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Module Descriptor

Mathematics

Award Type: Minor
Award Level: 3
Award Code: 3N0929
FÁS Assessment Code: 3N0929-028
Validation date 22nd November 2011

Revision 1.0

Module Descriptor

Purpose: The purpose of this module is to develop the knowledge skill and competence of learners to apply mathematical skills in their personal, social and employment environments.

Module Duration: The learning effort required from a typical learner to successfully achieve the stated learning outcomes for the module is **100 (one hundred) hours.**

Learning Outcomes: By the end of this module, the learner will be able to:

1 Number

1.1 Explain the concepts of natural numbers (N), integers (Z), and real numbers (R)

1.2 Demonstrate equivalence between common simple fractions decimals and percentages by conversion

1.3 Express simple ratios as fractional ratios

1.4 Give approximations by using strategies including significant figures and rounding off large and natural numbers

1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key

1.6 Demonstrate accuracy of calculation by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division, to natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers to two places of decimal

2 Measurement and Capacity

2.1 Describe shape and space constructs using language appropriate to shape and space to include square, rectangle, circle, cylinder, angles, bisect, radius, parallel, perpendicular etc.

2.2 Draw everyday objects to scale using a range of mathematical instruments

2.3 Calculate the area of a square, rectangle, triangle and circle using the correct formula and giving the answer in the correct form

2.4 Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form

2.5 Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity, weight and time

2.6 Use simple scaled drawings to work out real distance, location and direction

3 Algebra

3.1 Describe familiar real life situations in algebraic form

3.2 Simplify basic algebraic expressions by applying the principle mathematical functions i.e. addition, subtraction, multiplication, division, to algebraic expressions of 1 or 2 variables

3.3 Solve basic algebraic equations of one variable, by using the variable to solve mathematical problems where the solution is N

4 Data Handling

4.1 Describe the presence of data in everyday situations

4.2 Conduct a simple survey using a variety of data collection methods

4.3 Display data using appropriate classifications on bar charts or pie charts

4.4 Describe findings, to include interpretation of results, and suggesting reasons for findings

5 Problem Solving

5.1 Describe everyday situations in terms of quantitative descriptions

5.2 Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques

5.3 Describe how a quantitative solution to a problem may be applied in a limited range of contexts

Unit 1 Title: Number

At the end of this unit, the learner will be able to:

1.1 Explain the concepts of natural numbers(N), integers (Z), and real numbers (R)
1.2 Demonstrate equivalence between common simple fractions decimals and percentages by conversion
1.3 Express simple ratios as fractional ratios
1.4 Give approximations by using strategies including significant figures and rounding off large and natural numbers
1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key
1.6 Demonstrate accuracy of calculation by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division, to natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers to two places of decimal

Key Learning Points

Learning Outcome 1.1: Explain the concepts of natural numbers (N), integers (Z), and real numbers (R)
Key Learning Points
• Basic mathematical functions • Natural numbers (N) • Integers (Z) • Real numbers (R) • Explaining concepts • Explaining concepts of natural numbers (N), integers (Z) and real numbers (R) • Listing numbers 1-100, orally and in writing • Listing numbers backwards • Reading and writing numbers up to 1,000,000 • Sequencing in set increments • Listing numbers in set increments : 2, 4, 6, 8; 3, 6, 9, 12, etc • Adding and subtracting 1, 2 and 3-digit numbers without a calculator • Multiplying and dividing • Multiplying and dividing by single-digit numbers without a calculator

Learning Outcome 1.2: Demonstrate equivalence between common simple fractions decimals and percentages by conversion
Key Learning Points
• Basic fractions • Decimals • Percentages

- Solving numerical and verbal problems
- Solving numerical and verbal problems using basic fractions, decimals and percentages
- Recognising values of numbers up to 2 decimal places
- Calculating common percentages
- Calculating common percentages with and without a calculator
- Converting basic fractions to decimals and percentages and vice versa.

Learning Outcome 1.3: Express simple ratios as fractional ratios

Key Learning Points

- Identifying and using basic fractions
- Identifying and using ratios
- Solving numerical and verbal problems using basic fractions, and ratios
- Converting simple fractions to ratios

Learning Outcome 1.4: Give approximations by using strategies including significant figures and rounding off large and natural numbers

Key Learning Points

- Estimating answers
- Rounding off answers
- Estimating answers to numerical problems using addition, subtraction, multiplication and division
- Estimating total of selection of items in context of shopping and eating out
- Rounding off answers to numerical problems to two significant figures, including decimal numbers
- Explaining, estimating and rounding off answers verbally and in writing

Learning Outcome 1.5: Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key

Key Learning Points

- Using a calculator
- Function keys on a calculator
- Adding, subtracting, multiplying and dividing using a calculator
- Solving numerical problems using up to 4-digit numbers with a calculator
- Calculating percentages
- Adding to or subtracting from totals using a calculator
- Using Clear and Clear entry functions
- Using Memory + and Memory – functions

Learning Outcome 1.6: Demonstrate accuracy of calculation by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division, to natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers to two places of decimal
Key Learning Points
• Principal mathematical functions i.e., addition, subtraction, multiplication, division • Adding and subtracting natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers • Multiplying and dividing natural numbers (N), integers (Z), and real numbers (R), simple fractions, and decimal numbers • Rounding off answers to numerical problems to 2 (two) significant figures, including decimal numbers

Unit 2 Title: Measurement and Capacity

At the end of this unit, the learner will be able to:

2.1 Describe shape and space constructs using language appropriate to shape and space to include square, rectangle, circle, cylinder, angles, bisect, radius, parallel, perpendicular etc.
2.2 Draw everyday objects to scale using a range of mathematical instruments
2.3 Calculate the area of a square, rectangle, triangle and circle using the correct formula and giving the answer in the correct form
2.4 Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form
2.5 Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity, weight and time
2.6 Use simple scaled drawings to work out real distance, location and direction

Key Learning Points

Learning Outcome 2.1: Describe shape and space constructs using language appropriate to shape and space to include square, rectangle, circle, cylinder, angles, bisect, radius, parallel, perpendicular etc.
Key Learning Points
• Common geometric shapes • Understanding common terms used in geometry to include angles, bisect, radius, parallel, perpendicular • Appropriate language • Identifying common two and three dimensional shapes to include triangle, square, circle, cylinder, cube and cone • Describing common two and three dimensional shapes to include triangle, square, circle, cylinder, cube and cone • Sketching common two and three dimensional shapes to include triangle, square,

circle, cylinder, cube and cone • Giving examples of shapes as they occur in everyday objects

Learning Outcome 2.2: Draw everyday objects to scale using a range of mathematical instruments
Key Learning Points
• Mathematical instruments • Scale drawings • Using mathematical instruments • Hazards using mathematical instruments • Listing the hazards of using mathematical instruments • Making scale drawings • Making scale drawings using mathematical instruments

Learning Outcome 2.3: Calculate the area of a square, rectangle, triangle and circle using the correct formula and giving the answer in the correct form
Key Learning Points
• Common shapes • Using formulae • Calculating areas • Calculating area of circle, square, rectangle and triangle

Learning Outcome 2.4: Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form
Key Learning Points
• Calculating volume of cones and cylinders • Giving answers in correct form

Learning Outcome 2.5: Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity, weight and time
Key Learning Points
• Length, distance, capacity, time and weight • Metric units and their abbreviations • Writing metric units and their abbreviations • Measuring the length and breadth of objects • Calculating distance to next/nearest city, town and airport • Measuring various amounts of liquid up to 1litre • Weighing everyday items up to 1kg in weight • Using the unit of measurement appropriate to different situations

Learning Outcome 2.6: Use simple scaled drawings to work out real distance, location and direction
Key Learning Points
• Scales • Scales on maps • Explaining scales verbally and in writing • Using everyday objects when judging distance • Calculating real distance • Calculating real distance on simple scaled maps • Calculating location and direction • Calculating location and direction on simple scaled maps • Drawing everyday objects to scale • Drawing everyday objects to scale using selection of mathematical instruments

Unit 3 Title: Algebra

At the end of this unit, the learner will be able to:

3.1 Describe familiar real life situations in algebraic form
3.2 Simplify basic algebraic expressions by applying the principle mathematical functions i.e. addition, subtraction, multiplication, division, to algebraic expressions of 1 or 2 variables
3.3 Solve basic algebraic equations of one variable, by using the variable to solve mathematical problems where the solution is N

Key Learning Points

Learning Outcome 3.1: Describe familiar real life situations in algebraic form
Key Learning Points
• Definition of algebra using simple terminology • Giving examples of real-life situations in which algebra is used • Benefits of understanding algebra to everyday life • Writing algebraic expressions • Expressing ‘stories’ as mathematical sentences

Learning Outcome 3.2: Simplify basic algebraic expressions by applying the principle mathematical functions i.e. addition, subtraction, multiplication, division, to algebraic expressions of 1 or 2 variables
Key Learning Points
• Building simple equations • Solving simple equations • What are inequalities • Solving inequalities of 1 (one) variable • What are simultaneous equations

• Solving simultaneous equations • Application to real life problems

Learning Outcome 3.3: Solve basic algebraic equations of one variable, by using the variable to solve mathematical problems where the solution is N.
Key Learning Points
• Identifying problems • Constructing algebraic expression of problem • Solving selection of algebraic problems

Unit 4 Title: Data Handling

At the end of this unit, the learner will be able to:

4.1 Describe the presence of data in everyday situations
4.2 Conduct a simple survey using a variety of data collection methods
4.3 Display data using appropriate classifications on bar charts or pie charts
4.4 Describe findings, to include interpretation of results, and suggesting reasons for findings

Learning Outcome 4.1: Describe the presence of data in everyday situations
Key Learning Points
• Definition of data • Looking at data in everyday surroundings • Describing where data can be seen • Describing how alarm clocks, cooker clocks etc are part of data that is seen • Data that is present in everyday lives explained verbally and visually

Learning Outcome 4.2: Conduct a simple survey using a variety of data collection methods
Key Learning Points
• Purpose of data collection • Explaining how data is used to collect information of any variety • Variety of data collection methods • Describing questionnaires • Describing interviews • Describing surveys • Describing the usage of timetables, league tables • Choosing appropriate data collection method • Designing a questionnaire and applying interview techniques to class • Carrying out a survey using a questionnaire and interviewing

Learning Outcome 4.3: Display data using appropriate classifications on bar charts or pie charts
Key Learning Points
• Interpreting the data to enable the creation of a pie chart and bar graph • Organising the data to be placed into a pie chart and bar graph. • Displaying data using bar charts, pie charts • Using the pie charts and bar charts to gain answers to the survey

Learning Outcome 4.4: Describe findings, to include interpretation of results, and suggesting reasons for findings.
Key Learning Points
• Examining the results of a survey • Interpreting results • Exploring the concepts of the bar and pie chart being picture images of data, so that people can take information easily from them • Interpreting surveys using own thoughts and ideas, e.g. why we do sports/why not • Showing how a survey leads to unexpected discoveries, new thoughts, and ideas • Coming up with reasons for the findings of a survey • Describing findings

Unit 5 Title: Problem Solving

At the end of this unit, the learner will be able to:

5.1 Describe everyday situations in terms of quantitative descriptions
5.2 Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques
5.3 Describe how a quantitative solution to a problem may be applied in a limited range of contexts

Key Learning Points

Learning Outcome 5.1: Describe everyday situations in terms of quantitative descriptions
Key Learning Points
• Exploring everyday situations where maths is used • Definition of the term quantitative • Quantitative descriptions of everyday situations • Learning through visualisation, association reasoning and generalisation • Using inquiry as a means to finding the answer, e.g. brainstorming • Learning that the type of problems we encounter in mathematics can vary and be applied to all areas of life

- Calculating fractions in problem solving
- Applying values to letters
- Calculating values once numbers have been applied to letters
- Defining a goal (answer) and break it down into intermediate goals
- Learning how to use the information at hand and work backwards
- Calculating answers to problem questions using multiplication/addition/subtraction
- Calculating answers using real numbers, integers and natural numbers

Learning Outcome 5.2: Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques

Key Learning Points

- Learning how to break down a problem and identify a method of reasoning – Present Problem, Solution Search, Implement Solution
- Calculating answer to problem questions using multiplication/addition/subtraction
- Calculating answer using natural numbers and integers

Learning Outcome 5.3: Describe how a quantitative solution to a problem may be applied in a limited range of contexts

Key Learning Points

- Describing the unitary method of maths
- Describing the value of one
- Calculating answer to problem questions using multiplication/addition/subtraction
- Calculating answer using natural numbers

Assessment Specification

Award Title	**Mathematics**
Award Type	**Minor**
FÁS Assessment Code	**3N0929-028**
Award Code*:*	**3N0929**
Credit Value :	**10**

Note: This module is assessed using a combination of assessment instruments contained in three Assessment Instrument Specifications

- **Application of Number (3N0928) = AIS A**
- **Functional Mathematics (3N0930) = AIS B**
- **Mathematics (3N0929) = AIS C**

Learning Outcome	Performance Criteria (Knowledge, Skill & Competence)	Assessment Techniques	Weighting	Assessment Instrument	Assessment Evidence
L01.1	Knowledge, Skill	Portfolio	6%	AIS B (E1)	Exercise Sheet
L01.2	Knowledge, Skill	Portfolio	3%	AIS B (E3)	Exercise Sheet
L01.3	Knowledge, Skill	Portfolio	3%	AIS B (E3)	Exercise Sheet
L01.4	Knowledge, Skill	Portfolio	2%	AIS B (E4)	Exercise Sheet
L01.5	Knowledge, Skill	Portfolio	2%	AIS B (E4)	Exercise Sheet
L01.6	Knowledge, Skill, Competence	Portfolio	2%,6%	AIS A (E4), (E5)	Exercise Sheets
L02.1	Knowledge, Skill	Portfolio	6%	AIS A (E6)	Exercise Sheet
L02.2	Knowledge, Skill	Portfolio	2%	AIS A (E7)	Exercise Sheet
L02.3	Knowledge, Skill	Portfolio	2%, 3%	AIS A (E7), (E9)	Exercise Sheets
L02.4	Knowledge, Skill	Portfolio	2%, 3%	AIS A (E7), (E9)	Exercise Sheets
L02.5	Knowledge, Skill, Competence	Portfolio	6%	AIS A (E10)	Exercise Sheet
L02.6	Knowledge, Skill	Portfolio	6%	AIS A (E8)	Exercise Sheet

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Learning Outcome	Performance Criteria (Knowledge, Skill & Competence)	Assessment Techniques	Weighting	Assessment Instrument	Assessment Evidence
L03.1	Knowledge, Skill	Portfolio	2%	AIS B (E5)	Exercise Sheet
L03.2	Knowledge, Skill	Portfolio	3%	AIS B (E5)	Exercise Sheet
L03.3	Knowledge, Skill	Portfolio	6%	AIS B (E6)	Exercise Sheet
L04.1	Knowledge, Skill	Portfolio	6%	AIS C (E1)	Exercise Sheet
L04.2	Knowledge, Skill	Portfolio	2%	AIS C (E2)	Exercise Sheet
L04.3	Knowledge, Skill	Portfolio	2%	AIS C (E2)	Exercise Sheet
L04.4	Knowledge, Skill, Competence	Portfolio	2%	AIS C (E2)	Exercise Sheet
L05.1	Knowledge, Skill,	Portfolio	6%	AIS C (E3)	Exercise Sheet
L05.2	Knowledge, Skill, Competence	Portfolio	6%, 6%	AIS C (E4), (E5)	Exercise Sheets
L05.3	Knowledge, Skill, Competence	Portfolio	5%	AIS C (E6)	Exercise Sheet

Key: **E**=Exercise, for example E1 is Exercise 1

Suggested Learning Methodologies

Activities and exercises
Note taking
Discussion groups
Project work
Text-book study

Specific Module Requirements

Drawing equipment
Measurement instruments
Calculators

Suggested Learning Resources

All of the highlighted curriculum resources mentioned below are available on the Moodle Community Services Curriculum and Assessment page. You can access the CSCA Moodle web page from this link:
http://www.ecollege.ie/site/home.html ..

Learning Resources for Unit 1, Unit 2 and Unit 3

Refer to Learning Resources in Application of Number and Functional Mathematics for Units 1, 2 and 3.

Learning Resources for Unit 4 and Unit 5

This learning resource pack includes resources for Data Handling and Problem Solving. These are summarised and highlighted in bold below.

Learners will explore **data in everyday life,** they will look where data is present for example at home, in the training centre.

Learners will carry out a **Survey using a Questionnaire** and display their results.

The instructor will show the learner how data is inputted into a computer package, this is outlined in **Displaying data using a computer package**.

Learners will identify what the term quantitative means and where they experience it in **Quantitative Descriptions.**

The instructor will explain to the learner how to solve problems using the unitary method. Learners will do exercises in **Solving quantitative problems using the unitary method.**

Recommended by: _____

Manager Training Policy Development and Support

Approved by: _____

Director Training Policy Development and Support