

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

Total Marks

# **Statistics**

## **Paper 1**

### **Higher Tier** **(Calculator)**

**Thursday 11 June 2020 – Afternoon**

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

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

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

**Y62711A**

**YOU MUST HAVE**

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

**YOU WILL BE GIVEN**

**Data Book**

**Formulae Pages**

**Turn over**

# **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.**

**You must NOT write anything on the Formulae Pages. Anything you write on the Formulae Pages will gain NO credit.**

**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.**

## **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.**

**5**

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**Turn over**

- 1. Look at the information for Question 1 in the Data Book.**

**A presenter wants to get feedback on a lecture that she gave.**

**There were 467 students at the lecture.**

**The presenter plans to give a questionnaire to a sample of 50 of these students.**

**One of the questions on the questionnaire is shown in the Data Book.**

**(continued on the next page)**

**Turn over**

**1. continued.**

**(a) Circle the word from the list that best describes the type of data that this question collects.**

**(1 mark)**

**ORDINAL**

**BIVARIATE**

**CONTINUOUS**

**GROUPED**

**(continued on the next page)**

**Turn over**

**1. continued.**

**(b) Describe how the presenter can use a list of random numbers to select a simple random sample of 50 students.**

**(3 marks)**

---

---

---

---

---

---

---

---

---

---

**(Total for Question 1 is 4 marks)**

**Turn over**



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

**It gives information about the percentage change in the number of police officers in each of the 42 different police force regions of England and Wales between 2014 and 2015**

- (a) Write down the percentage change in the number of police officers in region 17**  
**(1 mark)**
- 

**(continued on the next page)**

**Turn over**

**2. continued.**

**(b) In how many of the 42 regions  
did the number of police officers  
increase?**

**(1 mark)**

---

**(continued on the next page)**

**Turn over**

**2. continued.**

**Sadiq thinks that the table shows that there was a decrease in the overall number of police officers in England and Wales between 2014 and 2015**

**(c) Explain why Sadiq may NOT be correct.**

**(1 mark)**

---

---

---

---

---

**(continued on the next page)**

**Turn over**

**2. continued.**

**(d) What is the statistical name for the type of map that could be used to show the information in the table?**

**(1 mark)**

---

**(Total for Question 2 is 4 marks)**

---

**Turn over**

- 3. Look at the diagram for Question 3 in the Data Book.**

**It shows a composite bar chart which shows information about the number of new car registrations for the first quarter of 2018 in the UK and in Italy for each fuel type.**

**In total, there were more new car registrations in the UK than in Italy.**

**(continued on the next page)**

**3. continued.**

**(a) Work out an estimate for how many more.**

**(2 marks)**

---

**thousand**

**(continued on the next page)**

**Turn over**

**3. continued.**

**(b) Explain why the answer to  
part (a) is an estimate.**

**(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**

**3. continued.**

**(c) For each fuel type, compare the number of new car registrations in the UK with the number of new car registrations in Italy.**

**(2 marks)**

---

---

---

---

---

---

**(continued on the next page)**

**Turn over**



**3. continued.**

**Look at the table for Question 3(d) in the Data Book.**

**It shows the number of alternative fuel new car registrations in the UK for the first quarter of each year from 2015 to 2017**

**Michael says that the information in the table shows that the total number of alternative fuel new car registrations in the UK for 2015 to 2017 increased each year.**

**(continued on the next page)**

**Turn over**

**3. continued.**

**(d) Explain why Michael's conclusion  
may NOT be valid.**

**(1 mark)**

---

---

---

**(Total for Question 3 is 6 marks)**

---

**Turn over**

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

It shows an incomplete probability tree diagram.

It was reported that 3% of the old style £1 coins are fake.

All the other old style £1 coins are genuine.

Shreya has two old style £1 coins.

She does not know if each coin is genuine or fake.

(continued on the next page)

Turn over

**4. continued.**

**(a) Complete the probability tree diagram in the Data Book.**

**There are five spaces to fill.**

**(2 marks)**

**(b) Show that the probability that both of Shreya's coins are genuine is  $0.9409$**

**(1 mark)**

**(continued on the next page)**

**Turn over**

**4. continued.**

**Shreya claims that the probability that exactly one of her two coins is fake is less than 6%**

**(c) Determine whether or not Shreya is correct.  
(3 marks)**

**(Total for Question 4 is 6 marks)**

---

**Turn over**

- 5. Look at the table for Question 5 in the Data Book.**

**It shows information from a survey about train passengers' satisfaction with seven categories of train facilities in spring 2018**

**(continued on the next page)**

**5. continued.**

**(a) In which of the seven categories  
was**

**(i) the ‘% satisfied or good’ the  
least?**

**(1 mark)**

---

---

**(ii) the ‘% dissatisfied or poor’  
the greatest?**

**(1 mark)**

---

---

**(continued on the next page)**

**Turn over**

**5. continued.**

**(b) How many people said 'satisfied or good' for punctuality?  
(2 marks)**

---

**(continued on the next page)**

**Turn over**



**5. continued.**

**Michelle claims that the percentages for 'Cleanliness of the inside' are the most reliable for these seven categories.**

**(c) Using the information in the table, suggest why she might think this.**

**(1 mark)**

---

---

**(Total for Question 5 is 5 marks)**

---

**Turn over**

- 6. Look at the diagram for Question 6 in the Data Book.**

**It shows a cumulative frequency graph with information about the maximum daily temperature, in  $^{\circ}\text{C}$ , in Bingley for the 30 days of June 2018**

**(continued on the next page)**

**6. continued.**

- (a) (i) Find the 90th percentile.  
(1 mark)**

\_\_\_\_\_ °C

- (ii) Interpret your 90th  
percentile in context.  
(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**

**6. continued.**

**For Bingley in June 2018, the lowest maximum daily temperature was  $13^{\circ}\text{C}$  and the greatest maximum daily temperature was  $28^{\circ}\text{C}$**

**(b) Show that the greatest maximum daily temperature in June is not an outlier.**

**(4 marks)**

**Answer space continues on the next page.**

**Turn over**

**6. (b) continued.**

**(continued on the next page)**

**Turn over**

**6. continued.**

**Look at the diagram for Question 6(c) in the Data Book.**

**The box plot shows information about the maximum daily temperature, in  $^{\circ}\text{C}$ , in Aultbea for each day of June 2018**

**(c) On the grid, draw a box plot for the maximum daily temperatures in June 2018 for Bingley.  
(2 marks)**

**(continued on the next page)**

**Turn over**

**6. continued.**

**(d) Compare the distributions of maximum daily temperatures in June 2018 for Aultbea and for Bingley.**

**(3 marks)**

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

---

---

---

---

---

---

**Turn over**

**6. (d) continued.**

---

---

---

**(Total for Question 6 is 11 marks)**

---

**Turn over**



7. Reeta read a report that said that these days more 18 to 24 year olds find out what is happening in the news from social media than find out by watching TV.

She decided to investigate how the 12 000 students at her university find out what is happening in the news.

(continued on the next page)

**7. continued.**

**Reeta wrote the following as a hypothesis:**

**Do more students get their news from social media than from other sources?**

**(a) Comment on whether it is appropriate to use this as a hypothesis.**

**(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**

**7. continued.**

**Reeta planned to use a sample of the students at her university stratified by gender and by age.**

**(b) Explain why this method of sampling would be appropriate.  
(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**

**7. continued.**

**Look at the table for Question 7(c) in the Data Book.**

**It shows a data collection sheet.**

**Reeta found that she could not get a list of all the students at her university to use for her stratified sample.**

**Instead she decided she would question students in the university cafeteria.**

**The data collection sheet Reeta plans to use is shown in the Data Book.**

**(continued on the next page)**

**Turn over**

**7. continued.**

**(c) Discuss whether Reeta's data collection sheet is appropriate for her to use.**

**You should consider how Reeta might use the responses and describe any problems she may have when she uses the data collection sheet.**

**(3 marks)**

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

---

---

**Turn over**

7. (c) continued.

---

---

---

---

---

---

---

---

---

---

(continued on the next page)

Turn over

**7. continued.**

**Reeta's friend George is at a different university with 18 000 students.**

**George carried out a similar investigation at his university so that he and Reeta could compare their results.**

**They each questioned the same percentage of students at the university they each attend.**

**They decided to compare their results by using comparative pie charts.**

**(continued on the next page)**

**Turn over**

**7. continued.**

**(d) Explain why comparative  
pie charts would be appropriate.  
(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**



**7. continued.**

**Reeta used a circle with diameter  
10 cm for her pie chart.**

- (e) Calculate the diameter of the  
circle that George used for his  
pie chart.  
(2 marks)**

\_\_\_\_\_ **cm**

**(continued on the next page)**

**Turn over**

**7. continued.**

**(f) Discuss TWO things that Reeta and George should have considered in planning their investigations to help improve the reliability and validity of their comparisons.**

**(2 marks)**

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

---

---

---

---

---

**Turn over**

**7. (f) continued.**

---

---

---

---

**(Total for Question 7 is 10 marks)**

---

**Turn over**

- 8. Look at the table for Question 8 in the Data Book.**

**It shows information about the performance of students in a Maths examination and in a Statistics examination.**

**Freya scored 62 marks in her Statistics examination.**

**(continued on the next page)**

**8. continued.**

- (a) Show that Freya's standardised score for Statistics is  $0.5$**   
**(1 mark)**

**(continued on the next page)**

**Turn over**

**8. continued.**

**Freya's Maths examination mark was 59 giving her a standardised score for Maths of 0.7**

**She thinks she did better in the Statistics examination than in the Maths examination.**

**(continued on the next page)**

**Turn over**

**8. continued.**

**(b) Explain whether or not Freya is correct.**

**(2 marks)**

---

---

---

---

---

**(continued on the next page)**

**Turn over**

**8. continued.**

**Freya also took a French examination.**

**She says that her mark in this examination is below average.**

**(c) Explain how Freya's standardised score for French can be used to confirm this.**

**(1 mark)**

---

---

**(Total for Question 8 is 4 marks)**

---

**Turn over**



9. **Tamiki wants to estimate the number of pigeons in a park.**

**He catches a sample of 48 pigeons in the park, tags each pigeon and then releases it.**

**A week later, Tamiki catches a sample of 20 pigeons in the park.**

**He uses the Petersen capture recapture formula to estimate that there are 240 pigeons in the park.**

**(continued on the next page)**

**9. continued.**

**(a) Work out how many of the  
20 pigeons in Tamiki's sample  
had tags.**

**(2 marks)**

**Answer space continues on the  
next page.**

**Turn over**

9. (a) continued.

---

(continued on the next page)

Turn over

9. continued.

(b) Comment on the reliability of Tamiki's estimate by considering the assumptions that he needed to make in order to use the Petersen capture recapture formula.

(3 marks)

Answer lines continue on the next page.

---

---

---

---

---

Turn over

9. (b) continued.

---

---

---

---

---

---

---

**(Total for Question 9 is 5 marks)**

---

**Turn over**

**10. Look at the table for Question 10(a) in the Data Book.**

**It gives the price index number for the average rail fare in Great Britain for each of six years, with 2012 as base year.**

**The table also gives some of the chain base index numbers for the same information.**

**(continued on the next page)**

**10. continued.**

**(a) Find, correct to 2 decimal places,  
the chain base index number for  
2017**

**(2 marks)**

---

**(continued on the next page)**

**Turn over**

**10. continued.**

**Look at the information for  
Question 10(b) in the Data Book.**

**It shows Chris's working.**

**He wanted to know the percentage  
increase in the cost of the average  
rail fare in Great Britain between  
2016 and 2017**

**(b) Explain whether or not Chris is  
correct.**

**(2 marks)**

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

---

---

**Turn over**



10. (b) continued.

---

---

---

---

(continued on the next page)

Turn over

**10. continued.**

**The geometric mean of the chain base index numbers for 2013 to 2017 is 102.18**

**(c) Interpret this geometric mean in the context of the average rail fare in Great Britain.**

**(2 marks)**

---

---

---

---

---

---

---

**(Total for Question 10 is 6 marks)**

**Turn over**

**11. Look at Diagram 1 for Question 11 in the Data Book.**

**The time series graph and the trend line show information about the number, in thousands, of visitors per quarter to a museum for the years 2015, 2016 and 2017**

**(a) Describe the trend in visitor numbers to the museum over these three years.**

**(1 mark)**

---

---

**(continued on the next page)**

**Turn over**

**11. continued.**

**(b) For which quarter each year does the museum have the fewest visitors?**

**(1 mark)**

---

**(continued on the next page)**

**Turn over**

**11. continued.**

**Look at Diagram 2 for Question 11 in the Data Book.**

**It shows the trend line from Diagram 1**

**David has drawn a right-angled triangle on the graph from 2015 Quarter 1 to 2016 Quarter 4 so that he can calculate the gradient of the trend line, correct to one decimal place.**

**(continued on the next page)**

**Turn over**

11. continued.

Here is his calculation.

$$\frac{200 - 190}{7 \text{ quarters}} = \frac{10}{7} = 1.4$$

(c) Interpret, in context, the gradient  
of 1.4

(1 mark)

---

---

---

---

---

(continued on the next page)

Turn over

**11. continued.**

**David used the trend line and mean seasonal variation (or average seasonal effect) to predict the number of visitors to the museum for Quarter 2 of 2018**

**(d) Comment on the validity of a prediction found in this way.  
(1 mark)**

---

---

---

**(continued on the next page)**

**Turn over**

**11. continued.**

**The actual number of visitors to the museum in Quarter 2 of 2018 was 203 100**

**(e) Determine how close David's prediction was to 203 100  
(5 marks)**

**Answer space continues on the next page.**

**Turn over**



**11. (e) continued.**

**(Total for Question 11 is 9 marks)**

---

**Turn over**

**12. Look at the table for Question 12 in the Data Book.**

**In a town music competition,  
6 groups competed against each other.**

**The table in the Data Book shows the marks awarded to each group by the invited independent judge.**

**It also shows what the Mayor thought the rank order of the groups should be.**

**(Best group is given rank 1)**

**(continued on the next page)**

**Turn over**

**12. continued.**

**Using suitable calculations,  
investigate how much agreement  
there is between the judge and the  
Mayor.**

**There are three blank columns in the  
table for your working.**

**(5 marks)**

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

**Turn over**

**12. continued.**

---

---

---

**(Total for Question 12 is 5 marks)**

---

**Turn over**

**13. Fruitees sweets come in different flavours.**

**There are 8 sweets in a pack of mixed flavours and the flavours for each pack are chosen at random.**

**The mean number of strawberry flavour Fruitees in a pack of 8 sweets is 2**

**Ed suggests that the number of strawberry flavour Fruitees in a pack of 8 sweets can be modelled by a binomial distribution.**

**(continued on the next page)**

**Turn over**

**13. continued.**

- (a) By considering the conditions that make a binomial distribution a suitable model, explain why Ed's suggestion is appropriate.  
(2 marks)**

---

---

---

---

---

---

---

---

**(continued on the next page)**

**Turn over**

**13. continued.**

**One sweet is selected at random from a pack of Fruitees.**

- (b) Find the probability that the flavour of this sweet is strawberry.**
- (1 mark)**

---

**(continued on the next page)**

**Turn over**

**13. continued.**

**Ed buys a pack of Fruitees.**

**(c) Find the probability that there will be exactly 3 strawberry flavour Fruitees in the pack.**

**(2 marks)**

**Answer space continues on the next page.**

**Turn over**



13. (c) continued.

---

(Total for Question 13 is 5 marks)

---

**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

---