External Assessment Report 2013

Subject(s)	Mathematics
Level(s)	Intermediate 1

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

Approximately 10% of entries were for Mathematics 1, 2 and Applications.

Mathematics 1, 2 and 3:

- the mean mark was marginally lower than in 2012
- candidates' performance was better in Paper 1 but poorer in Paper 2

Mathematics 1, 2 and Applications:

- the mean mark was significantly higher than in previous years, although it continues to be lower than that for candidates doing Mathematics 1, 2 and 3
- candidates' performance was better in both Papers 1 and 2

Areas in which candidates performed well

Paper 1

- Question 1a): Add decimals.
- Question 1b): Multiply a decimal by a single digit whole number.
- Question 7a)&b): Find probability.
- Question 8: Interpret table and carry out time interval calculations.

Paper 2

- Question 1: Solve a simple problem on direct proportion.
- Question 2a) (Applications): Evaluate SUM formula in spreadsheet.
- Question 3a): Interpret bar graph.
- Question 4a) (Applications): Extract information from loan repayment table.
- Question 6a) (1, 2, 3): Write in full, a number given in scientific notation.
- Question 8a): Find the median of a data set.
- Question 8b): Find the range of a data set.
- Question 9 (Applications): Interpret a flowchart.
- Question 10(1, 2, 3): Evaluate a formula.

Areas which candidates found demanding

Paper 1

- Question 4: **Hire Purchase (working backwards)**. Many candidates used an incorrect method. Common incorrect methods were: 700 + 136×6, (700 + 136) × 6 and (700 + 136) ÷ 6. Even when the correct method was used, many candidates could not carry out the subtraction and/or division correctly.

- Question 5 (Applications): **Calculate curved surface area of a cylinder**. Many candidates did not use the correct formula despite it being given in the formula list. Even when the correct formula was used, some candidates substituted 16 instead of 8 for the radius; some candidates substituted correctly but were unable to carry out the multiplication correctly.

- Question 6b): **Calculate mean from a frequency table**. Few candidates knew to divide the total by 50. Of those who knew to divide by 50, many could not carry out the division correctly. Most common answers were 45÷6 = 7·5 or 7·3, 385÷6 = 64·1 and 385÷5 = 77.

- Question 9: **Evaluate expression involving negative integers**. Many candidates ignored the negative signs and evaluated 2×10×4 − 30. Most candidates were unable to subtract −30 correctly. Common answers were: −80 − (−30) = −110, −80 − 30 = −110, 80 − (−30) = −50 and 80 − 30 = 50.

- Question 10b): **Calculate exchange rate**. Many candidates knew to calculate 620÷400 but most were unable to carry out the division correctly.

Paper 2

- Question 2a) (1,2,3): **Multiply out brackets and simplify**. Most candidates were able to multiply out the brackets, but many were unable to collect the like terms. The most common answer was 12*n* − 18 + 11 = 12n − 29.

- Question 2b) (Applications): **Construct formula in a spreadsheet**. Many candidates answered this question incorrectly. A common answer was =SUM(E2..E8).

- Question 3b): **Interpret bar graph**. Many candidates gave an answer of 17, ie number of silver and bronze medals.

- Question 5: **Calculate average speed**. Few candidates managed to get the correct answer to this question. Most achieved 1 mark for knowing to divide distance by time, but few used the correct distance and/or time (in seconds) in the calculation. The most common answers were: 500÷4 = 125 and 3000÷4 = 750.

- Question 6b) (1, 2, 3): **Calculation involving scientific notation**. Few candidates were able to write 5·2 million out in full or in scientific notation; many subtracted instead of dividing.

- Question 7: **Problem involving volume of a cuboid**. Few candidates managed to deal with the mixed units. The most common answer was (7×3×10)×60 = 12600.

- Question 8c): **Interpret median and range**. Most candidates found the median and range correctly in 8a) and 8b). Some went on to interpret the median correctly, but very few interpreted the range correctly.

- Question 10b) (Applications): **Find the point of intersection of two bearings**. Few candidates scored full marks since they were unable to correctly show the 248^{o} bearing, but many gained one or two marks for correctly showing the 135^{o} bearing and/or finding the point of intersection of two bearings.

- Question 11: **Calculate simple interest for a fraction of a year**. Many candidates were able to find the annual interest but did not know how to find the interest for eight months. The most common answers were 2·4/100 × 4750 = 114, 114 × 8 = 912 or 114 ÷ 8 = 14·25. A number of candidates did not know how to calculate 2·4% of 4750.

- Question 12: **Pythagoras' Theorem**. Very few candidates were able to identify the correct triangle to work in but were then able to gain the remainder of the marks for a correct follow-through. Some did not recognise this as a Pythagoras question and attempted to calculate an area instead.

- Question 13: **Express delivery charge as percentage of price**. A variety of answers like those listed in the marking instructions were common. Few candidates gained full marks, but most picked up at least one mark.

- Question 15: **Calculate length of composite shape involving semi-circle**. Few candidates gained full marks, but most were able to pick up some marks for one of the options listed in the marking instructions.

Advice to centres for preparation of future candidates

- In Paper 1, performance in number skills continues to be disappointing, and costs many candidates valuable marks. Centres should continue to consider how best to maintain and practise number skills and mental strategies in preparation for the non-calculator paper, especially in questions that test Course content.

- Centres should continue to consider how best to maintain and practise skills acquired at earlier stages of the Course on a regular basis to improve retention (eg area and perimeter of composite shapes; mean from a frequency table; expressing one quantity as a fraction of another; calculating simple interest for a fraction of a year). These are routine topics which candidates regularly respond poorly to in the external assessment.

- Centres should continue to consider how best to practise interpreting calculated statistics. Candidates demonstrated that they are particularly weak at comparing sets of data with different ranges.

- Centres should consider how best to practise problem solving skills, which candidates require to tackle non-routine questions in the external assessment.

- Detailed Marking Instructions for Intermediate 1 Mathematics are available on the SQA website. Centres should consider directing candidates to these in an attempt to help them realise the importance of showing working in their responses to maximise the marks they can be awarded.

Statistical information: update on Courses

Intermediate 1 Mathematics

Number of resulted entries in 2012	13115

Number of resulted entries in 2013	11721

Statistical information: Performance of candidates

Distribution of Course awards including grade boundaries

Distribution of Course awards	%	Cum. %	Number of candidates	Lowest mark
Maximum Mark 80				
A	23.0%	23.0%	2695	56
B	18.3%	41.3%	2140	48
C	19.0%	60.2%	2225	40
D	8.1%	68.3%	947	36
No award	31.7%	100.0%	3714	-

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.