# Common questions about Applications of Mathematics, Mathematics, and Mathematics of Mechanics



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# General questions

## How should I use practice assessments for Mathematics and Applications of Mathematics?

Where you use practice assessments with candidates, you should consider the degree of similarity between the practice assessment and the summative assessment.

### Mathematics — outcome 1 (operational skills)

Summative assessments are likely to be most reliable where operational skills are tested using questions set in different contexts or testing different aspects of the skill. For some skills, 'changing the numbers' may be the only option, for example factorising a sum of terms with a numerical common factor.

Where a question features a context, then you could change the context, for example Pythagoras' theorem could be in the context of a gate in a practice assessment, then the roof of a house, or context-free in a summative assessment.

Where a question tests a particular aspect of a skill, you could test a different aspect, for example if a sine rule question asked for the angle in a practice assessment, then the summative assessment could ask for the side instead.

### Mathematics — outcome 2 (reasoning skills)

Summative assessments are likely to be most reliable where questions testing reasoning skills are attached to different operational skills or use different contexts or strategies.

### Applications of Mathematics

Summative assessments are likely to be most reliable where skills are tested using questions set in different contexts. For example, a question on time management may be in the context of cooking in the practice assessment and then planning a journey in the summative assessment.

## How many unit assessment support packs using the unit-by-unit approach are there?

For Mathematics and Applications of Mathematics units, we have published one unit assessment support pack using the unit-by-unit approach for each unit. For Numeracy units we developed several unit-by-unit assessments to illustrate different contexts, some of which may be particularly suitable for adult learners.

## How do I know the difference between C and A/B content?

A/B content can come from integration of skills or skills set within a context.

## What is DESMOS?

DESMOS is a free graphic calculator, available online.

### Do question papers start with C-level questions and get progressively harder, as was the case in previous years?

All question papers meet the blueprint outlined in the course specifications. They contain 65% C-level marks and 35% A/B-level marks and also set questions in context.

# National 4 Applications of Mathematics

### If I use National 4 Applications of Mathematics — package 2: combined approach, is it correct that candidates don't have to do any additional Numeracy tasks?

If you are using a combined approach that covers the *Numeracy* assessment standards, there is no need to do any additional *Numeracy* tasks or tests. You just need to track your candidates' achievement.

# National 5 Applications of Mathematics

### For stand-alone units, what unit assessment support packs can I use to assess the Numeracy unit?

You can use any of the following packs to assess candidates:

- Applications of Mathematics Geometry and Measures and Numeracy — combined approach
- Applications of Mathematics Managing Finance and Statistics and Numeracy — combined approach
- Numeracy: using an interdisciplinary context
- Numeracy: using a travel and tourism context
- Numeracy e-assessment using SOLAR
- Numeracy package 3: unit-by-unit approach

Please note that candidates who pass the National 5 *Numeracy* bridging pack and the *Geometry and Measures* and *Managing Finance and Statistics* units, do **not** automatically achieve the outcomes and assessment standards of the *Numeracy* (National 5) unit.

### Why are the gradient formula and Pythagoras' theorem given on the formula list in the question paper?

These formulae are available so that candidates are examined on the application of the formulae and not on remembering them.

## What happens if a candidate tries two different strategies when answering a question?

If candidates make multiple attempts using the same strategy and do not identify their final answer, markers must mark all attempts and award the lowest mark. If candidates try different valid strategies, markers must apply the above rule to attempts within each strategy and then award the highest mark. For example:

| | |
|---|---|
| Strategy 1 attempt 1 is worth 3 marks. | Strategy 2 attempt 1 is worth 1 mark. |
| Strategy 1 attempt 2 is worth 4 marks. | Strategy 2 attempt 2 is worth 5 marks. |
| From the attempts using strategy 1, the resultant mark would be 3. | From the attempts using strategy 2, the resultant mark would be 1. |

In this case, award 3 marks.

## Where can I find percentage pass rates for the past year's National 5 Applications of Mathematics course?

You can find this information on SQA's website in the National 5 Applications of Mathematics Course Reports.

## What support does SQA offer for prelims?

A specimen question paper is available on SQA's website. We don't provide guidance about prelims, as this is a centre issue.

# Numeracy

## In what circumstances should I use the National 5 Numeracy bridging pack?

Candidates who pass the three stand-alone National 5 Mathematics units have already achieved most of the assessment standards of National 5 Numeracy. You can use the Numeracy bridging pack (or equivalent) to generate evidence for the remaining assessment standards. Candidates who achieve these assessment standards can then be entered and awarded a pass for the National 5 Numeracy unit.

## If candidates don't pass the National 4 Numeracy unit after re-assessment, but pass certain assessment standards, do I need to re-assess these assessment standard at National 3 Numeracy?

If a candidate passes assessment standards in the Numeracy unit at National 4, you do not need to re-assess these assessment standards at National 3 level. You only need to assess the assessment standards that the candidate did not achieve at National 4.

# National 4 Mathematics

## How do you deal with a situation where candidates taking National 4 Mathematics have been unsuccessful with their National 4 Added Value unit but have passed the other three units?

If a candidate passes **all** the National 4 Mathematics units apart from the *Added Value Test*, they have enough evidence for us to award them a pass in the National 3 Applications of Mathematics course. We can only certificate candidates for the National 3 Applications of Mathematics course if they are entered for it. The three unit passes at National 4 will also appear on the candidate's Scottish Qualifications Certificate.

## If candidates don't pass all of the National 4 Mathematics units, to achieve the National 3 Applications of Mathematics course do they need to sit all of the National 3 unit assessments, or only the tasks in areas that they didn't achieve at National 4?

If they started on the National 4 Mathematics course and are then entered for National 3 Applications of Mathematics instead, any assessment standards they achieved in the National 4 Numeracy unit would overtake the requirements of the National 3 Numeracy unit.

However, for the other two Mathematics units, candidates need evidence for the assessment standards for the *Manage Money and Data* and *Shape, Space and Measures* units to achieve the National 3 Applications of Mathematics course. Some of this evidence could come from work they have completed for *Expressions and Formulae, Relationships* or *Numeracy* at National 4*,* but it is likely they would have to produce additional evidence.

## In the stand-alone National 4 and National 5 Mathematics unit assessment support packs it states that, for re-assessment purposes, questions covering assessment standards 2.1 or 2.2 should use different operational skills. Does this mean that all re-assessments involving these assessment standards must be submitted for prior verification?

For assessment standards 2.1 or 2.2, the re-assessments should either be attached to a different operational skill from the same unit (ie one of the sub-skills as listed in the evidence requirements for each unit and also listed in the 'Judging evidence' table in the unit assessment support packs) or involve the same sub-skill but be in a different context or require a different strategy. Re-assessments do not need to be prior verified if they are taking the same basic approach as outlined in any of the unit assessment support packs.

# Added Value unit

## Can we develop our own assessments for the National 4 Added Value unit?

Yes, you can develop your own Added Value unit assessments. We strongly advise getting these prior verified before use with candidates. This is a free service. For further information, please visit SQA's prior verification home page.

## In the Added Value Test for Mathematics and Applications of Mathematics, do candidates always have to state the correct units in their answers?

Candidates must state the correct units in most cases. Where units are not required for candidates to gain full credit, the units appear in brackets in the specific assessment guidelines, for example (£)12·54 or 5·6(m). This also applies to the bank of additional questions.

# National 5 Mathematics

## Is rationalising denominators such as $\sqrt{2} + 5$ included in National 5 Mathematics?

Candidates are only expected to be able to rationalise denominators such as $\sqrt{2}$ as a matter of routine.

## When solving inequalities, can the variable be left on the right-hand side in the final answer, for example $4 > x$?

Yes.

## Do candidates always need to show the unrounded answer before rounding?

In the stand-alone units: yes, but this is not necessary in the question paper. However, it is good practice to show the unrounded answer before rounding. An incorrectly rounded answer in the question paper could lose 2 marks if the unrounded version is not shown.

## Is $\frac{14}{3}$ acceptable as a final answer?

Yes. If a mixed number is required then the question will state 'give your answer as a mixed number'.

## Will the question paper ask candidates to rationalise a denominator with a complex surd?

A routine question involving rationalising a complex surd will not appear in the question paper. However, it could be the final part of a reasoning question following on from an earlier part involving finding the product of a complex surd and its conjugate.

## What is an acceptable level of rounding for a question with no specific rounding requirements?

Generally, answers rounded to three significant figures are appropriate, but candidates should not round their working. They should only round when they have their final answer.

## What do candidates need to do to get full credit when completing nature tables?

For nature tables, candidates must provide communication appropriate to the context of the question. For example, arrows around one turning point, with the other turning point ignored could be insufficient, and incorrect notation may be penalised. You can find guidance in past paper marking instructions.

## When translating log graphs, do candidates have to draw the asymptote?

Yes, it is important that candidates draw and identify the asymptote.

## In the question paper, are candidates penalised for not simplifying their answers?

General marking principle (j) for question papers states: ‘In final answers, numerical values should be simplified as far as possible, unless specifically mentioned in the detailed marking instructions’.

# Advanced Higher Mathematics of Mechanics

## Can candidates be awarded the *Mathematical Techniques for Mechanics* unit on the basis of passing the *Methods in Algebra and Calculus* unit?

Evidence candidates generate for the stand-alone *Methods in Algebra and Calculus* unit can also be used for the stand-alone *Mathematical Techniques for Mechanics* unit. You should ensure that the evidence meets all the assessment standards.

Specifically, assessment standards 1.1, 1.2 and 1.4 are directly equivalent but assessment standard 1.3 is not:

- A candidate who **has demonstrated competence in all three sub-skills** from *Methods in Algebra and Calculus* assessment standard 1.3 has generated enough evidence for *Mathematical Techniques for Mechanics*.
- A candidate who **has demonstrated competence in two of the sub-skills** will need to be assessed on the remaining sub-skill from *Mathematical Techniques for Mechanics*, 'applying integration to a range of physical situations', before an assessment judgement can be made.

Candidates must be entered and resulted for each unit separately.

National Qualifications questions and answers can be found on the frequently asked questions section of SQA's website.