Summary of Senior Examiners' Reports for NST Mathematics 2016

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This report provides a summary of some of the main points made in the Examiners' reports and provides some commentary following a meeting of the NST Mathematics Teaching Committee held on 27 October 2016, at which the reports were discussed.

NST Mathematics IA

A total of 524 students took this examination, comprising 444 from the Natural Sciences Tripos (NST), and the remainder from the Computer Science Tripos (CST). There were none from the Education Tripos (ET). In 2015 there were 511 students, comprising 420 NST, 89 CST and 2 ET.

There were no reports of misconduct. One question required a correction to eliminate a typo. This was spotted by the examiners, with an announcement made before the examination began.

Three Assessors from DAMTP assisted the examiners in marking selected questions, each under the supervision of the Examiner who had set the question concerned. Questions were assigned to Assessors to even out the marking load of different Examiners.

The median raw mark (out of 240) had climbed steadily between 2008 and 2012 from 131 to 182 but has reduced significantly in the last four years, with the 2016 raw mark being the lowest since 2008:

2008	2009	2010	2011	2012	2013	2014	2015	2016
131	140	162	170	182	150	160	151	137

The two papers were of roughly equal difficulty, with mean scores of 65.1, 71.7 and median scores of 64, 73 (out of 120).

The teaching committee agreed that the Examiners for 2017 should be encouraged to set papers which reverse the recent decline in raw marks.

In 2014, an appeal from a student resulted in the discovery of a subtle error in the spreadsheet used for processing the marks. Following the practice introduced in 2015, the Examiners used several independent methods to process the marks. Scaling of marks was performed using both a spreadsheet and a custom-written computer code. The two methods were found to be consistent. The Senior Examiner also performed the scaling by hand for a selection of candidates, again with consistent results.

The Examiners provide a list of recommendations.

They recommend the introduction of an additional Examiner from the Computer Laboratory, which seems appropriate given the large number of CST candidates. In previous years, the Computer Laboratory has not taken the opportunity to supply an Examiner when invited to do so.

The Examiners recommend, as a matter of urgency, that a computer code (instead of a spreadsheet) be used in future to process marks, as in the Mathematical Tripos. The Teaching Committee agrees that this should be a priority. The committee agreed that in 2017 it would be prudent to continue the practice of using both a computer code and a spreadsheet to perform the mark processing, even though this involves more work for the Examiners.

The Examiners express a concern about the absence of a large board or screen in the Sports Hall. This would make it difficult to communicate a correction of a technical nature if an error were found in a question. The NST IB Maths Senior Examiner's report expresses the same concern. This concern was also raised in 2015, with the report of the final Senior Examiners' Meeting for NST IA stating that it would be referred to the Board of Examinations. However, it appears that this did not result in any change. The teaching committee has asked the undergraduate office to follow this up.

NST Mathematics IB

168 candidates sat this exam (there were 164 last year, 166 the year before). No problems arose during the exam.

Following the practice of previous years, each Examiner checked the questions set by one other Examiner without the aid of solutions. The questions and solutions were then sent to lecturers for comment, and revisions made where deemed appropriate. The Examiners then carefully checked all questions together.

The examination consisted of two papers. Candidates performed significantly worse on paper 1 (mean mark 53.7%) than on paper 2 (mean mark 69.7%). The Examiners felt that the difficulty of paper 2 was comparable to recent years whereas paper 1 was significantly harder. They believe that a contributing factor was that none of them had either lectured or supervised this course previously, and that this led them to misjudge which topics the candidates would find challenging. The teaching committee agreed that it would be desirable in future for at least one Examiner to have experience in teaching or supervising the course.

The Examiners adjusted the class boundaries to mitigate the effects of the difficulty of paper 1. In NST IB there is a procedure for comparing the marks of the cohort of students taking a particular subject (in this case Mathematics) with the performance of the same cohort in IA. The cohort taking IB Mathematics is typically strong and therefore expected to perform well at IB. This year, the proposed class boundaries were found to lie outside the targets based on the IA cohort performance but the NST mathematics examiners felt

that this was justified because of the difficulty of paper 1. However, after discussion with the Chair of NST IB/II Examiners, the class boundaries were adjusted with the effect that 6 candidates moved from II.1 to II.2.

The final result after rescaling was a mean mark of 66.6% with the number of candidates in each class as follows (2015 figures in brackets): I 42.9% (40.9%), II.1 29.8% (26.2%), II.2 19.6% (20.1%), III 6.0% (10.4%), Ordinary/Fail 1.8% (2.4%).