



External Assessment Report 2011

Subject	Mathematics
Level	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

Overall, candidates found the question paper to be slightly more demanding than in previous years. This may have been due to a few questions set on less familiar topics or in unusual ways.

Some candidates, however, performed extremely well.

Areas in which candidates performed well

Question 1: Integration using partial fractions.

Question 2: Binomial theorem.

Question 4 (a): Understanding of singular matrix.

Please see detailed comments in the advice to centres below.

Areas which candidates found demanding

Question 4: Notation for transpose.

Question 7: Many candidates selected an inappropriate method.

Question 12: Proof by induction.

Question 16 (c): Most candidates did not gain marks in this part of the last question.

Advice to centres for preparation of future candidates

General

Please consider these question-by-question comments.

Question 1: This was a standard topic with which all candidates were familiar. Some candidates made errors in the initial factorisation which incurred a slight penalty. Many candidates lost a mark by failing to use modulus signs in the answer.

Question 2: This standard question was done well. There were some careless errors but the method needed was well known.

Question 3: Part (a) proved more of a challenge than had been expected. It was intended as a routine question of implicit differentiation, but not all candidates used the expected method and the alternative shown in the published solutions was seen from time to time. There was a disappointingly high number of scripts which showed evidence of a 'distributive law' being applied to the left-hand side.

Question 3: It was regrettable that a correction notice was needed for part (b). However, the corrected question was done well. The marking instructions had been adjusted to take

account of candidates who had not been given the corrected question or who had tried to merge the two versions of the question.

Question 4: Part (a) was done well. Candidates knew what was needed. Some made arithmetical mistakes but the strategy was understood.

Question 4: Part (b) demonstrated that the notation for the transpose of a matrix was unfamiliar to many. The setting up and solving of equations earned marks in other cases.

Question 5: Maclaurin series form part of the routine questions and the early parts of this question were done well. It was disappointing that many candidates failed to see how the first part could make the second result much more accessible. It was also disappointing to see many attempts for the last part which ignored the early parts.

Question 6: This question was set to test understanding of graphical concepts and seemed to succeed in that respect. Many candidates showed a good grasp but others failed to make their method clear.

Question 7: This question was expected to be quite a challenge. Making use of the properties of logs should have been obvious and a candidate who used this approach minimised the difficulty. The alternative methods in the marking instructions were more arduous and must have seemed very difficult for just four marks.

Question 8: This question proved to be demanding. Candidates were not as fluent with the notation as had been hoped and seemed unfamiliar with the formulas for sums of squares and of cubes. Complete solutions were rare.

Question 9: This question was set to assess solution by separating variables and, even using that approach, was a demanding task. Those candidates who chose to rearrange it and use an integrating factor made it far harder.

Question 10: Questions which use the word 'locus' are set from time to time and are usually demanding. This was no exception despite the context being quite straightforward.

Question 11 (a): Many candidates showed a good grasp of what was needed and were familiar with the necessary standard integral. Full marks for this part was a common occurrence.

Question 11 (b): Few candidates really got to grips with this part. The setters felt that an appropriate substitution should have been within reach for a well-prepared candidate. Some candidates provided good solutions along the lines of the second method in the marking instructions.

Question 12: Proof by induction seems always to be a challenge. Few candidates gained full marks.

Question 13: Questions on standard series should be routine for AH candidates. Although most candidates recognised the context there were many errors and, in the final part, justifying the value 39 was a real challenge.

Question 14: It was good to see that this substantial question was tackled well. Over the years, proficiency has steadily increased. The form of the right-hand side proved to be a challenge; although most candidates knew what was needed, others struggled.

Question 15 (a): Quite often part (a) was done well but a significant number of candidates constructed parametric equations for the two lines which used the same symbol as the parameter for each line. Inevitably, this caused problems.

Question 15 (b): Irrespective of the success (or otherwise) of part (a), part (b) was generally tackled well.

Question 16: This was expected to be a very challenging question and it performed as such. Full marks were rare and it was disappointing that few candidates picked up partial marks.

Statistical information: update on Courses

Number of resulted entries in 2010	2,935
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Number of resulted entries in 2011	3,098
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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	22.4%	22.4%	693	68
B	20.7%	43.0%	640	55
C	23.0%	66.0%	713	43
D	10.1%	76.2%	314	37
No award	23.8%	100.0%	738	-

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, therefore, SQA 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 Head of Service 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.