



External Assessment Report 2010

Subject	Mathematics
Level	Intermediate 2

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

In general, feedback from the Marking Team confirmed that the question papers were at an appropriate level with the vast majority of candidates able to attempt every question.

Candidates from S3 and S4 continue to perform better than other groups.

Candidates sitting the Applications of Mathematics option accounted for just over 20% of the total candidates presented. These candidates tend to score less than candidates sitting the Units 1, 2, 3 option, although the gap between the two groups has narrowed this year.

Areas in which candidates performed well

Paper 1

Question 2 (b) and (c) (both versions): quartiles and boxplot

Question 4 (a) and (b) (both versions): Factorisation and multiplication of a trinomial by a binomial

Question 8 (a) and (b) (Units 1, 2, 3): Discriminant: calculation and interpretation

Question 7 (a) (Units 1, 2, Apps): Formula

Paper 2

Question 1 (both versions): Depreciation

Question 4 (a) (both versions): Mean and standard deviation

Question 9 (both versions): Surface area using area of a sector of a circle

Question 11 (both versions): Find height, given volume of a cylinder

Question 14 (a) (Units 1, 2, 3): Solve trig equation

Question 7 (b) (Units 1, 2, Apps): Use a formula in a spreadsheet

Question 14 (Units 1, 2, Apps): Calculate number of hours overtime worked

Areas which candidates found demanding

Paper 1

Question 2 (both versions): Construct a frequency table

In the frequency table many candidates omitted the '10'. This had implications for the cumulative frequency column.

Question 3 (both versions): Calculate the volume of a sphere

Most candidates gained the first mark for correct substitution into the appropriate formula. However few could complete the calculation correctly, with many not being able to 'cancel' the 3s and so missing the opportunity to ease the final multiplication.

Question 6 (both versions):

Candidates realised that the sine rule should be used. However some substituted $\sin \frac{1}{2}$ instead of $\frac{1}{2}$. Even those who had substituted correctly had difficulty dividing by a fraction.

Question 7 (Units 1, 2, 3): Indices

One of the poorest responses. Many candidates seemed to think that when terms are being multiplied then the powers should also be multiplied. Few realised that $p^0 = 1$.

Question 9 (Units 1, 2, 3): Trig graph with equation of the form $y = \cos(x - a)$

Many opted for $a = 1$.

Question 10 (b) (Units 1, 2, 3): Calculate the value of b in $y = (x + a)^2 + b$

Some candidates seemed to realise that they should be substituting the coordinates of a point into the equation of the graph. However, instead of using P or Q, many used (5, 0).

Question 7 (b) (Units 1, 2, Apps): Using a formula to calculate a variable which is not the subject

Usually candidates could gain the first mark for correct substitution but often they did not follow through correctly.

Paper 2

Question 3 (both versions): Use the equation of the line of best fit

Many candidates used 4 for the number of miles rather than the 6 that was given in the question.

Question 4 (b) (both versions): Compare statistics

Some candidates merely repeated the results of the calculations, eg 'Under the new coach the standard deviation was lower'. Marks are awarded for *interpretation* of the statistics, eg 'The standard deviation was lower under the new coach. This means that the results under the new coach were more consistent', or similar.

Question 5 (both versions): Solve simultaneous equations

The majority of candidates knew how to do this question. Unfortunately, after they had scaled the equations, they tried to add instead of subtract or vice versa. This usually led to a decimal value for the first variable and often to errors in calculating the second variable.

Question 6 (Units 1, 2, 3): Multiplication of fractions

Often candidates used the strategy for addition/subtraction of fractions.

Question 10 (b) (Units 1, 2, 3): Solve a quadratic equation

The vast majority of candidates did not spot that this was a quadratic equation which has *two* solutions (found here by factorisation). Candidates tended to prove that $x = 2$ satisfied the equation. Since this is not an exhaustive solution, full marks were not available to them.

Question 6 (Units 1, 2, Apps): Interpret a network

Some responses showed a lack of understanding that the time taken for the whole tidying job was 23 minutes and suggested that one or more friends would be finished before the guests arrived.

Question 7 (a) (Units 1, 2, Apps): State the formula to be used in a specified cell in a spreadsheet

Candidates generally knew what calculation was required but mistakes were made in the format of the formula. Common errors included missing out the equals sign or using the term SUM in the formula.

Question 15 (a) (Units 1, 2, Apps): Draw a cumulative frequency diagram

A significant number of candidates drew a histogram. There was also confusion over the horizontal scale, with some using the groups from the cumulative frequency table, eg $0 \leq m < 10$, as a 'scale' for the diagram.

Advice to centres for preparation of future candidates

Hopefully the notes above will prove helpful to centres and teachers when preparing candidates for the external assessment at Intermediate 2 level.

Some additional points:

- ◆ Dealing with calculations involving negative numbers sometimes proved problematic, eg in calculating the gradient of a straight line, in adding/subtracting the equations when dealing with simultaneous equations. Centres should continue to remind candidates of the techniques and 'rules' used in addition and subtraction of negative numbers, both in isolation and in contexts such as the examples above.
- ◆ Arithmetic calculations in Paper 1 proved challenging for many candidates. Centres are advised to look for opportunities to practise dealing with topics from the Course without the use of a calculator.
- ◆ When asked to comment on statistical results, candidates should be encouraged to interpret the statistics and to endeavour to show understanding of the figures.
- ◆ Unit 3 algebra, especially indices, continues to prove challenging for candidates, even when used in a routine way. In centres where these skills are often taught towards the end of the Course, it may be beneficial for candidates to be introduced to them earlier in the Course with opportunities for revision as the Course progresses.

Statistical information: update on Courses

Number of resulted entries in 2009	21485
Number of resulted entries in 2010	21927

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	34.1%	34.1%	7473	56
B	18.8%	52.9%	4119	48
C	16.8%	69.6%	3673	40
D	6.5%	76.1%	1428	36
No award	23.9%	100.0%	5234	—

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.