

Paper Reference 1ST0/2F
Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Total Marks

Statistics
PAPER 2
Foundation Tier
(Calculator)

Monday 19 June 2023 – Afternoon

Time: 1 hour 30 minutes

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

YOU MUST HAVE

Ruler, protractor, compasses, writing and drawing equipment, scientific calculator.

YOU WILL BE GIVEN

Data Booklet

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or on the separate data sheets – there may be more space than you need.

Scientific calculators may be used.

You must show all your working out with your answer clearly identified at the end of your solution.

INFORMATION

The total mark for this paper is 80.

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

There may be spare copies of some data sheets in case you need them.

ADVICE

Read each question carefully before you start to answer it.

Try to answer every question.

Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1. Look at the diagram for Question 1 in the Data Booklet.**

It is an incomplete comparative bar chart showing the total number of medals won by three of the countries that took part in the 2014 and 2018 Winter Olympics.

The total number of medals won by Sweden in the 2018 Winter Olympics was 14

- (a) Complete the comparative bar chart in the Data Booklet for Sweden.
(1 mark)**

(continued on the next page)

1. continued.

- (b) Work out how many more medals were won by Sweden than Great Britain in the **2014 Winter Olympics**.
(2 marks)

(continued on the next page)

1. continued.

- (c) Compare the total number of medals won by Sweden, Great Britain and Switzerland in the 2014 Winter Olympics.
(2 marks)

(continued on the next page)

1. continued.

Thomas says that the data displayed in the comparative bar chart is quantitative data.

(d) Explain what is meant by quantitative data.

(1 mark)

(Total for Question 1 is 6 marks)

2. Look at the table for Question 2 in the Data Booklet.

Norbert asked each of the students in his class to name their favourite fruit from Apple, Banana, Orange or Pear.

The results are shown below.

Banana	Orange	Apple	Banana	Pear
Apple	Apple	Banana	Orange	Pear
Apple	Banana	Apple	Apple	Apple
Orange	Apple	Pear	Banana	Banana

(a) Fill in the tally chart for this information AND complete the frequency column in the table in the Data Booklet.

(2 marks)

(continued on the next page)

Turn over

2. continued.

(b) How many students are in the class?

(1 mark)

One of the students is chosen at random.

(c) Find the probability that this student's favourite fruit is Orange.

(1 mark)

(continued on the next page)

2. continued.

- (d) Compare the number of students whose favourite fruit is Apple to the number of students whose favourite fruit is Pear.**

(1 mark)

Norbert decides to find the favourite fruit that is the mode.

- (e) Explain why the mode is an appropriate average for Norbert to find for this type of data.**

(1 mark)

(continued on the next page)

Turn over

2. continued.

(f) Give one advantage of the tally chart over the raw data.

(1 mark)

(continued on the next page)

2. continued.

Norbert wants to draw a diagram to represent his results.

(g) Circle the type of diagram from the list below that is most suitable for him to draw.

(1 mark)

Scatter diagram

Bar chart

Line graph

Time series

(Total for Question 2 is 8 marks)

Turn over

3. Look at the diagram for Question 3 in the Data Booklet.

Keshav has a spinner with equal sections numbered 1, 2, 3 and 4

To investigate whether or not the spinner is biased towards the number 1 he spins the spinner 40 times.

- (a) Explain what is meant by 'biased towards the number 1'
(1 mark)

(continued on the next page)

3. continued.

Here is information about Keshav's results.

Number	Frequency
1	24
2	6
3	5
4	5

Keshav says the results show that the spinner is biased.

(continued on the next page)

Turn over

3. continued.

(b) Discuss whether or not the information in the table on the previous page supports what Keshav says.

(2 marks)

(c) What could Keshav do to help improve the accuracy of his investigation?

(1 mark)

(Total for Question 3 is 4 marks)

4. Rose is investigating the number of brothers and sisters that students in her secondary school have.

To investigate this she asks **10** students in Year **8** and **10** students in Year **11** how many brothers and sisters they each have.

(a) Assess Rose's method for her data collection.

(1 mark)

(continued on the next page)

4. continued.

Look at the diagram for Question 4(b), 4(c) and 4(d) in the Data Booklet.

It is a vertical line graph showing the data that she collected.

(b) How many students have 2 or more brothers and sisters?

(2 marks)

(c) Write down the mode.

(1 mark)

(continued on the next page)

Turn over

4. continued.

Rose uses her vertical line graph to conclude that no student in her school has 5 or more brothers or sisters.

(d) Assess whether or not Rose's conclusion is appropriate.

(1 mark)

(Total for Question 4 is 5 marks)

- 5. Look at the table for Question 5 in the Data Booklet.
It shows an incomplete two-way table.**

**Linzi is the owner of a coffee shop and makes
afternoon teas for customers.**

**The customers have an option of egg or ham
sandwiches and an option of plain or fruit scones.**

**The incomplete two-way table in the Data Booklet
shows information about the number of afternoon
teas she makes one Saturday.**

- (a) Complete the two-way table.**

There are three spaces to fill.

(2 marks)

(continued on the next page)

5. continued.

One of the customers is chosen at random.

(b) Write down the probability that this customer

**(i) ordered a plain scone,
(1 mark)**

**(ii) ordered an egg sandwich and a fruit scone,
(1 mark)**

(continued on the next page)

Turn over

5. (b) continued.

(iii) did NOT order a ham sandwich.

(2 marks)

(continued on the next page)

5. continued.

Linzi needs to place an order for scones for the next Saturday.

(c) Use the information in the table to help her decide if she should order more fruit scones than plain scones.

Give a reason for your answer.

(2 marks)

(Total for Question 5 is 8 marks)

6. **Connie is going to write a report on the difference in total rainfall between London and Aberdeen in 2019**

She collects secondary data to investigate this.

This question is multiple choice.

Write the letter of your chosen answer in the box provided.

(a) What should Connie include in her report?

A source of the data

B her telephone number

C her age

D name of her school

Answer

(1 mark)

(continued on the next page)

Turn over

6. continued.

(b) Describe one way that she could obtain this secondary data.

(1 mark)

(continued on the next page)

6. continued.

Look at the table for Question 6(c) in the Data Booklet.

It shows the total rainfall, in cm, for each month in 2019 in London.

The mean monthly rainfall in Aberdeen in 2019 is 6.2 cm

Connie considers the data in the table and concludes that the mean monthly rainfall for Aberdeen in 2019 is greater than the mean monthly rainfall in London in 2019

(c) Is Connie correct?

You must show how you get your answer.

(3 marks)

Answer space and lines continue on the next page.

Turn over

6. (c) continued.

(Total for Question 6 is 5 marks)

7. A theme park in Staffordshire has around **30 000** visitors per day.

Navine is a manager at the theme park.

Navine is investigating what visitors think about the theme park.

He is going to do a survey of visitors at the theme park.

Navine decides to question
30 people aged under **18** and
30 people aged **18** and over
as they leave the theme park one day.

He plans to ask them face to face what their favourite ride was.

(continued on the next page)

7. continued.

(a) Name this sampling method.

(1 mark)

(continued on the next page)

7. continued.

(b) Describe the population for this survey.

(1 mark)

(c) Assess Navine's plan to get the opinions of the people who have visited the theme park.

(3 marks)

(Total for Question 7 is 5 marks)

Turn over

8. A Science teacher wants to know the effects of revision on a student's performance in an exam. She decides to carry out an experimental test on a group of 15 students to find out the effects of any revision.

(a) Describe one way the teacher could carry out an experimental test.

(2 marks)

(continued on the next page)

8. continued.

(b) Give one reason why the results of this experimental test could be unreliable.

(1 mark)

(Total for Question 8 is 3 marks)

9. Look at the diagram for Question 9 in the Data Booklet.

It is a graph showing the crude birth rate and crude death rate for Malta from 2000 to 2014

Using the information from the graph in the Data Booklet Lottie concludes

“The total population of Malta has increased between 2000 and 2014”

- (a) Explain how the graph can be used to support Lottie’s conclusion.

(1 mark)

(continued on the next page)

9. continued.

(b) Give one reason why Lottie's conclusion might NOT be correct.

(1 mark)

In **2015**, the population of Malta was **445 053**

In the same year there were **4398** births in Malta.

(c) Using the formula below, work out the crude birth rate in Malta in **2015**

Give your answer correct to **1** decimal place.

$$\text{crude birth rate} = \frac{\text{number of births} \times 1000}{\text{total population}}$$

(2 marks)

Answer space continues on the next page.

9. (c) continued.

(Total for Question 9 is 4 marks)

Turn over

10. Sam used the internet to collect the times, in minutes, it took for 50 cyclists to compete in a hill climb competition.

He used a group frequency table to record the results he collected.

(a) (i) Give one advantage of using grouped data rather than raw data.

(1 mark)

(ii) Give one disadvantage of using grouped data rather than raw data.

(1 mark)

(continued on the next page)

Turn over

10. continued.

Sam used this grouped frequency table to show the results for the hill climb.

Time (t minutes)	Frequency
$11 \leq t < 12$	2
$12 \leq t < 13$	25
$13 \leq t < 14$	15
$14 \leq t < 15$	4
$15 \leq t < 16$	1
$16 \leq t < 17$	1
$17 \leq t < 18$	1

(continued on the next page)

Turn over

10. continued.

Before Sam collected the data he did not know what the longest time would be.

The longest time in the hill climb was **28·3** minutes.

(b) Explain why this table cannot be used to show the data for all **50** riders.

(1 mark)

(continued on the next page)

10. continued.

Look at the diagram for Question 10(c) and 10(d) in the Data Booklet.

It shows the frequency polygon that Sam drew for the hill climb results.

Sam decided not to include the value of 28.3 minutes on his frequency polygon.

(c) Suggest a reason why Sam's decision might be appropriate.

(1 mark)

(continued on the next page)

Turn over

10. continued.

(d) (i) Describe the skew of the distribution.

(1 mark)

(ii) Interpret the skew of the distribution in context.

(1 mark)

(Total for Question 10 is 6 marks)

11. Grace asked a sample of **60** people in her town if they had ever visited France or Spain.

17 people visited both France and Spain

23 people visited Spain only

33 people visited France

- (a) Draw a Venn diagram in the Data Booklet to represent this information.

There is blank space on pages 12 and 19 in the Data Booklet.

(5 marks)

(continued on the next page)

11. continued.

Grace says

- **more than half of the people in her sample have visited France**
- **therefore more than half of the people in her town have visited France**

(b) Discuss the validity of each of Grace's comments.

(3 marks)

(Total for Question 11 is 8 marks)

Turn over

12. Look at the diagram for Question 12 in the Data Booklet.

It is a box plot.

Logan is investigating the heights of male adult giraffes and the heights of female adult giraffes.

He records the height, in metres, of each of a sample of male adult giraffes and the height, in metres, of each of a sample of female adult giraffes.

He draws the box plot in the Data Booklet for the recorded heights of the male adult giraffes.

The table on the next page gives information about the recorded heights of the female adult giraffes.

(continued on the next page)

12. continued.

Summary statistic	Height (metres)
Mean	4·8
Median	4·9
Minimum	3·9
Maximum	5·9
Lower quartile	4·2
Upper quartile	5·4

Logan makes the following two conclusions.

1. Male adult giraffes are generally taller than female adult giraffes.
2. The heights of the female adult giraffes are more consistent than the heights of the male adult giraffes.

(continued on the next page)

Turn over

12. continued.

Assess Logan's two conclusions.

**You should show clearly the values of any statistics
you use in your answer.**

(5 marks)

Answer lines continue on the next page.

Turn over

12. continued.

(Total for Question 12 is 5 marks)

13. Look at the diagram for Question 13 in the Data Booklet.

It is a cumulative frequency step polygon showing information about the number of goals scored in each of 28 matches played by the German women's national football team.

(a) Give a reason why a cumulative frequency step polygon is used to represent this information rather than a cumulative frequency curve.

(1 mark)

(continued on the next page)

13. continued.

(b) Find the mode of the number of goals scored.

(1 mark)

(continued on the next page)

Turn over

13. continued.

(c) Find the number of these matches where

**(i) exactly 6 goals were scored,
(1 mark)**

**(ii) more than 6 goals were scored.
(2 marks)**

(continued on the next page)

Turn over

13. continued.

In 24 matches fewer than n goals were scored.

(d) Find the value of n
(1 mark)

(continued on the next page)

13. continued.

Klara tries to calculate the interquartile range of the number of goals scored.

She gets an answer of 14

(e) Explain how you know that her answer is incorrect.

(1 mark)

(Total for Question 13 is 7 marks)

14. Look at the diagram for Question 14 in the Data Booklet.

It is a choropleth map representing a park that has been divided into 25 squares of equal area.

Arthur has collected data about litter in the park.

The number of pieces of litter collected in each square on one Saturday morning is shown.

- (a) Use the information in the choropleth map to calculate an estimate of the total number of pieces of litter that were collected that day.**
(3 marks)

(continued on the next page)

Turn over

14. continued.

Arthur works in this park.

He has been asked to decide where a new bin should be placed in the park to help reduce the amount of litter.

He concludes that the new bin should be placed in the corner of the park represented by the bottom right of the choropleth map.

(b) Assess the validity of Arthur's conclusion with reference to the choropleth map.

(2 marks)

(continued on the next page)

Turn over

14. continued.

Ian suggests that the method Arthur used to collect his data is not suitable to reach a reliable conclusion.

(c) Assess whether Ian's suggestion is correct.

Give a reason for your answer.

(1 mark)

(Total for Question 14 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER

Sources

Question 7
(Source: www.statista.com)

Question 10
(Source: cyclinguphill.com)