



Examiners' Report Principal Examiner Feedback

Summer 2025

Pearson Edexcel GCE
In Further Mathematics (8FM0)
Paper 23 Further Statistics 1

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Introduction

Overall students seemed well prepared for the demands of this specification and good attempts at all questions were seen. In general, students work to an appropriate degree of accuracy but sometimes premature rounding lost accuracy marks. Students are reminded that when a calculator is used instead of the statistical tables provided, the values should be quoted to at least the same degree of accuracy as the values in the tables.

Question 1

(a) Most were able to set up appropriate hypotheses using the required context of 'age' and 'shopping'. On some occasions, these were given the wrong way round. Others used vague or incorrect language such as 'relationship' or 'correlation'.

(b)(i)(ii) Nearly all students were able to clearly identify the cell with the smallest expected frequency. And virtually all who did went on to correctly calculate the value of 17.5.

(c) Of those realising that the given value was only part of the test statistic, most accurately calculated the value of the test statistic. The calculation of the degrees of freedom was generally correct but there were some slips in using the tables to identify the correct value of the critical value. Some, however, did not give their answer to the required accuracy (which must match or exceed the accuracy of the table values). It was pleasing to see that most conclusions to the hypothesis test were given in context.

(d) Most identified the new critical value and realised that the conclusion of the test statistic would change. Again, some slips were seen in reading the correct column of the table for the given significance level.

Question 2

Overall, good attempts were seen at this question, but part (c) proved to be one of the more discriminating parts of the paper.

(a) Students generally did well to follow the instructions that working was required here and many showed clearly all stages in calculating the variance.

(b) Nearly all students realised that there were two ways of obtaining 14 points and showed clearly the calculation needed in order to do so.

(c) There was a mixed response to this part. Some simply restated the expected value calculated in part (a). Some missed the instruction for scoring 0 points and went on to give extra point values which were not possible. Another common error was to just list the possible totals and select the one that appeared most often, rather than calculating an expected value.

(d) This part had a high success rate as most were able to select the appropriate Poisson distribution and use it to calculate the required probability. Only on rare occasions did students use the exact binomial distribution.

Question 3

(a)(i)(ii) The calculation of Poisson probabilities proved to be accessible to nearly all students. Nearly all understand the requirement to give answer to at least 3 significant figures. Only on some rare occasions were students unable to accurately convert the mean in part (ii).

(b) In general, the hypotheses were stated with correct notation and in terms of λ . Nearly all identified the appropriate Poisson distribution in this part and most calculated a correct lower tail probability. Of those also finding a correct upper tail probability, some went on to approximate the actual level of significance and gave an answer of 5% or 6% rather than simply adding together the two tails.

(c) This was well answered with most working accurately enough to arrive at the final answer.

(d) Those who gave their answer in context generally identified independence as the reason that Taro's model allowed him to add together the means of the other two distributions. Some unsuccessful responses saw students giving generic answers about the conditions required for a Poisson distribution in general, such as singly or constant rate.

Question 4

Overall, this question saw a mixed response though it was pleasing to see an improved response to part (c) compared to previous series.

(a) It appears that most students understand how to calculate a proportion from a frequency table, though it was not uncommon to see this part left blank. Many completed this part in one clear calculation.

(b) The calculation of r and s was generally well done. Some used a Poisson distribution to calculate these values and scored no marks for their attempt.

(c) The attempts at the final part of this paper were promising and many earned at least one mark. The idea that the last three columns needed to be combined was generally well communicated, though, on some occasions, the word 'expected' was not mentioned. The idea that there were 2 degrees of freedom was not communicated as effectively. A significant number said it was because they calculated expected values for the distribution rather than the fact that the proportion was estimated using the given data.

