



education

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Education
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NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

MATHEMATICS

NQF Level 4

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MATHEMATICS – LEVEL 4

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Mathematics in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Mathematics Level 4* to prepare for and deliver Mathematics. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
 - social adjustment and responsibility;
 - moral accountability and ethical work orientation;
 - economic participation; and
 - nation-building.

The principles that drive these objectives are:

- **Integration**

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- **Relevance**

To be dynamic and responsive to national development needs.

- **Credibility**

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- **Coherence**

To work within a consistent framework of principles and certification.

- **Flexibility**

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- **Participation**

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- **Access**

To address barriers to learning at each level to facilitate students' progress.

- **Progression**

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- **Portability**

To enable students to transfer credits of qualifications from one learning institution and/or employer to another.

- **Articulation**

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- **Recognition of Prior Learning**

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- **Validity of assessments**

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

- clearly stating the outcome to be assessed;
- selecting the appropriate or suitable evidence;
- matching the evidence with a compatible or appropriate method of assessment; and
- selecting and constructing an instrument(s) of assessment.

Topics should be assessed individually and then cumulatively with other topics. There should be a final summative internal assessment prior to the external assessment.

- **Reliability**

To assure that assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- Cumulative and summative assessments must be weighted more than single topic tests for the internal mark.
- There should be at least one standardised or norm test in each trimester.
- All standardised or norm tests must be moderated by a subject specialist.

- **Fairness and transparency**

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

- Inequality of opportunities, resources or teaching and learning approaches
- Bias based on ethnicity, race, gender, age, disability or social class
- Lack of clarity regarding Learning Outcome being assessed
- Comparison of students' work with other students, based on learning styles and language

Assessment in Mathematics must take into consideration that the process or method carries more weight than the final answer.

- **Practicability and cost-effectiveness**

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a

“Structured Environment”. This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is either a single paper or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator’s involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assurer; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures be customised for students who experience barriers to learning, and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational)*.

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student's or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's PoE.

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate that the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	Task-based (Structured)	Test-based (More structured)
Assessment instruments	<ul style="list-style-type: none"> • Observation • Class questions • Lecturer, student, parent discussions 	<ul style="list-style-type: none"> • Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews 	<ul style="list-style-type: none"> • Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	<ul style="list-style-type: none"> • Observation sheets • Lecturer's notes • Comments 	<ul style="list-style-type: none"> • Checklists • Rating scales • Rubrics 	<ul style="list-style-type: none"> • Marks (e.g. %) • Rating scales (1-7)
Evidence	<ul style="list-style-type: none"> • Focus on individual students • Subjective evidence based on lecturer observations and impressions 	<p>Open middle: Students produce the same evidence but in different ways.</p> <p>Open end: Students use same process to achieve different results.</p>	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

Task lists and **checklists** show the student what needs to be done. These consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics provide a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. Use of rubrics provides a different way of assessing that cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not be simply a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) that a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN MATHEMATICS

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 75 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a PoE account for the other 25 percent.

The PoE and the external assessment include practical and written components. The practical assessment in Mathematics, must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001)*.

2 RECORDING AND REPORTING

Mathematics is assessed according to seven levels of competence. The level descriptions are explained in the following table.

Scale of achievement for the Fundamental component

RATING CODE	RATING	MARKS (%)
7	Outstanding	80 – 100
6	Meritorious	70 – 79
5	Substantial	60 – 69
4	Adequate	50 – 59
3	Moderate	40 – 49
2	Elementary	30 – 39
1	Not achieved	0 – 29

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following at least should be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's PoE must include at least:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task
- A record of the marks (and comments) achieved for each task

Where a task cannot be contained as evidence in the PoE, its exact location must be recorded and it must be readily available for moderation purposes.

The following internal assessment units guide the assessment of Mathematics:

NUMBER OF UNITS	ASSESSMENT	COVERAGE
3	Formal written tests	One or more completed topics
1	Internal written examination	All completed topics
4	Practical assessment	The related Subject Outcomes, for example: <ol style="list-style-type: none">1. Analyse demographics of the community to test applicability of a new product.2. Work out a personal budget and find out where savings can best be invested.3. Construct at least three models of solids and calculate their total surface area and volume.4. Choose the national flag of a country or a favourite sports flag and discuss all the axes of symmetry, reflection and transformation that can be demonstrated in the flag

ASSESSMENT OF MATHEMATICS
LEVEL 4

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN MATHEMATICS - LEVEL 4

Topic 1: Functions and algebra

SUBJECT OUTCOME	
1.1 Work with a wide range of functions and patterns and solve problems.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> An ability to work with various types of function, relations and inverses demonstrated: $y = ax + q$ $y = ax^2$ $y = a^x; a > 0$ 	<ul style="list-style-type: none"> Formulate the inverses of the functions and sketch the following graph. $y = ax + q$ $y = ax^2$ $y = a^x; a > 0$
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
1.2 Factorise third degree polynomials.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Third degree polynomials are factorised and graphed. <i>Range: Including examples that require factor theorem.</i> 	<ul style="list-style-type: none"> Factorise third degree polynomials including examples that require factor theorem.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
1.3 Investigate and use instantaneous rate of a variable when interpreting models of situation.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> An intuitive understanding of the limit concept is demonstrated in the context of approximate rate of change or gradient of a function at a point. $f(x) = b$ $f(x) = x$ $f(x) = x^2$ $f(x) = x^3$ $f(x) = \frac{1}{x}$ 	<ul style="list-style-type: none"> Find the derivatives of the following functions using first principles: $f(x) = b$ $f(x) = x$ $f(x) = x^2$ $f(x) = x^3$ $f(x) = \frac{1}{x}$
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
1.3 Use rules of differentiation.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<p>Rules of differentiation are applied correctly:</p> <ul style="list-style-type: none"> If $y = f(x) = a$ and a is a constant function, then $\frac{dy}{dx} = f'(x) = 0$ If $y = f(x) = x^n$, then $\frac{dy}{dx} = f'(x) = nx^{n-1}$ If $y = kx^n = k \cdot f(x)$ and k is a constant, then $\frac{dy}{dx} = f'(x) = k \cdot n \cdot x^{n-1}$ If $y = f(x) \pm g(x)$, then $\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$ If $y = f(x) \cdot g(x)$, then $\frac{dy}{dx} = f(x) \cdot g'(x) + f'(x) \cdot g(x)$ If $y = \frac{f(x)}{g(x)}$, then $\frac{dy}{dx} = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{\{g(x)\}^2}$ If $y = f(x) = e^x$, then $\frac{dy}{dx} = f'(x) = e^x$ If $y = f(x) = \ln x$, then $\frac{dy}{dx} = f'(x) = \frac{1}{x}$ 	<ul style="list-style-type: none"> Use the constant, sum, difference, product, quotient and chain rules correctly. Use notation appropriately.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
1.5 Determine the equations of tangent to the curve.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Equations of the tangents are found. 	<ul style="list-style-type: none"> Find equations of the tangents.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
1.6 Sketch graphs of cubic functions.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • The graph of cubic and other suitable polynomial functions are sketched. • Practical problems involving optimisation and rates of change are solved. • Problems based on linear programming are solved 	<ul style="list-style-type: none"> • Sketch the graph of cubic and other suitable polynomial functions. • Solve practical problems involving optimisation and rates of change. • Solve problems based on linear programming.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

Topic 2: Data handling and probability

SUBJECT OUTCOME	
2.1 Collect and work with data using various techniques to establish statistical models for specific purposes.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • Situations or issues that can be dealt with through probabilistic or statistical methods are identified correctly. • Data is collected, recorded and organised and resolutions are made to maximize efficiency. • Data is graphically and numerically represented with consistency. 	<ul style="list-style-type: none"> • Handle issues that can be dealt with; statistical methods are identified correctly. • Collect record and organise data and resolutions are made to maximize efficiency. • Represent data graphically and numerically with consistency.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Projects • Investigations/research. 	

SUBJECT OUTCOMES	
2.2 Use experiments, simulations and probability distribution to set and explore probability models..	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • Predictions are made based on validated experimental or theoretical probabilities. • Results of the experiments are interpreted correctly in terms of real context. • The outcomes of the experiments are clearly communicated. 	<ul style="list-style-type: none"> • Make predictions based on validated experimental or theoretical probabilities. • Interpret results of the experiments correctly in terms of real context. • Communicate clearly the outcomes of the experiments.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Projects. • Investigations/research. 	

SUBJECT OUTCOMES	
2.3 Construct and interpret probability and statistical models.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Statistics generated from the data are meaningfully interpreted and interpretations can be justified. Assumptions made in data collection are defined. Tables, diagrams, chart and graphs are used appropriately in the analysis and representation of data, statistics and probability distributions. Predictions, conclusions and judgements are made on the basis of valid arguments and supporting data, statistics and probability models. 	<ul style="list-style-type: none"> Define assumptions made in data collection. Use tables, diagrams, chart and graphs appropriately in the analysis and representation of data, statistics and probability distributions. Predict, conclude and make judgement on the basis of valid arguments and supporting data, statistics and probability models.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Case studies. Practical exercises. Demonstrations. 	

Topic 3: Space, shape and measurement

SUBJECT OUTCOME	
3.1 Measure, estimate and calculate physical quantities.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Symbols and units are used in accordance with the SI unit conventions and as appropriate to the situations. Scales on the measuring instrument are correctly read. The appropriate formula are selected and used. Symbols and SI units as used appropriate to the situation. 	<ul style="list-style-type: none"> Read scales on the measuring instrument correctly. Select and use the appropriate formula. Use symbols and Systeme Internationale (SI) units as appropriate to the situation.
ASSESSMENT TASKS OR ACTIVITIES	
Practical exercises.	

SUBJECT OUTCOME	
3.2 Explore, analyse and critique, describe and represent, interpret and justify geometrical relationships	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Descriptions are based on a systematic analysis of shapes and reflect the properties of the shapes accurately, clearly and completely. <i>Range: Proof of basic theorems on circles, Co-ordinate geometry.</i> Major theorems on circles are stated and proved. Use co-ordinate geometry to find an equation of a circle, equation of a tangent to a circle at a given point on the circle. Compound angle identities are applied to solve problems based in two and three dimensions. 	<ul style="list-style-type: none"> State and prove major theorems on circles. Find equation of a circle, equation of a tangent to a circle at a given point on the circle using co- ordinate geometry. Apply compound angle identities to solve problems based in two and three dimensions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Investigations and research. Open book tests. Class test. 	

Topic 4: Complex numbers

SUBJECT OUTCOME	
4.1 Use real complex numbers and systems to make sense of and solve non-trivial problems.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Complex numbers are represented in terms of real and imaginary parts. Formulae used for calculations are appropriate to the situation. Identical complex numbers are solved. Modulus notation is interpreted and used. Complex numbers are represented using various methods like polar and algebraic forms. 	<ul style="list-style-type: none"> Solve identical complex numbers. Interpret and use modulus notation with complex numbers. Represent complex numbers using various methods like polar and algebraic forms.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Class tests. Practical exercise. 	

SUBJECT OUTCOME	
4.2 Carry out operations on complex numbers in non-trivial cases.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Four basic operations are performed correctly when complex numbers are in the polar and rectangular form. 	<ul style="list-style-type: none"> Do all four operations on complex numbers in both rectangular and polar form; and conversion of rectangular and polar form.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

Topic 5: Derivatives and integrals.

SUBJECT OUTCOME	
5.1 Use radian measure in working with trigonometric functions	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Angles are expressed correctly in terms of radians. Equations are solved correctly and solutions are given in radians. 	<ul style="list-style-type: none"> Express angles correctly in terms of radians. Solve equation correctly and give solutions in radians.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/Assignments.	

SUBJECT OUTCOME	
5.2 Analyse and represent mathematical and contextual situations using integral and curve sketching.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Anti-derivatives and integrals are found by using rules and simplifications correctly. 	<ul style="list-style-type: none"> Find anti-derivatives and integrals by using rules and simplifications correctly.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

SUBJECT OUTCOME	
5.3 Determine anti-derivatives and area under a curve using integration rules.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Areas are determined correctly by splitting two or more intervals when the graph crosses the x-axis. 	<ul style="list-style-type: none"> Determine areas under a curve by splitting two or more intervals when the graph crosses the x-axis.
ASSESSMENT TASKS OR ACTIVITIES	
Class tests/assignments.	

Topic 6: Financial mathematics.

SUBJECT OUTCOME	
6.1 Use mathematics to plan and control financial instruments.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> Personal and business finances are organised. Taxation, inflation and interest rate are understood and the impact of it is predicated. <p><i>Range: Personal and business finances, the effect of taxation, inflations and changing interest rates.</i></p>	<ul style="list-style-type: none"> Organise personal and business finances. Understand taxation, inflation interest rate and predicate the impact of it.
ASSESSMENT TASKS OR ACTIVITIES	
Investigations/research.	

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN MATHEMATICS - LEVEL 4

A national examination is conducted annually in October or November each year by means of two three hour examination papers set externally and marked and moderated externally. One of the papers will consist of algebra, statistics and complex numbers. and the other of geometry, trigonometry, calculus and financial mathematics. The content covered in each is described in *Subject Guidelines Mathematics Level 4*. The following distribution og cognitive application is suggested:

LEVEL 4	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	25%	50%	25%

Details in respect of relative weightings of the topics are contained in *Subject Guidelines Mathematics Level 4*.