

Summary of Senior Examiners' Reports for NST Mathematics 2019

H S Reall
(Convenor, NST Mathematics Teaching Committee)

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 31 October 2019, at which the reports were discussed.

NST Mathematics IA

A total of 542 students took this examination, comprising 421 from the Natural Sciences Tripos (NST) and 121 from the Computer Science Tripos (CST). In 2018 there were 520 students, comprising 429 NST and 91 CST.

There were no reports of misconduct.

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 declined significantly from 2013 to 2016, with the 2016 papers being especially difficult. The raw mark in 2019 was 165. The Teaching Committee was satisfied that this indicates that the papers were set at an appropriate level of difficulty.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Median/240	162	170	182	150	160	151	137	160	153	165

The two papers were of roughly equal difficulty, with mean scores of 81.7, 81.1 and median scores of 83, 84 (out of 120). Section A of each paper contains questions which are supposed to be short and contain no problem solving element. On paper 1 these questions test A-level material and it is pleasing to see that candidates performed well on this section, scoring a median mark of 16 (out of 20). This is comparable to 2018 (median mark 15/20). On paper 2 the section A questions test core material from the NST mathematics course and the performance on this section was significantly worse, with a median mark of just 11/20. This is similar to 2018 (12/20). I will remind the Senior Examiner for 2020 that the section A questions are intended to be very straightforward.

The Examiners report that one candidate indicated on a cover sheet that s/he had attempted section A of Paper 1. However, no such attempt could be found. After investigation, the Examiners discovered rough working (in the trash) that pointed to the existence of such an attempt. They estimate that if this work had been found then the candidate would have gained about 15 raw marks, moving them 58 places up the ranking.

In 2018 the Examiners recommended that Assessors be given access to the online markbook so that they can enter marks directly. This was approved by the Faculty Board but an oversight meant that this system was still not implemented in 2019. It should be in place for the 2020 exams.

The examination took place in the Sports Hall. The Examiners are **very strongly critical** of the failure of the Exam Board to provide suitable means of displaying corrections in this venue. The Examiners report that they were promised 5 large whiteboards. However, only 2 medium sizes whiteboards were present and these would have been wholly inadequate for communicating corrections to students. **This is an issue that Examiners have criticized every year** since the Sports Hall was first used as an examination venue. Fortunately, the need to communicate corrections to students has not arisen. But, obviously, it is essential that we have the means to communicate corrections to students in the unlikely event that this is necessary. This is, after all, probably the largest examination set by the University. The NST Mathematics Examiners have requested that the overall Chair of NST IA Examiners should ask the NST Management Committee to write to the Pro-Vice Chancellor for Education about this issue. The Faculty Board may wish to consider whether there is any action that it can take that would help with this problem.

There are several other recommendations in the report, to which the current chair of NST IA Mathematics should pay attention.

NST Mathematics IB

There were no problems during or after the exam.

The Senior Examiner's report does not state how many students sat the exam or the raw marks on each paper. This data is also absent from previous years' reports. (I have asked the Senior Examiner for 2020 to include this information in his report.) The undergraduate office has supplied me with the following data. 168 candidates sat paper 1 and 169 sat paper 2. The median raw marks were 66% on paper 1 and 61% on paper 2. The corresponding figures for 2018 were 67% and 63% and in 2017 they were 78% and 76%. (The 2017 papers were exceptionally straightforward: an overcorrection in response to a difficult exam in 2016.) The difficulty in 2019 seems about right to me.

The Examiners expressed concern about the absence of any means of displaying corrections in the Guildhall. Just as with the IA exam, this is an issue that the Examiners criticize every year. It is troubling that the University does not appear to be taking this seriously.

There are several other recommendations in the report, to which the current chair of NST IB Mathematics should pay attention.