GCSE
STATISTICS
8382/2H: Paper 2 Higher
Report on the Examination

8382
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General

This was Paper 2 for the Higher Tier in the first sitting of the new GCSE Statistics specification. Students showed good knowledge throughout the paper and seemed comfortable, in many cases, with the increased emphasis on interpretation and analysis. All questions appeared to be accessible and there appeared to be no time issues as attempts at the last question, the extended Statistical Enquiry Cycle question, were as proportionately high as any others.

Topics which were answered well included:

- Completing a stem-and-leaf diagram
- Interpreting a stem-and- leaf diagram
- Inserting probabilities on a tree diagram
- Drawing a cumulative frequency graph
- Understanding the purpose of a control group
- Using data to make a judgement on a hypothesis
- Using formulae to calculate a mean and a standard deviation

Topics which students found difficult included:

- Correcting or detailing accurately, the steps required to take a random sample
- Realising a poorly worded question should be written as two questions
- Interpreting whether a target was met or not
- Interpreting a pair of means and a pair of standard deviations in context
- Calculating a binomial probability
- Calculating the new radius necessary for a proportional pie chart

Question 1

This part was very well answered.

Question 2

This part was well answered.

Question 3

This part was well answered.

Question 4

This new part of the specification did not appear to be very well known and this was the poorest response of the first four multiple choice questions. Test C was the most commonly selected incorrect answer.

Question 5

Part (a) was very well answered.

In part (b) most students completed the graph correctly. However a significant minority appeared not to have seen the request for the axes to be labelled as well. Of those who did label the axes,

the horizontal axis was done well. The vertical axis, however, was often missing the millions which is required to give the appropriate sense of the scale.

Part (c) was generally well answered with the positive focussing on the saving of space and the negative focussing on the way the graph can subsequently mislead or that the break sign might not be understood by people. There were few who couldn't come up with either a valid positive or a valid negative.

Part (d) was well answered with students often referring to potential increases in staff or number of hospitals which might mitigate the increased attendance and therefore mean that longer waits were not necessarily a direct result of this.

Question 6

Part (a) was well answered.

Most students in part (b) identified that the faster times had shorter bars and therefore that this was misleading the viewer. Far fewer secured a second reason regarding disproportionate increases or the use of arrows for bars. Quite a few thought that regions with the same speed had different sized bars but this is not the case. Others talked about the regions themselves or shoppers being the reason for this, which is not why the diagram itself is misleading.

The stem-and-leaf in part (c)(i) was well done, with very few errors. One issue students had was the loss of vertical alignment if they had to cross out one or two figures. This does need to be rectified if full marks are to be scored in these situations.

Part (c)(ii) was well done – with the word average in the question, students only had to identify which month was quicker (or slower).

Part (c)(iii) was generally well done, this piece of interpretation did see some very imaginative responses but most correct answers focussed on Christmas or underfoot conditions.

Question 7

Part (a) was well answered with very few errors.

Part (b) was quite well done, although it was common for students to look only at exactly one machine breaking down rather than at least one, even though this was in bold. Of those who got this correct, few went for the more efficient method of   1 – neither of them breaking down, instead going for the sum of the three correct products.

Question 8

Most students in part (a) identified at least one of the two issues of Maxine's table having overlaps and not covering all possible values. Focussing on Maxine's starting at 4 was not enough on its own and a few students simply referenced Toby as having used (double) inequalities without saying why, in this case, that makes them more suitable.

The cumulative frequency in part (b)(i) was set up to be as straight forward as possible and it was done well.   A few did still manage to plot at midpoints but far fewer than normal due to the way the data were presented in the table. Curves or straight lines between the plots were both fine but students do not find it easy to fit a smooth curve through points so using straight lines between the

plots remains the advice for students to follow. There were very few misplots for the cumulative frequency.

Part (b)(ii) was quite well done with many students working out where to read off and doing so successfully.

In part (b)(iii) there were many routes to a successful comparison being made and many students were able to do this. Some got confused (if trying to use the graph) about which end of the graph to look at. The easiest method was to use the answer in (b)(ii) and make a direct comparison.

Question 9

Part (a) was generally well answered. Most successful answers here focussed on level of control over conditions or the variables.

Part (b)(i) was very well answered. Students understood the relevance of the control group and that it was there to check that changes were due to the coffee and nothing else.

In part (b)(ii) most appreciated that even though the coffee drinkers had improved, the control group had improved by more and therefore stated that the results didn't support Steve's hypothesis.

Question 10

This was well answered with many understanding that it was the graph with the strongest correlation that was most suited to be used as a predictor. Reading off the diagram was generally extremely accurately done.

Question 11

Parts (a) and (b) were well answered.

Question 12

Part (a) was well done with the majority of students seeing that it was only the standard class passengers that were required in terms of the population.

Part (b) was not at all well answered. Most chose not to correct Natalie's method but instead simply outline a method to obtain a random sample. Whichever way they did do this, students did not often give a full method or full set of corrections often forgetting to detail the numbers which should be allocated to people, exclude repeats or (if relevant) round or ignore values too big.

In part (c) the vast majority partially rewrote the questionnaire question so that the issue of lack of balance in the options was improved. However, very few, rewrote the question into two separate questions so that there was more clarity about which part of the original question was being answered.

Question 13

In part (a) for the majority who understood how to obtain a weighted average this was done really well. Many others didn't really know where to start.

In part (b), overall this was quite well done with the best students working out the overall mark so far after the course and written examination and then simply deducing that adding the full 45% available on the practical examination took her potentially to over 60% so she could still pass.

Question 14

In (a)(i) the mean value of 6.24 was shown to be correct on the vast majority of occasions.

Part (a)(ii) was also done well though some students do not appreciate that with a given result and two marks available it is not sufficient to simply substitute the values into an also given formula and then state the given result. A more precise answer of all least two decimal places was required to show that the evaluation had been carried out accurately.

In part (a)(iii) there were a lot of poorly written comments given in this question such as the target was met with the mean but not with the standard deviation. Students were not clear at all that the target had not been met as the target was to walk at least 6 km every day. Many thought that the average being above 6 was enough to say that this was true. Better students of course referenced the standard deviation and how that meant it was almost certain that distances below 6 km must have been walked on some days.

Part (b) was not that well answered with, some simply made observations of the relative sizes of the means and standard deviations and therefore failed to reference the context of the question. Also, some made statements such as 'Erika walks further' instead of 'Erika generally walks further' or 'Erika walks further on average'.

Question 15

Part (a) was quite well done with students understanding that a particular person might not have a drink or may have a cold drink.

In part (b), considering that this is a new part of the specification, this was fairly well done by some but it was a minority of the students who appeared to recognise the meaning of a Binomial situation. Some forgot to multiply their probabilities by 5 but generally those who knew about the Binomial completed their calculation correctly.

There were some good responses to part (c) regarding the lack of independence between members of the same family and other appropriate considerations. A common error was to talk about the three people and therefore there weren't only the two possible outcomes under consideration.

Question 16

The vast majority of students understood the idea in part (a), that it would be really difficult to obtain the necessary data; others simply commented that the data were already collected.

Most students in part (b) were able to reference the usefulness of illustrating proportions visually and / or the comparative nature of having the different radii reference total population each time. This was well answered.

Many students found part (c) difficult to achieve the necessary calculation of the second pie chart's radius but were still able to score quite well based on accurately calculating the required angles and accurately drawing and labelling their pie chart. It was a shame to see so many students

without a pair of compasses which always led to a significant loss of marks, especially if working for the angles was not present.

Part (d) was generally well answered. However some students, instead of using the given value of 88 890 for 2016 used their own rounded calculation of the angle to calculate this figure (inaccurately) from the total. This is what led to the special case in the mark scheme. There were a notable number of errors in writing down figures from calculators or the student's own previous line in this question.

Part (e) was quite well answered with a variety of acceptable reasons being seen.

Part (f) was quite well answered for the very last part of the examination, showing that students had managed to keep going and find questions accessible right up until the end. Some of the conclusions offered incorrectly referred to numbers rather than proportions.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website.