



External Assessment Report 2011

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

The vast majority of candidates were able to tackle all questions.

Feedback from Markers was positive and suggested that the paper was appropriate for the level, accessible to candidates and consistent with previous years' papers.

Around 20% of those presented sat the Applications papers and generally did not perform as well as those sitting Units 1, 2, 3, although the Applications candidates did marginally better in Paper 1.

Candidates sitting Units 1, 2, 3 performed better in Paper 2 than Paper 1, but the reverse was true of those sitting Applications.

Areas in which candidates performed well

Paper 1

Q1a & b (both versions): *Quartiles and boxplot:* Most candidates gained these first five marks of the paper.

Q2 (1,2,3) and Q3 (Apps): *Multiplying out brackets:* This was reasonably well done although a significant number of candidates attempted to multiply by 5x.

Q9a (1,2,3): *Quadratic factorisation:* Well done.

Q9a (Apps): *Tree diagram:* High success rate but some diagrams were messy and difficult to follow.

Paper 2

Q1 (1, 2, 3): *Gradient:* A good lead-in for the 1, 2, 3 candidates.

Q2 (both versions): *Percentages:* Generally candidates were clear on the strategy, although some did make errors when finding the multiplier for 3.15%. Those who used the 'year on year' method tended to have more arithmetic errors and so lost the calculation mark. Since the rounding was 'to significant figures', there was a separate mark for rounding. A point to note here is that if candidates complete the calculation correctly, but don't write the answer down, and then round incorrectly, they will lose **both** of the last two marks. Candidates should be reminded to write down the unrounded answer as well as the rounded answer.

- Q4a (1,2,3) and Q3a (Apps): *Volume of cylinder*: Very well done by almost all candidates.
- Q5 (1,2,3) and Q4 (Apps): *Area of sector*: The vast majority knew the strategy and correctly calculated the answer.
- Q6a (1,2,3) and Q5a (Apps): *Mean and standard deviation*: This was very well done. When substituting into the formula, care should be taken to ensure that the square root covers the whole expression.
- Q7 (1,2,3) and Q6 (Apps): *Simultaneous equations*: A standard type of question which was well done. A very small number of candidates persist in using trial and improvement, and produce a response which does not gain full marks — and often gains no marks. At this level a more sophisticated and efficient response is expected.
- Q7 (Apps): *Loan from repayment table*: Many candidates gained 3 marks.
- Q8a (Apps): *Interpreting an ogive*: A high rate of success for candidates who read the graph correctly in the first part of this question.
- Q10 (1,2,3): *Trigonometric equation*: Most gained 3 marks out of 3.
- Q10c and d (Apps): *Spreadsheet*: Generally full and correct responses. However, a few seemed to have written working on the spreadsheet on the question paper — which is not handed in with the script!
- Q11 (1,2,3): *Quadratic formula*: A standard question, here graded as A/B level because the coefficient of x^2 is greater than 1. Mostly well done, though some candidates, after stating that $b = -7$, substituted incorrectly for $-b$ in the formula.
- Q13 (1,2,3) and Q12 (Apps): *Chord in a circle*: Although this topic is categorised as A/B content, many of the candidates gained most, if not all, of the marks, as they did this year.

Areas which candidates found demanding

Paper 1

- Q1c (both versions): *Interpretation of statistics*: Some candidates mistakenly read these two sets of data as both referring to lateness of buses or both referring to lateness of trains. Many found it difficult to express themselves correctly in this question: eg ‘*The train was less late than the bus*’ gained 1 mark, but ‘*The train was late less than the bus*’ gained no marks since it referred to how **often** they were late.
- Q3 (1,2,3) and Q4 (Apps): *Angles in a circle*: This question proved problematic for Markers since many candidates neither drew the diagram nor

referred to the angles by name. In these cases, where all that was written was a series of calculations, it was difficult to allocate marks. In questions like this, candidates should be encouraged to **copy out diagrams** and mark sizes on them. In this way, they may be awarded at least partial marks.

Q4 (1,2,3): *Surds:* Candidates were told in the question that 'Three of the following have the same value' so no marks can be gained by simply re-iterating this with one of the expressions. For example, ' $3\sqrt{8}$ is different from the other three because they are all equal to $\sqrt{24}$ ' will gain no marks unless backed up by **explicit** evidence.

Q6 (1,2,3): *Fractional indices:* This question was very disappointing since most candidates gained no marks because they could not interpret a fractional power.

Q6 (Apps): *Credit card:* To gain the first mark, candidates had to demonstrate that they knew how to work out the interest due, ie $(240 - 7.20) \times 0.01$. However, most candidates did not get beyond $(240 - 7.20)$.

Q9c (1,2,3): *Finding the turning point of a quadratic curve:* A common wrong answer here was $(4, -21)$, where candidates had apparently 'mistaken' $y = x^2 - 4x - 21$ for $y = (x - 4)^2 - 21$.

Q10 (both versions): *Finding trig values of angles greater than 90° :* Many candidates overlooked the fact that they were asked to find 'cos A' and answered with a number of degrees. Few used SOHCAHTOA.

Paper 2

Q1 (Apps): *Gradient:* Though candidates sitting Units 1, 2, 3 coped well with this question, Applications candidates did not.

Q3 (1,2,3): *Change the subject of a formula:* There was a tendency to treat 4 and π differently, eg subtract 4 and divide by π . Also, some candidates were careless when writing the square root sign. They should be reminded that when finding the square root of a fraction, the square root sign must cover the whole fraction and not just the numerator.

Q6b (1,2,3) and Q5b (Apps): *Interpret statistics:* Candidates should realise that to gain the marks in this question they have to do more than simply re-iterate the answers they have calculated in part (a). For example, for a response 'Yes the data in part (a) supports the claim because the mean is 41 and the standard deviation is 2.1', candidates would be awarded 0 marks.

Candidates must compare **explicitly** to gain the marks and, in this particular question, they must also **explicitly** show understanding of 40 ± 2 . A response 'Yes, the data in part (a) does support the claim made by the company because the mean is 41 which lies in the range of 3–42, and the standard deviation is 2.1 which is less than 3' would be awarded both marks.

- Q8 (1,2,3): *Simplify algebraic fractions:* Candidates found this difficult, with many apparently not realising what was required. Others seemed to realise that they needed $(x - 5)$ on the numerator but were not able to obtain it correctly.
- Q8b (Apps): *Cumulative frequency curve:* Few stated the quartiles correctly, although some could use the incorrect quartiles to calculate the semi-interquartile range consistently.
- Q9 (1,2,3): *Subtraction of fractions:* Though this type of question appears regularly in the question papers, it continues to give problems.
- Q9 (Apps): *Given total wage, find overtime rate:* This question was very poorly done. Most candidates divided by 35 or 39 and not by 41.
- Q10a, b (Apps): *Spreadsheet:* Candidates need to be more careful when writing formulae. Even when they correctly calculated the answers to (c) and (d), thereby showing they understood the spreadsheet, they did not express the formulae correctly. The equals sign was often omitted and SUM was used (incorrectly) at almost every opportunity.
- Q14 (1,2,3): *Trigonometric identities:* As always, candidates found this difficult though more than usual attempted the question and picked up at least one mark.

When asked for a proof, candidates must be careful to explain/demonstrate each step. Since the 'answer' is known, **explicit** steps are required to gain marks.

Advice to centres for preparation of future candidates

General

Hopefully the comments above will assist teachers in preparing candidates for the external examination in Intermediate 2 Mathematics. Some additional points may be helpful.

- ◆ Some Markers commented this year on the unacceptable presentation of diagrams (specifically boxplots and tree diagrams). Centres should continue to encourage candidates to use rulers and squared paper where appropriate. Where diagrams are not accurate, marks may be lost.
- ◆ Where candidates use the squared paper provided, they **must write their name** on the squared paper booklet and remember to **insert the squared paper** into their answer booklet before handing it in to the invigilators.
- ◆ Where diagrams are included in the question paper, it is often good practice for the candidate to copy them and use the copies in their answer booklet to record the results of their working. For example, in Paper 1 Q3 (Q4 in Apps) and Paper 2 Q12 and 13 (Q11 and 12 in Apps), Markers found that it helped them to allocate marks when they could see what the candidate had recorded on their diagram. Marks are available for calculating certain angles and where these were marked on the diagram, marks could be allocated accordingly.
- ◆ It is pleasing to note that almost all candidates take care to show working, as instructed on the front page of the question paper. However, there were some cases this year where candidates appeared to have arrived at the correct answers without evidence of method or calculation, sometimes in questions worth 4 or 5 marks. Candidates must be aware that, in these cases, they run the risk of being awarded no marks.

Teachers may find it useful to consult the Detailed Marking Instructions for Intermediate 2 on SQA's website. Discussing these with candidates may help the candidates to realise the importance of certain evidence/working in their responses and so maximise the marks they can be awarded.

Statistical information: update on Courses

Intermediate 2

Number of resulted entries in 2010	21,927
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Number of resulted entries in 2011	22,406
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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	36.2%	36.2%	8,121	56
B	19.0%	55.3%	4,259	48
C	16.8%	72.1%	3,769	40
D	6.8%	78.9%	1,526	36
No award	21.1%	100.0%	4,731	-

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.