



Course report 2019

Subject	Applications of Mathematics
Level	National 5

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report 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 assessment documents and marking instructions.

The statistics used in this report have been compiled before the completion of any post-results services.

Section 1: comments on the assessment

The course assessment was accessible to the majority of candidates. Feedback suggests that it gave candidates a good opportunity to demonstrate the breadth and depth of their knowledge of the subject at this level.

The question papers largely performed as expected, but the overall level of demand was slightly higher than intended. The grade boundaries were adjusted to take account of this.

Question paper 1 (non-calculator)

This question paper performed as expected, except for questions 3b and 12, which candidates found more demanding than expected. Questions 4 and 9b appeared to be less demanding than expected. The majority of candidates made a good attempt at all questions, apart from questions 3b, 7c, 7d, 8b and 12.

Poor basic number skills resulted in some candidates not gaining marks for some questions.

Question paper 2

This question paper performed as expected, except for questions 3a, 3b, 9b and 9d, which candidates found less demanding than expected.

The majority of candidates made a good attempt at all questions, apart from questions 7b, 9c and 10b.

Section 2: comments on candidate performance

Areas that candidates performed well in

Question paper 1 (non-calculator)

Candidates performed well in the following questions:

- Question 1 **Considering the effects of tolerance**
Most candidates achieved full marks.
- Question 2a **Calculating gross pay**
Many candidates achieved full marks.
- Question 2b **Calculating hire-purchase terms**
Many candidates achieved full marks.
- Question 7a **Calculating the median and quartiles for a data set**
Most candidates achieved full marks.
- Question 7b **Constructing a box plot**
Most candidates achieved full marks.
- Question 9b **Calculating a time interval across time zones**
Most candidates achieved full marks.

Question paper 2

Candidates performed well in the following questions:

- Question 1 **Compound percentages**
Most candidates achieved full marks and used an efficient method to obtain the answer. However, some candidates failed to round their final answer to three significant figures and did not gain the final mark. There was little evidence of candidates using a year-by-year approach.
- Question 2 **Compound volume**
Most candidates completed this question well, although many did not use the correct units in their final answer.
- Question 3a **Reading from a graph**
Most candidates read the correct value from the graph. However, many did not know how to convert from euros to pounds sterling.
- Question 6 **Calculating profit**
Most candidates achieved full marks.
- Question 7a **Calculating the mean and standard deviation**
Most candidates could successfully calculate these values.

- Question 7c **Construct and interpret a scatter graph**
Most candidates performed well in this question.
- Question 7d **Extracting information from a table**
Most candidates completed this question very well.
- Question 9d **Determining the best deal given three pieces of information**
Most candidates completed this question well, with only a very small number attempting to compare discount with price this year.

Areas that candidates found demanding

Question paper 1 (non-calculator)

Candidates found the following questions demanding:

- Question 3b **Calculating a probability from pie chart**
Most candidates did not realise that a probability should be stated as a fraction. Many attempted to calculate the number of employees in the given categories rather than the probability of choosing an employee in the category.
- Question 6 **Converting between common fractions, decimal fractions and percentages**
Although most candidates could arrange the decimal fractions and the percentage in the correct order, very few knew how to convert a vulgar fraction to either a decimal or a percentage.
- Question 7c **Calculating the interquartile range**
Many candidates did not appear to know how to calculate the IQR. Some incorrectly calculated the SIQR.
- Question 7d **Interpreting calculated statistics**
Very few candidates knew that the IQR was a measure of the spread of the data.
- Question 8b **Using a scale drawing to calculate gradient**
Few candidates could interpret their scale drawing to find the gradient of the slope.
- Question 12 **Comparing fractions**
Very few candidates realised that the questions were asking them to compare fractions.

Question paper 2

Candidates found the following questions demanding:

- Question 5 **Calculating the perimeter of a composite shape**
Many candidates calculated area instead of perimeter. Some failed to handle the conversion of units correctly. Some did not use appropriate rounding before calculating the cost of the safety rail.
- Question 7b **Interpreting calculated statistics**
Candidates continue to find the comparison of mean and standard deviation very challenging. Comments often referred to 'the data' rather than to the context of the question.
- Question 9c **Carrying out efficient container packing**
Candidates continue to find this very challenging, with some still dividing the volume of the big box by the volume of the small one and not considering potential 'gaps'.
Many candidates did not round appropriately. Many candidates added the number of books that would fit into the length, breadth and height instead of multiplying them.
- Question 10a **Calculating the area of a composite shape**
Many candidates did not interpret the shape correctly and, as a result, did not combine the areas calculated appropriately.
- Question 10b **Using inverse proportion**
Candidates continue to find this challenging.

Section 3: preparing candidates for future assessment

The majority of candidates were well prepared to answer most questions, showing appropriate working and using the correct units in most cases.

The following advice may help prepare future candidates for the National 5 Applications of Mathematics question papers:

- ◆ In paper 1, performance in number skills was disappointing, and many candidates failed to gain valuable marks. Teachers and lecturers should consider how best to maintain and practise number skills to prepare candidates for the non-calculator question paper.
- ◆ The comparison of calculated statistics was disappointing. Teachers and lectures should consider how best to ensure that candidates know the difference between measures of location (mean, median) and measures of spread (standard deviation, interquartile range, range).
- ◆ Some candidates found the calculation of perimeter and area of composite shapes challenging. Teachers and lecturers should consider how best to ensure that candidates know the difference between the perimeter and the area of a two-dimensional shape.
- ◆ Inverse proportion continues to be challenging for candidates. Teachers and lecturers should consider how best to reinforce this topic.
- ◆ Candidates were often unable to complete questions, as they could not interpret the question correctly. Teachers and lecturers should consider how best to practise problem-solving skills.

Further advice and guidance is available in the detailed marking instructions for the 2019 course assessment on SQA's website. Marking instructions from previous years are also on the website.

Grade boundary and statistical information:

Statistical information: update on courses

Number of resulted entries in 2018	2482
Number of resulted entries in 2019	4458

Statistical information: performance of candidates

Distribution of course awards including grade boundaries

Distribution of course awards	Percentage	Cumulative %	Number of candidates	Lowest mark
Maximum mark				
A	23.8%	23.8%	1062	77
B	16.1%	39.9%	717	65
C	18.6%	58.5%	828	53
D	18.6%	77.1%	828	41
No award	22.9%	-	1023	-

General commentary on grade boundaries

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.

SQA aims to set examinations and create marking instructions that allow:

- ◆ a competent candidate to score a minimum of 50% of the available marks (the notional C boundary)
- ◆ 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.

Therefore, SQA holds a grade boundary meeting every year for each subject at each level to bring 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. Members of the SQA management team chair these meetings. SQA can adjust the grade boundaries as a result of the meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper has been more, or less, challenging than usual.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the question paper is more challenging than usual.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the exam is less challenging than usual.
- ◆ Where standards are comparable to previous years, similar grade boundaries are maintained.

Grade boundaries from question papers in the same subject at the same level tend to be marginally different year to year. This is because the particular questions, and the mix of questions, are different. This is also the case for question papers set by centres. If SQA alters a boundary, this does not mean that centres should necessarily alter their boundary in the question papers that they set themselves.