

Write your name here

Surname	Other names
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Centre Number

Candidate Number

Edexcel GCSE

Statistics

Paper 1H

Higher Tier

Mock paper Time: 2 hours	Paper Reference 5ST1H/01
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You must have:
Ruler graduated in centimetres and millimetres, protractor, pen, HB pencil, eraser, electronic calculator.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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Turn over ►

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

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

Standard deviation (set of numbers) $\sqrt{\left[\frac{\sum x^2}{n} - \left(\frac{\sum x}{n} \right)^2 \right]}$

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

where \bar{x} is the mean 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 $\sqrt{\left[\frac{\sum f(x - \bar{x})^2}{\sum f} \right]}$

Spearman's Rank Correlation Coefficient $1 - \frac{6\sum d^2}{n(n^2 - 1)}$



Answer ALL the questions.

You must write down all stages of your working

1 The 140 employees at a factory were asked how they travelled to work one day.

Some of the results are shown in the two-way table.

	Walk	Car	Bus	Cycle	Other	Total
Shop Floor	38	24			10	104
Office		15	4	1	3	
Management	1	8	0	0	0	
Total	43		16			

(a) Complete the two-way table.

(2)

(b) How many of the employees are office employees?

.....
(1)

One of these employees is to be picked at random.

(c) What is the probability that this employee is

(i) an office employee who travelled to work by car,

.....

(ii) an employee who travelled to work by car,

.....

(iii) an employee who walked to work, given that they are a manager.

.....

(3)

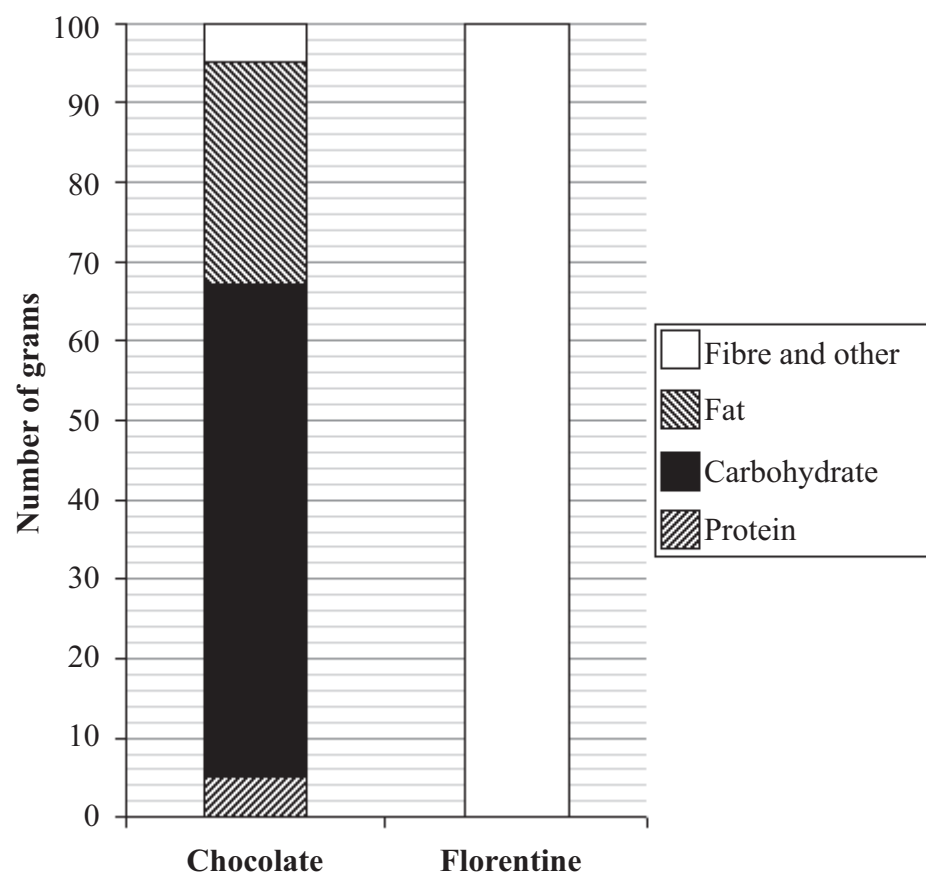
(Total for Question 1 is 6 marks)



2 The table gives some information about the nutritional content in 100 grams of Florentine biscuits.

Biscuit Type	Protein	Carbohydrate	Fat	Fibre and other
Florentine	9	57	31	3

The composite bar chart shows the nutritional content in 100 grams of Chocolate biscuits.



(Source: Adapted from Tesco Finest Data)

(a) On the grid draw the composite bar chart showing the nutritional content in 100 grams of Florentine biscuits.

(3)



(b) Compare the nutritional contents in each of the two types of biscuit.

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(2)

(c) Comment on the choice of shading for the composite bar charts.

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(1)

(Total for Question 2 is 6 marks)



5
Turn over ▶

3 A market research company wants to find out whether or not shoppers like a new shopping centre that has recently opened.

(a) Give **two** reasons why the company should take a sample of the customers rather than a census.

1

.....

2

.....

(2)

(b) Describe a possible sampling frame that could be used.

.....

(1)

The market research company decides to use a questionnaire.

(c) Write down an example of a closed question that could be used on this questionnaire to find out whether customers like the shopping centre.

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(2)

It is suggested that a pilot survey is used.

(d) Give **two** advantages of carrying out a pilot survey.

1

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2

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(2)



One question on the questionnaire is

“Do you agree that the shopping centre is well laid-out and it is easy to find the goods you want?”

(e) Is this a suitably worded question for the questionnaire? Give reasons for your answer.

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(2)

(Total for Question 3 is 9 marks)



7
Turn over ▶

4 A drug company wants to find out how effective a new drug is at relieving pain.

The drug is to be tested on different age groups.

The company decides to take a stratified sample of the patients from Skipworth Clinic who take this drug.

(a) Suggest suitable strata that could be used.

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

(b) Write down a hypothesis the company might wish to test.

.....
.....
..... (2)

(c) What type of data will the company collect?

..... (1)

The company decides that it needs to use a control group.

(d) Discuss how a control group would be used.

.....
.....
.....
..... (2)

The company finds that 58% of the patients who take the drug think that it works well. 30% of the patients think that it has no effect and the rest are not sure.

(e) What sort of diagram could be used to show this information?

..... (1)

(Total for Question 4 is 7 marks)



5 The table shows the average house price in one county of England in the first three months of 2009

The table also shows the simple price index number for February with January as the base month.

Month in 2009	January	February	March
Average price	£150 500	£147 750	£153 500
Simple House Price Index	100	98.17	

(Source: Adapted from: nationwide website)

(a) Work out the simple price index number for March with January as the base month. Write your answer to 2 decimal places.

.....
(2)

In September 2009, the simple price index number based on January 2009 was 107.50

(b) Comment on the percentage change in the average price of a house between January 2009 and September 2009

.....
.....
(2)

(c) What conclusion can you draw about the average price of a house in September 2009 compared to February 2009? Give a reason for your answer.

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(2)

(Total for Question 5 is 6 marks)



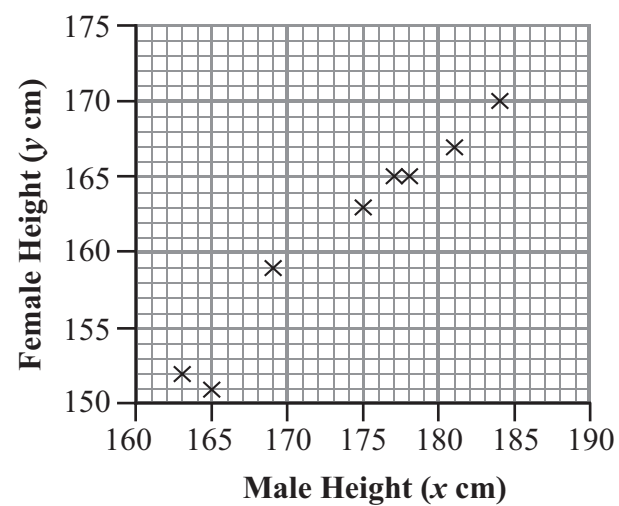
- 6 The table shows the mean heights (cm) of males and of females in eight different countries.

Country	Male Height (x)	Female Height (y)
Netherlands	184	170
Sweden	181	167
Philippines	163	152
Australia	175	163
Germany	178	165
South Africa	169	159
Vietnam	165	151
New Zealand	177	165

(Source: en.wiki/Human_weight)

The scatter diagram shows this information.

Mean Heights of Males and Females



The mean point of these data (\bar{x}, \bar{y}) is $(174, 161.5)$.

- (a) Plot the mean point on the diagram.

(1)

- (b) Draw a line of best fit on the scatter diagram.

(1)



(c) Describe and interpret the correlation.

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

(2)

The equation of a possible line of best fit is $y = 0.9x + 5.25$

(d) Give a practical interpretation of the value 0.9 in the equation.

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.....

(2)

The value 5.25 in the equation does not have a sensible practical interpretation.

(e) Explain why.

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

(1)

(f) (i) Use the equation of this line of best fit to work out an estimate for the mean height of females in a country where the mean height of males is 190 cm.

..... cm

(ii) Explain why this is likely to be an unreliable estimate.

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

(2)

(Total for Question 6 is 9 marks)



7 Here are the weights, in kg, of fifteen adult female gorillas.

70 85 90 110 112 112 115
115 116 120 122 127 131 143 150

(a) For the weights of these female gorillas, find

(i) the median,

..... kg

(ii) the lower quartile,

..... kg

(iii) the upper quartile.

..... kg

(3)

(b) Show that 70 is an outlier for the weights of the adult female gorillas.

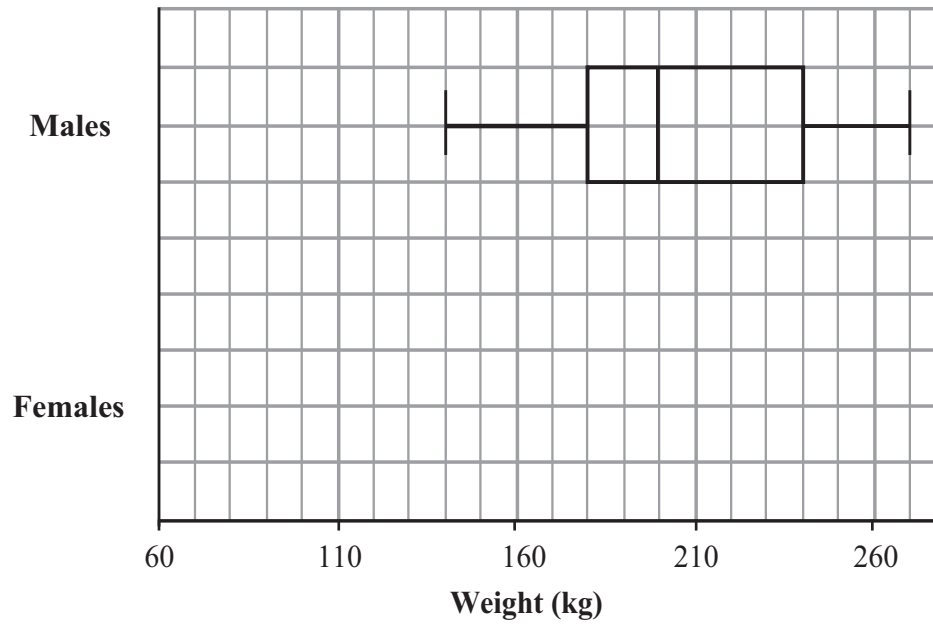
(3)



There are no other outliers.

The weights, in kg, of a group of male gorillas were also recorded.

These weights are summarised in the box plot.



(Data source: *Adapted from last refuge*)

(c) On the grid, draw a box plot to show the distribution of the weights of the female gorillas.

(3)

* (d) Compare the distributions of the weights of the adult male and female gorillas.

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(4)



(e) A particular gorilla is found to have a weight of 148 kg.

Discuss, giving reasons, whether this is likely to be a male or a female gorilla.

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(2)

(Total for Question 7 is 15 marks)



8 During a time and motion study the times, to the nearest minute, taken to do a particular activity were recorded.

Here are the results:

22 14 16 18 18 23 21 21 15 12 28 33 22 26 30

A stem and leaf diagram for these 15 results has been started.

(a) Complete the stem and leaf diagram.

Key 1 | 6 = 16

1		2	4	5	6
2		1			
3					

(1)

(b) Find the median time.

..... minutes

(1)

(c) Work out the mean time. Give your answer to one decimal place.

..... minutes

(2)



Another time was recorded as 25 minutes.

(d) Without doing any further calculations, write down what effect this will have on

(i) the median,

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

(ii) the mean.

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

(2)

(e) Ignoring the extra time recorded, how long do you think should be allowed for this activity? Explain your answer.

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

(2)

(Total for Question 8 is 8 marks)



9 The comparative pie charts show some information about the numbers of different types of medals won in the Olympics of 1984 and of 2008 by the United Kingdom.



(Data Source: The Olympic Games Results)

(a) In which year did the United Kingdom win the greatest total number of medals?
Give a reason for your answer.

.....

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(2)

(b) Compare the numbers of the different types of medals won in 1984 and 2008

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(4)

(Total for Question 9 is 6 marks)



10 Two judges rank each skater in an ice-skating competition according to how well they have skated.

Spearman's rank correlation between the ranks of the two judges was -0.219

Write down what this tells you about the rankings of the judges.

You must explain your answer.

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(2)

(Total for Question 10 is 2 marks)



11 Joanne and Curwin do tests in Science and Mathematics.

In order to compare their results they worked out their standardised scores in each subject.

The table shows their scores.

	Standardised Science Score	Standardised Mathematics Score
Joanne	1.3	0.5
Curwin	-0.2	1.4

What do these scores tell you about how well Joanne and Curwin did in Science and Mathematics and how their results compare?

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(3)

(Total for Question 11 is 3 marks)

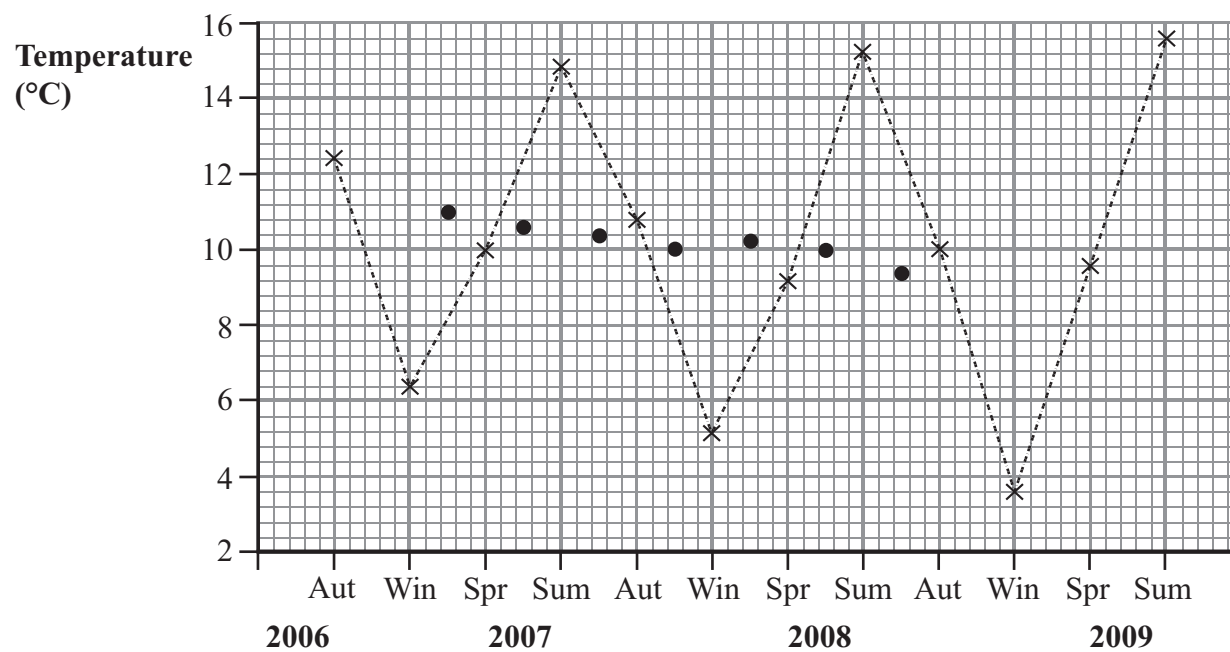


12 The table gives information about the mean seasonal temperatures ($^{\circ}\text{C}$) in England between Autumn 2006 and Summer 2009.

Year \ Quarter	Winter	Spring	Summer	Autumn
2006				12.4
2007	6.2	9.9	15.2	10.6
2008	5.5	8.9	15.5	9.9
2009	3.5	9.4	15.7	

The time series graph shows this information.

The first seven 4-point moving averages for this information are also plotted on the graph.



(Data Source: www.metoffice.co.uk)

(a) (i) Calculate the last two 4-point moving averages.

..... and

(ii) Plot these moving averages on the time series graph.

(3)



(b) Draw in a trend line for the moving averages.

(1)

(c) Describe the trend.

.....
.....

(1)

(d) Work out the seasonal variation for the autumn quarter.

.....
(3)

(e) Use your answer to (d) to estimate the mean seasonal temperature for the autumn quarter of 2009.

..... °C
(2)

(Total for Question 12 is 10 marks)



* **13** A town council decide to look at what can be done to reduce the waste sent to landfill.
They want to find out what the people in the town will find acceptable.

Discuss how they could go about doing this.

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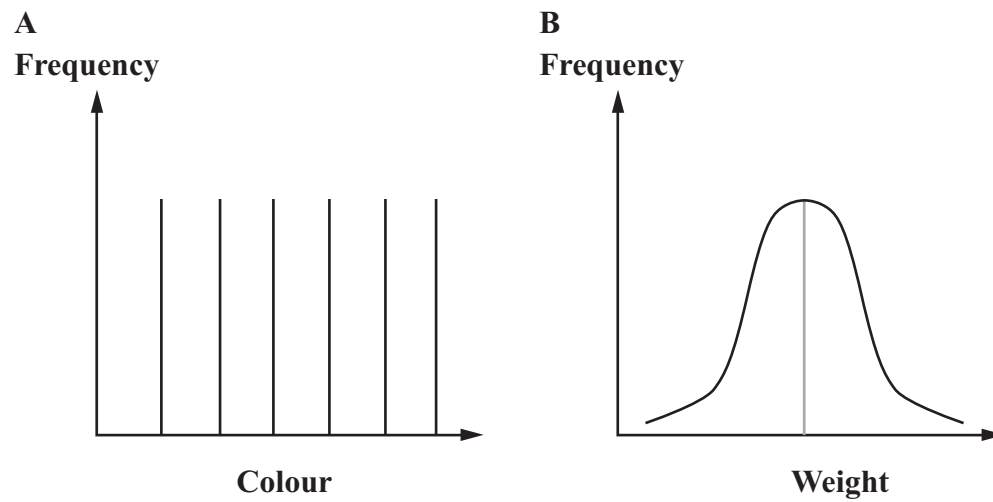
(4)

(Total for Question 13 is 4 marks)



14 Sketch A shows the distribution of colours of sweets in a box.

Sketch B shows the distribution of weights of edible crabs caught by a fishing boat



Write down the name of the distribution that will model the data in each case.

Sketch A

Sketch B

(2)

(Total for Question 14 is 2 marks)

15 A survey was done into the subjects studied at A-level.

37% of students took A-level Mathematics.

24% of students took A-level Physics.

75% of students taking A-level Physics also took A-level Mathematics.

X is the event a student took A-level Mathematics.

Y is the event a student took A-level Physics.

Work out $P(X \cup Y)$.

.....
(2)

(Total for Question 15 is 2 marks)



16 A company fills tubes with four different coloured sweets.

Each tube is supposed to contain six red, six orange, six brown and six green sweets.

A tube contains the correct number of sweets of each colour, and a sweet is chosen randomly from it.

(a) Write down the probability that the sweet is red.

.....
(1)

(b) Work out the probability that the sweet is not red.

.....
(1)

The tubes do not always contain the correct number of each colour of sweets.

It is known that the probability that a tube of these sweets, chosen at random, contains six green sweets is 0.9

Jacinda buys four tubes of these sweets.

(c) Work out the probability that 3 or more of the tubes contain exactly six green sweets.
(You may use $(p + q)^4 = p^4 + 4p^3q + 6p^2q^2 + 4pq^3 + q^4$)

.....
(3)

(Total for Question 16 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

