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Examiners' Report
Principal Examiner Feedback

Summer 2023

Pearson Edexcel GCSE (9-1)
In Statistics (1ST0)
Higher Paper 2

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General Comments

Although the questions in which most candidates excelled were once again those which required routine calculations to be performed, graphs or charts completed, or information extracted from them, it is pleasing to report that questions asking candidates to explain, assess or interpret are improving compared to previous years.

Question 1

(a)

This part of question 1 was correctly completed by the majority of candidates with most candidates achieving full marks from a fully labelled and correctly calculated Venn diagram. A few candidates struggled to understand how to calculate the number of visitors for France and the visitors who had been to neither France nor Spain.

(b)

Many candidates answered this part well, but unfortunately some candidates did not indicate which comment they were responding to and so achieved no marks. Some of the candidates answering the first comment did not back up their answer with numbers to correctly show that more than half of the visitors visited France. Meanwhile, some stated numbers, but then did not compare and said it was greater than a half. Most of the candidates who responded to the second comment gained full marks for their answers. It is important to note that in a question asking candidates to discuss the validity of a statement, they must write valid or invalid, followed by the explanation.

Question 2

The easiest way to answer open questions like this is to bullet point responses. This makes it easier for the candidates to organise their thoughts.

Most candidates gained some marks for this question by correctly calculating the IQR or range, but only a minority achieved full marks. Some candidates lost marks because they did not compare the median heights and IQR or Range with their calculated values and stated that one value was **bigger** or **smaller** than the other. Stating that the median

for males is 5.6m and the median for females is 4.9m and so males are taller will **not** score the mark, because that is repeating the question. They **must** state that 5.6 > 4.9 either symbolically or in words. The same applies to the IQR or range. To score the mark, it is necessary to state that, for example, 2 > 1.6 and so heights of the females are more inconsistent.

Some candidates also missed out on the final B mark as they did not state whether comments were correct or incorrect.

Question 3

(a)

This was generally answered well with most candidates being able to state or imply that a step polygon is required for discrete data.

(b)

Virtually every candidate identified the mode correctly.

(c)(i) and (ii)

It was actually a rare sight to see the correct answer of 0 goals for part (i) and almost no candidate showed us any working [28 – 23] for the number of matches where more than 6 goals were scored.

It is essential to look at the mark allocation. 2 marks were allocated for (c)(ii) indicating that some working was required.

(d) and (e)

The correct answers were only seen very rarely here. It was clear that a step polygon was not well known to this cohort of candidates.

Question 4

(a)

This was a computer marked question, but it was not well answered at all, where candidates were unable to identify the correct population.

(b)

We scored marks as follows: the first B mark was for ‘not appropriate’ with some attempt at a reason and the second B mark was for the correct reason.

It was clear that centres need to concentrate on teaching the types of sampling and their uses and limitations. Some candidates were able to articulate the correct reason that Quota sampling is not random, and we cannot group the hammers, or that it is not possible to group the hammers, but 2 marks scored here was a rare sight.

(c)

The same comment regarding (b) applies here. We awarded the marks for ‘Suitable, as it is less biased’ but this was a minimally acceptable response.

Question 5

Candidates lost marks here because of vague responses. It is necessary to be as much precise as possible. Once again, bullet pointing would help.

Examiners required to see firstly a comment about whether each of the spinners X and Y were biased and then a reason given. Quite a few candidates failed to discuss outcomes vs experimental frequencies, and some gave mixed comments on bias / not bias for same spinner. Marks cannot be awarded for conflicting statements.

However, most students were able to identify Spinner X was unbiased and Spinner Y was biased; nonetheless, some reasonings were not always sound. It was rare for students to identify the experimental frequency and related this to the expected/theoretical probability. Most said Spinner Y was biased due to the uneven segments on the spinner rather than the fact that '5' had only 1 segment but was the highest scoring, implying that it was biased towards 5.

This was a good source of marks for many candidates.

Question 6

(a)

Most candidates were able to give the correct answer of 32.

(b)

Although many frequency polygons were completed carefully, some candidates continued to be careless by plotting their point inaccurately and then drawing lines freehand. It is obvious from the two drawn lines given to candidates that lines should be straight, and so untidy lines were not credited with a mark.

(c)

Whilst we saw many correct responses of $\frac{45}{52}$ or 0.87 or 87%, there were many who just wrote the answer down without showing working [in fairness, this part of the question was allocated just one mark] but working helps the candidates.

(d)

The most common answer was 'positive distribution'. Very few stated that the mean was bigger than the median.

Some candidates who identified a positive skew were unable to interpret what this implied about the mean and median, and only a few students scored both marks here. Some candidates wrote about a hypothetical situation rather than referring to the data supplied.

(e)

This was not well answered with only a minority identifying the correct estimate, despite the answer being obvious from the stem.

(f)

Again, not well answered with some careless notation seen. However, the mark scheme was fairly generous on this.

Question 7

(a)

Given that the formula was written down for candidates, meaning they only need to extract the two pieces of data and enter the number into their calculators, it came as a surprise to find a minority of candidates entering the data incorrectly and even using 100 in place of the correct 1000. We could not allow the use of 100 as a misread. These should have been two of the easiest marks to gain in this paper.

(b)

Only a minority reasoned correctly that as the population was likely to be much larger in the year 2019 than in the year 2000, then the given statistic could be true.

Many challenged the statistic and declared that it was incorrect.

Question 8

(a)

This question asked about the definition of matched pairs in an experiment. Although some understood what this meant, few were able to score both marks in this part of the questions.

(b)

This part of the question on the other hand was well answered with many correct responses seen.

Question 9

(a)

Most candidates failed to score well on this question. Many who failed to score marks, did so as they misunderstood the idea of comparative Pie Charts and explained that comparison could not be made as there was not enough information. Some candidates did have the right idea but lacked accuracy in their answers as they discussed the **size** of the sectors rather than the **area**. Those candidates who realised (and stated) the significance of the values 60 and 65 then went on to score full marks.

(b)

On the whole this question was not answered well. Very few students scored full marks and many scored no marks at all. Although there were many examples of students attempting to use ratios in this question, many were unable to process the information correctly. The best method to use on this question was to first find the total frequency for the Radio Pie Chart. It was not clear that many candidates were attempting to do this as a first step as there were many incorrect methods seen. Students who demonstrated the correct method almost always arrived at an accurate solution.

Question 10

It was clear on this question that many centres had prepared students well for this topic and that students were quite familiar with Quality Assurance reports. The vast majority of students were able to calculate the sample mean and enter it in the appropriate space. Unfortunately, the majority of students did not then go on to plot the point on the graph, but those who did generally plotted the point accurately. Although the Standard Deviation was found by reading off from the graph, many candidates did not manage this correctly – this is an area that centres should prioritise more with their students. Lots of students used appropriate vocabulary when deciding on actions to be taken based on the samples taken. Unfortunately, there is still some confusion over the types of actions needed to be taken in different situations.

Question 11

(a)

The correct value of 121.7 was given by the majority of candidates.

(b)

Many found the value of 3, and we allowed M1 for $\left(1.4-\left[-1.6\right]\right)$, but then they didn't know what to do with it. Those who obtained the correct answer worked out the heights of both boys, spending longer on the question than they needed to.

(c)(i) and (ii)

Most candidates left these questions blank. Knowledge of use of sample means and the sample standard deviation in the calculation of standardised scores is required in the syllabus and we gave no latitude in the answers we were prepared to accept. These are standard definitions that should be known by candidates.

Question 12

(a)

The furthest some candidates got with this question to achieve 2 marks was to find the value of p or $3p$.

Otherwise, only a few of the most able candidates were able to complete the correct calculation, using the correct binomial coefficients (often using Pascal's triangle) and give a correct conclusion to achieve all 6 marks. Some candidates misunderstood the question and carried out binomial expansions quite needlessly.

(b)

This part of the question was clearly well understood and it was obvious that centres had taught the conditions for a binomial distribution to be a suitable model.

Many were able to just write down the required conditions, complete with the comment that it was an appropriate model.

(c)

Only a few candidates were able to give the correct explanation with the correct conclusion.

Question 13

(a)

Although virtually all candidates made some comments about reliable data, only a few recognised that quoting a source allows us to **check** the data.

(b)

Whilst most candidates recognised that the correlation is positive – the question clearly stated 'Give an interpretation of this value in context'. We did not therefore credit a comment stating it is 'positive correlation'. We needed to see 'as income increases, then so does life expectancy'. Some candidates wrote 'as life expectancy increases then so does income' which could not be credited.

(c)

Few candidates were able to articulate the correct explanation in this part of the paper and many blank responses were seen here.

(d)

However, this part was often the best answered part of the questions with those candidates answering this part of the questions able to state that the strength of the correlation was stronger between fertility and life expectancy because – 0.8 is closer to – 1 than 0.72 is to 1.

Summary

Based on their performance in this paper, candidates should:

- 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 sampling
- learn to identify a population
- give statistical interpretations in the context of the scenarios in the questions
- revise standardised scores
- revise skew in distributions.

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