

Summary of Examiner's Reports for NST maths 1A and 1B, 2009

R.R. Horgan

1 NST maths 1A

This is the third year of the new format which includes section A on each paper comprising short questions to test skills; section A1 (on paper 1) tests school-based skills and section A2 (on paper 2) tests skills acquired at Cambridge; I return to this aim below in light of a comment in the report. The following section each consists of 10 questions, two of which are starred requiring knowledge of B-course material. There were 419 NST students and 62 CST students taking the exam.

As last year, it was gratifying that no reports of misconduct were received. There was one instance where a student was suspected of cheating but on investigation the student was cleared. Examiners should be aware of all exam venues as CST students take exams in the senate house separate from other NST students and no examiner was present for the start of the exams there. The sorting was undertaken by the Board of Exams and was speedily and accurately done.

Raw marks were input by each examiner into a personalized spreadsheet and data from master cover sheets were entered into another spreadsheet which was used to check final amalgamated markbook. Only a few discrepancies were found which were corrected.

The median mark was 140/240 to be compared with 131/240 in 2008, 137/240 in 2007 and 136/240 in the earlier format exam of 2006. This corrects the trend towards lower scores and is to be welcomed. A significant fact is that the median on Paper 1 (68) was lower than that on Paper 2 (74) mainly because on paper 1 question 14Z (on complex numbers) was very popular but only scored a median value of 6/20 in 395 attempts. There was a similar problem last year concerning question 2T on paper 1, also on complex numbers, which was attempted by 403 students but only a median of 6/20 was achieved.

Concerning the section A questions, the scores are much higher than last year. On section A1 the mean score was 14.17/20 (11.1/20 in 2008) and on section A2 it was 14.83/20 (12.9/20 in 2008). This is an encouraging improvement. However, I am a little surprised by the statement that both sections A1 and A2 were designed to test exclusively core A-level mathematics (see page 3); my understanding is as stated in my first paragraph above that A2 is to test core knowledge learned in the Cambridge course. This should be clarified.

There are seven important points raised by the report and also by the examiners:

- (1) The role of sections A1 and A2 should be clarified.

- (2) Unlike last year there were a substantial number of attempts at the B-course, starred, questions. There will always be fewer attempts on average than for unstarred questions since these tend to be easier and on similar topics and there are fewer students in the B-course (around 200) . However, except for 20T on Paper 2 (14 attempts with mean 14.43/20) there is a solid achievement and an average mean score of over 11/20 which favourable compares with the scores on unstarred questions.
- (3) As last year, the Examiners recommend that the issue of Mathematics only counting 75% should be reconsidered. This was brought before the NST Management Committee and the 75% rule was confirmed. It arises because physical science students can rise to the top of the NST classification on strong performance in physics and mathematics to the detriment of those in the biological sciences and it is the strong representation of the biological science departments that the balance be addressed in this way. It should be noted that the score in Mathematical Biology also counts 75%r aand in EMB it is 70%. This is no longer under active discussion.
- It should also be noted that, although not yet voted on by the NST Management Committee, it is a strong recommendation of a sub-committee that the Computing Course be delivered by the experimental departments in rotation and be administered by a panel of representatives. The mark will no longer be included in the maths mark meaning that the score on the maths really will now contribute a maximum of 75% rather than around 70% (as computing took up about 5% of the mark). This has still to be ratified.
- (4) The Examiners were divided over the question of whether Mathematics could be rigorously examiner in only one paper. The relevant points are that one paper containing section A questions, long questions and starred long questions, covering respectively basic knowledge, the A-course material and the B-course material, is not adequate to test these different skills and knowledge bases.
- (5) The Examiners felt that the marking load is too high. There are three issues. The first how many questions are actually marked. There were on average 158 A-section questions and 783 long questions marked per examiner. It might be thought that the questions are quicker to mark than in IA/IB of the Mathematics Tripos and so the load, in my view, is comparable. However, it would be useful to know how the time spent marking compares with the Maths Tripos (around 5-6 days full time). The second point is that last year it was recommended that there be an examiner from the Computer Laboratory. This would increase the number from 6 to 7 thus alleviating the load. This was not implemented for 2009. The last point is the timing of the exam and the time allowed for marking. It may not be possible to schedule the exams earlier but it would help were this possible.
- (6) Invigilators should be instructed to give more time to allow students to fill in cover sheets and the information to be filled in should be clarified.
- (7) Machine-readable cover sheets should be used.

2 NST maths 1B

There were 145 students. There were no typographical errors in the exam. Consistent with agreed NST1B policy giving 60% of candidate a II.1 or better and the II.1/I border

was determined by detailed scrutiny of performance. There was one failure.

There are some issues to which I would like to draw your attention.

The report states that the procedures for checking scripts was completed successfully as was the checking of the aggregate marks against the master cover sheets. This seems at variance with the processing error that led to the exclusion of marks of 23 students for Paper 2. I would expect that the script checkers would all check a print-out of each examiner's spreadsheet entries and that any remaining mistakes be picked up by checking against the master cover sheet. Dr Dalziel carried out an exhaustive analysis and found some other errors which were corrected. It is unclear why procedures that have worked well in the Maths Tripos should have failed especially when they have worked well in the NST IA maths exam. Dr Dalziel makes recommendations for catching errors. It should also be considered, as recommended by the NST IA examiners, that machine readable master cover sheets be used.

Another issue in the exam itself was that a question was set on Laplace transforms which was not in the schedule. Whilst the question could be done it is clear that it should not have appeared with terminology not in the schedule. There were 5 attempts with a mean mark of 7.4/20. The Examiners recommend that they be provided with the current schedules to avoid this happening again. It might be a view that it was the duty of the Examiners to check themselves that they had the correct information: it is on the web. Also, this question should have been rejected by the lecturer concerned. Perhaps the Chair of the Faculty Board should annually remind the Senior Examiner of the importance of having thorough procedures for setting and checking questions.