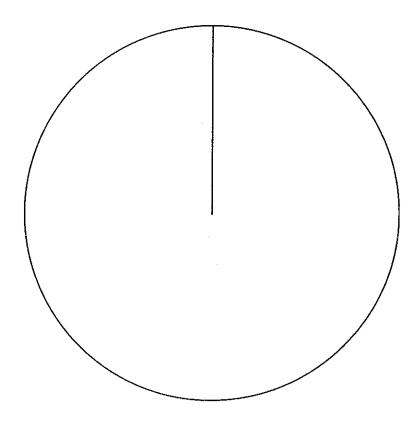
Blood group	Angle in pie chart
A	120°
0	144°
В	
AB	

(1)

(1)

Leave blank

(c) Draw and label the pie chart.



(3)

The table below gives the proportion of each blood group in Sussex.

Blood group	Proportion	
A	33%	
О	40%	
В	17%	
AB	10%	

(u)	Do you think that Town Chine could be in Sussex? Give a reason for your answ	/er.

•••••••••••••••••••••••••••••••••••••••	***************************************	 ***************************************

Q6 (1)

(Total 6 marks)

7. Joan catches a bus, or cycles, or drives, to work.

The probability that Joan catches a bus to work is 0.4

The probability that she cycles to work is 0.5

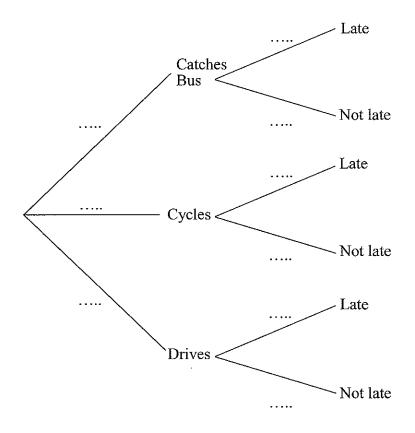
The probability that she drives to work is 0.1

When Joan catches a bus, the probability of her being late is 0.2

When she cycles to work, the probability of her being late is 0.3

When she drives to work, the probability of her being late is 0.1

(a) Complete the probability tree diagram below.



(2)

A day is chosen at random.

(b) Find the probability that Joan is late for work.

(3)



				Leave blank
Joai	ı wa	s late on Monday.		
(c)	(i)	Work out the probability that she caught a bus.		

	(ii)	Work out the probability that she did not catch a bus.		
				07
			(3) (Total 8 marks)	
			(Iotal o marks)	<u> </u>



0	Daniel Lander Caladia - Fact dia has Chang Danier walls both disc	
8.	Barry has two fair dice. Each dice has 6 faces. Barry rolls both dice.	
	He adds the numbers on the top of the two dice to get his total score.	
	(a) Write down all the ways in which he can score 7.	
		(2)
	(b) Write down the probability that he scores 7.	

		(1)
	Barry rolls both dice together 80 times.	
	(c) Estimate how many times he scores 7.	
		(1)
	Megan throws darts at a target. She can hit the target with 7 out of 9 to	hrows.
	Megan throws three darts.	
	(d) Assuming a binomial distribution, work out the probability that sl exactly twice. You may use $(p+q)^3 = p^3 + 3p^2q + 3pq^2 + q^3$.	ne hits the target
		(2)

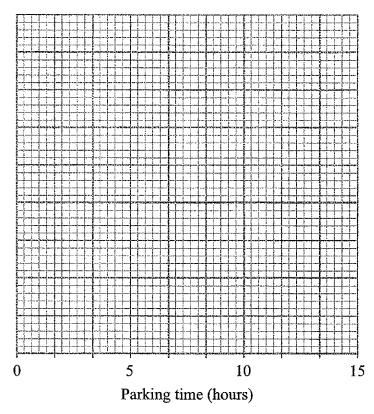
·	·	····
(e)	In order to assume a binomial distribution, what do you have to assume about the	L
	probability of hitting the target with each of the three darts?	
	(1)	
The	assumption may not be realistic.	
	Write down one reason why.	
(1)	write down one reason wily.	
٠.	(1)	Q
	(Total 8 marks)	

9. The parking times in hours (p) for 118 cars in a car park are summarised in the table.

Hours (p)	Frequency (f)
0	16
1 < <i>p</i> ≤ 2	24
2 < <i>p</i> ≤ 4	30
4 < <i>p</i> ≤ 6	24
6	24
p > 12	0

(a) Draw a histogram for the data.

Parking times of cars in a car park



(3)

p	Frequency (f)	
0	16	
1 < <i>p</i> ≤ 2	24	
2 < <i>p</i> ≤4	30	
4 < <i>p</i> ≤ 6	24	
6 < <i>p</i> ≤ 12	24	
Totals	118	

(b) Work out an estimate for the mean parking time of the cars.

You may use the space in the table.

..... hours (3)

(c) Work out an estimate of the standard deviation of these parking times.

Give your answer to 1 decimal place.

You may use $\sum fx^2 = 2872$.

..... hours

(3)

(Total 9 marks)

TOTAL FOR SECTION B: 65 MARKS

TOTAL FOR PAPER: 100 MARKS

END



Q9

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