Revised Programme Module

Mathematics

leading to

Level 3 QQI Component: Mathematics 3N0929

Please note the following prior to using this programme module descriptor:

- This programme module can be delivered as a stand- alone module or as part of the:

    1. **Level 3 QQI Certificate in General Learning 3M0874**
    2. **Level 3 QQI Certificate in Employability Skills 3M0935**
    3. **Level 3 QQI Certificate in Information and Communication Technologies 3M0877.**

- Upon successful completion of this programme module the learner will achieve 10 credits towards the Level 3 QQI Certificates in General Learning, Employability Skills or Information and Communication Technologies.

- The learner needs to accumulate a minimum of 60 credits in order to achieve the Level 3 QQI Certificates in General Learning or Employability Skills or Information and Communication Technologies.

- Teachers/tutors should familiarise themselves with the information contained in CDETB's programme descriptor for Everyday Living Skills, Skills for the Workplace or Introduction to Information and Communication Technologies prior to delivering this programme module.

- In delivering this programme module teachers/tutors will deliver class content in line with the Guidelines for Teaching and Learning included in this programme module.

- In assessing the learner, teachers/tutors will assess according to the information included in this programme module. Teachers/tutors are required to devise Assessment Briefs for the Collection of Work and the Skills Demonstration.

- Where overlap is identified between the content of this programme module and one or more other programme module(s), teachers/tutors are encouraged to integrate the delivery of this content.

- Where there is an opportunity to facilitate the learner to produce one piece of assessment evidence which demonstrates the learning outcomes from more than one programme module, teachers/tutors are encouraged to integrate assessment.

Overview of the Programme Module

The Programme Module is structured as follows:

Section 1 to 8: contains important information for the teacher/tutor about the credit value, title, code, etc. of the programme module.

Section 9: details the learning outcomes prescribed for the programme module by QQI. These outcomes are set by QQI and cannot be changed in any way by the CDETB or individual teachers/ tutors.

Section 10: outlines suggestions and guidelines for teaching the module. It contains useful information and ideas for teachers/tutors and can be helpful in clarifying learning outcomes.

Section 11: contains the relevant information in relation to the assessment of the module. As the teacher/tutor is the assessor of the work, this section is essential reading.

Section 11a specifically prescribes the way in which learners are required to present evidence for assessment.

Learner Marking Sheet: this is the marking sheet that must be attached to the assessment portfolio and signed by the teacher/tutor and the learner.

Programme Module	Award
1. Title of Programme Module Mathematics	**2. Component Name and Code** Level 3 Mathematics 3N0929
3. Duration in Hours of Programme Module 100	**4. Credit Value** 10
5. Assessment Technique Collection of Work 100%	**6. Specific Requirements** None.

7. Aims and Objectives of the Programme Module

This programme module aims to equip the learner with the knowledge, skills and competencies to use mathematical concepts and relationships to solve real life mathematical problems that may be experienced in their personal life, educational life and work life.

8. Objectives:

- to provide clarity around different kinds of numbers, including fractions, percentages, decimals, natural numbers, integers, and real numbers that people are exposed to everyday
- to develop mathematical skills and understanding to support use of maths in real life situations
- to create an awareness of the functions of a calculator and develop competency in using a calculator
- to consider the concept of algebra and its use in daily life
- to create an awareness of the presence of data in daily life and to collect, organise, present and interpret data in a practical manner
- to consider the concept of shape and space and practically apply these concepts to solving mathematical problems relating to area and volume

9. Learning Outcomes of Level 3 Mathematics 3N0929

The learner will be able to:

1. Number
1.1 Explain the concept of natural numbers (N), integers (Z), and real numbers (R)
1.2 Demonstrate equivalence between common simple fractions, , decimals, and percentages by conversion e.g. ½ = 0.5 = 50%
1.3 Express simple ratios as fractional ratios e.g. 1:2 = 1/3:2/3
1.4 Give approximations by using strategies including significant figures and rounding off large 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, 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, 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 principal mathematical functions, i.e. addition, subtraction, multiplication, division to algebraic expressions of 1 or 2 variables

3.3 Solve basic algebraic equations of 1 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.

Delivery Strategies and Learning Activities

This programme module could be delivered through classroom-based learning activities, teamwork, group discussions, one-to-one tutorials, field trips, case studies, and other relevant activities.

10. Guidelines for Teaching and Learning

This section provides suggestions for programme content but is not intended to be prescriptive. In addition the following guidelines suggest a sequence for the teaching of the module. In some cases this may differ from the sequence of learning outcomes outlined in section 9.

A note on the typical learner at level 3 and the possible need for specific instruction in basic numeracy skills.

Learners undertaking mathematics at level 3 span a broad spectrum of ability. At one extreme, are learners who will be able to achieve the outcomes with relative ease. These learners are likely to be able to undertake basic mathematics with minimal reminders of how to do the calculations. There may be some material that is difficult for them, like getting the volume of a cylinder or a cone, but with minimal instruction they will be able to carry out the operation. At the other extreme are learners who have the potential, with time and support, to become proficient at this level. They are likely to need specific instruction and plenty of practice to bolster their confidence and capacity to meet the learning outcomes. The vast majority of learners fall somewhere in between these extremes and are likely to be proficient in some areas of mathematics and not so proficient in others.

Thus, it cannot be assumed that the typical learner has the entire range of basic numeracy skills to engage with the module. It is therefore inevitable that the teaching of these skills will form a greater or lesser part of the process of teaching level 3 mathematics. The spirit of the module is that at the end of the process, learners will be able to carry out the basic mathematical operations with a reasonable degree of accuracy, confidence and independence and be aware of the usefulness of mathematics in everyday life. Failure to ensure that learners have at least the basic skills and can use them in real life situations outside the classroom will result in a restriction of their capacity to progress beyond level 3. To assist teachers/tutors, the following guidelines take each learning outcome in turn and indicate the level at which the tasks should be completed.

Finally, the aim of this module is to enable learners to become comfortable with numbers. They can develop their own number sense by looking at the numbers they use everyday; their bodies (ten fingers, one nose, height, weight, age etc.) , money, phone numbers, route to work or school, the weather, the building you are now in, food they eat. Teachers/tutors are encouraged to use relevant examples where possible and encourage the learner to make their own mathematics dictionary.

Free resources available on the web (these are examples)
- Geogebra resources (www.geogebra.org)
- Project Maths website (www.projectmaths.ie)
- Times Educational Supplement (www.tes.co.uk)
- Special Education Needs resources (www.senteacher.org)
- BBC Skillswise Maths *(*www.bbc.co.uk/skillswise/maths)

Unit 1 Number

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

1.6 Calculate accurately natural numbers (N) integers (Z) and real numbers (R) including simple fractions and decimal numbers to two places, by addition, subtraction, multiplication and division.

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

*In order to help the learner achieve **Learning Outcome 1.1, 1.5 and 1.6,** consider integrating the teaching of these skills throughout the delivery of the module.*

In situations where this is not appropriate, it may be necessary to teach these learning outcomes separately and distinctly. In these cases, you may consider the following:

Learning Outcomes 1.1 & 1.6

Explain **natural numbers (N), integers (Z), and real numbers (R)** giving examples. (Note it is sufficient at this level that the learner knows that there are different types of numbers. It is more important that the learner can add, subtract, multiply and divide the different types of numbers. Hence it is appropriate to combine learning outcome 1.1 with learning outcome 1.6)

Natural numbers (N) = numbers you use to count real objects that we can see and touch. (1,2,3,4,5,)

Integers (Z) = includes natural numbers and negative natural numbers. (Fractions and decimals are not integers). (-3,-2, -1, 0,1,2,3,4,5)

Real numbers (R) = are the numbers which exist. Every type of number belongs to the real number set. They are; natural numbers, whole numbers, integer numbers, fractions or rational and irrational numbers.

For example:
- Using the symbols **+ - × ÷,** show simple calculations for the range of number types mentioned above.

1.5 Use a calculator to perform the following functions: addition, subtraction, multiplication, division, percentages, memory keys and the clear key.

*In order to help the learner achieve **Learning Outcome** 1.5 in particular, consider doing the following:*

Identify and locate all keys needed to carry out basic calculations on a calculator such **as +, -, ×, ÷, %, M+, MRC, M- and ON/AC.**
- This may be achieved by using simple everyday calculations to show the use of these calculator keys.
- This may be used to check calculations in any of the learning outcomes.

1.3 Express simple ratios as fractional ratios e.g. 1:2 = 1/3:2/3

In order to help the learner achieve **Learning Outcome 1.3** in particular, consider facilitating the learner to show ratios in real life situations.

For example:
- a) Concrete is made of cement, sand and gravel. A ratio of 1:3:4 would mean that concrete is

made up of, 1 part cement, 3 parts sand and 4 parts gravel.

b) For every 7 cars on the road there is 1 truck, giving a ratio of 7:1. Explain the idea of a ratio and show calculations. Express ratios as fractional ratios.

c) The ratio of men to women on a college course is 1:2 = ⅓ men: ⅔ women. Show similar calculations to express ratios as fractional ratios.

1.4   Demonstrate how to give approximations by rounding off to significant figures and by rounding off large natural numbers.

*In order to help the learner achieve **Learning Outcome** 1.4 in particular, consider doing the following:*

Explore with the learner how rounding off numbers is something that we do in real life situations where an approximate number suffices rather than the exact amount or number. For example, we often approximate the number of people at a football match rather than give the precise number.
Show the learner how to give approximations by rounding off natural numbers to the nearest 10, 100, 1000. Use simple examples so that the learner can focus on internalising the concept.

For example:
a) Round off the following numbers to the nearest 10
18, 23, 58, 69
b) Round off the following numbers to the nearest 100
141, 163, 178, 177
c) Round off the following numbers to the nearest 1000
1680, 2,300,   4,950, 2,750

Show the learner how to round off natural numbers to one and two significant figures. Use simple calculations.

1.2   Demonstrate equivalence between common simple fractions, decimals, and percentages by conversion e.g. ½ = 0.5 = 50%.

*In order to help the learner achieve **Learning Outcome** 1.2 in particular, consider doing the following:*

Discuss how percentages, fractions and decimals are used in everyday life. The learner may already know some percentages, fractions, decimals and their equivalences. Consider using this knowledge to create a table similar to the one below.

	Fraction	Percentages	Decimals
1.	?	**50%**	?
3.	?	?	**0.75**
4.	¼	?	?

Carry out simple calculations to show equivalence between fractions and percentages, decimals and fractions, etc.

## Unit 2 Measurement and Capacity

2.1 Using the correct language, describe particular shapes including squares, rectangles, circles, cylinders and cones and show an understanding of the meaning of the following words, angle, bisect, radius, parallel, perpendicular etc.

*In order to help the learner achieve **Learning Outcome** 2.1 in particular, consider doing the following:*

Discuss the general characteristics of the various shapes and facilitate the learner to use the correct mathematical language to describe them. It may be helpful to examine everyday shapes as a way of reinforcing the concept. The teacher/tutor may consider an exercise such as the one below as a way of demonstrating that the learner is able to describe the shapes appropriately.

For example:

a) Consider asking the learner to identify the following shapes and to use appropriate language to describe them. The learner may find it appropriate to use the words; angle, radius, parallel, and perpendicular when describing the shapes.
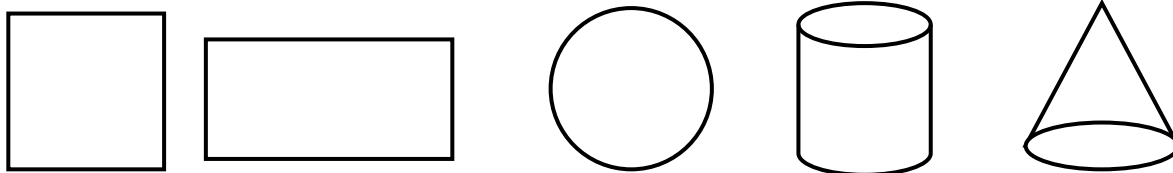
b) Consider asking the learner to sketch a line to show their understanding of a line which is perpendicular / parallel to a line drawn on a page.

c) In relation to the mathematical term *bisect,* it is sufficient that the learner understands the concept in its most simple form i.e. to divide something into two parts. (Usually these parts are equal).

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

*In order to help the learner achieve **Learning Outcome** 2.3 in particular, consider doing the following:*

Use real life situations such as measuring carpet for a room to show area. Explain the different formula used for calculating the area of a square, rectangle, circle and triangle. Show the answer in the correct form such as (m^2).

Calculate the area of a room which measures 4 metres by 8 metres: 4m × 8m = 32 m^2

8 m

4 m
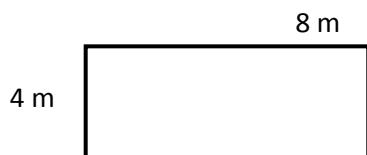
a) Use other examples to show how to calculate the area of a square, circle and triangle
   * Area of a square = length × width
   * Area of a triangle= **½** × base × height
   * Area of a circle= πr^2

2.4 Calculate the volume of a cylinder and cone using the correct formula, give the answer in the correct form.

In order to help the learner achieve Learning Outcome 2.4 in particular, consider doing the following:

Introduce the learner to the different formula for calculating the area of a cone and a cylinder.
(Note: It is not necessary that learners at level 3 understand the concept of pi. It is sufficient that they know how to use it to get the volume.)
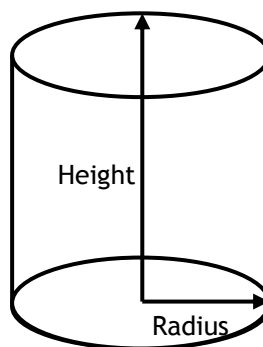
Definitions

V	=	volume
r	=	radius of the base
h	=	height
pi	=	π, approximately 3.142

Use examples to calculate the volume of a cone and a cylinder. Show the answer in the correct form i.e.
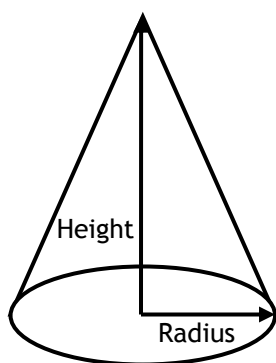
$V = 1/3 \; \pi \; r^2 \; h$	$V = \pi \; r^2 \; h$

For example:
  a) Calculate the volume of a cone with a radius of 4cm and a height of 10cm.
     Using the formula ($1/3 \, \pi \, r^2 \, h$), the answer is $1/3 \; 3.142 \times 4 \times 4^2 \times 10 = 168$ cm³.

  b) Calculate the volume of a cylinder with radius of 3cm and a height of 8cm.
     Using the formula ($\pi \, r^2 \, h$), the answer is $3.142 \times 3 \times 3 \times 8 = 226$ cm³.

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

In order to help the learner achieve Learning Outcome 2.5 in particular, consider doing the following:

Discuss with the learner the length/distance, weight and capacity of common objects. It is useful to ask the learner to estimate the measurement of common objects and then to actually measure them.
You may consider providing for the learner with everyday measuring tools such as the following:
  • measuring jug
  • tape measure
  • string
  • bathroom scales
  • kitchen scales

- calculator
- 100 square
- multiplication square
- clocks
- calendar
- maps
- stop watch

Time:
- Even though time is not measured metrically it is important that the learner can read and use the 12 and 24 hour clock.
- Also consider showing the learner how to use a stopwatch to calculate how long it takes to carry out a simple task.

2.2 Explain the concept of scale and facilitate the learner to draw objects to scale

*In order to help the learner achieve **Learning Outcome** 2.2 in particular, consider doing the following:*

- Define the term scale and facilitate the learner to give examples.
- Elicit from the learner the reasons why scale is necessary.
- Where possible bring in items that are miniatures such as toy cars, monopoly houses, small and large dice.
- Use a projector to show how scale can increase and decrease objects.
- Introduce the tools necessary to draw by hand scaled objects: pencil, graph paper, ruler, compass, set square, protractor.
- Practice drawing to scale some common shapes and objects.

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

*In order to help the learner achieve **Learning Outcome** 2.6 in particular, consider doing the following:*

Use a scaled map or drawing of a local area which clearly shows a number of well known places, to help the learner:
- Locate a familiar venue or road.
- Work out how to get from a to b.
- Work out how far it is from a to b by using the scale on the map and appropriate measuring tools.

Unit 3 Algebra

3.1 Describe familiar real life situations in algebraic form.

*In order to help the learner achieve **Learning Outcome** 3.1 in particular, consider doing the following:*

Show the learner how algebra is used in everyday life.
Consider an example such as below or develop a similar exercise to use real life situations to explain algebra.

For example:
Mr. Lynch has a café and uses a code for all the items on his menu.

<div align="center">

Menu

t =	tea
c =	coffee
b =	bun
s =	sandwich

</div>

When Mr. Lynch takes an order, he writes it in code to save time, 2t + 1s + 1b = 2 teas, 1 sandwich and 1 bun

Write the codes for the following orders:
- 4 coffees, 3 sandwiches and 1 bun   =   4c + 3s + 1b
- 8 coffees, 3 buns and 8 sandwiches   =   ?
- Use similar examples to explain the use of algebra in everyday life.

3.2 Simplify basic algebraic expressions by using addition, subtraction, multiplication and division of one or two variables.

*In order to help the learner achieve **Learning Outcome** 3.2 in particular, consider doing the following:*

Explain that simplifying algebraic sentences means tidying them up or solving them or grouping the same ones together. Demonstrate to the learner how to do this by using simple examples.

For example:

a) Mr. Lynch has 15 buns in the kitchen and five buns on display. How many buns has he got all together?

15b + 5b = 20b

b) Three families order five buns each. How many buns does Mr. Lynch need?

3 x 5b = 15b

c) At the end of the day there are 20 buns left and Mr. Lynch shares them among his four staff. How many buns do they get each?

20b ÷ 4 = 5b

3.3 Solve basic algebraic equations of 1 variable, by using the variable to solve mathematical

problems where the solution is N (a variable is the part of the equation that is unknown i.e. x)

*In order to help the learner achieve **Learning Outcome** 3.3 in particular, consider doing the following:*

Explain how algebra is used in maths and show calculations to solve basic algebraic equations.
Explain the concept of inverse and explain that + and – are inverse and that × and ÷ are inverse.
Anything that is applied to one side of an equation must be applied to the other side.
For example:
Consider solving algebraic expressions by doing calculations similar to those below

Question	Answer
If x + 4 = 10 How much is x ?	x + 4 = 10 x = 10 – 4 x = 6
Answer: x = 6 because 6 + 4 =10	

Question	Answer
If $6x$ = 12 How much is x ?	$6x$ = 12 x = 12 ÷ 6 x = 2
Answer: x = 6 because 6 × 2= 12	

Unit 4 Data Handling

4.1 Explain how data is present in everyday situations

*In order to help the learner achieve **Learning Outcome** 4.1 in particular, consider doing the following:*

Explore with the learner how data is present in everyday life. Use examples relevant to the learner.

For example:
  Sport
- sports results
- finance and sport
  Weather
- snowfall
- weather forecast
- rainfall
- temperatures
  Entertainment
- music downloads
- size and capacity of computer/iPod/phone
- film and music sales
  Media
- current affairs
- unemployment figures
- financial markets
  Citizenship
- voting
- environment
- crime statistics
  Health
- weight loss or gain
- baby's growth
- medication

4.2 Conduct a simple survey, using a variety of data collection methods
4.3 Display data as a chart e.g. pie or bar chart.
4.4 Explain the findings of the data results

*In order to help the learner achieve **Learning Outcome** 4.2 , 4.3 and 4.4 consider combining the teaching of these skills by doing the following:*

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

The learner should conduct a simple survey, using a variety of data collection methods, such as interview, questionnaire, survey etc. This could be carried out among classmates, with family/friends or with other people. The survey may be conducted by interview, by internet, by phone, by asking friends/classmates etc.
For example, conduct a survey in the class, asking classmates their favourite colour or which is their favourite season.

4.3 Display data as a chart e.g. pie or bar chart.

Show the data collected in learning outcome 4.2 above on a pie chart, bar chart. The learner may do this on a computer programme or they may draw the chart by hand. Describe the findings of the survey and interpret the findings.
For example, the learner may consider asking their classmates what type of car they drive. The information obtained could be displayed on a pie chart such as below or a bar chart or a trend graph.

Survey of cars driven by classmates

- Toyota= 5
- VW= 4
- Nissan= 3
- Ford= 1
- Other= 2
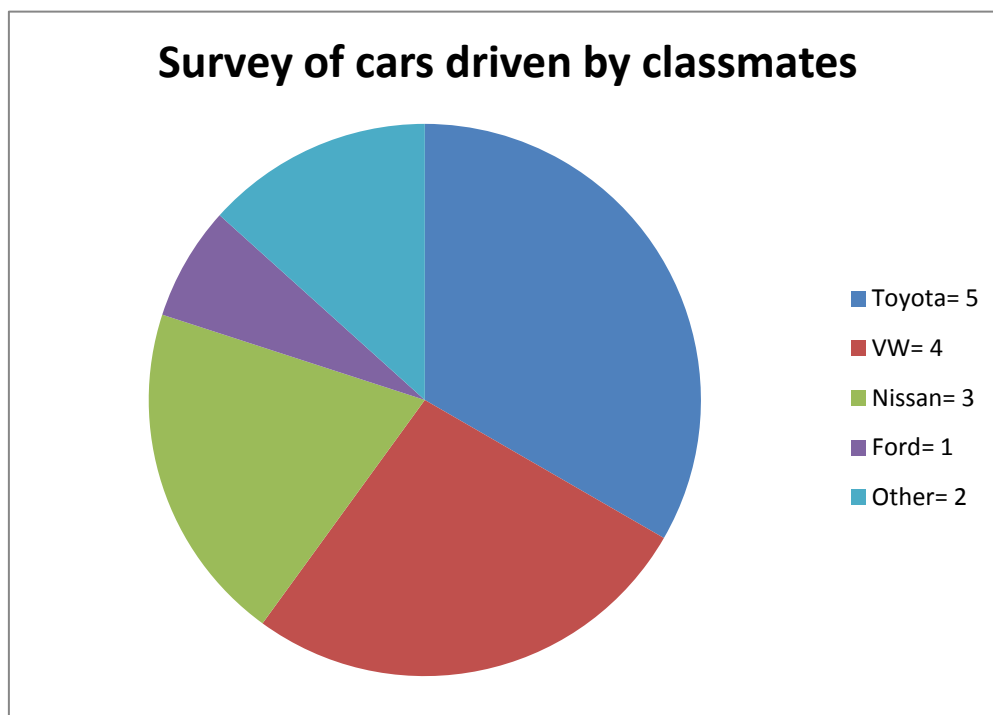
4.4 Describe findings, interpret result and suggest reasons for the findings.

The data collected for learning outcome 4.2 may be used or the learner may carry out a survey of their choice. The survey should be examined and simple questions asked about the survey/data.

For example:
- o   Which car is the favourite?
- o   What car is the least favourite?
- o   Where in real life would this data be used?
- o   Were there any surprises with the data results?
- o   Why do so many people drive Toyota cars?
- o   If you conducted the survey with another group, do you think the results would be the same or not? Why?

Unit 5 Problem Solving

5.1 Explore everyday situations where maths can be used to solve quantitative problems
5.2 Using different mathematical techniques, calculate solutions to real life quantitative problems/case studies.

In order to help the learner achieve **Learning Outcome** 5.1 and 5.2 consider combining the teaching of these skills by doing the following:

5.1 Explore everyday situations where maths can be used to solve quantitative problems
Learners should show calculations in everyday situations to solve real life problems. The teacher/tutor may devise various maths problems that are common in daily life. The teacher/tutor may consider using resources from the internet to help facilitate the learning outcomes in section 5

For example:
  a) Mr. and Mrs. Buckley are shopping for carpet for their living room and dining room. Their living room is 7 metres x 8 metres and their dining room is 4 metres x 6 metres. Their final decision is between the following:
       a. A carpet for €14.95 a square metre.
       b. A carpet for €19.99 a square metre.
  How much would they save by choosing the cheaper carpet?

  b) A taxi service charges €1.50 for the first kilometre and €0.90 for each additional kilometre. How far could Mr. Kelly go for €20?

5.2 Using different mathematical techniques, calculate solutions to real life quantitative problems/case studies.

Solve real life problems by using mathematical techniques. The tutor should devise calculations which examine the learners' ability to solve real life problems.

For example:
Mary goes to the shop with €20.00 and puts the following items in her basket: biscuits for €3.99, tea for €2.79, rice for €4.35, butter for €2.79 and ham for €7.99. Before she goes to the till, she rounds off the cost of the items to the nearest euro.

Ask the learner to round off the prices to see if Mary will have enough money to pay for her groceries.

5.3 Explore how a quantitative solution to one problem in mathematics can be used to solve other problems.

The learner should solve a real life problem using maths. The learner should show all calculations clearly. Below are 2 examples. The teacher/tutor may use his/her own examples.

For example:
  a) It costs €8 per square meter to cover a garden with new grass. How much would it cost to cover grass over a garden which is circular and has a radius of 8 metres?
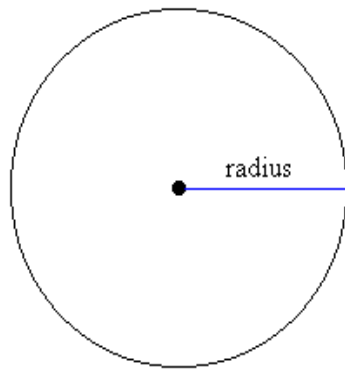
Alternatively the owner is considering covering the garden with slabs which cost €22 per m^2

How much would it cost to cover the same garden with slabs and what would the difference in cost be between covering the garden in grass and slabs?

b) Mr and Mrs Malone have 2 children. Mr Malone earns €400 per week and Mrs Money earns €200 per week

Each week they have to pay the following bills:
- o Food €180
- o Travel €20
- o Rent €60
- o Electric & Gas € 80
- o Clothes €60
- o TV Bill €40
- o Insurance €20

Draw up a weekly budget (Income and Expenditure) for Mr and Mrs Malone and answer the following questions:
- How much do Mr and Mrs Malone have left after paying the bills?
- If Mrs Money lost her job, would they be able to pay their bills?
- What would you tell them to cut out/down in their budget?

11.a   Specific Information Relating to the Assessment Techniques

The assessor (teacher/tutor) is required to devise Assessment Brief/s for the Collection of Work and Skills Demonstration. In devising the Assessment Brief/s, care should be taken to ensure that the learner is given the opportunity to show evidence of ALL learning outcomes. Each learner is required to work alone in completing the Collection of Work. There is no facility for this Collection of Work to be completed as a group.

Evidence that the learner has achieved the learning outcomes may take a variety of forms including tutor verification of the learner's contribution, learner worksheets, diagrams, cloze tests, multiple choice statements, visual presentation or other appropriate evidence in the form of written, oral, graphic, audio, visual or any combination of these. Any audio or visual evidence must be provided in a suitable format. All of the evidence must be retained in the learner's assessment portfolio.

Collection of Work	100%

The Collection of Work may be produced throughout the duration of this programme module. It must be clearly indicated where evidence covers more than one learning outcome.

In compiling the Collection of Work, the learner should be accommodated to demonstrate the practical application of mathematics to personally relevant situations. The assessor may set a context and require a learner to complete a number of tasks based on that context or the assessor may integrate the following tasks in a real life quantitative problem to be solved by the learner.

In compiling the Collection of Work, the learner will include evidence that demonstrates the following throughout:

- Accuracy of calculations
- Correct order of operations
- The application of principal mathematical functions: addition, multiplication, subtraction and division
- The approximation of calculations, where appropriate, using significant figures and rounding off large natural numbers.
- Use of correct mathematical vocabulary

Unit 1 Number

The learner will show their understanding of different **numbers** by undertaking the following:
Evidence of 1.1, 1.5 and 1.6 must be included throughout the Collection of Work

1.1 Explain the concept of natural numbers (N), integers (Z) and
real numbers (R). (Demonstrate understanding by fulfilling the requirements of 1.6)
1.6 Calculate accurately natural numbers (N) integers (Z) and real numbers (R) including simple fractions and decimal numbers to two places, by addition, subtraction, multiplication and division.
Give 5 examples of addition, subtraction, multiplication and division of natural numbers (N).
Give 5 examples of addition, subtraction, multiplication and division of integers (Z).
Give 5 examples of addition, subtraction, multiplication and division of real numbers (R).
1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key. These skills should be integrated across the delivery of the module. The Collection of Work should include 3 clear examples of the capacity of the learner to use the functions mentioned in the learning outcome.

1.2 Show an understanding of equivalence between common simple percentages, fractions and decimals by conversion. Give 5 examples of equivalence, between common simple percentages, fractions and decimals by conversion.

1.3 Show an understanding of simple ratios and express ratios as fractional ratios. Show at least 3 calculations relevant to the learner.

1.4 Show an understanding of making approximations by giving 3 examples of rounding off to significant figures. Give 3 examples of rounding off large natural numbers.

Unit 2 Measurement and Capacity

The learner will demonstrate an understanding of **measurement and capacity** by undertaking the following:

2.1 Using language appropriate to shape, the learner will describe the following: square, rectangle, circle, cylinder and cone. The learner should also use the following words appropriately, angle, radius, bisect, parallel and perpendicular.
Show that the learner can describe each shape using the correct mathematical language.

2.2 Draw 3 common everyday objects to scale using appropriate mathematical instruments.

2.3 Use the correct formula to calculate the area of a square, rectangle, circle, and triangle. Give at least 2 examples of each.

2.4 Calculate the volume of a cone and a cylinder presenting at least 1 example of each.

2.5 Demonstrate metric measurement skills using the correct measurement instrument and appropriate vocabulary. Measure length/distance, capacity, weight and time accurately.
Give at least 2 examples of measuring each of the following, length/distance, capacity and weight accurately.
Show 3 examples of the capacity of the learner to read and use either the 12 or 24 hour clock.
Show 1 example of the capacity of the learner to measure the time it takes to carry out a simple task.

2.6 Accurately read a map/drawing to calculate distance.
Show 2 examples of the capacity of the learner to calculate the distance between two given points using a scaled drawing/map.

Unit 3 Algebra

The learner will demonstrate an understanding of **algebra** by undertaking the following:

3.1 Describe familiar real life situations in algebraic form.
Give at least 3 examples where algebra is used in real life situations.

3.2 Simplify basic algebraic expressions by using addition, subtraction, multiplication and division of one or two variables.
Show the capacity of the learner to simplify algebraic expressions by giving 1 example of adding, subtracting, multiplying and dividing using algebra.

3.3 Solve basic algebraic equations of 1 variable.
Show the capacity of the learner to solve 3 basic algebraic equations.

Unit 4 Data Handling

The learner will demonstrate an understanding of **data handling** by undertaking the following:

4.1 Describe a minimum of 3 everyday situations where data is present.

4.2 Conduct a simple survey using different methods to collect data.

4.3 Display the findings of the survey in a chart format (pie chart or bar chart).

4.4 Describe and interpret the findings of the survey. Suggest reasons for these findings.

Unit 5 Problem Solving

The learner will demonstrate an understanding of **problem solving** by undertaking the following:

5.1 Show everyday situations where maths can be used to solve problems with at least 2 examples.

5.2 Calculate solutions to real life problems by using different mathematical techniques showing at least 2 examples.

5.3 Show how a particular problem/solution in maths can be used to solve other problems/ solutions.

11.b   Assessment - **General Information – Level 3 Mathematics 3N0929**

All instructions for the learner must be clearly outlined in an Assessment Brief.

Mapping Each Learning Outcome to an Assessment Technique	
Number	**Assessment Technique**
1.1 Explain the concept of natural numbers (N), integers (Z), and real numbers (R).	Collection of Work
1.2 Demonstrate equivalence between common simple fractions, decimals, and percentages by conversion e.g. ½ = 0.5 = 50%.	Collection of Work
1.3 Express simple ratios as fractional ratios e.g. 1:2 = 1/3:2/3.	Collection of Work
1.4 Give approximations by using strategies including significant figures and rounding off large natural numbers.	Collection of Work
1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key.	Collection of Work
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.	Collection of Work
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.	Collection of Work
2.2 Draw everyday objects to scale using a range of mathematical instruments.	Collection of Work
2.3 Calculate the area of a square, rectangle, triangle and circle using the correct formula and giving the answer in the correct form.	Collection of Work
2.4 Calculate the volume of a cylinder and cone using the correct formula and giving the answer in the correct form.	Collection of Work
2.5 Demonstrate metric measurement skills using the correct measurement instrument, and vocabulary appropriate to the measurement, to accurately measure length/distance, capacity and weight.	Collection of Work
2.6 Use simple scaled drawings work out real distance, location and direction.	Collection of Work

Algebra	
3.1 Describe familiar real life situations in algebraic form.	Collection of Work
3.2 Simplify basic algebraic expressions by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division to algebraic expressions of 1 or 2 variables.	Collection of Work
3.3 Solve basic algebraic equations of 1 variable, by using the variable to solve mathematical problems where the solution is N.	Collection of Work
Data Handling	
4.1 Describe the presence of data in everyday situations.	Collection of Work
4.2 Conduct a simple survey using a variety of data collection methods.	Collection of Work
4.3 Display data using appropriate classifications on bar charts or pie charts.	Collection of Work
4.4 Describe findings, to include interpretation of results, and suggesting reasons for findings.	Collection of Work
5 Problem Solving	
5.2 Describe everyday situations in terms of quantitative descriptions.	Collection of Work
5.3 Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques.	Collection of Work
5.4 Describe how a quantitative solution to a problem may be applied in a limited range of contexts.	Collection of Work

Grading

At Level 3 a learner is graded as successful or referred.

Successful means that ALL the learning outcomes from the Component Specification have been demonstrated to an appropriate standard in the learner's portfolio of assessment.

Referred means that the portfolio of assessment needs further work by the learner before s/he can demonstrate the standard and achieve certification from QQI.

Level 3 Mathematics 3N0929	Learner Marking Sheet

Learner's Name: _____   Learner's PPSN: _____

The learners will be able to:	Evidence of the following is included in the assessment portfolio:	✓ If present in portfolio	Please indicate where evidence is to be found
Number			

1.1 Explain the concept of natural numbers (N), integers (Z), and real numbers (R)
1.6 Calculate accurately natural numbers (N) integers (Z) and real numbers (R) including simple fractions and decimal numbers to two places, by addition, subtraction, multiplication and division.
	• 5 examples of addition, subtraction, multiplication and division of natural numbers (N).
	• 5 examples of addition, subtraction, multiplication and division of integers (Z).
	• 5 examples of addition, subtraction, multiplication and division of real numbers (R).
	  o Accuracy of calculations.
	  o Correct order of operations.
	  o The application of principal mathematical functions: addition, multiplication, subtraction and division.
	  o Use of correct mathematical vocabulary.		

1.5 Use a calculator to perform operations requiring functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key	• 3 clear examples of the capacity of the learner to use functions such as addition, subtraction, multiplication, division, percent, memory keys and the clear key. These skills should also be integrated across the delivery of the module...		
1.2 Demonstrate equivalence between common simple fractions, decimals, and percentages by conversion	• 5 examples of equivalence, between common simple percentages, fractions and decimals by conversion. o Accuracy of calculations.		

	o Use of correct mathematical vocabulary.		

1.3 Express simple ratios as fractional ratios e.g. 1:2 = ⅓ : ⅔	• 3 calculations.
	  o Accuracy of calculations.
	  o Use of correct mathematical vocabulary.		

1.4 Give approximations by using strategies including significant figures and rounding off large natural numbers	• 3 examples of rounding off to significant figures.
	• 3 examples of rounding off large natural numbers.
	  o Accuracy of calculations.
	  o Use of correct mathematical vocabulary.		

Measurement and Capacity			
2.1 Using language appropriate to shape, the learner will describe the following: square, rectangle, circle, cylinder and cone. The learner should also use the following words appropriately, angle, radius, bisect, parallel and perpendicular. Show that the learner can describe each shape using the correct mathematical language.	• Describe a square, rectangle, circle, cylinder and cone • Use the words angle, radius, bisect, parallel and perpendicular appropriately to describe shapes.		

2.2 Draw everyday objects to scale using a range of mathematical instruments	• Draw a minimum of 3 common objects to scale using:
	  • common mathematical instruments
	  • an appropriate scale.		

2.3 Calculate the area of a square, rectangle, triangle, circle, using the correct formula and giving the answer in the correct form	• Calculate the area of the following, by applying an appropriate formula:
	  • a square
	  • a rectangle
	  • a triangle
	  • a circle
	• Give at least 2 examples of each.
	  • Give the answer in the correct unit form.		

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

	• Give 1 example of each. • Give the answer in the correct form.		

2.5 Demonstrate metric measurement skills using the correct measurement instrument, and appropriate vocabulary. Measure length/distance, capacity, weight and time accurately.	• Accurately measure, using correct measurement instruments and vocabulary, the following:
	    • length / distance
	    • capacity
	    • weight
	• Give 2 examples of each.
	• Show 3 examples of the capacity of the learner to read and use either the 12 or 24 hour clock.
	• Show 1 example of the capacity of the learner to measure the time it takes to carry out a simple task.		

2.6 Accurately read a map/drawing to calculate distance.	• Show 2 examples of the capacity of the learner to calculate the distance between two given point using a scaled drawing/map.		
Algebra			
3.1 Describe familiar real life situations in algebraic form.	• Give 3 examples where algebra is used in real-life situations.		
3.2 Simplify basic algebraic expressions by applying the principal mathematical functions, i.e. addition, subtraction, multiplication, division to algebraic expressions of 1 or 2 variables	• Simplify basic algebraic expressions. • Show one example of each of the following mathematical operations, addition, subtraction, multiplication and division of algebraic expressions.		
3.3 Solve basic algebraic equations of 1 variable, by using the variable to solve mathematical problems where the solution is n	• Solve at least 3 simple algebraic equations of one variable.		
Data Handling			
4.1 Describe the presence of data in everyday situations	• Describe at least 3 everyday situations where data is present		
4.2 Conduct a simple survey using a variety of data collection methods	• Present a simple survey		

4.3 Display data using appropriate classifications on bar charts or pie charts	• Display the data using either a bar chart or a pie chart		

4.4 Describe findings, to include interpretation of results, and suggesting reasons for findings	• Using the bar chart or pie chart:
	  • describe the findings of the survey
	  • interpret the findings of the survey
	  • suggest reasons for the findings		

Problem Solving			
5.1 Describe everyday situations in terms of quantitative descriptions	• Give at least 2 examples		
5.2 Calculate solutions to real life quantitative problems by applying appropriate mathematical techniques	• Give at least 2 examples		
5.3 Describe how a quantitative solution to a problem may be applied in a limited range of contexts.	• Describe how a quantitative solution to one problem of relevance to the learner may be applied in a limited range of contexts.		

This is to state that the evidence presented in the attached portfolio is complete and is the work of the named learner.

Learner's Signature: _____   Date: _____

Assessor's Signature: _____   Date: _____

Internal Verifier's Signature: _____   Date: _____

External Authenticator's Signature: _____   Date: _____