A-LEVEL
STATISTICS

SS03 – Statistics 3
Report on the Examination

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General

Students were well prepared for all topics in general and stated hypotheses accurately and in context as well as trying to interpret conclusions etc in context. 5(a) was the only question that presented significant problems for students. Many students made efficient use of a graphics calculator and most displayed a sound understanding of all topics on the spec.

Question 1

In part (a), most students correctly stated that there were no measured values given or that ranks only were given for the 400 metres and positions for the cross country. Some students struggled to express this clearly and stated comments such as "there are no numbers". Part (b) was very well done by almost all students, with only a few losing marks because they gave their answer to fewer than three significant figures or because they found the PMCC for the given data. Part (c) was done well, but some students lost marks because they found the wrong cv tail or failed to state their conclusion in context. In part (d), many students gave a correct explanation of a Type II error and most went on to explain it well in context. In part (e), most students successfully used a calculator to find the value of the PMCC and went on to say correctly that this was strong negative correlation in a context.

Question 2

Almost all students successfully completed the table of observed frequencies in part (a). In part (b), there were many correct solutions and good use of a calculator to obtain the correct test statistic. Conclusions in context were less common. Part (c) was only completed correctly in context by a minority of students as very few realised the strongest sources of the association were for 'soccer and avoidance' followed by 'baseball and avoidance' and correctly compared the observed and expected frequencies for these. In part (d), most students realised that it was necessary to use Yates' correction but a significant number applied the rule incorrectly as $(O - E - 0.5)^2$ rather than $(|O - E| - 0.5)^2$ for the numerator.

Question 3

In part (a), few students realised that the order in which the drugs were taken could have an effect on the outcome of the pain relief provided. In part (b), students usually wrote down the differences and made an effort to rank them. Hypotheses were stated accurately, but several students lost marks by not writing their conclusion in context. Students were confident to answer part (c) in a general manner but most missed that the adults who took part in the trial were volunteers and hence the adults were unlikely to be a random sample. It is useful if students read carefully the scenario for each question when they are providing written responses.

Question 4

Most students found the U-values and the critical value correctly and scored highly on this topic. Some students failed to include the context in their conclusion.

Question 5

Part (a) presented a challenge to most students who failed to state appropriate hypotheses. Many students found correct binomial probabilities and many of these went on to compare a probability with the significance level of 0.05. Fewer students were able to state the correct solution in context. A few students tried to state a critical region — a perfectly acceptable method — but lost marks as they failed to give an appropriate binomial probability to justify the critical region they had stated. Part (a)(ii) was found to be challenging as many students did not explain that a Wilcoxon signed-rank test cannot be used if there are only preferences given rather than numerical values.

In part (b), most students produced a correct test statistic and seem well trained at evaluating H on a calculator. The majority of students found the correct critical value from 2 df and rejected the null hypothesis. Part (b)(ii) was more challenging, with few students appreciating that at least two of the groups' average scores differ and only a small number of students correctly identifying the difference between the 'under 40' and the '40-55 years' age groups, with the latter being the most stressed.

Mark Ranges and Award of Grades

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

Converting Marks into UMS marks

Convert raw marks into Uniform Mark Scale (UMS) marks by using the link below.

UMS conversion calculator www.aqa.org.uk/umsconversion