

SECTION 4
CURRICULUM AND ASSESSMENT POLICY STATEMENT (CAPS)
FET TECHNICAL MATHEMATICS
ASSESSMENT GUIDELINES

4.1 INTRODUCTION

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps: generating and collecting evidence of achievement; evaluating this evidence; recording the findings; and using this information to understand and assist in the learner's development to improve the process of learning and teaching.

Assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

Although assessment guidelines are included in the Annual Teaching Plan at the end of each term, the following general principles apply:

1. Tests and examinations are assessed using a marking memorandum.
2. Assignments are generally extended pieces of work completed at home. They can be collections of past examination questions, but should focus on the more demanding aspects as any resource material can be used, which is not the case when a task is done in class under strict supervision.
3. At most one project or assignment should be set in a year. The assessment criteria need to be clearly indicated on the project specification. The focus should be on the mathematics involved and not on duplicated pictures and regurgitation of facts from reference material. The collection and display of real data, followed by deductions that can be substantiated from the data, constitute good projects.
4. Investigations are set to develop the skills of systematic observation into special cases with a view to observing general trends, making conjectures and proving them. To avoid having to assess work which is copied without understanding, it is recommended that while the initial investigation can be done at home, the final write up should be done in class, under supervision, without access to any notes. Investigations are marked using rubrics which can be specific to the task, or generic, listing the number of marks awarded for each skill:
 - 40% for communicating individual ideas and discoveries, assuming the reader has not come across the text before. The appropriate use of diagrams and tables will enhance the investigation;
 - 35% for the effective consideration of special cases;
 - 20% for generalising, making conjectures and proving or disproving these conjectures; and
 - 5% for presentation: neatness and visual impact.

4.2 INFORMAL OR DAILY ASSESSMENT

The aim of assessment for learning is to continually collect information on a learner's achievement that can be used to improve individual learning.

Informal assessment involves daily monitoring of a learner's progress. This can be done through observations, discussions, practical demonstrations, learner-teacher conferences, informal classroom interactions, etc, although informal assessment may be as simple as stopping during the lesson to observe learners or to discuss with learners how learning is progressing. Informal assessment should be used to provide feedback to the learners and to inform planning for teaching, and it need not be recorded. This should however not be seen as separate from learning activities taking place in the classroom. Learners or teachers can evaluate these tasks.

Self-assessment and peer assessment actively involve learners in assessment. Both are important as these allow learners to learn from and reflect on their own performance. Results of the informal daily assessment activities are not formally recorded, unless the teacher wishes to do so. The results of daily assessment tasks are not taken into account for promotion and/or certification purposes.

4.3 FORMAL ASSESSMENT

All assessment tasks that make up a formal programme of assessment for the year are regarded as Formal Assessment. Formal Assessment tasks are marked and formally recorded by the teacher for progress and certification purposes. All Formal Assessment tasks are subject to moderation for the purpose of quality assurance.

Formal assessments provide teachers with a systematic way of evaluating how well learners are progressing in a grade and/or in a particular subject. Examples of formal assessments include tests, examinations, practical tasks, projects, oral presentations, demonstrations, performances, etc. Formal Assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject.

Formal assessments in Technical Mathematics include tests, a June examination, a trial examination (for Grade 12), a project or an investigation.

The forms of assessment used should be grade- and developmental-level appropriate. The design of these tasks should cover the content of the subject and include a variety of activities designed to achieve the objectives of the subject.

Formal assessments need to accommodate a range of cognitive levels and abilities of learners as shown below:

4.4 PROGRAMME OF ASSESSMENT

The four cognitive levels used to guide all assessment tasks are based on those suggested in the TIMSS study of 1999. Descriptors for each level and the approximate percentages of tasks, tests and examinations which should be at each level are given below:

Weighting of cognitive levels

Papers 1 and 2 will include questions in four cognitive levels. The distribution of cognitive levels in the papers is given below.

NOTE: The weighting has been modified relative to the CAPS document.

COGNITIVE LEVEL	DESCRIPTION OF SKILLS TO BE DEMONSTRATED	Examples
<p>Knowledge</p> <p>25%</p> <p>37 - 38 marks</p>	<ul style="list-style-type: none"> • Recall • Identification of correct formula on the information sheet (no changing of the subject) • Use of mathematical facts • Appropriate use of mathematical vocabulary • Algorithms • Estimation and appropriate rounding of numbers • Definitions • Properties of Functions 	<ol style="list-style-type: none"> 1. Write down the domain of the function $y = f(x) = \frac{3}{x} + 2$ (Grade 10) 2. The angle \hat{AOB} subtended by arc AB at the centre O of a circle
<p>Routine procedures</p> <p>45%</p> <p>67 - 68 marks</p>	<ul style="list-style-type: none"> • Perform well-known procedures • Simple applications and calculations which might involve few steps • Derivation from given information may be involved • Identification and use (after changing the subject) of correct formula • Generally similar to those encountered in class 	<ol style="list-style-type: none"> 1. Solve for x: $x^2 - 5x = 14$ (Grade 10) 2. Determine the general solution of the equation $2\sin(x - 30^\circ) + 1 = 0$ (Grade 11) 3. Simplify: $\frac{\cos(360^\circ - x). \sin(180^\circ - x). \tan(90^\circ - x)}{\cos^2(180^\circ + x). \sin 240^\circ}$ (Grade 11)
<p>Complex procedures</p> <p>20%</p>	<ul style="list-style-type: none"> • Problems involve complex calculations and/or higher order reasoning 	<ol style="list-style-type: none"> 1. What is the average speed covered on a round trip to and

<p>30 marks</p>	<ul style="list-style-type: none"> • There is often not an obvious route to the solution • Problems need not be based on a real-life context • Could involve making significant connections between different representations • Require conceptual understanding • Learners are expected to solve problems by integrating different topics. 	<p>from a destination if the average speed going to the destination is 100km/h and the average speed for the return journey is 80km/h? (Grade 11)</p> <p>2. Differentiate $\frac{(x+2)^2}{x}$ with respect to x. (Grade 12)</p>
<p>Problem solving</p> <p>10%</p> <p>15 marks</p>	<ul style="list-style-type: none"> • Non-routine problems (which are not necessarily difficult) • Problems are mainly unfamiliar • Higher order reasoning and processes are involved • Might require the ability to break the problem down into its constituent parts • Interpreting and extrapolating from solutions obtained by solving problems based in unfamiliar contexts. 	<p>Suppose a piece of wire could be tied tightly around the earth at the equator. Imagine that this wire is then lengthened by exactly one metre and held so that it is still around the earth at the equator. Would a mouse be able to crawl between the wire and the earth? Why or why not? (Any grade)</p>

The Programme of Assessment is designed to set formal assessment tasks in all subjects in a school throughout the year.

a) Number of Assessment Tasks and Weighting:

Learners are expected to have seven (7) formal assessment tasks for their school-based assessment (SBA). The number of tasks and their weighting are listed below:

		GRADE 10		GRADE 11		GRADE 12	
		TASKS	WEIGHT (%)	TASKS	WEIGHT (%)	TASKS	WEIGHT (%)
School-based Assessment	Term 1	Project or Investigation Test	20 10	Project or Investigation Test	20 10	Test Project or Investigation Assignment / Test	10 20 10
	Term 2	Assignment or Test Mid-year Exam	10 30	Assignment or Test Mid-year Exam	10 30	Test Mid-year Exam	10 15
	Term 3	Test Test	10 10	Test Test	10 10	Test Trial Exam	10 25
	Term 4	Test	10	Test	10		
School-based Assessment mark			100		100		100
School-based Assessment mark (as % of promotion mark)			25%		25%		25%
End-of-year examinations			75%		75%		
Promotion mark			100%		100%		

Note:

- Although the project/investigation is indicated in the first term, it could be scheduled in term 2. Only **ONE** project/investigation should be set per year.
- Tests should be at least ONE hour long and count at least 50 marks.
- Project or investigation must contribute 25% of term 1 marks while the test marks contribute 75% of the term 1 marks. The same weighting of 25% should apply in cases where a project/investigation is in term 2.
The combination (25% and 75%) of the marks must appear in the learner's report.
- **Graphic and non-programmable calculators are not allowed (for example, calculators which factorise $a^2 - b^2 = (a - b)(a + b)$, or find roots of equations). Calculators should only be used to perform standard numerical computations and to verify calculations by hand.**
- **Formula sheet MUST NOT be provided for tests and final examinations in Grades 10 and 11. Learners can be with formula sheet in Grade 12 for tests and examinations.**
- **Trigonometric functions and graphs will be examined in paper 2.**

b) Examinations:

In Grades 10, 11 and 12, 25% of the final promotion mark is a year mark and 75% is an examination mark.

All assessments in Grades 10 and 11 are internal while in Grade 12 the 25% year mark assessment is internally set and marked but externally moderated and the 75% examination is externally set, marked and moderated. Euclidean Geometry content for grades 11 and 12 must not be removed (and must not be tested).

Mark distribution for Technical Mathematics NCS end-of-year papers: Grades 10 - 12			
Description	Grade 10	Grade 11	Grade. 12
PAPER 1:			
Algebra (Expressions, equations and inequalities including nature of roots in Grades 11 & 12)	60 ± 3	90 ± 3	50 ± 3
Functions & Graphs	30 ± 3	50 ± 3	40 ± 3
Finance, growth and decay	10 ± 3	10 ± 3	10 ± 3
Differential Calculus and Integration			50 ± 3
TOTAL	100	150	150
PAPER 2 : Grades 11 and 12 Geometry will not be examinable			
Description	Grade 10	Grade 11	Grade 12
Analytical Geometry	15 ± 3	30 ± 3	40 ± 3
Trigonometry	40 ± 3	55 ± 3	55 ± 3
Euclidean Geometry	30 ± 3	15 ± 3	10 ± 3
Mensuration and circles, angles and angular movement	15 ± 3	50 ± 3	45 ± 3
TOTAL	100	150	150
Note:			
<ul style="list-style-type: none"> • Modelling as a process should be included in all papers, thus contextual questions can be set on any topic. • Questions will not necessarily be compartmentalised in sections, as this table indicates. Various topics can be integrated in the same question. • Formula sheet must not be provided for tests and for final examinations in Grades 10 and 11 BUT for Grade 12 formula sheet must be provided for tests and examinations. • Trigonometric functions and graphs will be examined in paper 2. 			

4.5 RECORDING AND REPORTING

- Recording is a process in which the teacher is able to document the level of a learner's performance in a specific assessment task.
 - It indicates learner progress towards the achievement of the knowledge as prescribed in the Curriculum and Assessment Policy Statements.
 - Records of learner performance should provide evidence of the learner's conceptual progression within a grade and her/his readiness to progress or to be promoted to the next grade.

- Records of learner performance should also be used to monitor the progress made by teachers and learners in the teaching and learning process.
- Reporting is a process of communicating learner performance to learners, parents, schools and other stakeholders. Learner performance can be reported in a number of ways.
 - These include report cards, parents’ meetings, school visitation days, parent-teacher conferences, phone calls, letters, class or school newsletters, etc.
 - Teachers in all grades report percentages for the subject. Seven levels of competence have been described for each subject listed for Grades R – 12. The individual achievement levels and their corresponding percentage bands are shown in the Table below.

CODES AND PERCENTAGES FOR RECORDING AND REPORTING

RATING CODE	DESCRIPTION OF COMPETENCE	PERCENTAGE
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 – 79
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary achievement	30 – 39
1	Not achieved	0 – 29

Note: The seven-point scale should have clear descriptors that give detailed information for each level. Teachers will record actual marks for the task on a record sheet; and indicate percentages for each subject on the learners’ report cards.

4.6 MODERATION OF ASSESSMENT

Moderation refers to the process which ensures that the assessment tasks are fair, valid and reliable.

Moderation should be implemented at school, district, provincial and national levels. Comprehensive and appropriate moderation practices must be in place to ensure quality assurance for all subject assessments.

4.7 GENERAL

This document should be read in conjunction with:

- 4.7.1** *National policy pertaining to the programme and promotion requirements of the National Curriculum Statement Grades R – 12; and*
- 4.7.2** *The policy document, National Protocol for Assessment Grades R – 12.*