New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Statistics

Unit 1
Foundation Tier

GST11

[GST11]
THURSDAY 21 JUNE, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eleven** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 80.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and protractor.
There is no formula sheet for this examination.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total Marks	

BLANK PAGE

Answer **all** questions

Examiner Only	
Marks	Remark

1 The pictogram below shows the number of days of rainfall in September in five towns in Northern Ireland.

KEY

represents 2 days of rainfall

Antrim	
Ballynahinch	
Coleraine	
Dungannon	
Enniskillen	

(a) How many days of rainfall were there in Coleraine during September?

Answer _____ [1]

There were 6 days of rainfall in Dungannon during September.

(b) Use this information to complete the pictogram. [1]

(c) **(i)** Charlie says that is not a good symbol to use for this pictogram and that would be a better symbol to use.

Do you agree or disagree with Charlie?

Tick the correct box.

Agree ☐ **Disagree** ☐ [1]

(ii) Give a reason to explain your answer.

Reason _____

_____

_____ [1]

Examiner Only	
Marks	Remark

2 Amy is investigating colours of cars.

She went to the car park of her local supermarket at 10 a.m. one Saturday morning and recorded the colours of 80 cars as they arrived.

Amy's data collection sheet is shown below.

Data Collection Sheet

Colour of car	Tally	Frequency
Black	𝍸 𝍸 ||	12
Silver	𝍸 𝍸 𝍸 ||||	19
Blue	𝍸 |	6
Red	𝍸 𝍸 |||	13
Green		
White	𝍸 𝍸 ||||	14
Other	𝍸 ||||	9
	TOTAL	**80**

(a) Work out the number of green cars Amy counted.

Answer _____ [2]

(b) Complete the tally and frequency in the table for green cars. [2]

(c) Write down the modal colour of car.

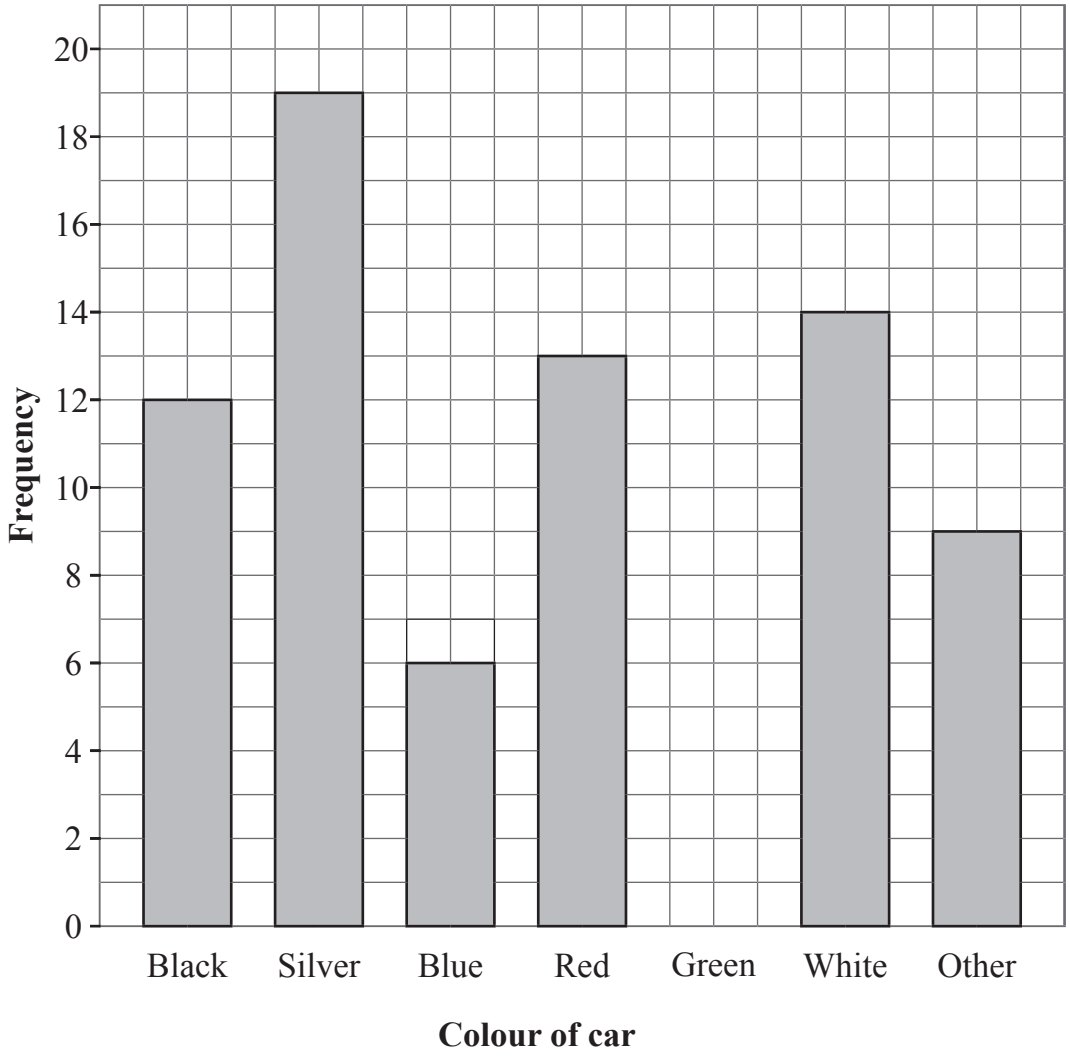
Answer _____ [1]

(d) Amy recorded twice as many cars of one colour than she did of blue cars.

What colour was this?

Answer _____ [1]

Amy drew a bar chart to display the data she collected.



(e) Complete the bar chart. [1]

(f) Has Amy collected primary data or secondary data?

Tick the correct box.

Primary Data ☐ **Secondary Data** ☐ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 A group of Year 10 pupils were asked to name their favourite science subject.

The table below shows the results.

	Biology	Chemistry	Physics	TOTAL
Boys	35	39		**122**
Girls		23	52	
TOTAL	**78**		**100**	**240**

(a) Complete the missing values in the table. [3]

(b) A pupil is chosen at random from the group.

Find the probability that the pupil's favourite science subject is Biology.

Answer _____ [1]

(c) A girl is chosen at random from the group.

Find the probability that her favourite science subject is **not** Chemistry.

Answer _____ [2]

(d) There are 24 pupils in one of the Year 10 classes.

How many pupils in this class would you expect to have Physics as their favourite science subject?

Answer _____ [2]

Examiner Only	
Marks	Remark

4 A local council is planning to close the library in a small town.

The council decides to investigate the opinions of the people who live in the town about their plan to close the library.

(a) What is the population for this investigation?

_____

_____ [1]

One of the questions on the questionnaire is:

How many times have you used the local library recently?

1–5 ☐ **6–10** ☐ **More than 10** ☐

(b) Give **two** reasons why this is not a suitable question.

Reason 1 _____

_____

_____ [1]

Reason 2 _____

_____

_____ [1]

(c) Another question on the same questionnaire is:

Would you prefer the library to open fewer hours than close altogether?

Yes ☐ **No** ☐

This is a closed question.

Give one advantage of using closed questions in a questionnaire.

_____

_____

_____ [1]

Examiner Only	
Marks	Remark

5 A group of 30 pupils recorded the number of text messages they received during one afternoon.

The results for the 16 girls are given below.

25	41	11	28	5	32	17	3
12	27	16	30	21	17	33	14

(a) Show the data in an ordered stem and leaf diagram.

Rough Work

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

Final Answer

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

. . . . . | . . . . . .

Key . . . . | . . . . represents . . . . . text messages

[4]

(b) For these data

(i) work out the median,

Answer _____ [2]

(ii) calculate the range.

Answer _____ [1]

For the boys, the median was 23 text messages and the range was 29 text messages.

(c) Use this information and your answers to parts **(b)(i)** and **(b)(ii)** to compare the number of text messages received by the girls with the number of text messages received by the boys.

Comparison 1 _____

_____

_____

_____ [1]

Comparison 2 _____

_____

_____

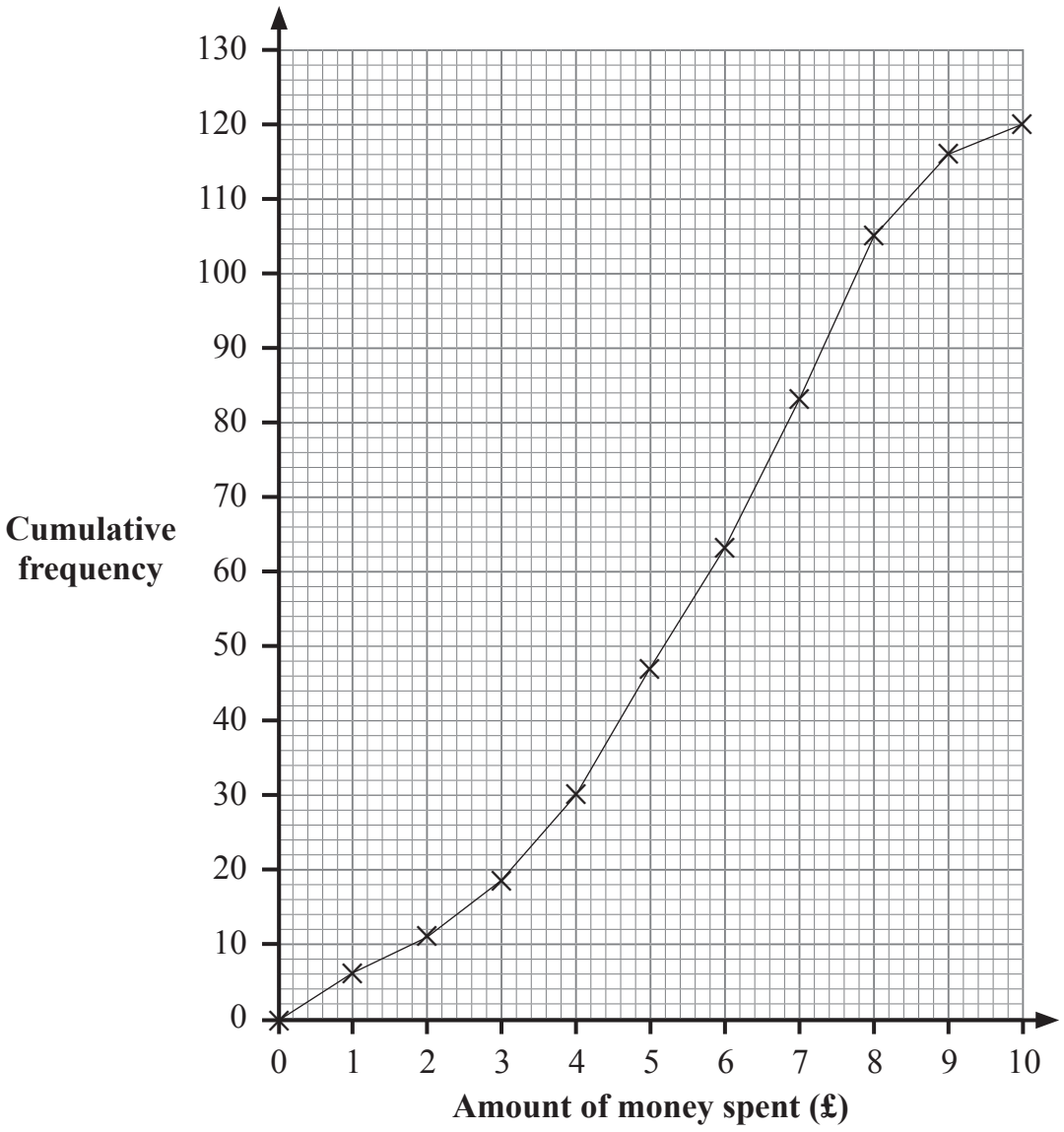
_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 In a survey, a researcher asked 120 customers leaving a shop how much money they had just spent.

A cumulative frequency diagram for this data is shown below.



(a) Using the cumulative frequency diagram, estimate

(i) the median amount of money spent in the shop;

Answer £ _____ [1]

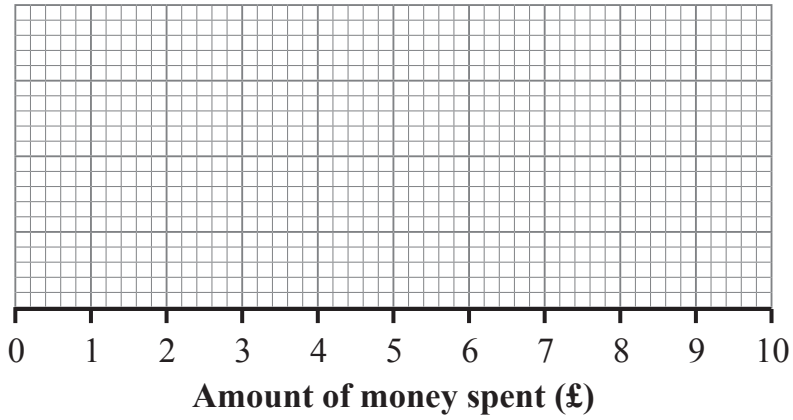
(ii) the interquartile range of the amount of money spent in the shop.

Answer £ _____ [2]

One customer among those surveyed did not spend anything in the shop, and another spent exactly £10

Examiner Only	
Marks	Remark

(b) On the graph paper below, draw a box plot to show the amount of money spent in the shop by customers in the survey.



[2]

(c) **(i)** Does your box plot show a positive skew or a negative skew?

Tick the correct box.

Positive Skew ☐ **Negative Skew** ☐ [1]

(ii) Give a reason for your answer.

Reason _____

_____

_____ [1]

(d) The researcher has used opportunity sampling for her survey.

Explain briefly what is meant by opportunity sampling.

_____

_____

_____

_____ [1]

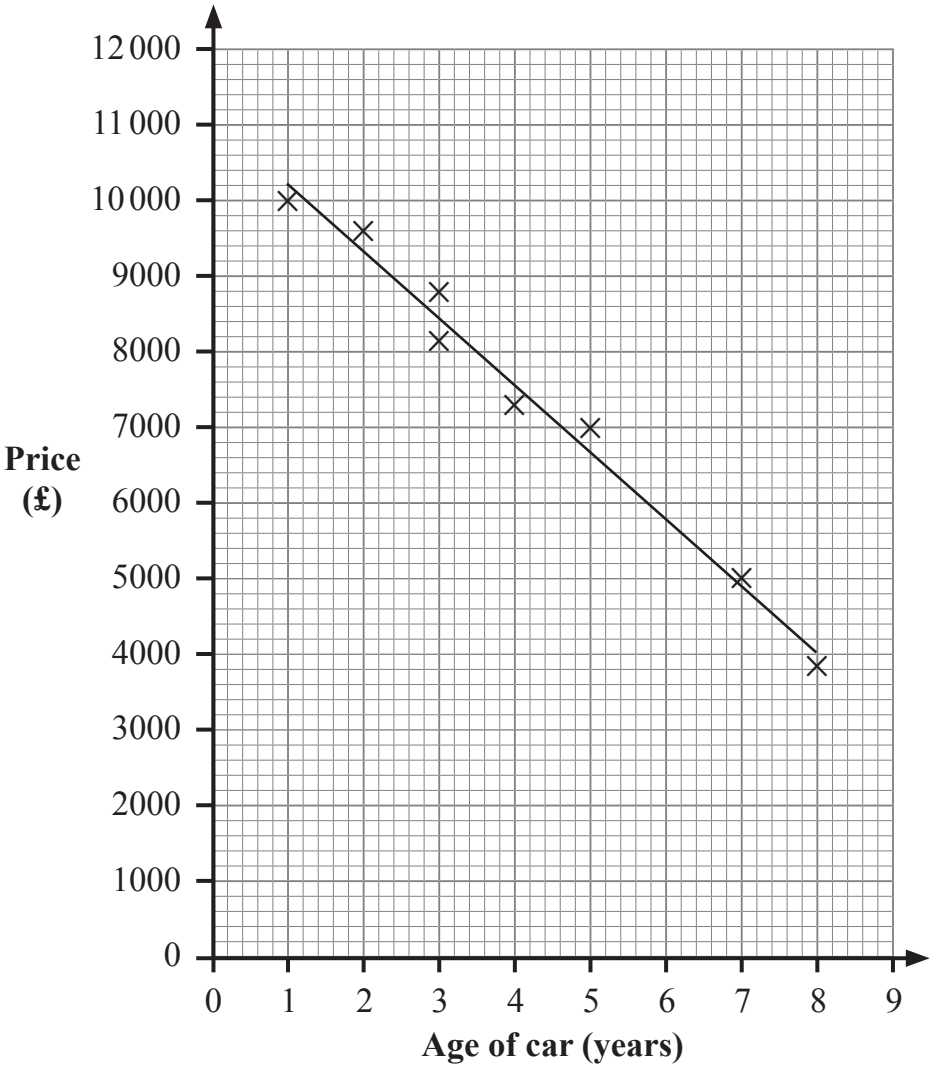
Examiner Only	
Marks	Remark

7 Paul is interested in buying a second hand car.

He searches a website for the make and model of the car he wants, and finds that there are eight cars available.

Paul records the age (in years) and the price (in £) of the eight cars.

He displays the data he finds in a scatter diagram and draws a line of best fit.



(a) Write down the age of the car which cost £7300

Answer _____ years [1]

(b) What type of correlation does the scatter diagram show?

Tick the correct box.

Positive Correlation ☐ **Negative Correlation** ☐ [1]

(c) Use the line of best fit to estimate the price of a car which is 6 years old.

Answer £ _____ [1]

(d) Paul thinks he might look for a brand new car instead of a second hand one.

(i) Use the line of best fit to estimate the price of a brand new car for Paul.

Answer £ _____ [1]

(ii) Comment on the reliability of this estimate.

_____

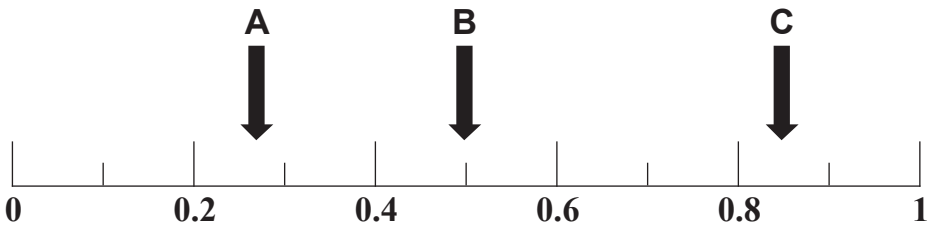
_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

8 Probabilities **A**, **B** and **C** are marked on the probability scale below.



(a) Write the letter **A**, **B** or **C** in the box beside the statement which matches the probability.

(i) Getting 'tails' when tossing a fair coin once. ☐ [1]

(ii) A fair dice thrown once does not show a '4' ☐ [1]

(iii) A day of the week chosen at random starts with the letter 'T'. ☐ [1]

(b) Rebecca has a coin which she thinks might be biased.

She tosses the coin 20 times and 'heads' shows 14 times.

Comment on this result.

_____

_____

_____ [2]

(c) Suggest one way in which Rebecca could improve the reliability of her result.

_____

_____ [1]

BLANK PAGE

(Questions continue overleaf)

9 A mail order company operates a customer service helpline.

On its website the company claims that calls are answered, on average, within 20 seconds.

One day, the manager records the length of time taken to answer all calls to the helpline.

The results are given in the table below.

Time, t (seconds)	**Frequency, f**		
$0 < t \leqslant 10$	343		
$10 < t \leqslant 20$	214		
$20 < t \leqslant 30$	197		
$30 < t \leqslant 40$	145		
$40 < t \leqslant 50$	72		
$50 < t \leqslant 60$	29		
TOTAL	**1000**		

(a) Give one advantage and one disadvantage of using a grouped frequency table for this data.

Advantage _____

_____

_____ [1]

Disadvantage _____

_____

_____ [1]

Examiner Only	
Marks	Remark

(b) Calculate an estimate of the mean time taken to answer a call.

You may use the blank columns in the table opposite to help you with your working.

Answer _____ seconds [4]

(c) Using your answer to part **(b)**, explain whether or not the claim made by the company is justified.

_____

_____

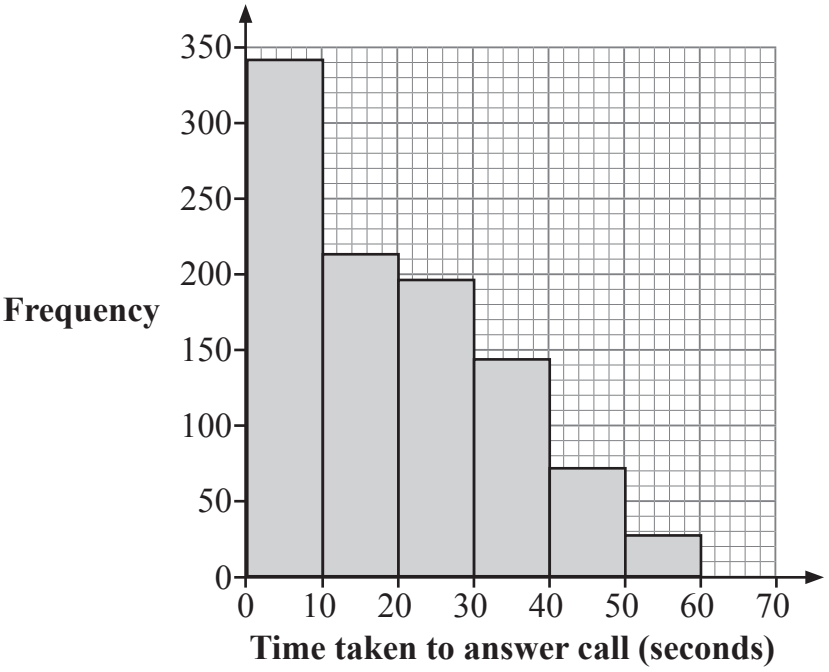
_____

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

A histogram showing the distribution of the times taken to answer the calls is shown below.



(d) (i) Do you think that this data could be modelled by a normal distribution?

Tick the correct box.

Yes ☐ **No** ☐ [1]

(ii) Explain your answer.

_____

_____

_____

_____ [1]

BLANK PAGE

(Questions continue overleaf)

Examiner Only	
Marks	Remark

10 Eight friends are talking about the number of times they had been to the cinema in the past year.

Their results are as follows.

3 8 9 5 12 4 2 1

(a) Calculate the mean of these numbers.

Answer _____ [2]

(b) Lisa says that the mode of these numbers is 12

Explain why Lisa is **not** correct.

_____

_____

_____

_____ [1]

(c) One of the group remembered that she had been to the cinema 7 times and not 9 times.

What effect will this have on the value of the mean?

Tick the correct box.

Increase ☐ **Decrease** ☐ **No change** ☐ [1]

Examiner Only	
Marks	Remark

(d) Jenny thinks that the number of times a person goes to the cinema might be related to how far they live from it.

Write down a hypothesis Jenny could use.

Hypothesis

_____

_____ [1]

Jenny plans to ask some people about:

- the distance they live from the nearest cinema; and
- the number of times they have been to the cinema in the past year.

(e) What kind of data is the number of visits to the cinema?

Circle **two** words from the list below that describe the data.

Qualitative	**Discrete**	**Continuous**
Bivariate	**Quantitative**	**Categorical**

[2]

After collecting her data, Jenny calculated the product moment correlation coefficient to be –0.769

(f) What conclusion could Jenny draw from this value?

_____

_____

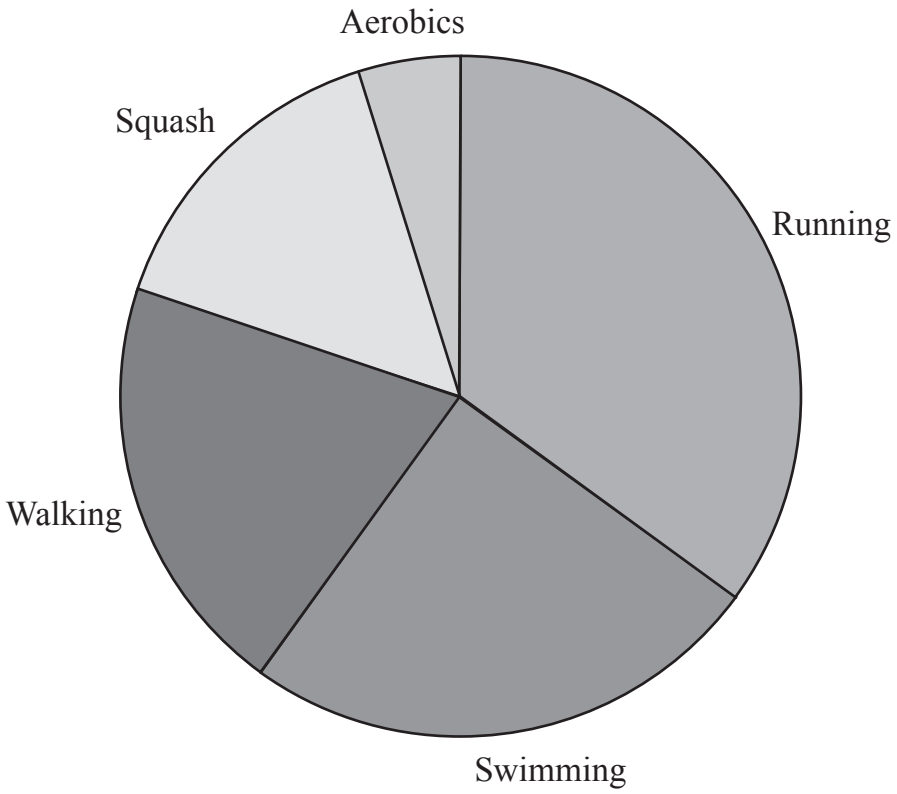
_____

_____ [2]

Examiner Only	
Marks	Remark

11 In a survey about fitness, some people were asked which activities they preferred.

All the results from the survey are given in the pie chart below.



(a) Only one of the following statements about the pie chart is correct:

Statement A *100 people took part in this survey*

Statement B *It is not possible to say how many people took part in the survey*

Tick the box that indicates the correct statement.

Statement A ☐ **Statement B** ☐ [1]

(b) Calculate the percentage of people who preferred running.

Answer _____ % [3]

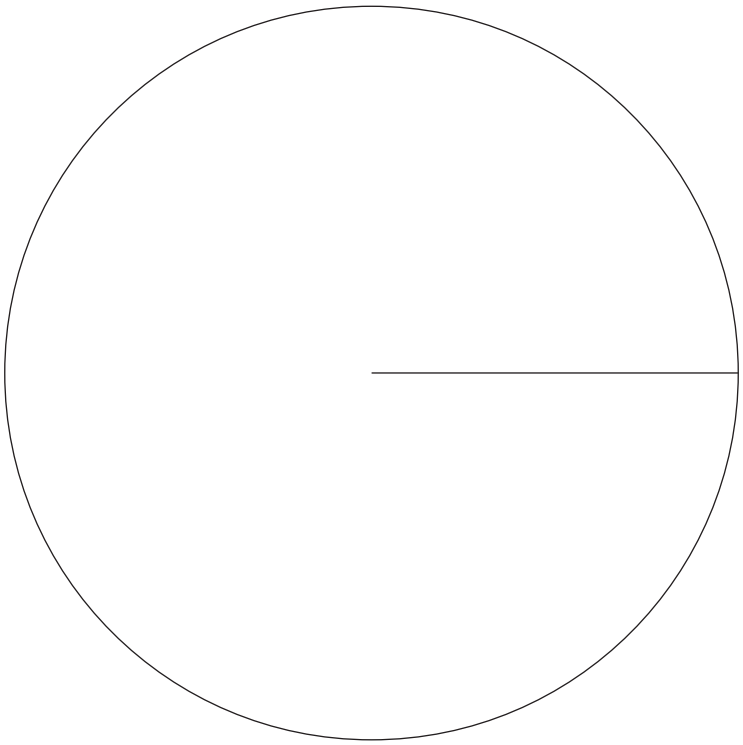
Examiner Only	
Marks	Remark

In a different survey about fitness, 120 people were asked how often they exercise each week.

The results are given in the frequency table below.

How often	Number of people	
Never	17	
Once	72	
Twice or more	31	

(c) Draw a clearly labelled pie chart for the above data.



[4]

(d) Give one reason why it would not be possible to find the exact value of the mean from the frequency table above.

Reason _____

_____

_____ [1]

THIS IS THE END OF THE QUESTION PAPER