

Principal Examiner Feedback

Summer 2015

Pearson Edexcel GCSE
In Statistics (2ST01)
Foundation Paper 1F

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2015

Publications Code UG042701

All the material in this publication is copyright

© Pearson Education Ltd 2015

GCSE Statistics 2ST01

Principal Examiner Feedback – Foundation Paper 1

Introduction

Candidates found this paper slightly more challenging than last year particularly toward the end. There are some topics in particular which were not well attempted including index numbers, probability and stratified sampling. Insufficient time appeared not to be an issue as most questions were usually attempted. Sometimes parts were left blank, but this was usually suggesting that particular techniques or terminology were not known.

Interpretation skills are a key part of this specification and whilst candidates in general are attempting to make sensible comments, poor clarity of handwriting and poor clarity of expression hinder many. They should be advised to take more care in this respect to ensure that examiners are able to award the marks deserved. Candidates also need to see the number of available marks as an indicator of the number of individual points which should be made.

Commonly questions demand a reason to support an answer, or ask for a discussion. Especially when there are only two possibilities a mark will usually not be earned without a supporting reason. Examples on this paper were 4c, 8c, 11e and 13c. In general when a reason is requested, statistical reasoning from the graph or statistics in question is expected.

There was some evidence of a lack of care in reading questions, where missed words changed the demand of the question.

Report on individual questions

Question 1

Candidates found this an accessible question to start the paper, with nearly all getting part (a) correct and most at least one of (b) and (c) also. Some in (b) did not read the question carefully and gave the angle instead. Part (c) was least successful with many not checking the wording of the question as a variety of answers were offered which were greater than 24 hours.

Question 2

Parts (a), (b) and (e) were commonly attempted successfully. A small number of candidates appeared to not understand 'frequency' in (a) and a similar number did not include the zero for five children families. In (b) there were a few drawing bar charts rather than vertical lines, and others drawing a frequency polygon.

Although the majority correctly gave the total number of families in (c) a common wrong answer seen was 6, being the maximum number of children. There were disappointing attempts at mean in (d) with the most commonly seen

working being number of families (16) divided by number of classes (7, or sometimes seen as 6). A few found 30 correctly but then divided by number of classes. Mode and median were both popular correct answers given in (e) although there were a number of incorrect answers, most commonly 'range'.

Along with (d) part (f) was also poorly attempted. It was clear that many candidates did not read the question carefully, instead estimating the number of children in one family, with answers often in single figures. Others seemed to multiply (c) by 100 in error. Of the few who correctly multiplied their answer to (d) by 100 it was unfortunate that some did not realise that the final answer needed to be a whole number.

Question 3

Part (a) was the most successfully answered part with many workable hypotheses seen. Pleasingly few answers were questions but candidates should be encouraged to give a simple statement to be tested rather than prefixing it with for example 'I think that...'.

In (b) it was clear that many candidates were unsure of what was meant by variables, suggesting conditions to be controlled such as keeping the same band. Others offered variables which did not address the specific aim, or simply wrote related words such as dependent and independent. Variables relating to cost and duration were often too vague; eg. 'time'. Candidates should make themselves clear as 'time of day' would be incorrect.

Only a small number seemed to appreciate that the scenario was to do with bivariate data, hence correctly suggesting a scatter diagram in (c).

Question 4

This was a successful question for most with nearly half gaining full marks. Nearly all completed the pictogram correctly although candidates should be encouraged to use equal spacing in each row. In (b) most reached the expected conclusion of more visitors in tents with the majority using correct figures from the pictogram to justify their answer. There was a small minority who suggested why more might be in tents rather than giving a statistical reason for their conclusion, while others extracted figures but did not reach a conclusion. A few candidates misread the question and discussed the numbers staying in caravans.

Most candidates reached the expected conclusion in (c) using figures from the pictogram. This was a QWC question so reasoning was required to gain any marks. Simply concluding 'yes' on a yes/no question cannot be expected to gain credit. There were arithmetic errors seen which sometimes led to the wrong conclusion. Very many candidates gave only a total number of visitors as their justification, which if correct (usually so) was sufficient, but if not correct meant no marks could be gained. Candidates should be encouraged to show full working.

Question 5

A significant majority of candidates were correct in parts (a) and (b). Part (c) was quite different with a number not interpreting the question correctly. A common error was to describe the trend in the difference between the two countries, rather than to look at the difference in the trends. Most common however was candidates not considering trends at all, but rather just describing or comparing amounts of honey consumed in different years. It should be noted that just comparing figures for two years (e.g. 2007 with 2003) is not the same as describing a trend.

Question 6

Foundation candidates do not find probability an easy concept; probability answers in part (c) were often larger than 1. Many candidates however were able to offer an acceptable explanation of a die being fair in part (a) although did not always express this well. It was clear they had different experiences of this with some making reference to biased or weighted dice but many referring to there being only one of each number. Care needs to be taken by candidates to check what they have written: 'each number has a chance (or an even chance) of coming up' was not uncommon, when they should have said an equal chance. Some showed little idea of bias simply stating 'a normal dice' or 'numbered 1 to 6'.

Part (b) was often correct and a large minority were able to use the sample space to offer correct answers in part (c). Weaker candidates simply offered answers such as likely/unlikely. There were many correct attempts at the new sample space in (d) but its use to answer part (e) was less successful. The most common error here was to miss the 'at least' in the question and give the answer $2/8$. Some gave an answer of $1/4$ with no working so scored 0 as we could not see where their answer came from.

Question 7

Part (a) was a good source of marks for most candidates with most being correct. There was more difficulty in (b) however where either they misread the question and so did not attempt the difference in heights (giving instead an answer of 3 or 24), or they misread the scale of the graph. Many showed no working and so scored all or nothing.

Question 8

Completing the two-way table was successful for most candidates although some lost a mark for an arithmetic slip. Many were then able to score in (b) although answers from some were not probabilities, being larger than 1 or were stated as ratios. There were a variety of methods employed to answer part (c) but commonly candidates were successful. Few referred to probabilities, more commonly making reference to the number of sales for each gender. These reasons were often poorly expressed however and should have referred to sales of male/female jumpers. Those not scoring either just stated 'yes' with no attempt at reasoning, made incorrect or incomplete use of the figures, or they referred to one type of jumper only. A small number misread the question

missing out the 'more than' and so incorrectly concluded 'no' following correct reasoning.

Question 9

Quite a variety of correct answers were offered in part (a) with many candidates being able to offer an advantage of a questionnaire, or disadvantage of a telephone survey. Most popular were questionnaires being quicker/cheaper or not all people being on the phone. The most common unacceptable answer was people not answering the phone or hanging up. Non-response is a common issue which can occur with questionnaires also.

In part (b) candidates were commonly able to pick up one mark but far fewer managed two. Missing response boxes for A, and bias or all negative options for B were most popular. Common answers not to score for A referred to people not knowing how far from the line they would be, or to it being a personal question or not being relevant. For B the most common answer not to score was the lack of an 'other' box which missed the point that the question was clearly biased.

Candidates found part (c) more challenging with few gaining full marks. Marked for QWC answers needed to be clear and to recognise that it referred to a pilot survey. Correct reasons which scored were based on a variety of the allowed points but typically insufficient points were made. The least successful candidates simply described a process of selecting a sample to test the questionnaire on without giving any reasons or naming the process. Vague answers such as asking for their opinions or asking for feedback were not uncommon. 'Checking it works' was not uncommon although was given in the question and so did not score.

Question 10

Part (a) demonstrated that candidates are not too familiar with the statistical terms. The correct 'quantitative' was most commonly picked out with very many fewer identifying 'bivariate'. Clear comments were required in (b) as it was marked for QWC. Most commonly candidates gained one mark for recognising that males were paid more than females on average, (sometimes repeated in a different way). This was often poorly expressed however, suggesting that males paid more, showing a lack of familiarity with the context of gross pay. Fewer identified or described the positive correlation evident in the scatter diagram, despite the question asking for the relationship between two variables to be discussed. Fewer still identified Ireland as an anomaly, instead often simply mentioning that it had the biggest difference between the genders. Many candidates listed examples for specific countries which in themselves did not score.

Question 11

Many quite good attempts at the stem plot in (a) were seen although not too many gaining full marks. Usually a workable stem was seen but often at least one error in the leaves. (A few had problems dealing with the 100s.) Most, but not all, attempted to order the leaves as required. As with the pictogram in question 4 many candidates paid little attention to spacing, although this was not

penalised here – unequal spacing on such a diagram reduces its effectiveness. A key was often omitted, meaning full marks were not possible. The median in (b) was often correct although errors in identifying the middle value(s) were not uncommon. This error sometimes came from apparently crossing out from alternate ends until one value was left – an approach which typically will not work on a list of even length. A small number stated only the leaf or mistakenly found the mean instead of median. Finding the correct range in (c) was usually more successful.

In part (d) when asked to compare distributions candidates need to be aware that a comparison of statistical measures (median and range in this case) is expected. A few listed the correct values but gave no explicit comparison. Some demonstrated a complete lack of understanding by totalling the median and range figures for each team and comparing the results. Generally there was more success seen in part (e) although some mistakenly thought that the larger range for Bolton Boys meant that they were most likely to score most points. Stating the correct team (there was only a choice of two) with no attempt at a reason did not score.

Question 12

Finding the mean of grouped data is a standard technique but one clearly found difficult by the majority of foundation tier candidates. A large number did identify correct midpoints in (a) and often went on to multiply these by the frequencies. Fewer then totalled these values correctly but those who did often then divided by the number of classes rather than the total frequency. Some candidates were mistakenly finding cumulative frequency.

In part (b) many plotted points at the correct heights using the easiest choice of scale, but quite often not plotted at midpoints (despite these being labelled on the axis). Some made a poor choice of scale which made it difficult to plot the points accurately. Completely correct polygons with a labelled axis were not that commonly seen. Given the scales used by some candidates it appeared they may have been plotting values of fx rather than frequencies. It was clear that many candidates were not familiar with frequency polygons. Some drew histograms, cumulative frequency graphs or box plots.

The idea of skew in part (c) was understood by very few candidates, but of those who realised it was likely to be positive or negative most made the wrong choice. Quite common were descriptions such as it goes up then comes down, or simply leaving it blank.

Question 13

Parts (a) and (b) were particularly poorly answered with candidates unable to express the statistical terms and ideas correctly. The knowledge of sampling frames was tested the opposite way round to previously and very few candidates knew the correct term to state. A handful came close with 'electoral register' although this is not a statistical term as demanded by the question. Common incorrect answers were population and census. Many left it blank.

In part (b) few candidates had the idea that all voters should have the same chance of being chosen. (Some referred to an 'even chance' which is incorrect.) For those who did score it was usually for stating a condoned answer that it was a sample that is fair or unbiased. Most incorrectly suggested that random simply meant the selection was without deliberate choice, or not knowing who would be chosen.

Many more candidates were successful in part (c) recognising the larger sample size, although some gained just one mark as their reason was not clear or was incorrect. The incorrect answer of Morning Chronicle was quite common, often with the reason of a higher estimate of votes for Mr Lopez.

Question 14

Nearly all candidates picked up an easy mark for identifying the mode in (a). Stratified samples were understood by very few candidates however with any marks scored in part (b) being very rare. Vague answers of being more accurate or more reliable were not sufficient without recognising that the aim of this sampling is to match the proportions in the population, to make it more representative.

Only the strongest candidates were able to show why the strata size should be 7 in part (c)(i). Part (c)(ii) was often more successful with a mark often gained for referring to random sampling; candidates need to realise however that 'picking from a hat' is not appropriate except for small populations. Part (b) and particularly (c)(i) were often left blank.

Question 15

Foundation tier candidates do not find index numbers easy and this question was no exception. Many answers were either blank or showed little understanding of the topic. There was a small minority correct in (a) but common wrong answers included 28 (no %), 128%, £28 or simply saying it went up. Correct answers to (b) were rarer.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

