

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

Total Marks

Statistics
Paper 2
(Calculator)
Foundation Tier

Tuesday 18 June 2019 – Morning

Time: 1 hour 30 minutes plus your additional time allowance.

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 Book

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.

Turn over

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 table and at the diagram for Question 1 in the Data Book.

Jools surveyed **40** members of his youth club to ask each of them their favourite type of music.

Some information about his results is shown in the incomplete table.

The diagram below the table shows the results of his survey.

- (a) Write down the name of this type of diagram.
(1 mark)

(continued on the next page)

1. continued.

(b) Using the information in the diagram, complete the table.

There are two spaces to fill.

(2 marks)

(c) (i) Write down the mode of the favourite type of music.

(1 mark)

(ii) Explain why the mode is the appropriate average to use for Jools' results.

(1 mark)

(continued on the next page)

Turn over

1. continued.

(d) Explain whether or not the diagram shown is a good way to represent Jools' results.

(2 marks)

(continued on the next page)

1. continued.

Jools selected at random one of the **40** members surveyed.

- (e) Write down the probability that this member's favourite type of music is R&B.
(1 mark)

(Total for Question 1 is 8 marks)

2. The employees in an office were asked the following question.

“How generous do you feel is the amount of time allowed for your lunch break?”

This is NOT a good question.

- (a) Give TWO reasons why.
(2 marks)

(continued on the next page)

Turn over

2. continued.

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

The 20 employees in the office work in one of two teams.

One employee from Team A is selected at random and one employee from Team B is selected at random.

Nabir is in Team A and Jenny is in Team B

(b) (i) Write down the probability that Nabir is selected.

(1 mark)

(continued on the next page)

Turn over

2. (b) continued.

(ii) Write down the probability that Jenny is selected.

(1 mark)

(iii) Who is more likely to be selected, Nabir or Jenny?

Give a reason for your answer.

(1 mark)

(Total for Question 2 is 5 marks)

3. Look at the table for Question 3 in the Data Book.
It shows information about the sales of cars in
the UK for **10** of the top selling makes of car in
September **2016** and in September **2017**

- (a) Write down the market share (%) for Vauxhall
in September **2016**
(1 mark)

_____ %

- (b) Compare the Peugeot sales for
September **2017** with the Peugeot sales for
September **2016**
(1 mark)

(continued on the next page)

3. continued.

(c) Which make of car had the largest percentage increase in sales between September 2016 and September 2017?

(1 mark)

(d) How many of these 10 top selling makes of car had fewer sales in September 2017 than in September 2016?

(1 mark)

(Total for Question 3 is 4 marks)

Turn over

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

It shows a grid.

Jon found the following information about the average price of a cinema ticket in the UK.

Year	Average price (£)
2007	5·05
2008	5·20
2009	5·44
2010	5·95
2011	6·06
2012	
2013	6·53
2014	6·75
2015	7·25
2016	7·50

(Adapted from: UK Cinema Association)

(continued on the next page)

Turn over

4. continued.

He did not find the average price for 2012

Jon's first six average prices have been plotted on the grid.

(a) Plot the average price for each of 2014, 2015 and 2016

(2 marks)

(b) (i) On the grid, draw a trend line for Jon's data.

(1 mark)

(ii) Describe the trend in the average price of cinema tickets in the UK from

2007 to 2016

(1 mark)

(continued on the next page)

Turn over

4. continued.

Jon uses statistical software to plot a trend line and find its gradient.

The gradient is 0.27

(c) Interpret this gradient.

(1 mark)

(continued on the next page)

4. continued.

Zoe says that the scale used on the Average price axis could make the graph misleading.

(d) Explain whether or not Zoe is correct.

(2 marks)

(continued on the next page)

4. continued.

Barry wants to use a trend line for Jon's data in order to find an estimate of the average price of a cinema ticket in **2012** and in **2020**

(e) Explain whether each of these is a sensible thing to do.

Do NOT work out these estimates.

(3 marks)

(Total for Question 4 is 10 marks)

5. Look at the table for Question 5(a) in the Data Book.
A supermarket manager recorded the total number of each type of bank note in the tills when the supermarket closed one Saturday.
His results are shown in the table.

One of the bank notes is selected at random.

- (a) Find the probability that the value of the bank note is less than £20
(2 marks)

(continued on the next page)

5. continued.

**Look at the table for Question 5(b) in the Data Book.
The manager uses his data to predict the proportion
of each type of bank note in use in the UK.**

**(b) Explain how the manager could improve his
predictions.**

(1 mark)

(continued on the next page)

5. continued.

**Look at the table for Question 5(c) in the Data Book.
It shows the true proportion of each type of bank
note in use in the UK in 2017**

**(c) For £5 bank notes, compare the true proportion
in use in the UK in 2017 with the manager's
predicted proportion.**

**You must suggest a possible reason for any
difference.**

(2 marks)

(Total for Question 5 is 5 marks)

Turn over

6. Look at the table for Question 6 in the Data Book.
It shows information about the time taken, in minutes, by each of the Wimbledon men's singles final matches for the 30 years from 1985

- (a) Explain why the class interval which contains the median time taken is $160 \leq t < 200$
(1 mark)

(continued on the next page)

6. continued.

(b) Use linear interpolation to work out an estimate
for the median time taken.

(2 marks)

_____ minutes

(continued on the next page)

6. continued.

For the **30** years before **1985**, the median time taken by the Wimbledon men's singles tennis final matches was **110** minutes.

(c) Compare the median time taken in the **30** years before **1985** with the median time taken in the **30** years from **1985**

Interpret your comparison.

(2 marks)

(continued on the next page)

Turn over

6. continued.

Sue thinks it would be better to use the **mean** for the average of the time taken by these matches.

(d) Suggest a reason why Sue is NOT correct.

(1 mark)

(Total for Question 6 is 6 marks)

- 7. Look at the table for Question 7 in the Data Book. Paula organised a fund raising charity run at her school.**

The table shows part of the spreadsheet that she used to record information about each student who took part.

- (a) Circle the variable from the list of four below that has qualitative data.
(1 mark)**

School Year	Age	Gender	Amount raised
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(continued on the next page)

7. continued.

(b) Give TWO reasons why the data in the spreadsheet needs to be cleaned before it can be processed.

(2 marks)

(continued on the next page)

7. continued.

(c) Explain whether or not using a spreadsheet to process the information is appropriate.

(1 mark)

A total of **£252** was raised by the **24** students in Year **9** who took part in the run.

(d) Show that the mean amount raised by these Year **9** students is **£10.50**

(1 mark)

(continued on the next page)

Turn over

7. continued.

Paula wants to display information about the amount raised by each year group.

She plans to use a poster to be seen by visitors to the school.

(e) Circle the type of diagram from the list of four below that would be best to use for this target audience.

(1 mark)

Box plot

Cumulative frequency chart

Pie chart

Scatter diagram

(Total for Question 7 is 6 marks)

8. Look at the information for Question 8 in the Data Book.

Mayokun measured and recorded the height, to the nearest **cm**, of each of the first **20** female students and of each of the first **20** male students to arrive at his college one morning.

He used statistical software to produce the diagrams and the summary statistics in the Data Book to help him compare the distributions.

Mayokun chose to use stem and leaf diagrams rather than histograms.

- (a) Give one advantage of using stem and leaf diagrams rather than histograms for Mayokun's data.

(1 mark)

(continued on the next page)

Turn over

8. continued.

Before collecting his data, Mayokun wrote down two hypotheses.

1. Males are taller than females.
2. The heights of males vary more than the heights of females.

(b) Using appropriate results from Mayokun's survey, discuss any conclusions that he might have made about his hypotheses.

You should comment on the reliability of the conclusions.

(6 marks)

Answer lines continue on the next two pages.

8. (b) continued.

[illegible]

Turn over

8. (b) continued.

(Total for Question 8 is 7 marks)

9. Look at the table for Question 9 in the Data Book.
Katrina travels to work by train or by bus or by car.

The table gives some information about her
200 journeys to work last year.

One of the days that Katrina travelled to work last
year is picked at random.

- (a) Find the probability that she travelled by train
and was late for work on that day.
(1 mark)

(continued on the next page)

9. continued.

The absolute risk of Katrina arriving late for work last year when travelling by bus was 0.6

(b) Show why the value of X in the table is 18
(1 mark)

(continued on the next page)

9. continued.

- (c) (i) Show that the relative risk of Katrina being late for work last year when she travelled by car compared with when she travelled by bus is 0.5
(2 marks)

- (ii) Interpret this relative risk.
(1 mark)

(Total for Question 9 is 5 marks)

Turn over

10. At a university, **70%** of students are undergraduates and **30%** of students are postgraduates.

Amy and Robert want to do a survey.

Amy decides to use simple random sampling to collect a sample of **100** students.

She uses the university database as a sample frame and she numbers each student on the database. She then generates exactly **100** random numbers and uses these random numbers to select her sample.

(continued on the next page)

10. continued.

(a) Give TWO reasons why Amy's method may NOT produce a sample of 100 students.

(2 marks)

(continued on the next page)

10. continued.

Robert decides to use quota sampling to collect a sample of 100 students.

He plans to stand outside the main building until he has interviewed 70 undergraduates and 30 postgraduates.

**(b) Give TWO advantages of using quota sampling.
(2 marks)**

(continued on the next page)

10. continued.

(c) Explain why this quota sample is NOT a random sample.

(1 mark)

(Total for Question 10 is 5 marks)

11. Look at the diagram for Question 11 in the Data Book.

The population pyramid shows information about the numbers (in thousands) of drivers of each gender who made car insurance claims in the UK in 2015

- (a) How many female drivers aged 50–59 in the UK in 2015 made car insurance claims?**
(1 mark)

_____ thousand

(continued on the next page)

11. continued.

The population pyramid shows that the age group which has the fewest number of drivers who made car insurance claims is the 17–19 age group.

**(b) Suggest a reason why this should be so.
(1 mark)**

(continued on the next page)

Turn over

11. continued.

In 2014, the number of male drivers aged 20–49 in the UK who made car insurance claims was 66 700

(c) Compare the number of male drivers aged 20–49 in the UK who made car insurance claims in 2014 with the number of male drivers aged 20–49 in the UK who made car insurance claims in 2015

You must show your working.

(3 marks)

(continued on the next page)

Turn over

11. continued.

The SafeDrive insurance company charges young male drivers more for car insurance than it charges all other drivers.

(d) Explain TWO features of the population pyramid which SafeDrive might use as its justification for doing this.

(2 marks)

(continued on the next page)

11. continued.

Jeremy says,

“The population pyramid shows that the total number of male drivers in the UK in **2015** is greater than the total number of female drivers in the UK in **2015**”

(e) Explain whether or not Jeremy’s conclusion is appropriate.

(1 mark)

(continued on the next page)

11. continued.

Vicki says,

“In the UK in 2019, there will be more male drivers who make car insurance claims than female drivers who make car insurance claims”

(f) Explain whether or not the information in the population pyramid can be used to support Vicki’s statement.

(1 mark)

(Total for Question 11 is 9 marks)

12. Look at the diagram and at the table for Question 12 in the Data Book.

The frequency polygon shows information about the times taken by 48 athletes to run 400 metres at the 2017 World Championships.

- (a) Use the information in the frequency polygon to complete the table by writing in the missing times.**

(1 mark)

None of the athletes ran 400 metres in exactly 53 seconds.

- (b) Find the number of athletes who ran 400 metres in less than 53 seconds.**

(2 marks)

(continued on the next page)

Turn over

12. continued.

(c) Calculate an estimate for the mean time of the
48 athletes.

(3 marks)

_____ seconds

(Total for Question 12 is 6 marks)

Turn over

13. Look at the tables for Question 13 in the Data Book.

A food critic was asked to compare six mince pies (labelled A to F) and to rank them in order of quality.

Jacques wants to see if the price of a mince pie depends on its quality.

The tables show information about these six mince pies.

Jacques calculates Spearman's rank correlation coefficient for the quality ranks and the price ranks.

(a) Explain whether or not this is a sensible statistic for Jacques to calculate.

(2 marks)

(continued on the next page)

Turn over

13. continued.

The value of Spearman's rank correlation coefficient calculated by Jacques is **0.77**

(b) Based on this value, write down a conclusion that Jacques could reach.

You must justify your answer.

(2 marks)

(Total for Question 13 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
