

National Unit Specification: general information

UNIT Mathematics 2 (Higher)

NUMBER D322 12

COURSE Mathematics (Higher)

SUMMARY

Mathematics 2 (H) comprises outcomes in algebra, geometry, trigonometry and elementary calculus. It is a mandatory unit of the Higher Mathematics course and provides a basis for progression to *Mathematics 3 (H)*.

OUTCOMES

- 1 Use the Factor/Remainder Theorem and apply quadratic theory.
- 2 Use basic integration.
- 3 Solve trigonometric equations and apply trigonometric formulae.
- 4 Use the equation of the circle.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following:

- *Mathematics 1 (H)*
- equivalent.

Administrative Information

Superclass: RB

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National Unit Specification: general information (cont)

UNIT Mathematics 2 (Higher)

CREDIT VALUE

1 credit at Higher (6 SCQF credit points at SCQF level 6*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

CORE SKILLS

This unit gives automatic certification of the following:

Complete core skills for the unit	None
Core skills components for the unit	Critical Thinking H Using Number H

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Mathematics 2 (Higher)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Use the Factor/Remainder Theorem and apply quadratic theory.

Performance criteria

- a) Apply the Factor/Remainder Theorem to a polynomial function.
- b) Determine the nature of the roots of a quadratic equation using the discriminant.

OUTCOME 2

Use basic integration.

Performance criteria

- a) Integrate functions reducible to the sums of powers of x (definite and indefinite).
- b) Find the area between a curve and the x -axis using integration.
- c) Find the area between two curves using integration.

OUTCOME 3

Solve trigonometric equations and apply trigonometric formulae.

Performance criteria

- a) Solve a trigonometric equation in a given interval.
- b) Apply a trigonometric formula (addition formula) in the solution of a geometric problem.
- c) Solve a trigonometric equation involving an addition formula in a given interval.

OUTCOME 4

Use the equation of the circle.

Performance criteria

- a) Given the centre (a, b) and radius r , find the equation of the circle in the form $(x-a)^2 + (y-b)^2 = r^2$.
- b) Find the radius and centre of a circle given the equation in the form $x^2 + y^2 + 2gx + 2fy + c = 0$.
- c) Determine whether a given line is a tangent to a given circle.
- d) Determine the equation of the tangent to a given circle given the point of contact.

Evidence requirements

Although there are various ways of demonstrating achievement of the outcomes, evidence would normally be presented in the form of a closed book test under controlled conditions. Examples of such tests are contained in the National Assessment Bank.

In assessments, candidates are required to show their working in carrying out algorithms and processes.

National Unit Specification: support notes

UNIT Mathematics 2 (Higher)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

Each mathematics unit at Higher level aims to build upon and extend candidates' mathematical knowledge and skills. Within this unit, the coordinate geometry of *Mathematics 1(H)* is extended to include the circle. The Factor/Remainder Theorem and quadratic theory and addition formulae are added to previous experience in algebra and trigonometry respectively. Basic integration is introduced to extend the calculus of *Mathematics 1(H)*.

The increasing degree of importance of mathematical rigour and the ability to use precise and concise mathematical language as candidates progress in mathematics assumes a particular importance at this stage. Candidates working at this level are expected to acquire a competence and a confidence in applying mathematical techniques, manipulating symbolic expressions and communicating with mathematical correctness in the solution of problems. It is important, therefore, that, within this unit, appropriate attention is given to the acquisition of such expertise whilst extending the candidate's 'toolkit' of knowledge and skills.

The recommended content for this unit can be found in the course specification. The *detailed content* section provides illustrative examples to indicate the depth of treatment required to achieve a unit pass and advice on teaching approaches.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Where appropriate, mathematical topics should be taught and skills in applying mathematics developed through real-life contexts. Candidates should be encouraged throughout this unit to make efficient use of the arithmetical, mathematical and graphical features of calculators, as well as basic non-calculator skills. Candidates should be aware of the limitations of the technology and always apply the strategy of checking.

Numerical checking or checking a result against the context in which it is set is an integral part of every mathematical process. In many instances, the checking can be done mentally, but on occasions, to stress its importance, attention should be drawn to relevant checking procedures throughout the mathematical process. There are various checking procedures which could be used:

- relating to a context – 'How sensible is my answer?'
- estimate followed by a repeated calculation
- calculation in a different order.

Further advice on learning and teaching approaches is contained within the Subject Guide for Mathematics.

National Unit Specification: support notes (cont)

UNIT Mathematics 2 (Higher)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

The assessment for this unit will normally be in the form of a closed book test. Such tests should be carried out under supervision and it is recommended that candidates attempt an assessment designed to assess all the outcomes within the unit. Successful achievement of the unit is demonstrated by candidates achieving the thresholds of attainment specified for all outcomes in the unit. Candidates who fail to achieve the threshold(s) of attainment need only be retested on the outcome(s) where the outcome threshold score has not been attained. Further advice on assessment and retesting is contained within the National Assessment Bank.

It is expected that candidates will be able to achieve the algebraic, trigonometric and calculus performance criteria of the unit without the use of computer software or sophisticated calculators.

In assessments, candidates are required to show their working in carrying out algorithms and processes.

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).