

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Statistics

Paper 1H

Higher Tier

Monday 24 June 2013 – Afternoon

Time: 2 hours

Paper Reference

5ST1H/01

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.

Turn over ►

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PEARSON

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.

Write your answers in the spaces provided.

You must write down all stages in your working.

- 1 The two-way table shows information about the membership of a tennis club.

Type of member	male	female	Total
Adult	43	31	
Teenage	12	10	22
Junior	10		24
Total		55	120

- (a) Complete the table.

(1)

One of the club members is chosen at random.

- (b) (i) Write down the most likely type of member to be chosen.

.....

- (ii) Find the probability that the member chosen is a Junior.

.....

(2)

A Teenage member is chosen at random to be on the club committee.

- (c) Find the probability that this member is female.

.....

(2)

(Total for Question 1 is 5 marks)



- 2 The table shows some information about the total money spent in British supermarkets in the 12 weeks up to 22 February for 2009 and for 2010

It also shows the market share for each supermarket.

Great Britain Consumer Spend

Supermarket	12 Weeks to 22 February 2009		12 Weeks to 22 February 2010	
	Money Spent (£ thousands)	Market Share (%)	Money Spent (£ thousands)	Market Share (%)
Tesco	6,709,669	30.1%	7,102,289	30.4%
Asda	3,827,675	17.2%	3,973,853	17.0%
Sainsbury's	3,596,800	16.2%	3,799,974	16.3%
Morrisons	2,609,140	11.7%	2,865,051	12.3%
Co-operative	1,137,972	5.1%	1,323,593	5.7%
Somerfield	724,733	3.3%	396,223	1.7%
Waitrose	861,835	3.9%	995,300	4.3%
Iceland	432,914	1.9%	458,996	2.0%
Aldi	641,166	2.9%	657,366	2.8%
Lidl	513,291	2.3%	520,455	2.2%
Netto	159,452	0.7%	161,342	0.7%
Farm Foods	111,104	0.5%	119,472	0.5%

Data source: adapted from Kantar Worldpanel

More money was spent in one of these supermarkets in 2009 than in 2010 for these 12 weeks.

- (a) Write down the name of this supermarket.

.....
(1)

More money was spent in Netto in 2010 than in 2009 for these 12 weeks.

- (b) Work out how much more money.

£.....
(1)



(c) Work out the total **Market Share (%)** for the first four supermarkets in the table for the 12 weeks in each year.

2009.....%

2010.....%

(3)

(d) Comment on your answers to part (c).

.....

.....

.....

(1)

(Total for Question 2 is 6 marks)



3 A new theatre was built in Appleyard.
Appleyard council wants to find out what people think of the new theatre.
The council decides to collect information using a questionnaire.

(a) State one advantage and one disadvantage of using a questionnaire rather than a face to face interview.

Advantage

.....

.....

Disadvantage

.....

.....

(2)

Councillor Flowers wants this question on the questionnaire.

‘Do you agree that the new theatre was a good use of council money?’

This is **not** a good question.

(b) Give two reasons why.

Reason 1

.....

.....

.....

Reason 2

.....

.....

.....

(2)



The council also wants to know how much people would pay to use the car park at the new theatre.

(c) Design a suitable question for the questionnaire.

(2)

The council decides to send the questionnaire to a sample of people.

(d) Give two advantages of taking a sample.

Advantage 1

.....

.....

Advantage 2

.....

.....

(2)

The questionnaire is to be sent to 20 people chosen at random from the local telephone directory.

(e) Discuss whether or not this would give a good sample.

.....

.....

.....

.....

.....

(2)

(Total for Question 3 is 10 marks)



4 A cycling club had a sponsored cycle ride to raise money for charity.

The table shows information about the amounts of money the cyclists raised.

Amount (£ x) of money raised	Number of cyclists
$20 \leq x < 30$	3
$30 \leq x < 40$	5
$40 \leq x < 50$	6
$50 \leq x < 60$	4
$60 \leq x < 70$	2

Sarah uses this table to calculate an estimate of the mean amount of money raised.

Sarah's value for the mean is an estimate.

(a) Explain why.

(Do not do any calculations.)

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

A local cycle shop owner added £10 to the amount of money each cyclist raised.

(b) How does the mean amount of money raised change?

(Do not do any calculations.)

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

(Total for Question 4 is 2 marks)



- 5 The table shows the simple index numbers for mean annual earnings in manufacturing for the years 2004 to 2006

The base year is 2000

Year	2004	2005	2006
Index number	112	116	123

Data Source: Adapted from www.fsmq.org

- (a) Describe the mean annual earnings in 2004 compared with the mean annual earnings in 2000

.....

.....

.....

.....

.....

(2)

The mean annual earnings in manufacturing in the year 2000 was £14 000

- (b) Work out the mean annual earnings in 2006

£.....

(2)

(Total for Question 5 is 4 marks)



The table shows the Year and the gender of the students in Jean's college.

Gender	First Year students	Second Year students
male	300	240
female	360	300

Jean's tutor says

'Gender and age may affect how likely students are to buy *ebooks*'.

Jean now decides to allow for this in her sampling method.

(c) (i) Name this sampling method.

(ii) Work out how many male Second Year students should be in Jean's sample of 40 students.

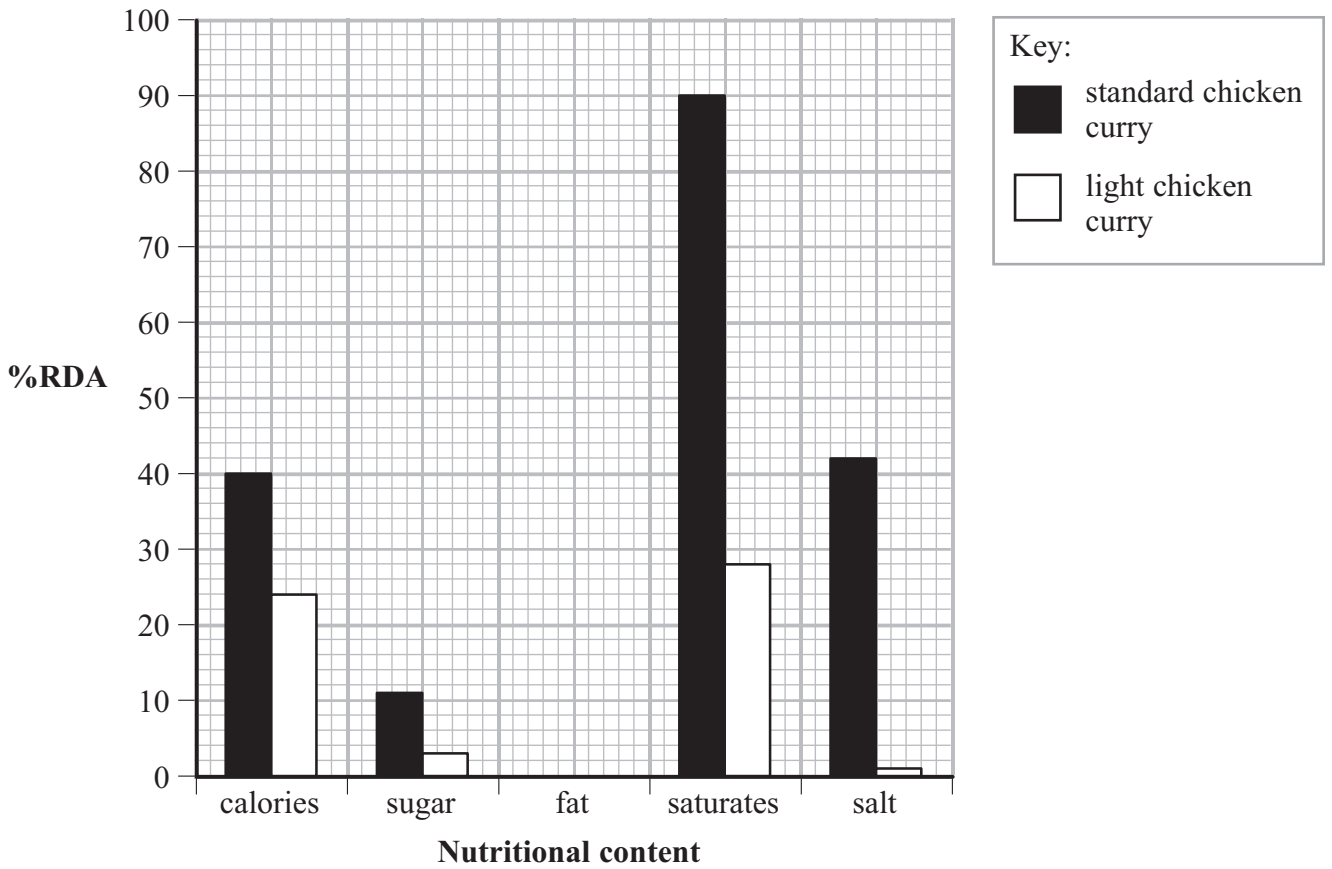
(3)

(Total for Question 6 is 8 marks)



7 The multiple bar chart shows some information about the nutritional content of a standard chicken curry and a light chicken curry.

The information is given as %RDA (percentage of ‘recommended daily allowance’).



The missing information for fat is

	%RDA
standard chicken curry	54
light chicken curry	12

(a) Complete the multiple bar chart.

(2)

(b) Write down the %RDA for salt in the standard chicken curry.

.....%

(1)

(c) Write down the nutritional content with the lowest %RDA for a standard chicken curry.

.....

(1)



(d) Compare the %RDA for saturates in the two chicken curries.

.....

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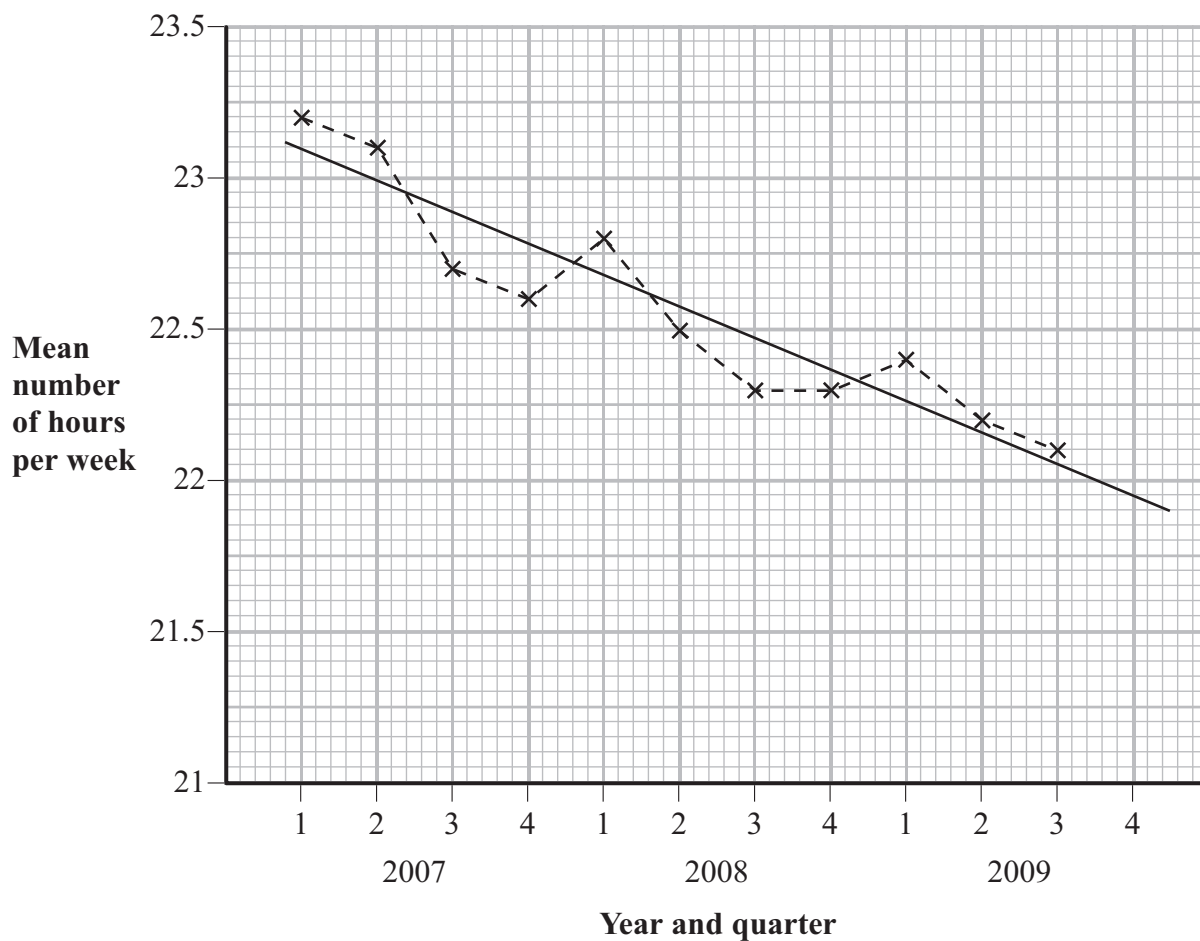
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(2)

(Total for Question 7 is 6 marks)



- 8 The time series graph shows information about the mean number of hours per week that people listened to the radio from 2007 to 2009



(Source: rajar.co.uk)

- (a) Between which two successive quarters was the greatest change in the mean number of hours per week that people listened to the radio?

(1)

A trend line has been drawn on the graph.

- (b) Describe the trend.

(1)

- (c) Write down the value shown by the trend line for the mean number of hours people listened to the radio in quarter 4, 2009

..... hours

(1)



(d) Comment on whether your answer to (c) is likely to be higher or lower than the true value.
Give a reason for your answer.

.....

.....

.....

.....

.....

.....

.....

(2)

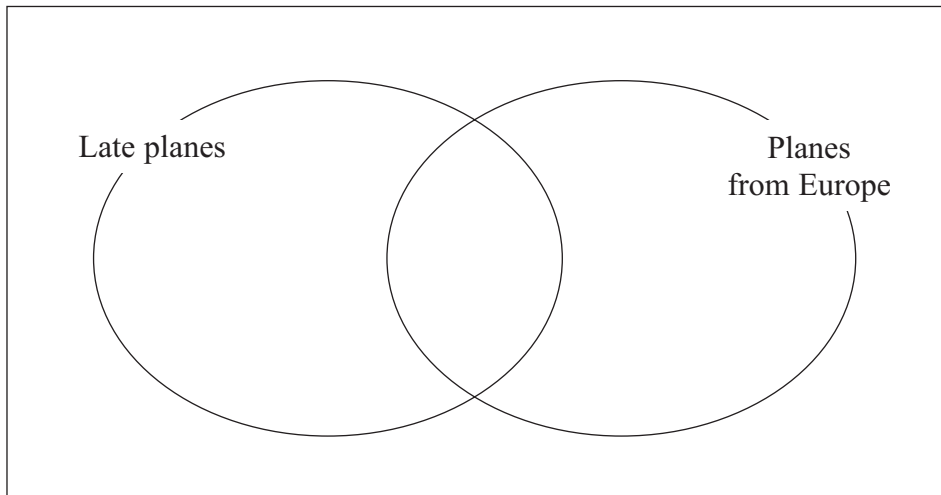
(Total for Question 8 is 5 marks)



- 9 100 planes landed at Heathrow Airport in a 3 hour period.
 40 of the planes were from Europe.
 20 of the planes were late, including 5 planes from Europe.

Data source: adapted from www.FlightStats.com

- (a) Complete the Venn diagram using the information above.



(3)

One of these planes is chosen at random.

- (b) Find the probability that

(i) the plane was **not** from Europe.

.....

(ii) the plane was on time and was from Europe.

.....

(3)

Given that the plane was late,

- (c) find the probability that the plane was from Europe.

.....

(2)

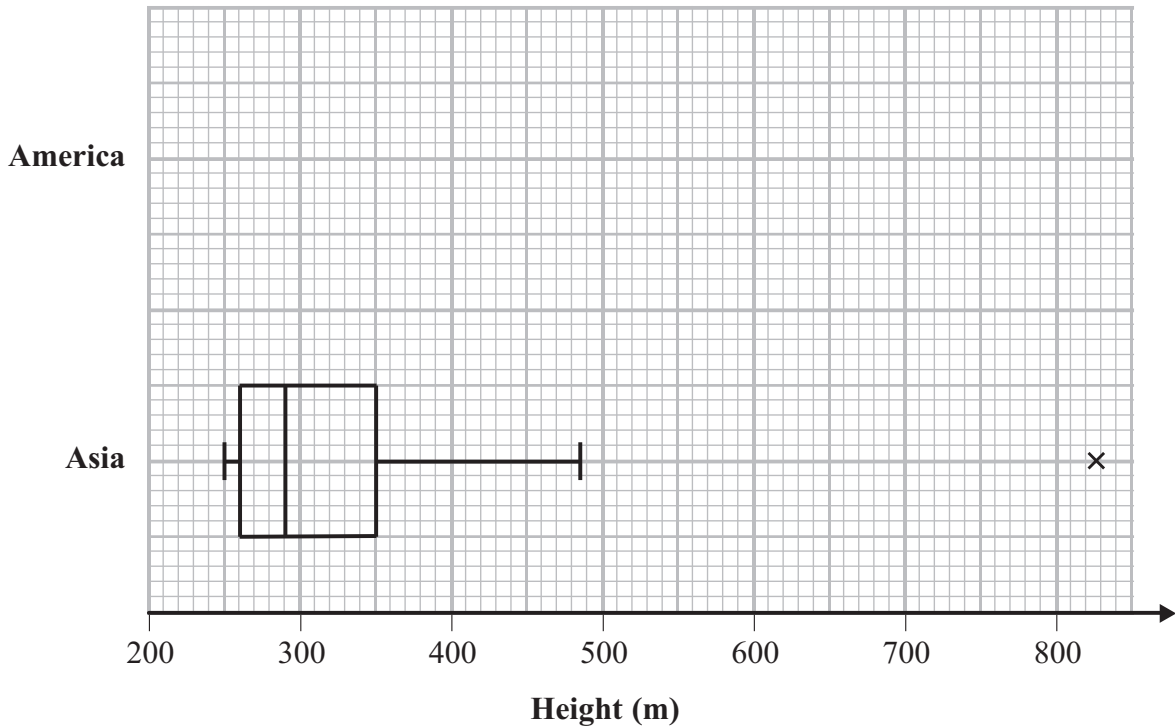
(Total for Question 9 is 8 marks)



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10 The box plot shows information about the heights of a sample of skyscrapers in Asia in 2010



(a) Write down the median height.

..... m
(1)

(b) Work out the interquartile range of these heights.

..... m
(2)

(c) What does the cross (x) on the box plot mean?

.....
(1)

The table shows information about heights of a sample of skyscrapers in America in 2010

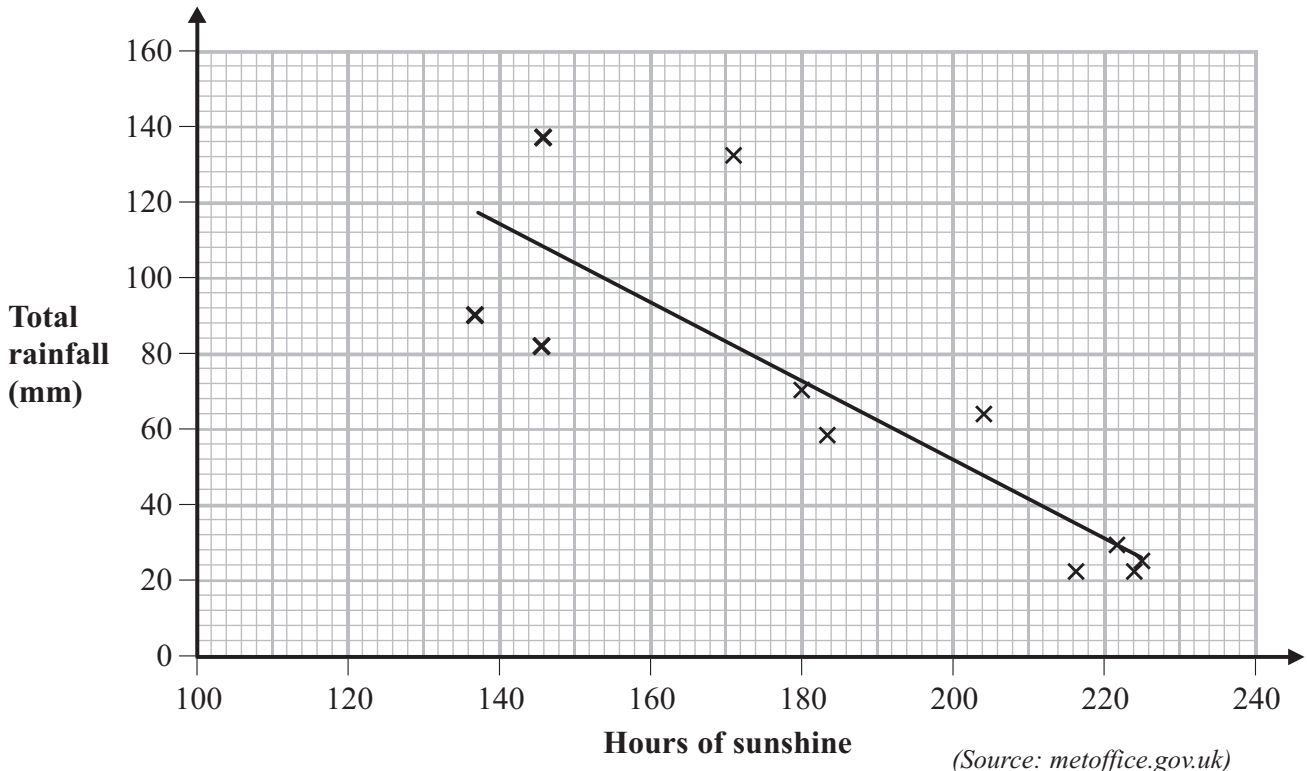
Minimum	Lower quartile	Median	Upper quartile	Maximum
240 m	255 m	270 m	300 m	442 m

Data source: *architecture.about.com*



11 The total rainfall and total hours of sunshine were recorded for August in Whitby over an eleven year period.

These data are shown in the scatter diagram below.



A line of best fit is drawn on the scatter diagram.

In August of the next year there were 200 hours of sunshine.

(a) Find an estimate for the total rainfall for that month.

..... mm
(1)

(b) Describe the correlation between rainfall and hours of sunshine.

.....
(1)

(c) (i) Calculate the gradient of the line of best fit.

.....

(ii) Interpret the value of this gradient.

.....

.....

(3)

(Total for Question 11 is 5 marks)



12 There are 8 dancers in a dancing competition.

Judge X and Judge Y each put the 8 dancers in rank order.

Rank 1 is for the best dancer.

Dancer	Judge X (rank)	Judge Y (rank)		
A	2	4		
B	5	2		
C	1	5		
D	4	1		
E	6	8		
F	7	7		
G	8	3		
H	3	6		

(a) Work out Spearman's rank correlation coefficient for these ranks.

You may use the blank columns in the table to help with your calculations.

.....
(3)

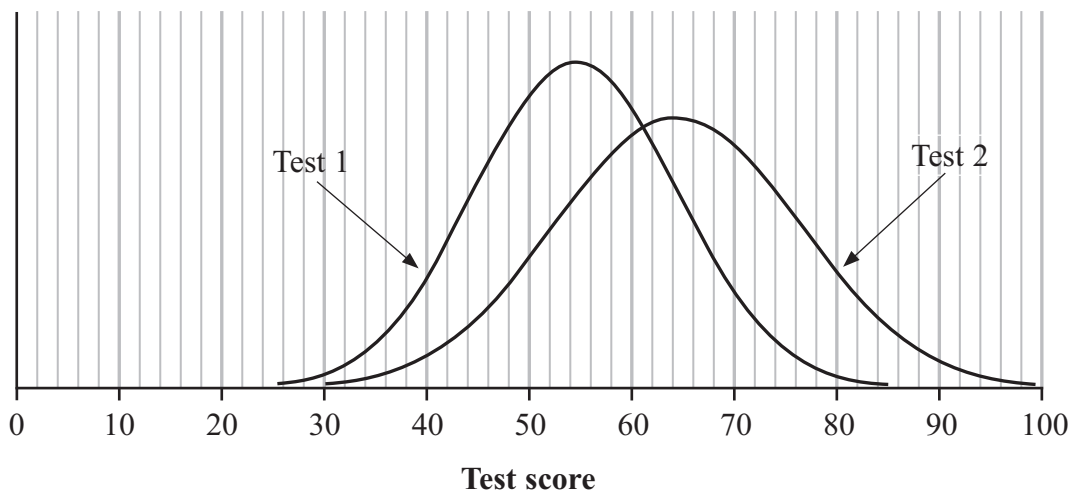
(b) Interpret your answer to part (a).

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

(Total for Question 12 is 5 marks)



- 13 Some students did two mathematics tests.
 The students' marks for the tests are normally distributed.
 The diagram shows the distribution of marks for Test 1 and Test 2



- (a) Estimate the mean and standard deviation of the marks for Test 1

Mean

Standard deviation

(3)

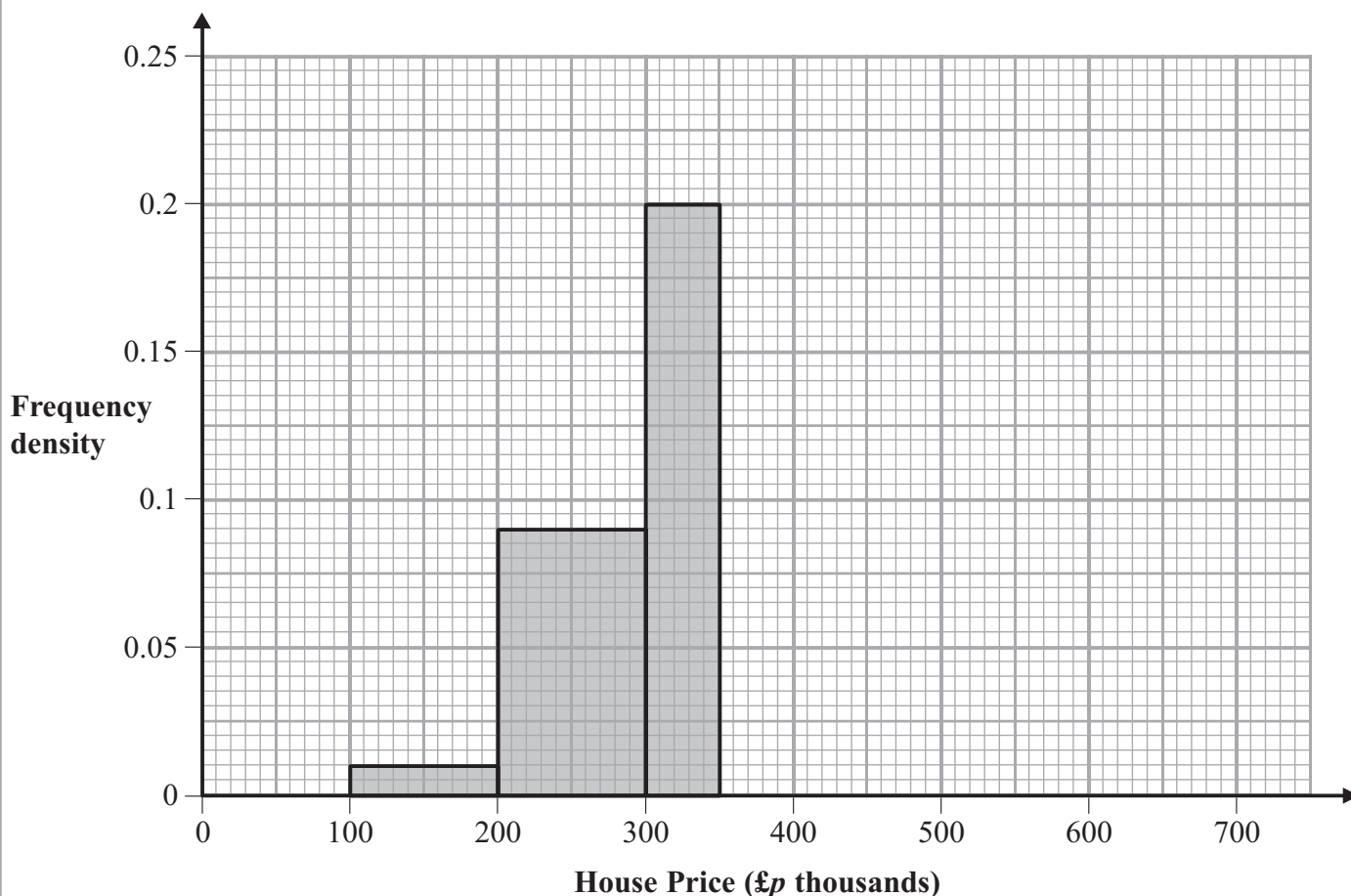


14 The table gives some information about house prices in a small town.

House Price (£ p thousands)	Number of houses
$100 \leq p < 200$	1
$200 \leq p < 300$	9
$300 \leq p < 350$	10
$350 \leq p < 400$	8
$400 \leq p < 500$	2
$500 \leq p < 700$	3

(Data source: *rightmove.co.uk*)

Some of these data are represented on this histogram.



(a) Use the table to complete the histogram.

(3)



Jason thinks the **median** of these prices is £350 000

Jason is wrong.

(b) Explain why.

.....

.....

.....

.....

.....

.....

.....

(2)

The mean price of these houses is £340 000

(c) Find an estimate for the number of these houses with a price less than the mean price.

.....

(2)

(Total for Question 14 is 7 marks)

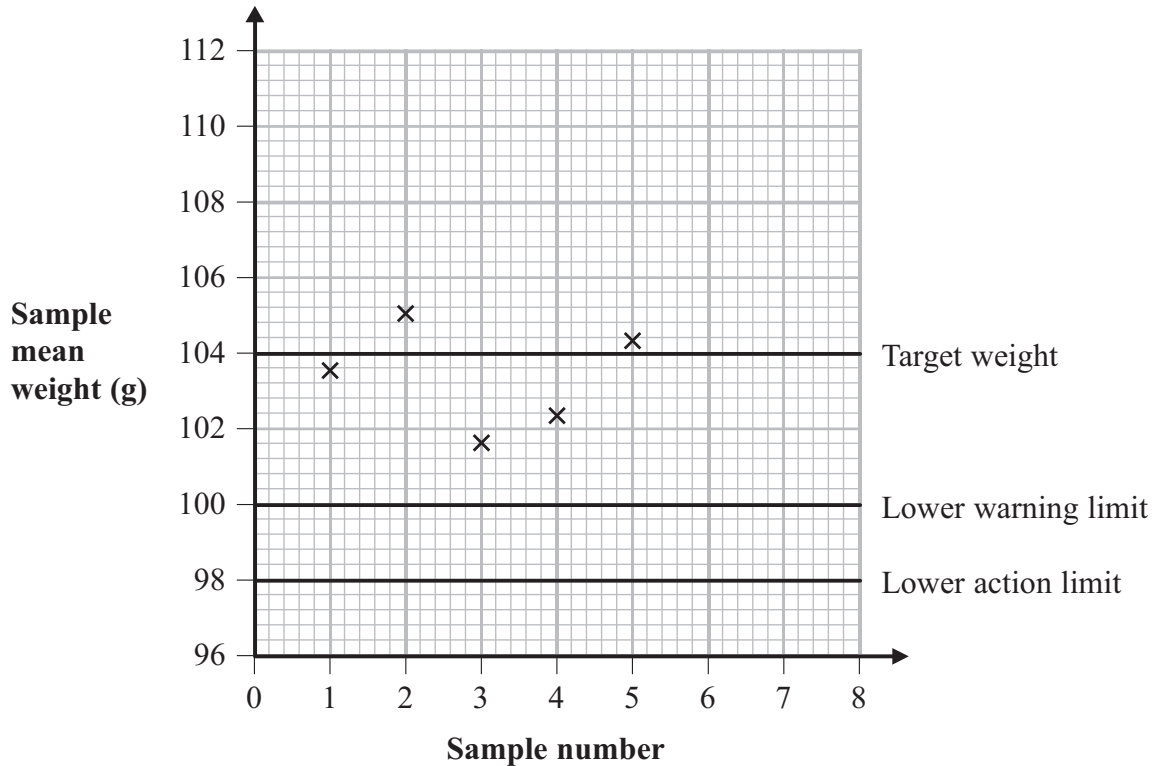


15 A production line is set up to produce chocolate bars with a target weight of 104 g. For quality control, random samples are taken to check that the production line is working correctly.

The chocolate bars in each sample should have a mean weight of 104 g and a standard deviation of 2 g.

The sample mean weights have a normal distribution.

A quality control chart is used to plot the sample mean weights.



The lower warning limit and the lower action limit have been drawn on the chart.

(a) Complete the control chart by adding the upper warning limit and the upper action limit. Label your lines.

(2)

(b) When the chocolate production line is working correctly, write down the percentage of samples expected to have a mean weight outside the warning limits.

..... %
(1)



Five sample means have been plotted on the control chart.

The next sample has a mean weight of 97.8 g

(c) (i) Plot this sample mean on the control chart.

(ii) Describe the action that now needs to be taken.

(2)

(d) Explain how warning limits on a control chart are used.

(3)

(Total for Question 15 is 8 marks)

TOTAL FOR PAPER IS 100 MARKS



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