Course report 2026

Advanced Higher Mathematics of Mechanics, SCQF level 7

We've written this report for teachers and lecturers. We recommend you read this with the published course assessment documents and marking instructions.

The report:

- provides a summary of how each course component performed
- highlights areas of the question paper and coursework where candidates performed well and areas where they did not perform well
- has advice you might find useful when preparing candidates for assessment

We collect and prepare the statistics in course reports before we complete the appeals process.

Statistical and grade boundary information

Course entries

Number of resulted entries in 2025: 473

Number of resulted entries in 2026: 486

Distribution of course awards (including minimum mark to achieve each grade)

Course award	Number of candidates	Percentage	Cumulative percentage	Minimum mark required
A	195	40.1	40.1	69
B	56	11.5	51.6	59
C	63	13.0	64.6	49
D	51	10.5	75.1	39
No award	121	24.9	100	Not applicable

We've not applied rounding to these statistics.

In this report:

- 'Most' means greater than or equal to 70%.
- 'Many' means 50% to 69%.
- 'Some' means 25% to 49%.
- 'Few' or 'a few' means less than 25%.

You can find statistical reports on our website.

General commentary on grade boundaries

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

For most National Courses, we aim 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's very challenging to get the standard on target every year, in every subject, at every level. Therefore, we hold a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and make final decisions on grade boundaries based on this information. Senior Qualifications Scotland staff normally chair these meetings.

Principal assessors use their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. We 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.

- We can adjust the grade boundaries downwards if there's evidence that the question paper or other assessment has been more difficult than usual.
- We can adjust the grade boundaries upwards if there's evidence that the question paper or other assessment has been less difficult than usual.
- If levels of difficulty are comparable to previous years, we maintain similar grade boundaries.

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.

For full details of the approach, please refer to the Awarding and Grading for National Courses Policy.

How the course assessment performed

The question paper largely performed as intended.

Feedback from the marking team, teachers and lecturers suggested that the paper was fair, accessible and positively received in centres.

Questions 5(b) and 7(b) were more demanding than intended. We took this into account when setting the grade boundaries.

How candidates performed

Overall, many candidates performed well in the question paper. Most candidates attempted every question including the most challenging questions at the end of the paper.

Areas where candidates performed well

Most candidates performed well in questions that assessed mathematical techniques for mechanics. Many candidates gained full marks for question 2 (partial fractions), question 6 (quotient rule), question 9 (second-order differential equations), question 12 (integration by parts), question 14 (implicit differentiation), question 15 (integration by substitution) and question 17 (first-order differential equations using an integrating factor).

Question 1

Many candidates performed well in question 1, using conservation of momentum and equations of motion for constant acceleration.

Question 3

Many candidates identified and applied the relevant simple harmonic motion formulae correctly.

Question 4

Most candidates approached this as an interception question. A few candidates used the closest-approach method, which was less efficient.

Question 11

This question involved variable acceleration. Most candidates identified and applied the correct approach to variable acceleration and correctly integrated.

Question 18(b)

Most candidates correctly used the equation from part (a) and set the tension equal to zero when the string became slack.

Question 19(a)

Most candidates successfully used a variety of methods to find the time of flight.

Question 20(a)

Most candidates correctly calculated the coordinates of points P, Q and R on the velocity–time graph.

Areas where candidates did not perform well

Question 5(b)

While many candidates correctly obtained an expression for velocity in part (a), part (b) proved more demanding. A few candidates used the work–energy principle or $W = \int \mathbf{F}.\mathbf{v}dt$ to calculate the work done. Some candidates incorrectly used equations for constant acceleration, or $W = Fd$.

Question 7(b)

Most candidates calculated the centre of mass in part (a) correctly. In part (b), only a few candidates stated that that the force needed to turn the lamina must be greater than 24.36….

Question 8

Question 8(a) proved challenging for many candidates, who did not set up the situation correctly and were, therefore, unable to calculate the bearing.

Question 10

Although many candidates gained full marks, some candidates did not gain any marks. Some candidates made errors when resolving forces involving strings, springs and rods at angles.

Question 13

Most candidates gained 3 or 4 marks in part (a). Some candidates gained 2 or 3 marks in part (b). A few candidates did not gain any marks in part (a), and some candidates did not gain any marks in part (b). When resolving forces on an inclined plane, some candidates did not account for all the forces, including weight, normal reaction, friction (for rough surfaces), any other external forces, and the reaction force.

Question 16

Many candidates did not calculate the elastic potential energy of the spring correctly.

Question 18(a)

Few candidates gained full marks. Some candidates did not gain any marks. Many candidates did not apply the conservation of energy in vertical circular motion or include the force that creates acceleration towards the centre.

Question 19(b)

Few candidates gained full marks in this question. Many candidates did not make use of the symmetry of the projectile's motion.

Questions 20(b) and (c)

Many candidates did not use displacement correctly when answering these questions.

Preparing candidates for assessment

Question paper

Most Advanced Higher Mathematics of Mechanics candidates simultaneously study Advanced Higher Mathematics. This means most candidates are strong mathematicians and generally perform well in mathematical techniques for mechanics questions. The more demanding questions that require setting up the model and solving several steps usually still prove challenging.

Although this course includes concepts from Higher and Advanced Higher Mathematics and Physics, candidates should ensure that they are familiar with the specific content, techniques and approaches to problem-solving required for Advanced Higher Mathematics of Mechanics.

The comments in the previous sections and those below can help you prepare candidates for the Advanced Higher Mathematics of Mechanics question paper.

- Communication is key:
    - Candidates should always set up a clear sign convention, for example:

      

    - Candidates should answer questions with as much detail as possible, ideally using a sentence, for example: ‘The force required to turn the lamina must be greater than 24.36 N.’
    - Candidates should label equations, for example (1) and (2) and explain how they are combining them, for example (1) ÷ (2).

- Candidates should not round prematurely. They should use of the ‘Ans’ button or store function on their calculator and use exact trigonometric values. Candidates should never truncate a terminating decimal.
- Candidates must consider whether acceleration is constant or variable. They should not use equations for constant acceleration indiscriminately, and they will often need to apply calculus techniques.

- Candidates need to understand that there are several ways to calculate ‘Work Done’, depending on the type of force (constant or variable). They need to choose formulae appropriately.
- You should give candidates opportunities to practise answering resultant velocity questions that require clearly labelled diagrams.
- Remind candidates to use consistent units when applying Hooke's Law and to express extension and natural length in metres when calculating elastic potential energy.
- Remind candidates to set the zero point for height when answering gravitational potential energy questions.
- Remind candidates that recognising keywords such as ‘projectile’ can help them choose the correct strategy.
- Candidates need to calculate displacement and distance carefully when finding the area under a velocity–time graph.
- Remind candidates to select and apply the appropriate technique when differentiating or integrating expressions involving products and quotients.
- Remind candidates that the mathematical skills developed at Higher remain essential when manipulating algebraic expressions and substituting into equations.
- Encourage candidates to use the course specification to ensure they have covered all the required skills, knowledge and understanding.

You can find the detailed marking instructions for the 2026 course assessment on our website. Our website also contains the marking instructions from previous years.

The Understanding Standards website contains examples of candidate evidence with commentary.