



Higher Mathematics — draft Course rationale and summary

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Course rationale

Background

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide time for learning, more focus on skills and applying learning, and more scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

Mathematics is important in everyday life, allowing us to make sense of the world around us and to manage our lives. Using mathematics enables us to model real-life situations and make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.

Because mathematics is rich and stimulating, it engages and fascinates learners of all ages, interests and abilities. Learning mathematics develops logical reasoning, analysis, problem solving skills, creativity and the ability to think in abstract ways. It uses a universal language of numbers and symbols, which allows us to communicate ideas in a concise, unambiguous and rigorous way.

Mathematics equips us with many of the skills required for life, learning and work. Understanding the part that mathematics plays in almost all aspects of life is crucial. This reinforces the need for mathematics to play an integral part in lifelong learning and be appreciated for the richness it brings.

This Mathematics Course allows learners to acquire and develop the attributes and capabilities of the four capacities. For example, success in mathematical learning and activity leads to increased confidence as an individual; being able to think logically helps towards being a responsible citizen; and being able to understand, use and communicate mathematical ideas will assist in becoming an effective contributor.

Purpose and aims of the Course

Mathematics helps us to make sense of the world around us. It is the study of relationships, patterns, measurement and the properties of numbers. Mathematics takes a reasoned approach to thinking, and is characterised by order and the use of carefully defined terms and processes. Mathematics can be used to model real-life situations and can equip us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk, and make informed decisions.

The Higher Mathematics Course will motivate and challenge learners by enabling them to select and apply mathematical techniques in a variety of mathematical situations, and will develop skills for progressing beyond Higher and for employment. The Course delivers in-depth study of mathematical concepts and the ways in which mathematics describes our world. It allows learners to interpret, analyse, communicate and manage information in mathematical form, skills which are vital to scientific and technological research and development.

This Course is designed to deepen the learner's skills in using mathematical language while exploring more advanced mathematical ideas. Learning in Mathematics is sequential in nature, and this Course will build on prior learning to develop more complex:

- ◆ operational skills in algebra, geometry, trigonometry, calculus and statistics
- ◆ reasoning skills of investigation, problem solving, analysis and mathematical modelling
- ◆ skills in the application of numeracy which underpin the operational skills

Information about typical learners who might do the Course

Mathematics at Higher is a suitable Course for learners who are secure in their attainment of Mathematics (National 5) or an equivalent qualification.

Learners will develop skills in selecting and applying mathematical techniques in a variety of mathematical situations. These skills will enable progression to further learning and to employment. Learners will experience in-depth study of the ways in which mathematics describes our world, and become skilled in interpreting, analysing, communicating and managing information in mathematical form.

On successful completion of this Course, the learner could progress to:

- ◆ Advanced Higher Mathematics
- ◆ Advanced Higher Applied Mathematics (Statistics)
- ◆ Advanced Higher Applied Mathematics (Mechanics)
- ◆ HNC/HND/degrees
- ◆ employment

Mathematics has applications in many other subject areas, and skills developed in this Course support progression in other curriculum areas.

Course summary

Course title: Higher Mathematics

SCQF level 6 (24 SCQF credit points)

Course outline

Mandatory Units

Mathematics: Expressions and Formulae (Higher) (6 SCQF credit points)

Mathematics: Relationships (Higher) (6 SCQF credit points)

Mathematics: Applications (Higher) (6 SCQF credit points)

Course assessment

(6 SCQF credit points)

This Course includes six SCQF credit points for 40 additional programmed hours to allow preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

Course structure and conditions of award

This Course will develop, deepen and extend the mathematical skills necessary at this level and beyond.

Learners will acquire and apply operational skills necessary for exploring mathematical ideas through symbolic representation and diagrams. In addition, learners will develop mathematical reasoning skills and will gain experience in making informed decisions.

The Course has three Units, totalling 18 SCQF credit points. An additional six SCQF credit points allows the use of an extended range of learning and teaching approaches, consolidation of learning, integration, and preparation for Course assessment.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways.

Mathematics: Expressions and Formulae (Higher)

This Unit will develop knowledge and skills, appropriate to this level, that involve the manipulation of expressions, the use of vectors and the study of mathematical functions, covering aspects of algebra, geometry and trigonometry. Learners will apply operational and reasoning skills in contexts, including those taken from life and work.

Mathematics: Relationships (Higher)

This Unit will develop knowledge and skills, appropriate to this level, that involve solving equations, covering aspects of algebra, geometry and trigonometry. It introduces both differential calculus, developing the concept of rate of change, and integral calculus, developing the concept of area by summation. Learners will apply operational and reasoning skills in contexts, including those taken from life and work.

Mathematics: Applications (Higher)

This Unit will develop knowledge and skills, appropriate to this level, that involve geometric applications, optimisation, area and probability, covering aspects of algebra, geometry, calculus and statistics. Learners will apply operational and reasoning skills in contexts, including those taken from life and work.

To gain the award of the Course, the learner must pass all the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Assessment

Information about assessment standards for the Course will be included in the *Course Assessment Specification*, which will provide full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in Unit specifications.

They will be assessed pass/fail within centres.

SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgements are consistent and meet national standards.

Exemplification of possible assessment approaches for these Units will be provided in the *National Assessment Resource*.

Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must address the key purposes and aims of the Course, as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge or application.

In Higher Mathematics, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

Learners will draw on and extend the skills they have learned during the Course. This will be assessed within a [question paper](#)², requiring demonstration of the breadth of knowledge and skills acquired from across the Units in unfamiliar contexts and/or integrated ways.

¹ Definitions can be found here: www.sqa.org.uk/sqa/45528.html

² See link above for definition.