



## External Assessment Report 2011

Subject	<b>Mathematics</b>
Level	<b>Intermediate 1</b>

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 12% 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 higher 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. The difference was greater than in previous years.

## Areas in which candidates performed well

### Mathematics 1, 2 and 3

#### Paper 1

Most candidates were able to do:

Question 1 (a): Add decimals.

Question 4 (a): Plot two points on a coordinate diagram.

Question 4 (b): Find the coordinates of the midpoint of a line.

Question 5 (a): Interpret a formula in words for calculating a taxi fare.

Question 8 (a): Identify the mode of data presented in a frequency table.

Question 8 (b): State a probability from data presented in a frequency table.

Question 9: List all possible combinations.

#### Paper 2

Most candidates were able to do:

Question 1: Solve a simple problem on direct proportion.

Question 3: Solve a problem where the answer had to be expressed in standard form.

Question 6: Solve a problem involving several steps including finding the volume of a cuboid.

Question 7 (b): Describe differences in information shown in two pie charts.

Question 11: Evaluate a formula involving a square root.

## **Mathematics 1, 2 and Applications**

### **Paper 1**

Most candidates were able to do:

Questions 1 (a), 4 (a), 5 (a) and 9 in common with Mathematics 1, 2 and 3.

### **Paper 2**

Most candidates were able to do:

Questions 1 and 7 (b) in common with Mathematics 1, 2 and 3, and also

Question 2: use a loan table to calculate total repayments.

## **Areas which candidates found demanding**

### **Mathematics 1, 2 and 3**

#### **Paper 1**

Question 1 (b):  $\frac{5}{8}$  of 360

Common errors were attempts to calculate  $360 \div 5 \times 8$ , or the correct method with errors made in carrying out the calculation, particularly in dividing 360 by 8.

Question 1 (c):  $12 \times 13$

A common error was  $12 \times 10 \times 3 = 360$ .

Question 3:  $17 - 4 \times (-2)$

Most common answers were  $13 \times (-2) = -26$  or 26;  $17 - 8 = 9$  and  $8 - 17 = -9$  also occurred often.

Question 8 (c): Mean from a frequency table.

The vast majority of candidates completed the table correctly, but then proceeded to calculate  $495 \div 5 = 99$  and therefore scored 1/3. Of those who attempted to calculate  $495 \div 30$ , many failed to carry out the calculation correctly.

Question 10 (a): Given range, find missing value from data set.

Knowing that they needed to work backwards and doing so correctly, proved to be difficult for many candidates.

Question 10 (b): Given the mean, find a missing value from a data set.

Knowing that they needed to work backwards and doing so correctly, proved to be difficult for many candidates. A common incorrect method was  $26 \div 6 = 4.3\dots$  rounded to 4.

## Paper 2

Question 4 (a): Interpret a distance-time graph.

Many candidates had difficulty in reading the correct time interval from the graph.

Question 4 (b): Calculate average speed from a distance-time graph.

The vast majority of candidates knew that  $S = D/T$  but misread the graph and/or were unable to carry out the calculation correctly. The most common answer was  $300 \div 4.75 = 63$ . Other common answers were  $300 \div 3.45 = 86$  or  $87$  and  $300 \div 4.45 = 67$ .

Question 7 (a): Extracting data from a pie chart.

The vast majority of candidates correctly calculated the angle at the centre of the Liberal sector of the pie chart but either stopped there or were unable to proceed correctly. A common incorrect answer was  $43\%$  of  $30960 = 13312.8$ .

Question 10: Calculate simple interest for a fraction of a year.

Most candidates were able to find the annual interest but did not know how to find the interest for four months. The most common answers were  $7.5/100 \times 1400 = 105$  or  $105 \times 4 = 420$ .

Question 12: Trigonometry — solve right-angled triangle using tangent.

The majority of candidates achieved the first mark for finding the length of the base of the right-angled triangle, but many then proceeded to use a variety of incorrect methods involving  $\tan^{-1}(6/49)$ ,  $49\tan 6^\circ$ ,  $\sin 49^\circ$  or  $\cos 49^\circ$ .

Question 14: Area of composite shape involving a semi-circle.

Although there was some improvement in responses compared to previous years, this question still proved to be demanding for most candidates. Many candidates were able to pick up some marks for one of the options listed in the marking instructions.

## Mathematics 1, 2 and Applications

### Paper 1

Questions 1 (b), 1 (c), 3, 8 (c), 10 (a) and 10 (b) in common with Mathematics 1, 2 and 3, and also the questions listed below.

Question 5 (b): Given a formula in words for calculating a taxi fare, work backwards.

Knowing how to work backwards proved to be difficult for most candidates.

Question 6 (a): Evaluate formula in a spreadsheet.

Most common answers were  $5 + 2 + 1 = 7$  or  $7 \times 3 = 21$ .

Question 6 (b): Construct a formula in a spreadsheet.

A few candidates knew that AVERAGE should be used but they were unable to give the formula in an acceptable form.

Question 7 (a): Find the scale used in a scale drawing.

Some candidates knew to divide 200 by 8. Some were unable to carry out the calculation correctly. Many who did get as far as  $200 \div 8 = 25$  did not communicate their answer correctly, eg 25, 1 to 25 were fairly common.

Question 7 (b): 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 but some were awarded 1 mark for finding the point of intersection of two (incorrect) bearings.

## Paper 2

Questions 4 (a), 4 (b), 7 (a), 10 and 14 in common with Mathematics 1, 2 and 3, and also the questions listed below.

Question 5: Interpret and use a flowchart.

Most candidates were able to interpret the flowchart but were unable to carry out the calculations correctly, eg for  $60p + £225$ , many candidates calculated  $60 + 225 = £285$ ; many candidates knew that they had to calculate a 12.5% discount but could not calculate it correctly.

Question 8: Solve a problem involving foreign exchange.

Most candidates did not use a correct sequence of steps needed to solve this problem. Common answers were  $800 \times 1.33 = 1064$  followed by  $800 \times 1.07$ ,  $800 \div 1.07 = 747.66$  and  $800 \div 1.33 = 601.50$ .

Question 9: Pythagoras' theorem.

Many candidates did not realise that they should be using Pythagoras' theorem to solve this problem. Many candidates who did use Pythagoras correctly did not get the final mark as they failed to add 2.4 to the result of their Pythagoras calculation.

Question 12 (a): Calculate interquartile range from boxplot.

Many candidates gave the range as their answer.

Question 12 (b): Compare two boxplots.

Very few coherent responses were given to this question. Very few candidates used the terms 'median' and 'interquartile range' in their responses. Common responses were 'the boxplot is higher' and 'the box is smaller', often not specifying which diagram they were referring to.

Question 13: Calculate percentage loss.

Most candidates scored 1 mark out of 4; some scored 2 or 3 marks out of 4 for one of the options listed in the marking instructions.

# Statistical information: update on Courses

## Intermediate 1

Number of resulted entries in 2010	12,720
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Number of resulted entries in 2011	12,843
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## 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	31.2%	31.2%	4,008	57
B	17.0%	48.2%	2,179	49
C	15.7%	63.9%	2,018	41
D	6.9%	70.7%	881	37
No award	29.3%	100.0%	3,757	-

## **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.