



External Assessment Report 2013

Subject(s)	Applied Mathematics
Level(s)	Advanced Higher

The statistics used in this report are pre-appeal.

This report provides information on the performance of candidates which it is hoped will be useful to teachers/lecturers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding. It would be helpful to read this report in conjunction with the published question papers and marking instructions for the examination.

Comments on candidate performance

General comments

The paper for both the Statistics and the Mechanics options consists of written response questions with a total maximum possible mark of 100.

The Mechanics paper has: Section A comprising only Mechanics questions with a maximum possible mark of 68; Section B comprising questions from the Mathematics for Applied Mathematics unit with a maximum possible mark of 32.

The Statistics paper has: Section A comprising only Statistics questions with a maximum possible mark of 68; Section B comprising questions from the Mathematics for Applied Mathematics unit with a maximum possible mark of 32.

Most candidates were able to access all of the questions. There were many solid performances. The performance of candidates undertaking Statistics was suitably comparable to those choosing Mechanics.

The average (mean) mark for the paper was 51.8: this compares with 61.8 (2012), 63.6 (2011), 58.8 (2010).

Mechanics

- ◆ Nearly all candidates attempted all questions.
- ◆ Questions 1, 2, 4, 5 and parts of 10 were done well by the majority.
- ◆ Candidates answered less well on questions 7, 8 and 11.

Statistics

- ◆ Nearly all candidates attempted all questions.
- ◆ Questions 2, 4, 5, 8 & 9 were done well by the majority.
- ◆ Candidates answered less well on questions 1, 3, 6 & 7, with 7 being particularly testing, although no questions were tackled poorly by all.

Mathematics for Applied Mathematics (Section B)

- ◆ Nearly all candidates attempted all questions.
- ◆ Questions B1 and B2 were done well by the majority.
- ◆ Candidates answered less well on question B6, but no questions were tackled poorly by all.

Areas in which candidates performed well

Mechanics

Questions 1 and 2 provided the straightforward introduction to the paper that was intended. Although question 10 was long and fairly complex, many showed a good understanding of what was required.

Statistics

The less technically-demanding areas of the syllabus were tackled well, in general. Calculation of confidence intervals and straightforward probabilities was handled well.

Mathematics for Applied Mathematics (Section B)

The less technically demanding areas of the syllabus were tackled well, in general.

Areas which candidates found demanding

Mechanics

In Question 7, very few candidates were able to prove Simple Harmonic Motion in a vertical plane. Questions 8, 9 and 10 were all non-routine. Whilst there was little evidence that candidates misunderstood any of the questions, accurate interpretation and a clear idea of how to proceed were frequently inadequate.

Statistics

In Question 7, the main obstacle to progress for many candidates was weak algebraic skills. A failure to recognise that $1 - \exp(-2\lambda)$ could be expressed as the difference of two squares frequently prevented any access to marks for the proof.

In general, difficulties interpreting results and/or commenting on them were widespread amongst the majority of candidates.

Mathematics for Applied Mathematics (Section B)

Candidates found the questions in this section progressively more difficult. Responses to the final part of the final question, B6, were quite poor. Since completion of this part depended on knowledge of a single formula, this may well have been overlooked by a good many candidates.

Advice to centres for preparation of future candidates

Mechanics

A greater exposure to non-routine and/or contextualised questions would enhance candidates' understanding of the concepts involved and better prepare candidates for the more demanding examination questions.

Statistics

A greater emphasis on the interpretation of results, and an ability to comment perceptively when asked to do so, would be of enormous overall benefit to candidates. Similarly, more care in the statement of hypotheses and an accurate communication of the acceptance or rejection of H_0 would result in improved performance.

Mathematics for Applied Mathematics (Section B)

Where possible, within the time constraints of the course, thorough coverage of all areas of the syllabus would enable candidates to access all questions with greater confidence.

Statistical information: update on Courses

Advanced Higher Applied Mathematics

Number of resulted entries in 2012	341
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Number of resulted entries in 2013	361
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Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 100				
A	34.9%	34.9%	126	59
B	21.3%	56.2%	77	49
C	17.5%	73.7%	63	40
D	7.8%	81.4%	28	35
No award	18.6%	100.0%	67	-

General commentary on grade boundaries

- ◆ While SQA aims to set examinations and create marking instructions which will allow a competent candidate to score a minimum of 50% of the available marks (the notional C boundary) and a well prepared, very competent candidate to score at least 70% of the available marks (the notional A boundary), it is very challenging to get the standard on target every year, in every subject at every level.
- ◆ Each year, SQA therefore holds a grade boundary meeting for each subject at each level where it brings together all the information available (statistical and judgemental). The Principal Assessor and SQA Qualifications Manager meet with the relevant SQA Business Manager and Statistician to discuss the evidence and make decisions. The meetings are chaired by members of the management team at SQA.
- ◆ The grade boundaries can be adjusted downwards if there is evidence that the exam is more challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual, allowing the pass rate to be unaffected by this circumstance.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.
- ◆ An exam paper at a particular level in a subject in one year tends to have a marginally different set of grade boundaries from exam papers in that subject at that level in other years. This is because the particular questions, and the mix of questions, are different. This is also the case for exams set in centres. If SQA has already altered a boundary in a particular year in, say, Higher Chemistry, this does not mean that centres should necessarily alter boundaries in their prelim exam in Higher Chemistry. The two are not that closely related, as they do not contain identical questions.
- ◆ SQA's main aim is to be fair to candidates across all subjects and all levels and maintain comparable standards across the years, even as arrangements evolve and change.