External Assessment Report 2010

Subject	**Mathematics**
Level	**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

The question papers were considered to have provided good coverage of the Course and to have been at an appropriate level of difficulty.

Approximately 11.8% of candidate 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 significantly higher than that for candidates doing Mathematics 1, 2 and Applications, although the difference was slightly smaller than in previous years.

Areas in which candidates performed well

Mathematics 1, 2 and 3

Paper 1

Question 1 (a): Subtracting decimals
Question 1 (c): Finding percentage of a quantity
Question 2 (a): Extracting data from a line graph
Question 4 (a): Plotting points on a coordinate grid
Question 5: Listing all possibilities

Paper 2

Question 12 (a): Finding the median from a data set
Question 12 (b): Finding the range from a data set

Mathematics 1, 2 and Applications

Paper 1

Question 1 (a): Subtracting decimals
Question 3 (a): Interpreting a simple network diagram
Question 4 (a): Plotting points on a coordinate grid
Question 5: Listing all possibilities

Paper 2

Question 3 (a): Finding monthly repayment from a loan table
Question 4: Using a simple flowchart
Question 12 (a): Finding the median from a data set
Question 12 (b): Finding the range from a data set

Areas which candidates found demanding

Mathematics 1, 2 and 3

Paper 1

Question 1 (b): 528 ÷ 300
Common incorrect answers were: 528 ÷ 100 × 3 = 15.84 and 528 ÷ 3 × 100 = 17 600.

Question 4 (b): Finding third vertex of triangle
Many candidates formed an isosceles triangle; a small number formed a triangle of area 24 square units; very few formed a triangle with both properties.

Paper 2

Question 3: 45 ÷ 500 = 0.09 = 9×10^{-2}
A common incorrect answer was: 500 ÷ 45 = 11.111 111 11 = 11.1×10^{8} or 1.1×10^{9}.

Question 5: Mean from frequency table
The vast majority of candidates were awarded 1 mark for 7200 ÷ 6 = 1200; more candidates than in previous years were awarded 2 marks for 7200 ÷ 40 = 180; very few candidates read the question carefully enough to gain the third mark for giving the final answer as 180000 or 180 thousand.

Question 6 b (ii): Draw the line $x = 4$
Many candidates did not attempt this question. Few of those who did, answered it correctly. Common incorrect answers were: the line $y = 4$ drawn, 2 or 3 points with x-coordinate 4 plotted but no line drawn, the point (4,0) plotted, the point $(4,3\frac{1}{3})$ shown on the line $y = \frac{1}{3}x + 2$.

Question 7: Pythagoras' Theorem
Few candidates achieved full marks in this question. Incorrect answers were mainly of two types. Those where candidates did not read the question carefully enough and took screen size to mean the area of the screen; 1 mark was still available for calculating the correct dimensions of the screen. Those where candidates used Pythagoras' Theorem, but with incorrect dimensions for the screen; 3 marks were still available for following through 'correctly'.

Question 9: Simple interest for a fraction of a year
The most common answers given were 1.3/100 × 4200 = 54.60 or 54.60 × 9 = 491.40; 1.3 × 4200 ÷ 12 × 9 = 4095 was less common but did appear fairly often.

Question 10: Find length given volume and height of a square based cuboid
The most common answer given was 1369 ÷ 25 = 54.76. Many candidates stopped at this point; very few proceeded correctly from there; 1369 ÷ 25 = 54.76 followed by 54.76 ÷ 4 = 13.69 was fairly common.

Question 12 (c): Interpret median and range
Some candidates interpreted the median correctly but very few interpreted the range correctly.

Question 14: Perimeter 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 for one of the options listed in the marking instructions.

Question 15 (b): Probability
The most common answer given was 5; particularly from candidates whose answer to 15 (a) was $^{3}/_{12}$ leading to $^{5}/_{15}$ in 15 (b).

Mathematics 1, 2 and Applications

Paper 1

Question 1 (b): 528 ÷ 300
Common incorrect answers were 528 ÷ 100 × 3 = 15.84 and 528 ÷ 3 × 100 = 17 600.

Question 3 (b): Interpreting a simple network diagram
Very few candidates answered this question correctly. Most gave an answer of 62 seconds.

Question 4 (b): Finding third vertex of triangle
Many candidates formed an isosceles triangle; a small number formed a triangle of area 24 square units; very few formed a triangle with both properties.

Question 8 (a), (b): Constructing and interpreting a scale drawing
Most candidates' positioning of B was acceptable but their positioning of C was unacceptable because they measured one or both of the angles of elevation outwith tolerance. Common errors in (b) were: incorrectly scaling up a measured length (eg 6.5 cm leading to 60.5 m); and giving an incorrect answer with no working.

Question 9 (a), (b): Negative number pyramid
Most candidates were unable to multiply and divide pairs of integers where at least one of them was negative.

Paper 2

Question 3 (b): Loan repayment calculation
Very few candidates achieved full marks. Common incorrect answers were:

475 × 12 × 15 = 85 500
85 500 – 40 000 = 45 500
396 × 12 × 15 = 71 280
71 280 – 40 000 = 31 280
(475 – 396) × 15 = 1185
(475 – 396) × 25 = 948 and
475 – 396 = 79

Question 5: Mean from frequency table
The vast majority of candidates were awarded 1 mark for 7200 ÷ 6 = 1200; more candidates than in previous years were awarded 2 marks for 7200 ÷ 40 = 180; very few candidates read the question carefully enough to gain the third mark for giving the final answer as 180 000 or 180 thousand.

Question 7: Pythagoras' Theorem
Few candidates scored full marks in this question. Incorrect answers were mainly of two types. Those where candidates did not read the question carefully enough and took screen size to mean the area of the screen; 1 mark was still available for calculating the correct dimensions of the screen. Those where candidates used Pythagoras' Theorem, but with incorrect dimensions for the screen; 3 marks were still available for following through 'correctly'.

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The most common answers given were: 1.3/100 × 4200 = 54.60 or 54.60 × 9 = 491.40; 1.3 × 4200 ÷ 12 × 9 = 4095 was less common but did appear fairly often.

Question 10: Find length given volume and height of a square based cuboid
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Question 11: Express commission as percentage of sales
Candidates sitting the Applications question paper were much weaker on this question than other candidates. The most common answer given was 750 ÷ 90 = 8.3...%.

Question 12 (c): Interpret median and range
Some candidates interpreted the median correctly but very few interpreted the range correctly.

Question 13: Surface area of a cylinder
Most candidates thought that the curved surface area was 12 × 20 = 240; some proceeded to correctly add the area of the circle.

Question 14: Perimeter 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 for one of the options listed in the marking instructions.

Question 15 (a), (b): Probability
The most common answer given for (a) was $^{3}/_{12}$ or $^{1}/_{4}$; most candidates then proceeded to give an answer of 5 coming from $^{5}/_{15}$ in (b).

Advice to centres for 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 in order 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 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 continue to consider how best to prepare candidates to tackle extended response questions which assess problem solving skills.

Statistical information: update on Courses

Number of resulted entries in 2009	12061
Number of resulted entries in 2010	12720

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	19.6%	19.6%	2493	53
B	15.4%	35.0%	1956	45
C	18.1%	53.0%	2298	37
D	8.6%	61.6%	1092	33
No award	38.4%	100.0%	4881	–

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 to maintain comparable standards across the years, even as Arrangements evolve and change.