



External Assessment Report 2012

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 9% 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 in 2011. A weaker performance by candidates in Paper 1 accounted for the lower mean mark this year. Candidate performance in Paper 2 was comparable with that of 2010.

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 less than in 2011 but greater than in years prior to 2011.

Areas in which candidates performed well

Mathematics 1, 2 and 3

Paper 1

Most candidates were able to do:

Question 1(a): Subtract decimals.

Paper 2

Most candidates were able to do:

Question 2: Solve a simple problem on direct proportion.

Question 4: Factorise an expression involving a numerical common factor.

Question 5: List all possible combinations.

Question 6(a): Extract information from a stem and leaf diagram.

Question 10: Construct a line graph.

Question 13: Evaluate a formula.

Mathematics 1, 2 and Applications

Paper 1

Most candidates were able to do:

Question 1(a) in common with Mathematics 1, 2 and 3, and also

Question 3(a): Calculate gross pay in a payslip.

Paper 2

Most candidates were able to do:

Questions 2, 5, and 6(a) in common with Mathematics 1, 2 and 3, and also

Question 7(a): Evaluate a formula in a spreadsheet.

Areas which candidates found demanding

Mathematics 1, 2 and 3

Paper 1

Question 1(b): 0.029×4000 . Most candidates got the digits 116 correct but put the decimal point in the wrong place.

Question 4: *Commission*. Most candidates used incorrect methods, usually avoiding 420 ($620 - 200$) completely. Nevertheless they achieved partial marks for calculating 30% correctly and/or correctly adding 50. The most common answer was 30% of $620 + 50 = \text{£}236$, which gained 2 marks.

Question 5(a): *Straight line*. Many candidates failed to complete the table correctly. A significant number of candidates treated $y = 0.5x + 3$ as $y = 0.5 + x + 3$ and gave an answer of $-4.5, 3.5, 7.5$.

Question 6(b): *Find range from a frequency table*. The most common answer was $72 - 7 = 65$.

Question 6(c): *Calculate mean from a frequency table*. Fewer candidates than usual were able to complete the table correctly. Few knew to divide the total by 200. Of those who knew to divide by 200, few could carry out the calculation correctly. Most common answer was $1296 \div 5 = 259.2$ or 259.1 .

Question 7(a): *Evaluate formula for volume of prism*. Many candidates did not know how to work out the area of the triangle and/or were unable to multiply a two digit number by 15. The most common answer was $8 \times 6 \times 15 = 48 \times 15 = 48 \times 10 \times 5 = 2400$.

Question 7(b): *Find height of cuboid, given length, breadth and using previously calculated volume*. Most candidates calculated $\text{length} \times \text{breadth} = 4 \times 10 = 40$ and then stopped or proceeded to subtract 40 from the answer to part (a).

Question 8(b): *Work backwards in a number machine involving negative numbers*. Most candidates were unable to solve $? - 17 = -35$.

Question 9: *Solve inequation*. Many candidates achieved 1 mark for $\frac{1}{4}n < 12$, but the vast majority then proceeded to give $n < 3$ as their answer.

Paper 2

Question 3: *Multiply out brackets and simplify*. Most candidates were able to multiply out at least one of the brackets but many were unable to collect the like terms. The most common answer was $8 - 12x + 20x + 5 = 32x + 13$.

Question 9: *Calculate average speed*. Very few candidates managed to get the correct answer to this question. Most achieved 1 mark for knowing how to find the speed but did not know how to convert the distance and time to get the correct answer.

Question 14: *Pythagoras' theorem*. Many did not recognise this as a Pythagoras question and calculated area instead.

Question 15(b): *Calculate percentage profit*. Many candidates did not attempt this question. The most common answer was $28/100 \times 80 = 22.4$.

Question 16: *Calculate area of composite shape involving semi-circles*. This question 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), 4, 6(b), 6(c), 7(a), 7(b) and 8(b) in common with Mathematics 1, 2 and 3, and also the questions listed below.

Question 1(c): *2/7 of 434*. Common errors were attempts to calculate $434 \div 2 \times 7$, or the correct method with errors made in dividing 434 by 7.

Question 2: *Probability*. Common partially correct answers were $8/20$ not fully simplified or $2/3$; a common incorrect answer was $8/12$.

Question 5: *Calculate distance and bearing from map*. Most candidates knew to multiply the correct distance on the map by 50 but were unable to carry out the calculation correctly. Few candidates gave the correct bearing; 50° was a common incorrect answer.

Question 8(a): *Number machine involving negative numbers*. Most candidates were unable to carry out calculations involving negative numbers: $-3 \times -2 = -6$ or -5 and $6 - 17 = 11$ were common.

Paper 2

Questions 9, 14, 15(b) and 16 in common with Mathematics 1, 2 and 3, and also the questions listed below.

Question 1: *Time interval calculation*. Most common answer was 2.15pm – 3hrs 40mins = 10.25am instead of 10.35am with the 25 coming from $40 - 15$.

Question 3(a): *Network diagram*. Many candidates gave the number of nodes, 6, instead of the number of arcs, 8.

Question 4(b): *Loan repayment table*. Most candidates gave the monthly payment, £157.25, as their answer to (a) and the total payments, £5661, as their answer to (b).

Question 7(b): *Construct a formula in a spreadsheet*. Very few candidates answered this question correctly. A common answer was =SUM(D2..D5). A few candidates answered =SUM(B6*10 + C6*7) or =SUM(B6×10 + C6×7).

Question 8(a): *Find upper quartile from a data set*. 11.9 was a common answer. Many candidates did not order the numbers.

Question 8(b): *Find interquartile range from a data set*. Most candidates gave the range as their answer.

Question 11: *Calculate insurance premium.* Most candidates knew how to find $\frac{1}{8}$ of the amount but were unable to calculate the gross premium correctly. A surprising number of candidates correctly calculated the discount but then did not subtract it. Some answers were greater than the value of the house.

Question 13: *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 20 instead of 10 for the radius; some candidates substituted correctly but were unable to evaluate the formula correctly.

Advice to centres for preparation of future candidates

General

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 area of composite shapes; mean from a frequency table; expressing one quantity as a fraction of another). These are routine topics which candidates regularly respond poorly to in the external assessment.

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

Statistical information: update on Courses

Intermediate 1

Number of resulted entries in 2011	12,843
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Number of resulted entries in 2012	13,115
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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	26.0%	26.0%	3,413	55
B	17.2%	43.2%	2,256	47
C	16.7%	59.9%	2,193	39
D	7.9%	67.9%	1,037	35
No award	32.1%	100.0%	4,216	-

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.