Course report 2024

Higher Applications of 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:   1,614

Number of resulted entries in 2024:   2,996

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

A	Number of candidates	587	Percentage	19.6	Cumulative percentage	19.6	Minimum mark required	73
B	Number of candidates	553	Percentage	18.5	Cumulative percentage	38.1	Minimum mark required	61
C	Number of candidates	671	Percentage	22.4	Cumulative percentage	60.4	Minimum mark required	50
D	Number of candidates	649	Percentage	21.7	Cumulative percentage	82.1	Minimum mark required	38
No award	Number of candidates	536	Percentage	17.9	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 was accessible to most 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.

Question paper

The question paper generally performed as expected; however, the level of demand in some questions was higher than intended. The grade boundaries were adjusted to take account of this.

Project

The project performed as expected.

Feedback from the marking team indicates it was positively received by centres and was fair and accessible for candidates.

Section 2: comments on candidate performance

Question paper

Many candidates attempted most questions.

Most candidates used appropriate statistical software. However, some candidates did not provide printouts for questions 4, 6 and 9 and, of those who did, some did not print out the formula view for questions 4 and 9, as stated in the question paper.

Question 1(a): calculate monthly effective rate

Many candidates simply divided the interest rate by 12.

Some candidates did not gain the mark because they used $((1+0.299)^{1/12})-1$ to calculate the monthly effective rate. Some candidates who did not gain the mark in this question, however, still gained the mark in question 9(a) for calculating the monthly effective rate in a spreadsheet.

Question 2(a): complete the Venn diagram

Most candidates performed well in this question; however, some candidates did not gain mark 2.

Question 2(b): state the probability

Many candidates gained full marks for this question.

Some candidates did not include the number of pupils that did not study any language within their total.

Question 3(a): complete the PERT chart

Most candidates put the tasks and durations in the correct sequence and successfully completed the forward scans. However, some candidates did not complete the backward scan correctly.

Question 3(b): complete the Gantt chart

Many candidates achieved full marks, although some candidates missed out on marks because they drew bars inaccurately.

Question 3(c): determine the maximum time

Many candidates calculated the float time but did not then state the maximum time.

Question 4(a): complete the worksheet

Many candidates achieved full marks, although a few candidates missed out on marks because they did not provide the required printout.

Question 4(b): construct a graph

Many candidates achieved full marks, although a few candidates missed out on marks because they did not provide the required printout.

Question 4(c): determine if the plants are effective

Many candidates did not make any reference to the figure quoted in the data booklet for very good air quality.

Question 5(a): accumulation

Many candidates attempted this question and gained marks. However, some candidates did not process the correct number of months for one or more accumulations.

Question 6(a)(i): generate measures of location and spread

Many candidates produced a statistical diagram instead of generating appropriate measures of location and spread.

Question 6(a)(ii): make two valid comparisons

Many candidates did not provide the necessary detail when comparing the generated statistics. Comments like, 'the golf ball travelled further' and 'the new golf ball is more varied' were common.

Question 6(c)(ii): perform hypothesis test and state p-value

Many candidates performed a hypothesis test and stated the p-value.

Question 6(c)(iii): interpret the p-value and result of hypothesis test

Some candidates interpreted the p-value but did not interpret the result in context.

Question 7(a): calculate the net salary

Some candidates did not calculate the required National Insurance contribution. Some candidates attempted to calculate the annual income tax that was already given, although they often calculated it incorrectly.

Question 8(b)(i): calculate expected value

Most candidates did not gain any marks for this question and did not use the £75,000 in the calculation. A common response was 15000 x 0.1.

Question 8(b)(ii): calculate expected value

Following on from question 8(b)(i), most candidates did not gain any marks for this question because they simplified the process.

Question 9(b)(i): advantage of insurance policy

Most candidates made statements suggesting that an insurance excess is a pot of money that can be used to repair an item damaged in an accident, and the greater the excess the more the insurance company will pay out.

Question 9(b)(ii): describe why an insurance claim may not be made

Many candidates simply stated that it would increase the monthly insurance premium instead of stating that it would increase future premiums.

Project

Introduction

Most candidates gained marks 1 to 4, however, some candidates did not explain the background and context of their project clearly enough to gain mark 1.

Some candidates did not state their research questions clearly and they did not always use appropriate statistical language.

Due to poorly formed research questions, some candidates did not perform appropriate statistical tests later in the project.

For marks 5 and 6, most candidates did not explain sufficiently why their data was valid or unbiased. Most candidates simply made a statement saying that they were referring to the source being reliable without explanation. For example, 'Since this is a government website, it's valid and unbiased.'

Subjective impression

Many candidates achieved marks 7, 8 and 11 by generating appropriate graphical displays, including titles, labels and scales. However, some candidates included additional graphs that were inappropriate and inserted graphs that they had not created. This year, more candidates gained marks 9 or 10 by describing the helpfulness of the graphs, for example: 'The boxplot allows me to visually compare the median of the two data sets and gives an indication of the spread of data.'

Presentation

Most candidates gained marks in this section and managed to stay within the word count. However, some candidates did not place enough emphasis on graphical displays, descriptive statistics and additional statistics.

Most candidates used appropriate headers and maintained a flow within the reports.

Conclusion

Many candidates did not make appropriate connections or provide a summary between their graphical displays, descriptive statistics, or additional statistics within their conclusion.

Some candidates did not gain any conclusion marks as they did not state an appropriate research question.

Section 3: preparing candidates for future assessment

The following advice may help prepare future candidates for the Higher Applications of Mathematics course assessment.

Question paper

Teachers and lecturers should:

♦ Remind candidates that they should print spreadsheets in both value view and formula view.

♦ Encourage candidates to use the checklist on the inside of the front page of the question paper to ensure that they have printed all relevant documents.

♦ Encourage candidates to refer to the data booklet to help them when answering questions.

♦ Consider what types of questions may be asked in the question paper after the data booklet is released.

♦ Consider the best way to allow candidates to practise skills for questions that require them to use software packages.

♦ Encourage candidates to set out clear, concise and appropriate working for all questions.

Project

Teachers and lecturers should:

♦ Ensure that candidates use appropriate data sets.

♦ Ensure that candidates have a suitable research question, based on their data. Candidates should state the research questions explicitly and of the form:
  — I am going to investigate if there is a difference in means between…
  — I am going to investigate if there is a relationship between…
  — I am going to investigate if there is a difference between two proportions

♦ Remind candidates that they cannot use the example projects on the Understanding Standards website as a template for their project.

♦ Remind candidates that they must generate all statistical diagrams they use in their project themselves and they must not copy statistical diagrams from textbooks or journals.

♦ Remind candidates to use language appropriate for the course.

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.