-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **7180311** **-Session-1991-92**
-Superclass- **RB**

-Title- **CORE MATHEMATICS 2**

-DESCRIPTION-

Purpose

This module has been designed for the student who requires practice in basic numerical skills and it provides an introduction to geometry and algebra. It should enable the student to acquire the confidence to apply these skills to problems in everyday situations and, as appropriate, vocational contexts and provide the motivation to attempt further work.

The module is broadly comparable to Standard Grade Mathematics at 5.

The use of mathematical investigations allows the development of skills in practical situations. "A Guide to Mathematical Investigations: SQA 1991" provides guidance on investigations.

The Appendix gives further guidance on mathematics modules in general and contains a grid showing the relationship between modules.

Preferred Entry Level

91051 Mathematics: Grade 1
or Standard Grade Mathematics at 6
or an equivalent level of experience.

Outcomes

The student should:

1. perform basic calculations;
2. use tables, charts and graphs;
3. use basic geometric properties;
4. evaluate expressions and formulae;
5. carry out a mathematical investigation.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.

The following abbreviations are used below:

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory).

OUTCOME 1 PERFORM BASIC CALCULATIONS

PCs

(a) Use of units of time is correct.
(b) Use of units of length, weight, capacity and temperature is correct.
(c) Use of simple percentages is correct.
(d) Calculation of simple proportion is correct.
(e) Calculation of mean is correct.

IA Calculation Exercise

Topics should be assessed on the number of occasions indicated:

(a)	time	3
(b)	length	2
	weight	2
	capacity	2
	temperature	2
(c)	simple percentages	3
(d)	simple proportion	3
(e)	mean	3

One question may cover more than one topic

Satisfactory achievement of the Outcome will be demonstrated by the student producing 2 correct responses for each of (a), (c), (d) and (e) and 6 correct responses for (b), with at least one correct response for each of length, weight, capacity and temperature.

OUTCOME 2 USE TABLES, CHARTS AND GRAPHS

PCs

(a) Interpretation of information from tables, charts and graphs is correct.
(b) Extraction of information from tables, charts and graphs is correct.
(c) Processing of information from tables, charts and graphs is correct.

IA Graphical and Calculation Exercise

Information will be interpreted, extracted and processed from a table, a chart and a graph. The interpretation, extraction and processing may occur in one question.

Satisfactory achievement of the Outcome will be demonstrated by the student producing correct responses for each of the table, chart and graph.

OUTCOME 3 USE BASIC GEOMETRIC PROPERTIES

PCs

(a) Drawing of rectangles, triangles and circles is in accordance with the specification.
(b) Calculation of perimeters of composite rectangular shapes is correct.
(c) Calculation of areas of composite rectangular shapes is correct.
(d) Calculation of volumes of cubes and cuboids is correct.

IA Graphical and Calculation Exercise

Topics should be assessed on the number of occasions indicated:

(a)	draw shapes	3
(b)	perimeters	3
(c)	areas	3
(d)	volumes	3

One question may cover more than one topic.

Satisfactory achievement of the Outcome will be demonstrated by the student producing 3 correct responses for (a) and 2 correct responses for each of (b), (c) and (d). The volume of at least one cube and one cuboid for Performance Criterion (d) should be correct.

OUTCOME 4 EVALUATE EXPRESSIONS AND FORMULAE

PCs

(a) Evaluation of expressions is correct.
(b) Evaluation of simple formulae expressed in words is correct.
(c) Evaluation of simple formulae expressed in symbols is correct.

IA Calculation Exercise

Topics should be assessed on the number of occasions indicated:

(a)	expressions	3
(b)	simple formulae in words	3
(c)	simple formulae in symbols	3

One question may cover more than one topic.

Satisfactory achievement of the Outcome will be demonstrated by the student producing 2 correct responses for each of (a), (b) and (c).

OUTCOME 5 CARRY OUT A MATHEMATICAL INVESTIGATION

PCs

(a) Identification of key factors of the investigation is correct.
(b) Identification of strategies is appropriate to the situation.
(c) Implementation of appropriate strategies is correct.
(d) Drawing of conclusions is appropriate to the investigation.
(e) Communication of findings is clear.

IA Project

The student should present evidence which shows the structure of the investigation and processes carried out during the investigation.

Satisfactory performance will be achievement of all the Performance Criteria.

The following sections of the descriptor are offered as guidance.
They are not mandatory.

CONTENT/CONTEXT

Corresponding to Outcomes 1-5:

1. Time involving real situations: timetables, holidays, TV programmes, mixed units of time.

   Conversion of units of length, weight and capacity: mm to m, kg to g, cm^3 to litres. Calculations using mixed units in context eg. fencing a garden, emptying a container, change in temperature.

   Simple percentages: discount, VAT, simple interest eg. 8% of £240. Direct proportion.

   Average weight, hours of sunshine.

2. Use of timetables e.g. time taken for fastest train from London to Edinburgh; catalogues e.g. cost of a holiday; tide tables, and other published tables; pie charts, bar charts, time/distance graphs, temperature graphs.

3. Examples in context eg. simple scale drawing; length of skirting boards in a room, area of carpeting, volume of a juice carton (cuboid).

4. Expressions such as 3a + 2b , a = 4, b = 1.
   Formulae such as profit is given by selling price less cost

   price, s = vt, A = $^1/_2$ bh, $R = \frac{V}{I}$.

5. The document "A Guide to Mathematical Investigations: SQA 1991" provides detailed information concerning, and exemplars of, investigations. The investigation should involve the content of other outcomes.

SUGGESTED LEARNING AND TEACHING APPROACHES

The module descriptor lists discrete outcomes, but the learning and teaching approaches adopted may change the order or integrate the outcomes as appropriate. Several approaches are possible depending on the availability of resources, experience of tutors and the type of student group. This may involve individualised learning, group work and class work. Multi media approaches should be encouraged where possible: text, practical activities, simulations, computer programs, videos etc. Problem solving should be encouraged throughout the module as part of the learning and teaching process, within the investigations, and as part of the assessment process. Likewise the investigation of mathematical ideas should be encouraged throughout the module. Diagnostic and formative assessment may be used where appropriate. The summative assessment may form an integral part of the whole learning/teaching process or may consist of separate tests.

The student should be encouraged to keep a log book/workfile. This should form a complete record of the student's work throughout the module. The workfile could contain the student's notes, class handouts, completed worksheets, exercises, assignments, projects, investigations, log of computer activities and a summary of the important details for later revision purposes.

The sensible use of appropriate technologies (numeric/ scientific/graphics/programmable calculators or computers etc.) should be encouraged. Due account should be taken of estimation, rounding and errors introduced into calculations.

Investigations should allow for divergent mathematical thinking. They may allow for comparisons and contain open ended or closed problems. Situations may occur where no solution is obtainable. The acquisition of mathematical skills may occur within the investigation. A typical investigation used for the purposes of summative assessment may take around 2 hours.

APPENDIX

FRAMEWORK OF THE MATHEMATICS MODULES 91/92

The module grid summarises the complete structure of the mathematics modules and some of their relationships.

Progression through the grid is to the right.

When considering the suitability of a module, it is important to consider it in relation to others in the grid and not just in isolation.

The first module, Using Numbers in Everyday Situations, relates to the most elementary number concepts and skills.

The modules Using Basic Number Skills, Using Arithmetic Skills, Dealing With Basic Measurements, Dealing With Money, Using Measurement Skills Within Everyday Activities and Small Scale Planning, Estimating and Costing were developed for the BBC Basic Skills Numeracy project.

The modules Core Maths 2, 3 and 4 relate approximately to work done in Standard Grade Mathematics. They are appropriate as National Certificate modules because they allow for consolidation of mathematical skills and they provide students with a second opportunity to create a base from which they can develop their mathematical knowledge and skills.

The modules Business Numeracy, Construction Numeracy 1 and 2, Engineering Numeracy and Laboratory Numeracy have a vocational bias and cater for the mathematical needs of students on craft, operator, clerical or YTS courses.

Craft Technology 1 and 2 are designed to consolidate the mathematical skills at craft level.

The remaining modules meet the needs of students requiring further mathematics in support of their other studies.

Modules Analysis/Algebra 1, Analysis/Algebra 2, Calculus 1(A) and Calculus 1(B) relate approximately to work done in Higher Grade mathematics, but alternative groupings are possible for students continuing or intending to continue, with college or university studies in, for example, business studies or engineering.

Specialist modules such as Business Statistics, Boolean Algebra, Numerical Methods, Operational Research and Spherical Trigonometry are available.