



Course report 2022

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 appeals.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2022	14305
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Statistical information: performance of candidates

Distribution of course awards including grade boundaries

A	Percentage	25.0	Cumulative percentage	25.0	Number of candidates	3570	Minimum mark required	62
B	Percentage	20.2	Cumulative percentage	45.2	Number of candidates	2890	Minimum mark required	51
C	Percentage	19.6	Cumulative percentage	64.8	Number of candidates	2805	Minimum mark required	41
D	Percentage	17.8	Cumulative percentage	82.6	Number of candidates	2555	Minimum mark required	30
No award	Percentage	17.4	Cumulative percentage	N/A	Number of candidates	2485	Minimum mark required	N/A

You can read the general commentary on grade boundaries in appendix 1 of this report.

In this report:

- ◆ 'most' means greater than 70%
- ◆ 'many' means 50% to 69%
- ◆ 'some' means 25% to 49%
- ◆ 'a few' means less than 25%

You can find more statistical reports on the statistics page of [SQA's website](#).

Section 1: comments on the assessment

The course assessment was accessible to most candidates. Feedback suggested that it gave candidates a good opportunity to demonstrate the spread and depth of their knowledge.

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)

Overall, this paper performed as expected and most candidates made a good attempt at all questions. However, questions 3(d), 7, 9, 10, 11, and 12 proved more challenging than expected.

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

Question paper 2

This paper performed as expected and most candidates made a good attempt at all questions. However, questions 2(b) and 7(c) proved more challenging than expected.

Section 2: comments on candidate performance

Question paper 1 (non-calculator)

Question 1: reading scales with minor unmarked divisions

Most candidates successfully marked the tyre pressures on the given gauge. However, some candidates did not gain the conclusion mark because they did not make a numerical comparison.

Question 3(a): determining the median, upper, and lower quartiles

Most candidates successfully determined the median, lower, and upper quartiles.

Question 3(d): comparing the interquartile ranges of two data sets

Very few candidates successfully compared the interquartile range.

Question 4(a): completing a precedence table

Most candidates successfully completed the precedence table. However, some missed out on marks because they wrote '1.45' instead of '1 hour 45 minutes'.

Question 7: calculating the gradient of a slope, expressing the answer as a fraction in its simplest form

Many candidates struggled to calculate the required gradient because they did not draw a diagram. Many candidates also missed out on marks because they did not convert the horizontal and vertical distances to the same unit. Many candidates did not successfully simplify the fraction that they found.

Question 9: calculating the perimeter of a shape including part of a circle

Although most candidates knew what they should do to find the perimeter, many candidates missed out on marks because of poor basic numeracy skills.

Question 10: interpreting information given in a table and in text to calculate a minimum ticket price

Many candidates did not realise that the desired profit had to be added to the costs before dividing by 200.

Question 11: knowing how to use Pythagoras' theorem to find the perpendicular height of a triangle

Very few candidates realised that they had to use Pythagoras' theorem to calculate the height of the triangle. Some candidates did not gain the final mark because they did not state the correct unit.

Question 12: using an expected frequency and interpreting the answer

Many candidates did not understand how to calculate the expected number of parcels using the expected frequency.

Question paper 2

Question 1: calculating compound percentages

Most candidates used an efficient method to obtain the answer. However, some candidates did not gain the final mark because they rounded incorrectly.

Question 2(a)(i) and 2(a)(ii): calculating the mean and standard deviation of a data set

Most candidates successfully calculated the mean and standard deviation.

Question 2(b): comparing calculated statistics

Very few candidates successfully compared calculated statistics. Statements such as 'on average prices in August were less consistent' were common.

Question 4(c): calculating percentage loss

Most candidates calculated the percentage loss. However, some candidates calculated the actual loss as a percentage of the selling price, rather than of the cost of producing the sandwiches.

Question 4(d): extracting information from a table to calculate a total price

Most candidates successfully extracted data from the table to calculate the total cost of the order.

Question 5(a): extracting ingot from a table

Almost all candidates achieved this mark.

Question 5(b): calculating average speed, including unit conversion

Most candidates successfully extracted data from the table and knew how to use the distance, speed, time formula. However, some candidates failed to convert minutes and seconds to seconds correctly.

Question 5(c): calculating a departure time, including a time difference

Most candidates successfully handled working with a time difference.

Question 5(d): using foreign exchange

Most candidates achieved full marks for this question. Many who did not, did not realise that they had to convert from riyals to pounds before converting to euros.

Question 6(b): using ratio

On the whole, candidates handled ratio calculations well.

Question 6(d): using tolerance

Most candidates correctly identified the limits and, therefore, the fire extinguisher's weight was within tolerance.

Question 7(b): calculating the volume of a compound solid

Most candidates used the correct strategy to calculate a compound volume. However, some candidates did not calculate the 2 cm gap between the water and the top of the tank correctly.

Question 7(c): demonstrating knowledge of and using Pythagoras' theorem to find the radius of the circle

Very few candidates realised that they had to use Pythagoras' theorem to calculate the diameter of the circle before working out the area. Candidates who chose to work in centimetres seldom managed to convert correctly from square centimetres to square metres.

Section 3: preparing candidates for future assessment

Most 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:

- ◆ Maintain and practise number skills to prepare candidates for the non-calculator question paper. In paper 1, performance in number skills was disappointing and cost many candidates valuable marks.
- ◆ Practise questions that require candidates to communicate a reason or an explanation. Many candidates still cannot compare data sets appropriately. Candidates should know that a numerical comparison is required in this type of statement.
- ◆ Candidates should know that problems involving area and circumference of circles and Pythagoras' theorem can feature in paper 1.
- ◆ Practise drawing a diagram where one is not provided, such as for questions about calculating the gradient of a slope.
- ◆ Practise working with probability and expected frequency.
- ◆ Candidates should be confident interpreting questions where more than one technique is needed, for example using Pythagoras' theorem to calculate a radius and then finding the area of the circle.
- ◆ Practise calculating gross pay, income tax, National Insurance, and net pay.
- ◆ Candidates should understand the difference between direct and inverse proportion.

Appendix 1: general commentary on grade boundaries

SQA's main aim when setting grade boundaries is to be fair to candidates across all subjects and levels and maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, SQA aims to set examinations and other external assessments and create marking instructions that allow:

- ◆ a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- ◆ a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade 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 for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of SQA's Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. SQA can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- ◆ The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- ◆ The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- ◆ Where levels of difficulty 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 on year. This is because the specific questions, and the mix of questions, are different and this has an impact on candidate performance.

This year, a package of support measures including assessment modifications and revision support, was introduced to support candidates as they returned to formal national exams and other forms of external assessment. This was designed to address the ongoing disruption to learning and teaching that young people have experienced as a result of the COVID-19 pandemic. In addition, SQA adopted a more generous approach to grading for National 5, Higher and Advanced Higher courses than it would do in a normal exam year, to help ensure fairness for candidates while maintaining standards. This is in recognition of the fact that those preparing for and sitting exams have done so in very different circumstances from those who sat exams in 2019.

The key difference this year is that decisions about where the grade boundaries have been set have also been influenced, where necessary and where appropriate, by the unique circumstances in 2022. On a course-by-course basis, SQA has determined grade boundaries in a way that is fair to candidates, taking into account how the assessment (exams and coursework) has functioned and the impact of assessment modifications and revision support.

The grade boundaries used in 2022 relate to the specific experience of this year's cohort and should not be used by centres if these assessments are used in the future for exam preparation.

For full details of the approach please refer to the [National Qualifications 2022 Awarding—Methodology Report](#).