



Examiners' Report

Principal Examiner Feedback

Summer 2019

Pearson Edexcel GCE AS Mathematics In
Statistics Paper 2 (8ST0/02)

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General introduction

Paper 2 showed to be challenging for some candidates, though some achieved high marks. The new styles of question for the 2017 specification were found to be particularly challenging for candidates.

Question 1

This question tested candidates' vocabulary and knowledge, and it caused problems for some candidates. Many candidates described the process of stratification with calculations in detail, even though it was not asked for in the question. Candidates are reminded to read the question carefully.

Question 2

This question tested both basic knowledge of the binomial distribution and ability to apply this knowledge to two contexts. Part (a) had a good spread of marks with most scoring at least one mark. Part (b) was found to be harder, though most candidates gaining the first mark also gained the second.

Question 3

Statistically, this question saw the best performance by candidates, on average.

Almost all candidates were able to interpret the graph correctly in part (a).

Fewer than half of candidates spotted that (b) was a binomial distribution question. This style of question, where a probability from a previous part is used as p in a binomial distribution without specific guidance, is likely to arise more frequently in the new non-modular specification.

Part (c) was done well, with more than half of candidates scoring full marks. Most errors were caused by summing the probabilities without multiplying by the value of the first digit.

Part (d) was a conceptual question testing candidates' understanding of the expected value. Most managed to explain that this represented the mean, though far fewer managed a fully correct explanation.

Question 4

This question tested candidates' understanding of calculator display outputs, as described in Appendix 4 of the specification. However, the absence of context and the superfluous information proved challenging for many candidates, with just under half scoring no more than a single mark. However, a good number of candidates did score full marks here.

Some candidates gave conclusions that were definite, e.g. 'the mean is equal to 8.5'. Candidates are reminded that a hypothesis test adds only some **evidence** to an argument, and a conclusion should show this, e.g. 'there is insufficient evidence to suggest that the mean is not 8.5'. Candidates are also reminded that a **significant** result provides **significant evidence for H_1** , whereas an **insignificant** result provides **insufficient evidence for H_1** . An insignificant result **does not** provide significant evidence for H_0 .

Question 5

Many candidates struggled to interpret part (a)(i) correctly. A price changing by not more than 5p means that the difference can be 5 at most, and -5 at least, $P(-5 < X < 5)$. Most errors involved

calculating $P(X < 5)$. Part (a)(ii) had simpler instructions, with about half of candidates scoring the mark.

Only about $\frac{1}{3}$ of candidates managed to gain marks here. The majority of candidates misunderstood the question, focussing on criticising the collected data (e.g. the data only records the daily change, not the actual share price) or the graph in Figure 2 (e.g. the bars are too thin), rather than criticising the model itself.

Candidates should make sure they are familiar with the concept of a statistical model for real-life data. They are also encouraged to read the question carefully, underlining any key words seen.

Question 6

Question 6 was completed well by most candidates, particularly the interpretation of a challenging graph in (a) and (b).

Part (c) was found to be more challenging, though most managed to score at least one mark. Candidates are reminded to use the number of marks as a guide for the level of detail required for the question.

Question 7

In part (a), most candidates did not see, or did not understand the significance of the (£000) note in the column title cells. Candidates are reminded to fully read the information given in tables before answering questions.

In part (b), very few candidates gained full marks, though a significant number scored highly. Most candidates ignored the figure of 6% given in the question, and many did not register that the 'percentage change' column was the one of interest. This style of multivariate question with superfluous information is likely to be seen more regularly in the new specification.

Most candidates answered (c) successfully.

Part (d) is a new style of question on the use of technology, and many candidates found this challenging. Many candidates described using a spreadsheet in ways **not** connected to sampling. Candidates are advised to read the question carefully.

The focus of these questions is always on the practicalities of manipulating the data above the use of functions (though the correct use of functions will of course improve the explanation). For instance, in this question, the sampling will not be improved greatly unless **all** councils are considered, and a random number generator is useless if the councils have not been **numbered** in some way.

Further, the number of marks awarded is a good indication of the level of detail required.

Finally, many candidates presented their explanations as a single paragraph, which is hard to read and difficult to mark. In explanation questions, candidates are recommended to use a bullet-pointed list, each of which is written in **clear, specific, and concise sentences**.

Question 8

In part (a), many candidates struggled to explain the problem of the data in Figure 5, though surprisingly far more were able to give at least one solution to the problem. For criticisms, candidates should try to write in clear, specific, and concise sentences.

The hypothesis test in (b) had a good spread of marks, with many candidates scoring full marks. This kind of question with limited scaffolding will be seen more regularly in the new specification.

In part (c), most candidates were able to interpret the context successfully, describing that a sprint cyclist should have strong legs, and a marathon runner should be able to run a long way in the beep test. However, candidates found it far more challenging identifying the outliers from a table. For those that had time, a quick scatter diagram may have helped.

Summary

Based on their performance on this paper, candidates should:

- read the question carefully and fully before answering the question. In particular, look to see if there is more than one instruction in a question part, and look out for words shown in **bold** type.
- know and understand all **vocabulary** used in the specification, including identifying or producing real-life examples.
- use **bullet points**, each written in clear, specific, and concise sentences for explanation questions.
- write conclusions to hypothesis tests in terms of **evidence**, rather than as a definite conclusion.

