

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

Total Marks

Statistics
PAPER 1
(Calculator)
Higher Tier

Wednesday 5 June 2024 – 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
Formulae Pages**

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.

Turn over

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.

Turn over

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Look at the table for Question 1 in the Data Booklet.

It gives the total labour force and the unemployment rate for the UK in 2017 and in 2018

In 2019 the total number of unemployed people was 1.29 million.

Unemployment rate

$$= \frac{\text{Number of unemployed people}}{\text{Total labour force}} \times 100$$

(continued on the next page)

Turn over

1. continued.

(a) (i) Using the formula on the previous page, work out the unemployment rate for the UK in 2019

Give your answer correct to 2 decimal places and write your answer in the table in the Data Booklet.

(2 marks)

(continued on the next page)

Turn over

1. (a) continued.

**(ii) Using your answer to
part (a)(i), what conclusion
can be drawn about the
unemployment rate in the UK
between 2017 and 2019?
(1 mark)**

(continued on the next page)

1. continued.

Bob says, without doing any calculations, that the total number of people unemployed decreased from 2017 to 2018

(b) Using the data in the table, assess Bob's claim.

(2 marks)

(Total for Question 1 is 5 marks)

Turn over

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

A fjord is a deep and narrow part of a sea with steep land on three sides.

Emily is investigating the length of fjords in Norway.

She collects some data from the internet and puts the data into a grouped frequency table.

The grouped frequency table in the Data Booklet shows information about the results she collected.

(continued on the next page)

Turn over

2. continued.

- (a) Work out the number of fjords
that have a length of at least
100 km
(2 marks)**

(continued on the next page)

Turn over

2. continued.

(b) (i) Calculate an estimate of the mean length of these fjords.

Give your answer to

1 decimal place.

(3 marks)

_____ **km**

(continued on the next page)

Turn over

2. (b) continued.

**(ii) Explain why your answer to
part (b)(i) is only an estimate.
(1 mark)**

(continued on the next page)

2. (b) continued.

**(iii) How could Emily have
improved the accuracy of her
answer to part (b)(i)?**

(1 mark)

(continued on the next page)

2. continued.

Emily plans to use a frequency polygon to represent the lengths of the fjords.

(c) Discuss whether or not a frequency polygon would be an appropriate diagram to use.

(2 marks)

(Total for Question 2 is 9 marks)

Turn over

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

They show two population pyramids. They give information about the percentage of the population who are male and who are female for each age group in France and in Italy in 2010

(continued on the next page)

3. continued.

Tommy is investigating how the populations of Italy and France differ in 2010

He uses the two population pyramids to reach the following two conclusions.

- The percentage of people aged 50–54 was lower in France than the percentage of people aged 50–54 in Italy.**
- The number of males aged 40–44 in France was greater than the number of males aged 40–44 in Italy.**

(continued on the next page)

Turn over

3. continued.

Assess Tommy's two conclusions.

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

(5 marks)

Answer space and lines continue on the next two pages.

Turn over

3. continued.

Turn over

3. continued.

(Total for Question 3 is 5 marks)

4. Look at the diagram for Question 4 in the Data Booklet.

It shows an incomplete histogram.

The time taken, in minutes, for some runners to complete a 5 km run was recorded.

The incomplete histogram in the Data Booklet and incomplete grouped frequency table on the following page give information about the times taken, in minutes, for these runners to complete the 5 km run.

(continued on the next page)

4. continued.

Time taken to run 5 km (t minutes)	Frequency
$15 < t \leq 20$	5
<hr/>	25
$25 < t \leq 30$	<hr/>
$30 < t \leq 35$	4
$35 < t \leq 40$	3

(continued on the next page)

4. continued.

(a) Use the information in the histogram to complete the table on the previous page.

There are two spaces to fill.

(2 marks)

(continued on the next page)

4. continued.

- (b) Estimate the number of runners that took less than or equal to 23 minutes to complete the race. (2 marks)**

(continued on the next page)

Turn over

4. continued.

(c) Identify and interpret the skew shown on the histogram in the Data Booklet.

(2 marks)

(Total for Question 4 is 6 marks)

Turn over

5. The management of a factory is considering changing the working hours of their employees.

Muhammad and Rose want to get the views of the employees in the factory.

Employees in the factory work on the production line or in the warehouse or in the office.

20 employees work on the production line.

15 employees work in the warehouse.

25 employees work in the office.

5. continued.

Muhammad plans to use a questionnaire.

He plans to take a sample of the employees and ask them the questions on his questionnaire.

For his sample, he decides to ask all of the employees who work on the production line.

(continued on the next page)

Turn over

5. continued.

**(a) (i) Name this sampling
technique.**

(1 mark)

(continued on the next page)

Turn over

5. (a) continued.

**(ii) Give two reasons why using
this sampling technique may
not be appropriate.**

(2 marks)

1 _____

2 _____

(continued on the next page)

Turn over

5. continued.

Muhammad wants to find out how many extra hours each employee would be willing to work each week.

(b) Design a closed question that Muhammad could use in his questionnaire.

(2 marks)

Answer space continues on the next page.

5. (b) continued.

(continued on the next page)

Turn over

5. continued.

Muhammad collects the completed questionnaires.

He finds that some of the employees on the production line have not responded.

(continued on the next page)

Turn over

5. continued.

(c) Suggest TWO ways in which Muhammad could have reduced the number of non-responses.

(2 marks)

(continued on the next page)

Turn over

5. continued.

Rose decides to take a 10% systematic sample of all the 60 employees in the factory.

(d) Describe in detail how this sample could be selected.

(3 marks)

Answer lines continue on the next page.

Turn over

5. (d) continued.

(continued on the next page)

5. continued.

Rose plans to use a face-to-face interview.

**(e) How would using a face-to-face interview rather than a questionnaire improve the quality of the responses?
(1 mark)**

(Total for Question 5 is 11 marks)

Turn over

6. Look at the diagram for Question 6 in the Data Booklet.

It is a time series graph giving information about the numbers, in thousands, of visitors to Canada from the UK for each quarter for the years 2017 to 2019

(continued on the next page)

6. continued.

A trend line has been drawn on the time series graph.

(a) Describe and interpret the trend shown by the graph.

(2 marks)

(continued on the next page)

Turn over

6. continued.

(b) Discuss any seasonal variation shown by the graph and interpret one in context.

Do NOT do any calculations.

(3 marks)

(continued on the next page)

Turn over

6. continued.

(c) (i) Work out the mean seasonal variation for Quarter 1

Give your answer correct to 1 decimal place.

(2 marks)

_____ thousand

(continued on the next page)

Turn over

6. (c) continued.

**(ii) Interpret your answer to
part (c)(i) in context.**

(1 mark)

(continued on the next page)

6. continued.

(d) (i) Use your answer to part (c)(i) and the time series graph to predict the number of visitors to Canada from the UK in Quarter 1 of 2020

You must show your working.

(2 marks)

Answer space continues on the next page.

Turn over

6. (d) (i) continued.

_____ thousand

(continued on the next page)

6. (d) continued.

**(ii) Discuss the reliability
of using your answer to
part (c)(i) to predict the
number of visitors to Canada
from the UK in Quarter 1 of
2025**

**Give a reason for your
answer.**

(2 marks)

(Total for Question 6 is 12 marks)

Turn over

7. Roberta is investigating how the ages of brides getting married in the UK has changed from 2003 to 2013. She collects official data from the internet using the website ‘Office for National Statistics’.

(a) Explain why this website will give reliable data.

(1 mark)

(continued on the next page)

Turn over

7. continued.

Roberta wrote the following hypothesis before she collected her data,

Has the age of brides increased between 2003 and 2013?

(b) Explain why it is not appropriate to use this as a hypothesis.

(1 mark)

(continued on the next page)

Turn over

7. continued.

Look at the table for Questions 7(c), 7(d) and 7(e) in the Data Booklet. It gives information about the data that Roberta collected.

Roberta wants to compare the proportion of brides in each age group and the total number of brides in each age group by presenting the results in charts for 2003 and 2013. She discusses how to present the results with Andria.

(continued on the next page)

Turn over

7. continued.

Andria thinks that they should use pie charts.

Roberta thinks that they should use comparative pie charts.

(c) What advice would you give to Andria and to Roberta on their choice of charts?

(3 marks)

Answer lines continue on the next page.

Turn over

7. (c) continued.

(continued on the next page)

7. continued.

Roberta used a circle with a radius of 4 cm for her comparative pie chart for 2003

(d) Calculate the radius of the circle for her comparative pie chart for 2013

Give your answer correct to 2 decimal places.

(2 marks)

Answer space continues on the next page.

7. (d) continued.

_____ cm

(continued on the next page)

Turn over

7. continued.

**Roberta is going to present
her comparative pie charts to
non-statisticians.**

**(e) What extra information could
she include on her pie charts to
help the non-statisticians make
comparisons?**

(1 mark)

(Total for Question 7 is 8 marks)

Turn over

8. Faiza owns a factory that makes footballs.

The production line is set up to make footballs with a diameter of 219 mm

As a quality control check, random samples are taken and the mean diameter of each sample is calculated.

The sample means should be normally distributed with a mean of 219 mm and a standard deviation of 0.05 mm

(continued on the next page)

Turn over

8. continued.

(a) Would the sample means or the population values be more consistent?

Give a reason for your answer.

(2 marks)

(continued on the next page)

Turn over

8. continued.

Look at the diagram for Questions 8(b) and 8(c) in the Data Booklet.

It is a control chart drawn by Faiza showing the first 5 samples.

Sample 6 and sample 7 have the sample means shown below.

	Sample 6	Sample 7
Sample mean (mm)	219.12	219.05

(b) Plot these two sample means on the quality control chart.

(2 marks)

(continued on the next page)

Turn over

8. continued.

(c) By completing the control chart, determine what actions, if any, Faiza should have taken based on the information given after each of these last two samples. You must justify your answer.

(5 marks)

Answer space and lines continue on the next two pages.

Turn over

8. (c) continued.

Turn over

8. (c) continued.

(continued on the next page)

8. continued.

(d) Faiza decides to complete more quality control checks and draw control charts for these.

From the four options on the following page, circle the two other measures that Faiza could measure and use in these control charts.

(1 mark)

(continued on the next page)

8. (d) continued.

range

mode

median

skew

(Total for Question 8 is 10 marks)

Turn over

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

It shows an incomplete tree diagram.

Peter drops his children off at a breakfast club every Monday morning and every Tuesday morning.

He either drops them off on time or late.

The probability that Peter drops his children off on time on a Monday morning is three times the probability that he drops them off late on a Monday morning.

(continued on the next page)

Turn over

9. continued.

The probability that Peter drops them off on time on a Monday morning AND on a Tuesday morning is 0.6

The probability that Peter drops them off late on a Tuesday morning given that he has dropped them off late on a Monday morning is 0.3

(a) Complete the tree diagram in the Data Booklet.

There are six spaces to fill.

(4 marks)

(continued on the next page)

Turn over

9. continued.

Peter drops his children off at the breakfast club every Monday morning and Tuesday morning over a 4-week period.

Assume that the probability of dropping them off on time on both a Monday morning and a Tuesday morning remains constant and that each week is independent.

(continued on the next page)

Turn over

9. continued.

(b) Work out the probability that, over a 4-week period, he drops his children off on time on a Monday morning and on time on a Tuesday morning on 3 or more occasions.

(4 marks)

Answer space continues on the next page.

Turn over

9. (b) continued.

(Total for Question 9 is 8 marks)

Turn over

- 10. Look at Table 1 and Table 2 for Question 10 in the Data Booklet.**
- During a sports day competition students take part in two races.**
- Each student runs a 100 metre race and a 400 metre race.**
- Table 1 shows the mean and the standard deviation of the times taken by the students in the 100 metre race and in the 400 metre race.**

(continued on the next page)

10. continued.

Dominic and Kai take part in the two races.

Table 2, which is incomplete, gives their times and standardised scores.

Dominic and Kai make the following conclusions.

- **Dominic concludes that he performed better in the 400 metre race compared to the 100 metre race.**
- **Kai concludes that he finished over one second slower than Dominic in the 400 metre race.**

(continued on the next page)

Turn over

10. continued.

**Complete Table 2 in the Data Booklet
and assess Dominic's and Kai's
conclusions.**

There are two spaces to fill.

**Give a reason for each of your
decisions.**

(6 marks)

**Answer space and lines continue on
the next page.**

Turn over

10. continued.

(Total for Question 10 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
