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General Certificate of Education (A-level)
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Mathematics MS2B

(Specification 6360)

Statistics 2B

Report on the Examination

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General

Students demonstrated a high level of competence in the various computational skills. However, there was some confusion between z-values and t-values and when each should be used, and similarly between $\mathrm{f}(t)$ and $\mathrm{F}(t)$ in the continuous random variable questions. Students must take care to read the requirements of the question carefully, and to follow them. They must also avoid premature rounding in calculations, particularly where similar sized numbers are to be subtracted.

Question 1

The calculation part was handled well, apart from by those students who used a z-value, and others who ignored the instruction to give the answer to two decimal places. A fair proportion of students recognised the uncertainty introduced because the 2011 mean lay within the 2012 confidence interval, and correctly deduced that the 2012 mean might lie below or above the previous year's mean. Others were far too definite in their conclusions. Strangely, a sizeable proportion of students equated a higher time with a better performance. Very few observed that success in races is not directly linked to mean time and depends also on other athletes' performances.

Question 2

Most students followed the instruction to combine two columns, though some did not explain why this was necessary, and others ignored it completely. Only a small proportion thought it was appropriate to combine 'flats' with 'detached'; the vast majority making the obvious choice of 'flats' and 'terraced'. The calculations were generally well done, although some did not work with sufficient significant places. Only a few felt it necessary to use Yates' correction. The majority of students realised that the degrees of freedom had now been reduced to 2 and reached the correct conclusion. In the final part, when students chose difference between expected and observed values as their criterion, it was often unclear why 'terraced' might be chosen in preference to 'flats'. There were, however, many excellent explanations.

Question 3

This question was generally very well-answered, although a small proportion used incorrect values of λ and scored poorly. In the final part, some students merely used 'standard' Poisson phrases such as 'not independent' or 'mean not equal to variance', but most 'considered the context and produced a sensible explanation.

Question 4

This was another well-answered question, with many students scoring full marks. A plot was not required for the sketch (though many did produce one) but an indication of scale on both axes was required. Students should appreciate the distinction between a requirement to 'Show' as in part (b), where each step of the working is expected, and 'Write down' as in part (c)(i) where only the answer is needed. Having shown that the area splits neatly in half as $9k + 9k$, many students wasted time with up to a page of working to find the median value.

Question 5

Part (a) was almost universally answered correctly. Most students then went on to complete the question successfully, although some found the algebra required confusing and squared the wrong part of the variance. Others ignored the instruction in part (b)(ii) to use the results from part (a) and so inevitably lost marks.

Question 6

In attempting this question, the population of students split essentially into two parts. The major part understood the concept of $\mathrm{F}(t)$ and its relationship to $\mathrm{f}(t)$ and generally scored very highly. The minor part usually started by integrating $\mathrm{F}(t)$ and thereafter gained very few marks. Amongst the better students, it was disappointing that so many failed to convert 5.79 weeks into days, as required, and equally that so many at this level differentiated t^3 and obtained $2t^2$.

Question 7

This was another question which the majority of students handled very well. Most defined H_0 and H_1 in terms of μ, the simplest approach given that some students confused population mean and sample mean. Use of σ, rather than s, was not common, and did not affect the final outcome. Slips in arithmetic accounted for many of the marks lost. Nearly all students completed part (b) correctly.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the Results Statistics page of the AQA Website: http://www.aqa.org.uk/over/stat.html

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