# External Assessment Report 2014

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| Subject(s) | Mathematics |
| Level(s) | Intermediate 1 |

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

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

The mean marks for candidates doing Mathematics 1, 2 and 3, and for candidates doing

Mathematics 1, 2 and Applications, were both lower than last year.

The mean mark for candidates doing Mathematics 1, 2 and 3 continued to be higher than that for candidates doing Mathematics 1, 2 and Applications.

## Areas in which candidates performed well

### Paper 1

Most candidates were able to do:

- Question 1(a): Subtract decimals.
- Question 2: Calculate annual insurance premium.
- Q5: List all possible combinations.
- Q6 (1, 2, 3): Complete table and draw straight line.

### Paper 2

Most candidates were able to do:

- Question 1: Solve a simple problem on direct proportion.
- Question 4(c): Calculate the range of given data.
- Question 5(b) (1, 2, 3): Factorise expression.
- Question 9(b): Make valid comments comparing results from two pie charts.

## Areas which candidates found demanding

### Paper 1

- Question 1(b): **Divide 9.632 by 8.** Many candidates omitted the 0 from 1.204.
- Question 1(c): **Find 5% of 60.** Common errors 60 ÷ 5 = 12 or calculation of 15% of 60 = 9.
- Question 6 (Applications): **Find lower quartile and interquartile range.** Many candidates made a good attempt to find L, Q1, Q2, Q3 and H, but many did not recognise Q1 as the lower quartile and gave the lowest value, followed by the range instead of interquartile range.
- Question 7(b): **Using formula in words (working backwards).** Many candidates calculated 7(a) correctly, but very few were able to solve the problem, with 15 as a common final answer instead of calculation of 15 x 40.

- Question 8: **Mean from frequency table.** There were many errors in calculations in 8(a). Few knew to divide by 300. Of those who attempted to divide by 300, few calculated correctly. A common answer was 21.6 (7.2 x 3).
- Question 9 (1, 2, 3): **Evaluate formula involving squared.** Most candidates did not calculate 5x5x4 first, making their calculation more difficult and prone to errors.
- Question 9 (b) (Applications): **Find the point of intersection of two bearings.** Many candidates did not attempt to answer this question. Few candidates were able to draw either of the bearings correctly.
- Question 10: **Calculate and compare 2 probabilities, giving explanation for conclusion.** Of the candidates who gave both probabilities, few knew to simplify them into an appropriate form for comparison. Only a very few gave an appropriate reason (4/100 > 3/100) to support their conclusion.

## Paper 2

- Question 2: **Write small number in standard form.** Common incorrect answers include 13 rather than 1.3 and 5 rather than -5.
- Question 3 (Applications): **Calculate the total surface area of prism.** Many candidates did not calculate five surfaces, omitting one of the rectangles.
- Question 4(a): **Stem and Leaf diagram.** Very few candidates showed an unordered stem and leaf followed by an ordered one; many missed out / inserted leaves, showing that they did not appreciate the reason for creating a stem and leaf diagram.
- Question 4(b): **Find the median from Stem and Leaf diagram.** Few candidates used their stem and leaf in (a) and wrote out the data in a list to find the median.
- Question 5(a) (1, 2, 3): **Multiply out brackets and simplify.** Some candidates did not manage to multiply out correctly; many did not manage to collect like terms correctly.
- Question 5(a) (Applications): **Evaluate a spreadsheet formula.** Few candidates calculated the value of the formula. Many did not manage to substitute values correctly from the data given.
- Question 5(a) (Applications): **Construct a spreadsheet formula.** Some candidates knew that AVERAGE should be used, but they were unable to give the formula in an acceptable form.
- Question 6: **Calculate volume.** Most candidates did know how to find the volume, but few used units correctly. The most common answer being 2.97 = (60 x 45 x 1.1) ÷ 1000 for 2 marks.
- Question 7: **Calculate the arrival time.** Most candidates gained marks, but the most frequent error was the incorrect conversion of 6.75 hours eg as 6 hours and 75 minutes or 7 hrs 15 mins. Many omitted the 80 minutes.
- Question 9(a): **Extracting data from a pie chart.** The vast majority of candidates correctly calculated the angle at the centre of the 'Good' sector of the pie chart but either stopped there or were unable to proceed correctly. A common incorrect answer was 188% of 3420.
- Question 10: **Pythagoras' Theorem.** Many candidates did not realise that they should use Pythagoras' theorem to solve this problem. Many candidates who did use Pythagoras correctly did not get the final mark as they failed to double the result of their Pythagoras calculation.
- Question 11: **Calculate simple interest for a fraction of a year.** Many candidates omitted division by 100, others divided by 1.8 when finding the annual interest; some candidates multiplied by 12 and/or divided by 5 in an attempt to calculate the interest.

- Question 12 (1, 2, 3): **Trigonometry – solve right-angled triangle using sine.** Many candidates started using Pythagoras' theorem. Of those who did find an angle, many omitted to add 90 for the final mark.
- Question 12 (Applications): **Overtime Pay (working backwards).** Most candidates gained marks, but a common answer was 14 rather than 7 hours.
- Question 13: **Calculate percentage increase.** Most candidates scored some marks; many divided by 81 instead of 75 or divided by 100 instead of multiplying.
- Question 14: **Area of composite shape involving semi-circle.** As in previous years, this question proved to be demanding, but many candidates were able to pick up some marks. Common errors: in selection of formula for semi-circle, value for radius and omitting to round the final answer.

# Advice to centres for the preparation of future candidates

Centres should continue to consider how best to maintain and practise number skills and mental strategies in preparation for the non-calculator paper in the external assessment.

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 mean from a frequency table; distance, speed, time calculations involving fractions of an hour; 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 tp poorly in the external assessment.

Centres should continue to consider how best to practise interpreting calculated probabilities. Candidates demonstrated that they are particularly weak at comparing probabilities.

Centres should continue to consider how best to prepare candidates to tackle extended response questions which assess problem solving skills.

## Statistical information: update on Courses

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| **Number of resulted entries in 2013** | 11721 |

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|---|---|
| **Number of resulted entries in 2014** | 5430 |

## Statistical information: Performance of candidates

### Distribution of Course awards including grade boundaries

| Distribution of Course awards | % | Cum. % | Number of candidates | Lowest mark |
|---|---|---|---|---|
| Maximum Mark | | | | |
| A | 19.7% | 19.7% | 1069 | 56 |
| B | 17.7% | 37.4% | 962 | 48 |
| C | 19.4% | 56.8% | 1051 | 40 |
| D | 8.7% | 65.4% | 470 | 36 |
| No award | 34.6% | - | 1878 | - |

## 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.