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Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2022

Pearson Edexcel GCSE
In Statistics (1ST0)
Foundation Paper 1F

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GCSE (9 – 1) Statistics – 1ST0

Principal Examiner Feedback – Foundation Paper 1

Introduction

General comments

The questions in which most students excelled were once again those which required routine calculations to be performed, graphs or charts completed, or information extracted from them. It was however noted that questions asking students to explain, assess or interpret have improved slightly from previous entries.

It is worth mentioning here that centres must impress on their students the importance of legible handwriting as a few responses were very difficult indeed to read; we cannot award marks when the handwriting is completely illegible. If a student is unable to write legibly then the use of an amanuensis is advisable to ensure that appropriate credit is given.

Question 1

Part (a) of the paper was answered very well overall, but some responses were drawn untidily. Students need to draw pictogram shapes carefully to the same scale as given in the question.

Part (b) was answered very well with most students scoring both marks. Some students misread the question and compared October with September.

Part (c) was completed poorly, because many students failed to reference the key in their answers and many failed to score the mark for this question. It was obvious that some clearly did not understand the command word explain and did not register that they were told that the key **may not** have been appropriate. It was necessary to use the information that two boxes represent 10 cars in the answer to score the mark.

Question 2

Part (a) was completed poorly, students frequently wrote 'number' for the 'side' quite often or used 'even chance' in their explanation which we did not accept. It was also clear that students did not understand the word 'fair'.

Part (b) and part (c) were both very well answered.

Part (d) was done reasonably well; most students were able to identify the 2 and/or the 5 in their explanation. Students who chose to say that the dice was fair were less able to explain their reasons for that, and students who went down this route were less likely to achieve the two marks.

Question 3

Part (a) of the question was answered very well with most students writing their estimates within the boundaries we were accepting.

Part (b) was also well attempted, but some students just assumed that the year 2019 was on the bold line in the graph without checking carefully that each year was represented by four small squares and thus placed their cross in the incorrect place horizontally and occasionally even in the vertical plane.

Part (c) was answered very well.

In part (d) most students were able to read values from the graph. The majority of these were able to calculate the difference, with only a small number losing marks due to accuracy outside the allowed values. The most common dropped mark was from not then comparing these increases.

Question 4

Part (a) of this question was one of the best answered questions in the paper. Most students indicated in some way that Alexa did not collect the data herself with many noting that the data was from the internet.

In part (b), students frequently gave one answer only or did not say that the data may not be in the form required. This question was answered not as well as part (a), but many responses given were correct. Some students gave two advantages or two disadvantages and some made the mistake of giving advantages and disadvantages of primary data.

Most students scored only one out of the two available marks here.

Question 5

Part (a) was generally well answered. students were able to articulate why there was no mode by referring to the data. Those who did not score the mark usually confused their measure of central tendency with another type of average and where they did this, they usually calculated this statistic to show it could be found from the data.

Most students were able to successfully find the median in part (b), but a small number calculated the mean instead. The most common error was to leave out one item of the data values. It is important when entering values, to perform a simple check to count the number of data in the resulting set to check that neither one is missed out nor duplicated.

Part (c) was answered well, although 15 – 35 was occasionally seen.

Many students were not awarded a mark in part (d) because they didn't state yes, which we required because we asked students for a decision. Only a few students were unable to identify that changing the tyres was more consistent. Not many were able to use the range to make a clear comparison. Bearing in mind that the ranges for changing a tyre and changing the oil were both given in the question, it was surprising to see that some students used the median to make the comparison or got confused about what the range showed and gave answers like 'changing a tyre takes longer'.

Question 6

Most students were able to complete the scale and label the key correctly in parts (a), (b) and (c). Those students who did not score both marks drawing the bar chart tended to lose it because they had the correct height but had the two categories the incorrect way around. Some forgot to shade the office block and left it blank. Some students did not use a ruler, although we always gave credit where the intention was clear.

Virtually every student answered part (d) correctly.

The overwhelming majority of students failed to score the available marks in this part (e) because although most identified the denominator correctly as 125 very few were even able to find the correct numerator, although we accepted a value greater than zero, but less than 35 for one mark. The most popular response was $\frac{35}{125}$ which could score no marks.

Question 7

This is an extended response question [ERQ, of which there are at least three in total across the Foundation papers] and was worth a total of 6 marks. It is clear that students generally do not understand how to answer this type of question and submitted very muddled and ill thought-out answers. There were also very many blank responses with no attempt whatsoever.

The question asked for a method of data collection, a choice of sampling method and a diagram to represent the data. Students were also asked to explain why each was appropriate/explain a feature of the method.

The best way of writing a response to an ERQ is to be as concise as possible using bullet points, and preferably in the order in which the question is asked.

So for example a model answer such as:

- Data collection **(B1)** – a questionnaire because it is easy to send one out to a large number of children. **(B1)**
- Mrs Singh could take a simple random sample **(B1)** – because each child has an equal chance of being selected **(B1)**
- Mrs Singh can draw a Pie Chart **(B1)** – because a Pie Chart shows proportions of the ways children use the internet **(B1)**

This type of response would have scored full marks. Many students struggled to distinguish between types of data and data collection however.

Often there were erroneous mentions of primary and or secondary data. Many were able to offer a simple data collection type like questionnaire but often struggled to suggest a reason why their choice was appropriate.

Students were able to articulate a type of sampling method [although quite a few suggested a census despite being told that a sampling method was required] but often did not name it thereby not scoring a mark. Many students who remembered the name of a type of sampling method often gave an incorrect reason as to its appropriateness.

Students were more successful in the last part of the question where they were able to confidently tell the examiner a suitable diagram and a reason why it is an appropriate method.

Question 8

The most common responses that earned a mark were for criticising the small sample size and the fact that only one location was sampled. Only a small number wrote about the time of day and even fewer mentioned that the process was not random. Some students gave the same reason twice but reworded it slightly.

Question 9

Part (a) (i) and (ii) of this question was not answered well at all with many answers being too vague. Even those that earned one mark did not fully convince of their understanding of grouped frequency. One mark was often given for the data is easier to read. Some students gave one correct answer with a second incorrect reason or a reason that contradicted the first with the second statement.

Successful students wrote down two brief reasons in bullet point form. Extended responses to this question tended to waffle and rarely scored marks.

Most students could see that Dylan's claim was appropriate in part (b). More gained marks for referencing the class width, as opposed to the 'empty' classes, though some of these used unfamiliar terms to describe the class width. Many students earned one mark for one reason only (and agreeing with Dylan). Those who disagreed with Dylan failed to make the link between the tables and did not use (or did not read) the information given at the start of the question about the youngest and oldest people.

In part (c) it was surprising to observe that quite a few students did not know how to apply this standard method of finding an estimated mean, and many did not attempt the question at all.

Many students did not multiply the frequency by the midpoint and therefore did not score any marks. Where students did complete the first step correctly they usually went on to score full marks. However, a significant minority of students divided $\sum fa$ by 5 and not by the given 150 [the total number of people].

Question 10

Parts (a) and (b) were generally answered well with most students able to write the correct answer down confidently.

Incorrect answers abounded in part (c). Whereas most students identified the correct denominator of 120, very few achieved the correct numerator. This was partially because many did not show any working at all relying on entering some numbers into their calculators and obviously mis-entering values. Centres must stress to their students that an allocation of 2 marks in a calculation question involves showing working. In this case $\frac{39+1+6+4+2+20}{120}$ would have scored the method mark even if the final correct answer of $\frac{72}{120}$ was incorrect or not seen.

It was surprising to see so much poor spelling in parts (c) (i) and (ii) given that the words were written out in full in a row above the question. This was particularly important as the words qualitative and quantitative were sometimes confused. It was rare to see a correct response to part (ii).

Part (d) was usually missed out completely and it was very rare to see a correct response. Once again, it was even rare to see a response with any working.

Question 11

Part (i) was generally answered well with most students understanding the essence of the question. Few however, gave negative correlation as their answer, but gave the reason in context which we accepted for the mark. Where students did not score, they generally made assumptions about dogs and not used the graph as instructed.

Part (ii) was not as successfully answered. Again, many students related their answers to the theme of the question (breeds of dogs) rather than the statistics.

It was clear in this question that some students did not understand the command 'assess the validity' and 'assess the reliability'. Both of these are in the specification and students are required to assess data for both.

The Statistics GCSE papers will test application of Statistics in unfamiliar contexts, and so students must use the available data/summary statistics in the question to answer questions. In this case some students who are clearly dog lovers relied on that knowledge/experience rather than on the statistical information given in the question.

Question 12

Quite a few students did not write anything. Of those who attempted the question, some compared the range or the maximum values and scored no marks. Many students gave two correct averages but with no conclusion and so scored only two out of the three available marks. It was, however, pleasing to see some very good responses with the median being the most common average used followed by the mode and then the mean. Many students did not state the average that they used, but provided their values were correct, we allowed use of the word 'average'. In a comparison question, a conclusion is required, but some students did not score the final mark by not stating that seedlings grown in the sunlight are on average taller than seedlings grown in the shade.

Question 13

Parts (a) and (b) were answered very well with few erroneous responses seen.

In part (c) quite a few students did not give any mathematical reasoning, and just gave a worded answer which scored no marks. The question clearly states 'You must show your working', and this question was answered poorly. Most answers try to link to rounding but without appropriate justification this could score no marks. Only a very small minority of students managed to score all three marks. Some scored two marks for a correct calculation but with no reference to rounding. Many commented that the value would round to 0 but with no calculation. Some students completed a correct calculation of $\frac{13310}{65511097}$ but did not multiply by 100 before explaining that it rounds to zero and so could only score one mark.

In part (d) most successful students completed a summation of all the percentages from ages 40 upwards identifying 24% for males, 26.3% for females, drew the correct conclusion and getting full marks. Those who did not quote percentages found less success as they relied on a clear explanation which was quite difficult to articulate. Quite a few students only commented only on the 40-44 age group and therefore did not score at all.

Question 14

Part (a) of this question was generally answered well. Most students either stated that two was written as a word rather than as the digit 2 or referred to missing data.

Part (b) of this part of the question was also answered very well with most students observing that the total percentage was higher than the total of 100. Where pupils lost the mark, they frequently referred to 124 as an outlier only.

Most students did not attempt part (c) of this question at all, and of those who did, many calculated an estimate of the mean speed of the motorcycles. We awarded one

mark for the correct class interval seen. It is clear however, that linear interpolation is not a well-known statistical method, but it is in the specification and is nearly always tested on the Foundation papers. Bearing in mind this question is worth 3 marks, it is worth knowing this technique.

At this stage in the paper, some Foundation students have given up, but considering that the frequency polygon for the speed of cars was drawn on the grid, this should have given a good hint on how to proceed. It was therefore surprising to see so many blank responses in part (d).

Of those students who did attempt it, some did not plot at midpoints, some did not use a ruler and some did not find the vertical heights carefully. However, attempted responses often scored at least 1 mark and quite a few scored 2 marks. Centres must impress on their students that graphs need to be drawn carefully using a ruler, as careless and sloppy graphs will lose marks.

The first mark in part (e) was relatively easy to attain, by describing the skew of the cars and the skew of the motorcycles, and it was surprising to note the number of erroneous descriptions, ranging from 'symmetrical skew' which we will not accept and references to a normal distribution.

Not one single student managed to score the second mark describing the spread of data either side of the median.

Question 15

Part (a) was answered very well indeed.

Part (b) was also answered well indicating a good knowledge of choropleth maps. Most students either referred to Regions 15 and 16 being the darkest regions or each having more than 1500 orangutans in each. Some students made the correct conclusion with no reason given and therefore scored no marks.

Once again it is important to stress that where a decision is required, this must be given as well as the supporting evidence for the decision.

Summary

Based on their performance in this paper, students are offered the following advice:

- practice development of extended response questions, laying out answers in bullet points
- use a ruler to draw graphs.
- show working in calculations.
- learn the names of different types of data
- give statistical interpretations in the context of the scenarios in the questions
- revise conditional probability
- revise linear interpolation.
- revise skew in distributions.

