Principal Examiner Feedback

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GCSE Statistics (2ST01)

Unit 1: 5ST1F_01 Foundation

PEARSON

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1. PRINCIPAL EXAMINER'S REPORT – FOUNDATION PAPER 1

1.1. GENERAL COMMENTS

1.1.1. The vast majority of candidates had time to attempt all questions.

1.1.2. The new style paper, compared with the old 1389 specification, with greater emphasis on interpretation proved more demanding for many. Whilst it was evident that some centres had successfully adapted their teaching to account for this, poor clarity of handwriting and poor clarity of expression was an issue for a number of candidates.

1.1.3. Candidates should be encouraged to show their working as some may have picked up more credit when their answers were incorrect. In some cases it was evident that correct values were extracted from the question but then incorrectly added etc, suggesting lack of a calculator. There was a general improvement from the previous specification in the standard of diagrams; candidates should take care however with reading correctly the scale on axes. They should also be encouraged to use a ruler when drawing box plots, histograms, lines of best fit, etc.

1.1.4. With comparison and interpretation, especially where a question is indicated as QWC (marked with *), candidates should be aware that correct statistical language is expected. When comparing distributions this should be using a correct average, measure of spread and direction of skew. 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.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1
Most candidates scored well on this question with only a small number not realising that each stick man represented two councillors. Most errors occurred in part (d) where either 4 was given (the number of stick men) or a correct calculation 11-3 but with an incorrect answer of 9 or 7.

1.2.2. Question 2
Although very many candidates were successful here, the common errors in the first half of this question appeared to be due to misreading, giving bike as the answer in (b) whilst in (c) giving answers of ¼, 25% or 90°.

In drawing the bar chart in part (d) most candidates were again successful, however the main reason for loss of marks was poor accuracy due to drawing freehand.

In part (e) many candidates found it difficult to express clearly the difference in purpose of a pie chart compared to a bar chart. For those who selected pie chart but did not score, it was usually when their reasons could equally apply to a bar chart.

1.2.3. Question 3

Completion of the two-way table was not generally a problem although not all candidates then correctly identified petrol as their answer to (b)(i). A common error here was to give 30.

In (b)(ii) 1/3 or 8/30 were common errors as was 7/20 in (b)(iii). When giving probabilities candidates should be reminded that only fractions, decimals or percentages are acceptable, not ratios. Whilst fractions need not be cancelled down, if doing so care should be taken to do so correctly.

1.2.4. Question 4

Most candidates picked up at least one mark in part (a) often for identifying that children were excluded, that the sample was taken at a time when many in the population may be excluded, or that it was a small sample.

Often these comments were stated in the form of an improvement rather than a problem and so also gained credit if re-stated in (b). Common incorrect answers referred to those in the sample sharing similar opinions.

1.2.5. Question 5

The three different categories on the diagram proved tricky for some in making their comments, for example confusing those who entered and those who started the marathon.

Parts (b)-(d) were asking about comparisons over a series of years, so trends in the figures were expected to be commented upon. A very common error here is simply to compare the last year with the first year – this does not answer the question as it ignores what happens in between. (For example ' the number of entrants increased by about 40000' is simply a direct comparison of 1981 with 2006.)

Part (c) is an example of a two mark question where often only one comment was made.

In part (d) whilst some simply re-stated that not all who entered for the marathon actually started, many realised that this number had increased and gained the mark.

1.2.6. Question 6

Very many candidates are now aware that a hypothesis needs to be in the form of a statement, although there were still a number who incorrectly stated a question in answer to part (a).

Reasons for taking a sample in part (b) are generally well known and many candidates gained both marks. However when apparently making converse statements about a census, some did not mention 'census' and thus their reasons were incorrect.

The remainder of this question was poorly answered with very few candidates aware of the term 'sampling frame' in part (c).

Not many more candidates were able to supply the correct answer of stratified sampling in part (d) with many clutching at straws and writing random statistical terms.

Again very few demonstrated an understanding of the concept of a control group in part (e).

1.2.7. Question 7

Plotting the points in parts (a) and (c)(i) was generally within tolerance although some candidates did misread the vertical scale.

The line of best fit in (c)(ii) did not always gain the mark, either because it did not go through the mean point as required by the question, or because the slope was deemed to be too steep.

The majority of candidates correctly identified negative correlation in part (b) or gave an appropriate interpretation, with many doing both.

Whilst most candidates gave a response to part (d) many were not sufficient to gain the mark. Identifying that this breed of dog was not included or that the weight was much smaller than the rest were the most common allowed answers, but very few candidates used the term extrapolation. Common non-scoring answers stated that the line does not go through many points or does not 'go near' the given point.

1.2.8. Question 8

It was clear that a number of candidates did not know how to read the stem plot and so were unable to get correct values for the median and quartiles. A common error for these candidates in (a) was to give 16, totalling the values on the stem as frequencies.

A few gave a value for median which was below their lower quartile. However most gained credit in part (d), pleasingly many with full marks for following through their quartiles. A mark was not uncommonly lost however for poor accuracy in transferring their values to the box plot correctly.

Part (e) was identified for QWC assessment, so answers had to use correct statistical language to gain credit. Also having four marks should

have indicated to candidates how many comments were needed. Whilst there were some good attempts gaining three or four marks, this was not common. Median was often commented upon but some gained no credit for referring to average or mean. A comment about quartiles or maximum/minimum values without translating this into IQR or range does not gain credit. Only a minority referred correctly to the positive skew shown by the box plots. It was quite common for incorrect contextual interpretations to be given, such as 'more people own CDs than downloads'. For many this was a poor understanding of the question posed, whilst for others it may have been down to difficulty in expressing themselves. ('The people own more CDs than downloads' would have been correct.)

1.2.9. Question 9

Most but not all were able to read the values correctly from the table in this question whilst some found the request in part (b) too demanding.

Candidates were generally successful in answering parts (c) and (d) but in some cases made addition errors having extracted the correct values.

Less successful was identifying an appropriate reason in (e) for the percentages not totalling 100%. Common was the incorrect suggestion that not all had graduated.

1.2.10. Question 10

It was apparent that a number of candidates were unfamiliar with the idea of a biased coin. Whilst the majority did imply carrying out more trials in part (b), there was a significant number that suggested ways of evening up the scores, such as by changing coins.

A large number of candidates correctly completed the tree diagram for part (d) although a small number put products on the second branches (0.36 etc). However, far fewer candidates knew how to use the tree diagram to find the probabilities in part (e).

Adding to get 1.2 for part (i) was not uncommon. For those who were more successful using the tree diagram it was common that the probability of two tails was omitted in part (ii). Fully correct answers were rare.

A number of candidates did gain credit in the final part for subtracting from 1 their answer to (e)(i), although the showing working in part (e) was not common.

1.2.11. Question 11

In part (a) many incorrectly thought that Method 1 would be best, referring to drawbacks of questionnaires, such as non-response. Method 2 was commonly given as the correct answer, most often referring to the bias in Method 1 only including current recyclers.

Part (b) was mostly answered quite well (although not always expressed well) referring to the question being open or lacking response boxes. A common answer to gain no credit here was given by candidates who expressed that the only way to use the recycling facilities was for recycling.

Most candidates gained at least one mark in (c) for an appropriate question but these often lacked response boxes or their equivalent. Attempts at response boxes to not gain credit contained overlaps, or omitted a 'more' option or more commonly a 'zero' option. To gain full marks a proposed question must be fully usable covering all options without ambiguity.

1.2.12. Question 12

It was pleasing to see many correct histograms where rulers had been used. It was more difficult for candidates to be accurate when drawing freehand. A small number only drew the final bar rather than all three that were needed to complete the histogram. There was more of a problem giving the modal class with common errors including the middle bar, just giving 90, or slips of 8 to 100. Clearly some candidates did not understand the term skewness in part (c), giving random answers; the typical mistake was to describe the skew as negative whilst some referred to it as decreasing.

1.2.13. Question 13

Index numbers continues to be a very difficult topic for Foundation tier candidates. Whilst there were some good complete calculations for part (a) some gave their final answer as £ or millions, or % all of which are incorrect as index numbers. Some divided the figures in the wrong order but by far the most common error was to subtract the figures given to get 126.

Part (b) proved more demanding still with few gaining marks. Candidates often thought that the figures were amounts spent. ('More spent on chocolate than fruit and veg' was common.) A few who perhaps did understand the index numbers unfortunately suggested there was a decrease for chocolate, presumably comparing with their answer to (a) which was for 2006 and so did not answer the question. The idea that the figures being over 100 meant that there was an increase was only picked up by a few candidates.

1.2.14. Question 14

Many candidates gave correct working to part (a)(i), although this was often mathematically poorly expressed, and went on to plot the point correctly. Identifying trend was poor for many candidates. There was no upward or downward trend of any significance. Some stated that it 'goes up and down', which may well have been referring to the seasonal variation in quarterly figures rather than moving averages.

In identifying features of seasonal variation candidates should be careful not to refer to specific years; e.g. in (c) a common incorrect answer was quarter 3 of 2007, or often just 2007. Part (d) was just not understood by many candidates.

1.3 GRADE BOUNDARIES

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