Course report 2024

Higher Mathematics

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. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2024 appeals process.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2023: 18,745

Number of resulted entries in 2024: 18,517

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	7,480	Percentage	40.4	Cumulative percentage	40.4	Minimum mark required	84
B	Number of candidates	3,442	Percentage	18.6	Cumulative percentage	59.0	Minimum mark required	71
C	Number of candidates	2,537	Percentage	13.7	Cumulative percentage	72.7	Minimum mark required	59
D	Number of candidates	2,064	Percentage	11.1	Cumulative percentage	83.8	Minimum mark required	46
No award	Number of candidates	2,994	Percentage	16.2	Cumulative percentage	100	Minimum mark required	N/A

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.

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 statistical reports on the statistics and information page of our website.

Section 1: comments on the assessment

The course assessment performed largely as expected and proved accessible to most candidates. Feedback from the marking team and teachers and lecturers indicated it was positively received by centres and was fair and accessible. Candidates had good opportunities to demonstrate their knowledge and understanding of the course.

Question paper 1 (non-calculator)

Most candidates made a good attempt at all questions.

Many candidates missed out on marks due to numerical inaccuracies in their responses.

Question paper 2

Most candidates made a good attempt at all questions.

The level of demand for question 5 was higher than anticipated. This was taken into account when setting the grade boundary.

Section 2: comments on candidate performance

Most candidates attempted most questions. Many candidates set out their working well and gave solutions in a clear and concise manner.

Some candidates' solutions were not well-structured. The handwriting and layout of their solutions led to working that was difficult to read and interpret. As a result, some candidates made additional errors, and missed out on marks.

Question paper 1 (non-calculator)

Question 1: applying $m = \tan\theta$

Many candidates gained full marks in this question. Some candidates did not know their exact values of trigonometric ratios.

Question 2: recurrence relations

Most candidates attempted this question well.

Question 3: differentiating using the chain rule

Most candidates gained the first mark in this question; however, many candidates did not complete their application of the chain rule.

Question 4: finding an internal division point

Many candidates did not gain any marks in this question.

Question 5: determining the inverse of a function

Many candidates attempted this question well; however, some candidates used invalid approaches involving swapping x and $h(x)$.

Question 6: applying the double angle formulae

Few candidates answered the final part of this question correctly.

Question 7: determining the intersection of a line and circle

Many candidates performed well in this question, although a few candidates only found the centre and radius of the circle, which was not required.

Question 8: using the discriminant

Most candidates used the correct strategy in this question; however, some candidates used an incorrect condition or did not state the inequality that they were solving.

Question 9: simplifying a numerical logarithmic expression

Many candidates attempted this question well.

Question 10: factorising a polynomial

Many candidates attempted this question well. A few candidates did not communicate their conclusion in part (a) of the question.

Question 11(a): applying the wave function

Most candidates attempted this part of the question well; however, some candidates made processing errors at several stages of their working.

Question 11(b): sketching a trigonometric graph

Most candidates did not gain any marks in this question. A few candidates translated the graph in the wrong direction. Only a few candidates considered the height of the graph at both ends of the domain.

Question 12: applying the rate of change

Some candidates considered $f'(1)$ rather than $f'(a)=1$.

Question 13(a): finding the equation of a perpendicular bisector

Many candidates attempted this question well.

Question 13(b): determining the equation of a circle

Few candidates gained full marks in this question. Most candidates did not use their answer to part (a) to find the centre of the circle.

Question paper 2

Question 1: finding the equation of medians and perpendicular lines

Many candidates attempted this question well.

Question 2: using differentiation to find the equation of a tangent line

Most candidates attempted this question well; however, some candidates did not differentiate expressions with negative indices correctly.

Question 3: finding the angle between two vectors

Most candidates attempted this question well.

Question 4(a): transforming the graph of a polynomial

Most candidates gained full marks in this question.

Some candidates did not clearly identify which set of coordinates were the maximum point of the transformed graph, or they identified the wrong set of coordinates.

Question 4(b): sketching the graph of the derivative function

Many candidates did not sketch a graph of a cubic function. Most candidates did not gain any marks in this question.

Question 5: evaluating a definite integral

Many candidates did not make effective use of their calculator to evaluate their expression for the integral of $\sin 5x$. Some candidates incorrectly evaluated $-\frac{1}{5}\cos 0$ as zero.

Question 6: using a straight-line graph to confirm a relationship of the form $y = ax^b$

Many candidates did not make a valid attempt at this question.

Some candidates used a valid method for tackling such questions but did not reproduce all the steps accurately. Some candidates incorrectly used a relationship of the form $y = ab^x$.

Question 7: finding the area between two curves

Many candidates attempted this question and worked through to a final answer. Some candidates used 'lower − upper', a few candidates made errors with brackets, and some candidates made inefficient use of their calculator for the substitution.

Question 8(a): determining a composite function

Many candidates gained full marks in this part of the question.

Question 8(b): using the domain of a function

Few candidates gave the condition for the function to be undefined.

Question 9(a): determining the coordinates of stationary points

Many candidates attempted this part of the question well.

Question 9(b): finding the greatest and least values of a function in a closed interval

Most candidates did not consider both ends of the closed interval.

Question 10(a): finding the centre and radius of a circle

Most candidates gained full marks in this part of the question.

Question 10(b): determining the equation of a circle

Most candidates did not gain any marks in this part of the question.

Question 11(a): using an exponential equation

Most candidates gained full marks in this part of the question; however, some candidates made inefficient use of their calculator.

Question 11(b): using an exponential equation

Many candidates did not rearrange from exponential form to logarithmic form.

Question 12: solving a trigonometric equation

Many candidates successfully used the appropriate double angle formula. A few candidates processed $4\cos x° - \sin x° = 0$ correctly, with a few candidates stating that $\tan x° = 4$ had 'no solutions'.

Question13: identifying the equation of a polynomial from its graph

Few candidates gained full marks in this question. Many candidates made errors with signs. Some candidates did not have a valid strategy for finding k.

Section 3: preparing candidates for future assessment

The comments in the previous sections and those below can help teachers and lecturers to prepare future candidates for the Higher Mathematics question papers.

- Maintain and practise basic numerical skills regularly, particularly fractions and negative numbers.
- Encourage candidates to check their final answers carefully and to simplify final answers, where appropriate.
- Encourage candidates to lay out their working in a structured and logical manner. Each line of working should follow logically from the line above. This is particularly important when differentiating and integrating, and when working with logarithms and exponentials.
- Encourage candidates to use notation and symbols accurately throughout the course, for example integral notation.
- Encourage candidates to use brackets appropriately throughout the course, particularly when finding the area between curves and when substituting negative numbers into formulae.
- Consider how best to practise using radian measure and the exact values of trigonometric ratios.
- Consider how best to practise finding an internal division point of a line segment given the coordinates of the two endpoints in three dimensions.
- When teaching algorithms that arrive at the correct final answer, give attention to the intervening steps. For example, when factorising a quadratic expression, statements such as $2x^2+3x-2=x^2+3x-4=(x+4)(x-1)=(x+2)(2x-1)$ are not consistent from line to line and would not gain full credit.
- Encourage candidates to use a calculator efficiently when preparing for paper 2.
- Encourage candidates to score out working that does not form part of their final response.
- Consider how best to practise sketching graphs of functions on provided axes.
- Provide opportunities for candidates to attempt more challenging and novel questions under exam conditions.

Teachers and lecturers delivering the Higher Mathematics course, and candidates taking the course, can consult the detailed marking instructions for the 2024 course assessment on SQA's website. These illustrate the requirements for questions on, for example, finding an internal division point of a line segment, finding inverse functions, evaluating the area between two curves, the wave function, determining the relationship between variables given a graph with logarithmic axes, and solving quadratic inequalities. The website also contains the marking instructions from previous years.

Appendix: 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.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do this, we measure evidence of candidates' knowledge and skills against the national standard.

During the pandemic, we modified National Qualifications course assessments, for example we removed elements of coursework. We kept these modifications in place until the 2022–23 session. The education community agreed that retaining the modifications for longer than this could have a detrimental impact on learning and progression to the next stage of education, employment or training. After discussions with candidates, teachers, lecturers, parents, carers and others, we returned to full course assessment for the 2023–24 session.

SQA's approach to awarding was announced in March 2024 and explained that any impact on candidates completing coursework for the first time, as part of their SQA assessments, would be considered in our grading decisions and incorporated into our well-established

grading processes. This provides fairness and safeguards for candidates and helps to provide assurances across the wider education community as we return to established awarding.

Our approach to awarding is broadly aligned to other nations of the UK that have returned to normal grading arrangements.

For full details of the approach, please refer to the National Qualifications 2024 Awarding — Methodology Report.