Higher
Unit
Specification

Mathematics: Applications (Higher) Unit

SCQF: level 6 (6 SCQF credit points)

Unit code: H22J 76

Unit outline

The general aim of this Unit is to develop knowledge and skills that involve geometric applications, applications of sequences and applications of calculus. The Outcomes cover aspects of algebra, geometry, calculus, and also skills in mathematical reasoning and modelling.

Learners who complete this Unit will be able to:

1 Use mathematical operational skills linked to applications
2 Use mathematical reasoning skills linked to applications

This Unit is a mandatory Unit of the Higher Mathematics Course and is also available as a free-standing Unit. The Unit Specification should be read in conjunction with the *Unit Support Notes,* which provide advice and guidance on delivery, assessment approaches and development of skills for learning, skills for life and skills for work. Exemplification of the standards in this Unit is given in Unit assessment support.

The *Course Assessment Specification* for the Higher Mathematics Course gives further mandatory information on Course coverage for learners taking this Unit as part of the Higher Mathematics Course.

Recommended entry

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- National 5 Mathematics Course or relevant component Units

Equality and inclusion

This Unit Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Unit Support Notes.*

Standards

Outcomes and assessment standards

Outcome 1

The learner will:

1 Use mathematical operational skills linked to applications by:

1.1 Applying algebraic skills to rectilinear shapes
1.2 Applying algebraic skills to circles
1.3 Applying algebraic skills to sequences
1.4 Applying calculus skills to optimisation and area

Outcome 2

The learner will:

2 Use mathematical reasoning skills linked to applications by:

2.1 Interpreting a situation where mathematics can be used and identifying a valid strategy
2.2 Explaining a solution and, where appropriate, relating it to context

Reasoning and modelling skills should be evidenced in this Unit.

Evidence Requirements for the Unit

Assessors should use their professional judgement, subject knowledge and experience, and understanding of their learners, to determine the most appropriate ways to generate evidence and the conditions and contexts in which they are used. They should ensure there is sufficient evidence of competence in algebraic, calculus and reasoning skills from the Outcomes and Assessment Standards to allow a judgement to be made that the learner has achieved the Unit.

Assessors should use their professional judgement when giving learners credit for an appropriate degree of accuracy. This may mean giving credit for incomplete solutions or numerically incorrect solutions which show correct methodology, therefore demonstrating required knowledge and understanding of the algebraic and calculus processes involved.

Evidence may be presented for individual Outcomes or it may be gathered for the Unit as a whole through integrating assessment in a single activity. If the latter approach is used, it must be clear how the evidence covers each Outcome.

A calculator or equivalent technologies may be used.

For this Unit, learners will be required to produce evidence as follows:

For Outcome 1: Learners will be required to provide evidence for each assessment standard linked to expressions and functions by drawing on the following:

Algebraic skills — finding the equation of a line parallel to and a line perpendicular to a given line; using $m = \tan\theta$ to calculate a gradient or angle; determining and using the equation of a circle; using properties of tangency in the solution of a problem; determining a recurrence relation from given information and using it to calculate a required term; finding and interpreting the limit of a sequence, where it exists
Calculus skills — determining the optimal solution for a given problem; finding the area between a curve and the *x*-axis; finding the area between two curves or a straight line and a curve

For Outcome 2: Evidence of reasoning skills can be collected separately or combined with evidence for Outcome 1.

Assessment Standards 2.1 and 2.2 are transferable across the Course.

Exemplification of assessment is provided in Unit assessment support.
Advice and guidance on possible approaches to assessment is provided in the *Unit Support Notes*.

Additional Information
Symbols, terms and sets: the symbols: ∈, ∉, { } the terms: set, subset, empty set, member, element the conventions for representing sets, namely: $\mathbb{N}$, the set of natural numbers, {1, 2, 3, ...} W, the set of whole numbers, {0, 1, 2, 3, ...} $\mathbb{Z}$, the set of integers $\mathbb{Q}$, the set of rational numbers $\mathbb{R}$, the set of real numbers The content listed above is not examinable but learners are expected to be able to understand its use.

Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Unit. The skills that learners will be expected to improve on and develop through the Unit are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Unit where there are appropriate opportunities.

2 Numeracy

2.1 Number processes
2.2 Money, time and measurement
2.3 Information handling

5 Thinking skills

5.3 Applying
5.4 Analysing and evaluating

Amplification of these is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work.* The level of these skills should be at the same SCQF level as the Unit and be consistent with the SCQF level descriptor. Further information on building in skills for learning, skills for life and skills for work is given in the *Unit Support Notes.*

Administrative information

Published: April 2014 (version 2.0)

Superclass: RB

History of changes to National Unit Specification

Version	Description of change	Authorised by	Date
2.0	Page 3 - For Outcome 1, Assessment Standard 1.1 has been split into three, giving four in total. Under Outcome 2**,** the wording of Assessment Standard 2.2 has been changed for clarity. Page 4 – information has been added on the transferability of Assessment Standards in Outcome 2 across the Course Page 4 – additional information has been added on symbols, terms and sets	Qualifications Development Manager	April 2014