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General Certificate of Education (A-level)
June 2012

Statistics SS03

(Specification 6380)

Statistics 3

Report on the Examination

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General

Most candidates had knowledge of the specification and managed to attempt all questions within the allocated time. Candidates usually quoted final answers to 3 or more sig figs and most gave clear written evidence of the method used when evaluating test statistics and the Spearman's rank correlation coefficient. Many candidates demonstrated an intelligent use of graphics calculators.
Marks were lost by candidates who reversed Null and Alternative hypotheses or who did not explain their conclusions in the context of the question.

Question 1

This sign test was generally tackled well by candidates and the majority made a very good effort at the test. Several candidates incorrectly thought they should exclude the zeros rather than allocating them a negative sign. B(12, 0.5) was the only model accepted although B(10, 0.5) and B(3, 0.1) were frequently seen.
Candidates often failed to show probabilities used, from the B(12,0.5) model, in order to carry out the test. Either a comparison of probabilities 0.073 and 0.05 or correct identification of the critical region, backed up by evidence of the probabilities examined in order to identify this region, must be seen for full marks to be awarded.

Question 2

Most candidates confidently evaluated Spearman's rank correlation coefficient but a significant minority evaluated the product moment correlation coefficient in error.
The test in part (b) was carried out well by most candidates but the conclusion was frequently not put into context.
Good efforts were seen at a difficult scatter diagram and many candidates correctly realised that this revealed a non-linear relationship in part (c)(ii)

Question 3

Candidates seemed confident in carrying out a χ^2 test for association and did this accurately. Many candidates spotted that the observed frequency for 'Brown' and 'Strong' was below 5 and incorrectly pooled the data. It is important to note that pooling of data should only happen when an expected frequency is below 5.
Conclusions were often either not put in context or put in a nonsensical context with statements such as 'sun and eyes are associated'.
In part (b), it is important that candidates refer to associations in context and supported by differences between observed and expected frequencies.

Question 4

Most candidates gained full marks in part (a) with very few starting at a rank of 12, not 11, and very few unable to deal with tied ranks.
There were many errors in applying the formula for H. Candidates should be encouraged to spend more time using this formula before the exam.
Most candidates seemed confident that $v = 3$.
In part (b) there were many correct definition of a Type II error but few candidates successfully put this into the context of the question.

Question 5

Most candidates successfully evaluated a mean, standard deviation and PMCC. The great majority of students gained their results directly from a calculator which is to be encouraged. Rounding caused some candidates to lose marks when their final answer was quoted to only 2 sig figs.
In part (b)(i), there were many confused responses but almost all candidates showed the differences and their ranks. It should be noted that the smallest absolute value difference is allocated rank 1. In part (b)(ii) it is the distribution of the differences in scores that should be symmetrically distributed and a good number of candidates correctly stated this.
Attempts at part (d) were generally poor with information from earlier in the question quoted rather than some interpretation of the results being made.
In part (e) an indication of pairing removing the effect of differences in the two tests was the comment desired, not just a mention about a test being 'fairer'. Most candidates understood that pairing reduced experimental error. Very few candidates mentioned that fewer people would be required for the combined test.

Question 6

A large number of candidates correctly selected a Mann Whitney test, separated the Morning and Afternoon data, and confidently carried out the test. Many candidates scored full marks on this final question.
Some candidates did not attempt this question and should be encouraged to consider the tests in this specification and to consider the conditions under which each test can be carried out so that they are able to select the appropriate test when required to do so.

Mark Ranges and Award of Grades

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