



External Assessment Report 2014

Subject(s)	Mathematics
Level(s)	Higher

The statistics used in this report are prior to the outcome of any Post Results Services requests

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 level of demand and coverage of the course was viewed as good in this year's examination. The question paper performed as expected, with questions that were designed to provide opportunities for candidates to demonstrate performance at A/B level proving to be demanding, as intended. The paper generated a good spread of responses. Overall, candidates put a great deal of effort into their responses. A high percentage of candidates, at all levels, tackled most questions, and there were few blank spaces. Candidates had clearly learned processes, but some lacked the required level of skill in basic equation solving and working with fractions and roots. Many responses lacked rigour and clarity in presentation and communication.

Paper 1 Section A: Objective Type Questions: Total mark possible: 40

Candidates' performance was in line with past examinations, with an average mark of 25.9 (compared with 26.4 in 2013, 24.4 in 2012, 27.1 in 2011). The first 16 or 17 questions are aimed at the candidate who is performing at C grade and intended to test routine mathematical skills. The final three or four questions are designed for the A/B candidates. However, question 15 proved to be more demanding than anticipated, and question 17 less demanding than anticipated.

Paper 1 Section B: Written response questions: Total mark possible: 30

Nearly all candidates attempted all questions. They found the first parts of the questions straightforward, with the following parts more demanding.

Paper 2 Section A: Written response questions: Total mark possible: 60

It was pleasing to see that the vast majority of candidates were able to access some marks in all of the questions, with the exception of Q8, where some were unable to start.

The average mark for the written response papers was 47.86: this compares with 48.19 (2013), 50.6 (2012), 54.1 (2011).

Areas in which candidates performed well

Objective Type Questions

In questions 1–6 and 14, more than three-quarters of candidates chose the correct response.

Written response questions

Candidates coped well with curve-sketching and straight line work, including finding the intersection of a line and circle. Finding an angle using scalar product and area between line and quadratic were tackled well. Those candidates who kept going were able to gain some marks for most questions.

Candidates appeared to find questions 21(a), 22(a), 23(a), 1(a), 2 and 4 straightforward. In particular, Q4, despite some errors in coordinates, was very well answered.

Question 21a: Most candidates knew how to tackle this question although some only identified one stationary point.

Question 5: The majority of candidates made a good attempt; nearly all candidates gained some marks.

Question 7a was reasonably well done and most candidates were well drilled in the straightforward processes required here, but some lacked the precision required to gain the final mark.

Areas which candidates found demanding

Objective Type Questions

In questions 15, 19 and 20 less than two-fifths of candidates chose the correct response.

Written response questions

Question 21(b): Many candidates failed to find both intercepts.

Question 22: This was completed correctly by about 50% candidates, but there was a lack of communication even from those who completed it well.

Question 23(c): Very few candidates sketched the question out. This would have improved understanding and hence their attempts. The majority of candidates missed the concept of angle in a semi-circle. Few seemed to realise which line was the diameter.

Question 24: Candidates continue to find the topic of logarithms challenging. Errors were made in applying the laws of logarithms, and it was apparent that some candidates had experienced less exposure to such equations.

Question 3(b): A lack of rigour when writing out expressions and poor use of brackets meant that many candidates were unable to access full marks.

Question 6: Poor substitution and then answering in degrees let many candidates down in this question.

Question 7(b): Few candidates were finding the intercepts required. They did not check that the equations of the lines they were using were credible.

Question 8: A majority of pupils failed to see the necessity for solving a quadratic inequation.

Question 9(b) and (c): A lot of candidates struggled with the context of this question, failing to correctly link velocity, acceleration and displacement despite this being defined in the question. This question also highlighted a general lack of confidence in dealing with radians.

Algebraic manipulation involving non-integer powers challenged a large number of candidates. In general, fraction work seemed to present difficulties for many. Several markers noticed many times when equal signs were missed out when solving equations as well as the numerous mistakes made with negative signs.

Advice to centres for preparation of future candidates

Paper 1 Section A: Objective type questions

Use can be made of the bank of questions available on the SQA website to prepare candidates for this type of question.

There is no penalty for wrong answers to these questions, so candidates should not leave any of these first 20 questions blank.

Paper 1 Section B and paper 2: Written response questions

Candidates should be encouraged to communicate their answers clearly. It is important that formulae are not just quoted; a formula should be linked to the diagram and/or context given in the question.

Candidates should look for connections between parts of questions, particularly where there are three or four parts to a question. These are almost always linked and, in some instances, an earlier result in part (a) or (b) is needed, and its use would avoid repeated work by candidates.

General

Learners should experience topics in unfamiliar contexts. They should be given regular opportunities to carefully read and interpret problems. For example, it was evident that many candidates had not been exposed to circle problems beyond unit level. As a result, although they knew the basics, they lacked a real understanding of the topic and were unable to apply their knowledge.

They should have exposure to proof, logical thinking strategies and rigour.

Candidates will not be told in every question to 'show their working'; it would be advantageous if candidates were routinely reminded of the requirement for accuracy, for detail, and for illustrating their understanding in their working.

Rather than continuing to work with an answer which is clearly wrong, candidates should be encouraged to check to see if they have made a simple mistake at the start of the question.

It is evident that learners would benefit from further practice in algebraic manipulation and consolidating numerical skills. A large number of candidates did not know how to deal with factorising and solving a quadratic where there was an algebraic common factor. It was also quite clear that some learners had not been exposed to the necessary content on logarithms.

Candidates need to be aware of necessary rigour in the use of the correct notation: the omission of brackets in cases where the meaning is altered will usually result in marks being lost. Some learners seemed to be unfamiliar with the convention of using no unit symbol with angles given in radians.

It is important that sketches are clearly annotated or at least provide critical information in accompanying working.

Communication is important in questions where standard results are used. It is insufficient just to quote the results: they need to be connected to the particular question. For example, when using gradients to show that lines are perpendicular, it is not enough to quote:

$$m_1 m_2 = -1.$$

The SQA website contains the marking instructions for 2014 (as well as previous years). All those teaching Higher Mathematics, and candidates undertaking the course, should ensure they look at these detailed marking Instructions for further advice and guidance.

Statistical information: update on Courses

Number of resulted entries in 2013	20663
------------------------------------	-------

Number of resulted entries in 2014	21851
------------------------------------	-------

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 130				
A	25.3%	25.3%	5536	93
B	23.6%	49.0%	5163	76
C	23.1%	72.1%	5058	59
D	9.8%	81.9%	2136	50
No award	18.1%	-	3958	-

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.