Principal Examiner Feedback

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Pearson Edexcel GCSE
In Statistics
5ST1F_01 (Foundation)

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GCSE Statistics 5ST1F
Principal Examiner Feedback – Foundation Paper 1

Introduction

Candidates on the whole seemed to find the paper accessible and generally had time to attempt all questions. The difficulty of this paper was in line with previous series and there was no evidence that candidates were unfamiliar with any of the topics, though a number of topics still challenge foundation candidates such as probability and index numbers. In Statistics, many responses rely on explanations and the clarity of written expression remains a major issue for candidates at this level. They must ensure that questions are read carefully as some relied on stock answers which did not address the demands being assessed (e.g. comparing medians on box plots when being asked to comment about the symmetry).

Often a question demands a reason to support an answer. Especially when there are only two possibilities a mark may not be earned without a supporting reason. There were occasions however, such as in Q2(c), Q8(d) and Q12(c) where some candidates provided reasoning but failed to state a conclusion. Candidates would be advised to re-read a question after writing their response to make sure they have answered it.

Candidates must be encouraged to show their working as some may have picked up more credit when their answers were incorrect (e.g. questions 6(abc), 12(a), 14(a)). The standard of drawing diagrams was often quite pleasing although a minority drew freehand when a ruler was appropriate (e.g. the heights of bars on the bar chart).

With comparison and interpretation, especially where a question is indicated as QWC (marked with *), candidates should be aware that correct statistical language is expected. It should also be noted that stating values (e.g. Poland won 36 medals overall) is not a comparison in itself; when values are stated there needs to be use of comparative language (e.g. "… which is more than …"). Where more than one mark is available for a question, candidates should be aware that the number of marks generally indicates the number of comments expected – this was apparently not appreciated by many candidates on some questions.

Report on individual questions

Question 1

Most candidates were able to select the required information from the table to successfully answer parts (a) and (b) of the first question on the paper.

In part (c) candidates should pay attention to the number of marks available and note that a single comparison would not be sufficient for 2 marks. Candidates simply stating or listing the number of medals won by each country often lost both marks when no comparison was being made.

Comparative language must be used, e.g. 'Poland had **more** gold medals than Netherlands'.

Question 2

The vast majority of candidates answered part (a) correctly by selecting the correct frequency from the pie chart. In part (b) those candidates who did not score the mark nearly always gave one of the correct frequencies. However, some tried to make the comparison between the two pie charts rather than within the 2006 pie chart.

The majority of candidates answered part (c) correctly with most referring to an increase in the daily proportion. However some candidates attempted to discuss the number of 16-24 year olds using computers rather than their frequency of use and often lost both marks in doing so. A small minority made a correct comment comparing the sectors on the pie charts but did not conclude that this supported the claim.

Question 3

This question allowed all candidates to show their ability with the latter parts discriminating the most able at the top end. Most candidates completed the multiple bar chart accurately in part (a), though on some occasions the bars were drawn freehand making it difficult to read off their heights. The most common mistake here was failing to shade the bars to match the key. Parts (b) and (c) were generally well answered.

The vocabulary tested in part (d) is not well known to candidates at this level with many opting for 'grouped' as the correct response. Part (e) caused the most difficulty likely because candidates did not read the question carefully. Many referred to the multiple bar chart as supporting his claim when the question required additional data to that already collected. Some discussed other types of diagrams that could be drawn whilst others offered sampling methods. The most common correct answers included 'box office ticket sales' and 'a survey asking people about their favourite type of film'.

Question 4

Candidates at this level are confident with completing two-way tables and part (a) was widely accessible and well answered. The majority understood that the total number of visitors was 50, however a significant amount of candidates still misinterpret the two-way table and add together the rows and the columns to obtain a total of 100. Part (c) was generally well answered although the common mistake here was to put the gender with the most number of visitors, i.e. female, or to write the number of students that were under the age of 18.

In part (d) candidates were generally able to give at least one reason why the sample was biased by commenting either about the time it was taken or the type of people in the museum at that time. Those scoring no marks often focused on the location of the museum, the size of the sample, the unequal age groups or the fact that there were more female visitors to the museum.

Another common error was to state that Liam may have forgotten to include everyone.

Question 5

The majority of candidates scored at least one mark on this question, usually for recognising that the graph is difficult to read due to it being in 3D. The next most common correct response was noting that the vertical scale did not start at zero. Those who identified the gaps in the months often made incorrect comments such as they are unequal or out of order or a comment that did not relate to the graph being misleading such as there are three months in 2011 and only one month in 2012. A minority of candidates failed to gain any marks as they commented on the subject of the graph, rather than the graph itself.

Question 6

The summary statistics in this question are well known to candidates and a good number achieved full marks in parts (a), (b) and (c). The most common incorrect answers involved failing to order the list of numbers which often cost candidates marks in parts (a) and (b). A large number of candidates do not appreciate the order of operations when calculating the mean and gave $(31 + 20 + 18 + 19 + 23 + 18 + 28 + 14 + 72 \div 9)$.

It is important that candidates show their working in these questions as some would have been able to earn method marks even if their final answer was incorrect. Still some candidates do not know which calculation is which and many mixed up these three calculations whilst others gave the mode as one of the three answers.

The key word in part (d) was 'advantage' and far too many candidates simply described the median as being the middle number. Only a few mentioned that outliers/extreme values were not taken into account although some scored with ease of working it out.

Question 7

Despite this being the first time a population pyramid question has appeared on this specification, candidates seemed comfortable selecting the appropriate information and making the simple comparison required. It should be noted that this diagram shows the percentage of population in each age group and not the number. Although responses referring to 'number' were condoned on this occasion, candidates should be aware that no information about either population size is given in the diagrams. When making a comparison, it should be an overall comparison and not a listing of percentages. In this instance a comparison of a single age group (e.g. 60-64) was not sufficient for the mark.

Question 8

This question tested the understanding of a variety of statistical vocabulary and it was pleasing to see candidates making a very good attempt at all parts. Part (a) was the most difficult for candidates as they again appeared to miss

out the keyword 'advantage' and often just gave a textbook definition of primary data. The most common correct answers did focus on the reliability of the data. Most were able to correctly identify at least three of the pieces of information as being discrete or continuous in part (b) though 'height of cyclist' was most commonly missed out.

It was pleasing to see that candidates are familiar with a data capture sheet in part (c) and only a minority suggested a question that Amy could use for a questionnaire instead. Even more pleasing were the correct responses seen in part (d). Stem and leaf diagrams cannot be used on qualitative data and many correctly stated that numerical information, and not colours, is needed. However, a significant amount of responses said that it would take a long time as you would need to do one for each colour. Others offered suggestions of alternative diagrams which would be better but did not explain why they would be more suitable.

Question 9

Question 9 proved to be a good source of marks for many candidates and allowed the opportunity for the most able to display their knowledge. Most candidates correctly plotted both points in part (a). In part (b) most understood it was negative correlation and a good proportion went on to give a correct contextual interpretation of this.

The line of best fit in (c) attempted by most candidates most was within tolerance. Those out of tolerance often had all of the plotted points above their line. Others connected the points to one another but not in a single straight line. Most were able to use their line in (c) to obtain an accurate estimate in (d). Those who did not use a straight line to read off the graph often ended up out of tolerance a few squares either side of the accepted accuracy.

Part (e) continues to challenge the clarity of written expression of foundation candidates. Many assumed any error was due to a badly drawn line of best fit. Those attempting to describe 'extrapolation' struggled to do so sufficiently. An answer mentioning that this distance was **beyond/outside** the given data set scored the mark. However, most gave incomplete responses notably saying that it was '**far** away from other points'.

Question 10

The vast majority of candidates gave a correct answer to part (a)(i) however, they failed to appreciate that the plotted point in part (a)(ii) was between the two lines and nearly half the candidates lost the mark here. In part (b) the description of the trend should be an overall comment. Many candidates simply listed the numbers at individual years which does not qualify as describing a trend. Other common errors were not paying attention to the time range requested and answering about French rather than Physics.

Despite there being two marks for this section far too many candidates only gave one comparison and some simply listed data from the graph. Almost all candidates could make at least one sensible comparison between the two subjects, mainly, that more students chose A Level Physics than A Level French, although many did not make it clear that this was 'always' the trend

over the years. A large number of candidates noticed that from 2008, the number of students taking A Level Physics increased while students taking A Level French decreased. Those candidates who quoted figures but made no comparison scored no marks.

Question 11

At this stage of the paper, the demands had become difficult for some of the candidates but most were able to make some attempt at parts of this question. Although many students showed an understanding of the population (saying customers, people in the office, etc.), most candidates missed out on the mark by not stating all of the customers. A large minority tried to calculate the number of customers that would work in the offices as the population. The most common correct response in (b) was that a census was more accurate. Some candidates also remarked that the opinions of all customers were considered or that a census was unbiased. Common incorrect responses included defining a census, stating advantages of a sample or that you would get lots of data.

Part (c) had the highest success rate with the majority of candidates scoring both marks, usually by stating that a sample is quicker and cheaper, sometimes within the same line. A minority of candidates put their response into context and thought that the sample would be sampling the sandwiches. Although many gave an example of how to take a random sample, the vast majority of candidates scored no marks in part (d). The most common responses included a restatement of the question such as 'a sample which is random' or a description of taking a random sample using a calculator or using names in a hat.

Candidates often had difficulty expressing their ideas in parts (e) and (f) and it was not always clear what they were trying to say. The majority of candidates scored at least one mark in (e) by describing the question as a leading question but often phrasing this point in their own language. A common error was to criticise the question for being vague or for not getting the 'right' information. In (f) most candidates scored at least one mark, generally for a correct disadvantage. The most common disadvantages given were that interviews were time consuming or the interviewee might lie. Correct advantages were less common.

Question 12

It was perhaps somewhat surprising to see that the calculation of the IQR was too difficult for most of the candidates on this exam. The ability to read the upper quartile correctly off the scale was rather poor and there was a fundamental lack of understanding of IQR by a lot of candidates, with some of them finding the range instead or using the median in place of one of the quartiles.

Almost all candidates were able to draw a box plot correctly in (b). The main error resulted in again not paying close enough attention to the scale and plotting the upper whisker in the wrong position, usually at 13 instead of 15.

In part (c) the majority of candidates identified that the box plot was not symmetrical but many did not seem to have a good understanding as to what this actually meant and why this was the case. This was another instance of candidates not reading the question properly as a significant
number compared the top shelf box plot with bottom shelf box plot and made the standard comparison of medians and IQRs. Some were able to identify the (positive) skewness of the distribution whilst others went on to say that the median was not exactly between the upper and lower quartiles.

Question 13

The majority of candidates showed their understanding of probability words with a fully correct pairing in part (a). The probability $\frac{1}{20}$ caused the greatest confusion as this was often swapped with $\frac{3}{4}$. Many were able to complete the sample space diagram in part (b) though it was not uncommon to see ordered pairs or products instead of totals. Part (c) required a probability rather than a probability word and some weaker candidates used the responses from (a) to answer this question. Those who completed the table correctly nearly always scored this mark.

The most discriminating part of this question, and perhaps the whole paper, was part (d). At this level candidates are confident in applying the addition rule of probability and many found $\frac{5}{24}$. Only a handful of candidates recognised the need to multiply this probability by itself to obtain the correct response here.

Question 14

Foundation candidates continue to find index numbers a demanding topic and this was once again no exception. At this level, a subtraction of the two given figures led to the most common incorrect answer of £145. Of those who had a correct method, many went on to lose the accuracy mark by adding % or £ to their answer. A significant number of blank responses were seen here.

In part (b) candidates needed to identify that both two-bed and three-bed house prices increased and show some appreciation of the percentage increase. Though it was clear from the table that the prices had increased, candidates who discussed the figures in £/pounds rather than as a percentage did not score any marks. Those candidates correctly interpreting and comparing the 14% and 20% increases were rare.

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