11

GRADE
MATHEMATICS

TEACHER TOOLKIT

CAPS Planner

TERMS 3 & 4

Mathematics
Teacher Toolkit: CAPS Planner

CONTENTS

CONTENTS

A. INTRODUCTION

This book is intended to help you cover the curriculum for Grade 11 Mathematics in Terms 3 and 4. There is a companion book for Terms 1 and 2. Teachers should keep these books to use from year to year.

1. The need to improve curriculum coverage

In South Africa, too many learners drop out of school before Grade 12, and too few of those who reach Grade 12 do well in the NSC examinations. There are many reasons for such poor outcomes. One of the most important of these is that the curriculum is not covered each year. In other words, the teachers do not teach everything required by the CAPS in the year, and learners do not sufficiently understand the concepts and develop the skills that are taught. **Improving curriculum coverage is the key thing that teachers can do to improve learning outcomes.**

2. A cycle of activities that support improved curriculum coverage

Covering the curriculum is a complex task in which teachers face many challenges. However, there is a cycle of practices that can support curriculum coverage (see Figure 1). If these practices become routine in the school, curriculum coverage, and thus learners' outcomes, should improve.

Figure 1: The cycle of practices for supporting improved curriculum coverage

The **best solutions** are identified. **Actions** the teacher will take, and the support the DH, peers and subject advisor will provide, are agreed on.

Teachers **plan** how they will cover the work in the time available for it.

Teachers **monitor** their progress against the plan: Are they on track or have they fallen behind? The DH monitors their progress.

AGREE ON ACTION

PLAN

TRACK/ MONITOR

IDENTIFY SUPPORT NEEDED

REFLECT

Teachers think about how well they covered the curriculum. How well did they teach and how well did learners learn? **What challenges** did they face in covering the curriculum?

EXPLORE SOLUTIONS

IDENTIFY CHALLENGES

Teachers **share** their curriculum coverage challenges with colleagues and **together they suggest and explore solutions**. They also share with their subject advisors.

SHARE/ COLLABORATE

REPORT

Teachers report on curriculum coverage to their DH.

B. INFORMATION ABOUT RESOURCES IN THIS BOOK

In this book, you will find resources which will help you plan, track, reflect and report on curriculum coverage for the purpose of working collaboratively with peers and your department head (DH) and subject adviser to solve curriculum coverage problems. The resources are described below.

1. Planners for a daily programme of work

Later in this book there are planners that will help you plan what to teach each day in Term 3 and Term 4 (see Resources 1 and 2 in Section C). These planners provide a daily programme of work. There is a planner for all the books on the approved list of Learning and Teaching Support Materials (LTSMs) for Grade 11 Mathematics.

1.1 How planners link to the CAPS

Planners link the CAPS contents and skills to activities in the learner's book (LB) and teacher's guide (TG) of each set of LTSMs. The daily plan of activities ensures that time is allocated to all the work required by the CAPS in the term. Should you miss a lesson for any reason, it is important that you do not skip this lesson, but continue in the next lesson from where you left off.

Please note: The planners were compiled a few years ago, and the sequence of topics in them follows the annual teaching plan (ATP) of the KZN Department of Education at that time. Since then, the order of topics of the ATP has changed substantially. Please, therefore, follow the current ATP but use the relevant parts of the planners to help you plan the work to be done in the LTSM you are using.

In the CAPS, four-and-a-half hours have been allocated to Mathematics in the FET Phase each week. To comply with this, the planners give the content and skills for five 55-minute lessons each week.

1.2 The structure of the planners

The example of a planner below (Table 1) is Week 5 from *Platinum Mathematics* Term 3. It shows you how the planning for a week is arranged. The same layout, abbreviations and symbols are used in the planners for all the LTSMs for each term.

The table heading states the week of the term and the LTSM to which the planning is linked. Look at the notes to see what each column tells you.

Table 1: An example of a planner

PLATINUM MATHEMATICS Week 5						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
21	Sketch more complex graphs and solve mixed questions involving these graphs (cont.)	135	11	139–140		
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Revise solving right-angled triangles	214–215	1	218–220		
23	Prove the sine rule; Solve problems involving the sine rule	215–217	2	220–221	6-11 (pp. 286–294)	326–329
24	Prove the cosine rule; Solve problems involving the cosine rule	217–219	3	221–222	6-12 (pp. 294–298)	330–332
25	**Formal assessment: Test**					

Note: Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.

The columns, from left to right, give the following information:
- The number of the lesson in the term.
- The CAPS content and skills that are dealt with in each lesson, and the page in the CAPS where each topic or subtopic starts.
- The page number in the learner's book where content and work for learners can be found.
- The activity in the learner's book that should be done by the learners during the lesson.
- The page number in the teacher's guide where support is given for the work to be done.

- The page number in the *Siyavula Everything Maths* learner's book where there are activities related to the content. These are resources which you can use for teaching, revision, extension or consolidation, in class or for homework.
- The page number in the *Siyavula Everything Maths* teacher's guide where there is information to support the material in the learner's book.

Abbreviations and symbols used in the planners
• TG = teacher's guide • LB = learner's book
* = select (this indicates that teachers should choose some of the questions given in the activity referred to) # = supplement (this indicates that the activity/exercise referred to is insufficient, and teachers should provide additional examples)

1.3 How to use the planners

Plan for the term
- **Find the correct planner to use** – the one that gives the daily plans for the LTSM that you use mostly in your class. You can of course use the others to help you find additional or alternative activities related to the same skills and concepts.
- **Check the length of the term against the number of weeks in the planner.** The planners for **Term 3** are based on a third term of eleven weeks. The content is covered and the first test written in the first ten weeks. Week 11 is set aside for revision and the writing of the end-of-term test. The planners for **Term 4** are based on a term that is nine weeks long. The content is covered in the first four weeks. Weeks 5 and 6 are allocated to revision and reviewing the test and the final two weeks are set aside for revision and the end-of-year examinations.

  The planners remain the same from year to year, but the school calendar does not. If the term in any year is of a different length, or if your school allocates more or less time for end-of-term tests and examinations than is in the planner, you will have to adjust your planning accordingly. It is very important to do this planning at the beginning of the term so that you neither rush through the work when you in fact have more time for it than allocated in the planner, nor find that you have followed the pace of the planner, but run out of teaching time.

Plan for lessons
- **Compare your timetable with the number of lessons in the week, and the length of each lesson.** In the planners, there are five lessons of 55 minutes each per week. If you do not have five periods of this length each week, you will need to adjust the programme for each lesson in the planner to fit the length and number of your lessons.
- **Plan and prepare for each lesson.** The planners give support for planning of a programme of work. They do not offer help with detailed lesson planning or preparation.

  Planning for a lesson involves drawing up a plan of action. A lesson plan should include an introduction, sequenced content and activities for learners to work on individually or in groups, a conclusion, and homework activities to consolidate the learning of the day or to prepare for the next day's lesson where possible. No lesson plan templates are provided here. You should use the one you prefer or that is specified by your school/subject adviser.

When preparing for a Mathematics lesson you should:
- make sure that you understand every aspect of the content knowledge and skills addressed in the lesson;
- consider relevant prior knowledge that the new work builds on, how you will check that learners have this knowledge, and how you will help close any gaps from the past;
- think carefully about how best to help learners understand new work and develop new skills;
- work through each of the learner activities yourself, noting alternative answers where necessary, and making notes on possible learner difficulties in relation to the activities;
- ensure that any resources you need to use in the lesson are available;
- decide how you will pair/group your learners;
- check in your teacher's guide and learner's book for enrichment/challenge activities for learners who have completed their work and/or need a challenge; and
- see where there are remedial and support activities for learners who have barriers to learning.

These brief points are elaborated on in Resource 3 in Section C.

2. Plans for assessment

Curriculum coverage requires teachers to teach the content given in the CAPS each term/year. It also requires that learners understand the concepts and develop the skills that are taught. Thus, assessment gives vital information about how well the curriculum is being covered. It tells teachers which topics or aspects of topics learners are struggling with, and how many learners are managing well, just coping, or struggling. Teachers need to reflect on possible reasons for and implications of these patterns of achievement, thinking about, for example, what they tell of the efficacy of their teaching methodology and how it could be improved, what feedback they can give learners to encourage and support improvement, and whether they can move on to new work, or need to remediate that which has already been taught.

The CAPS requires that teachers assess their learners' progress by means of both informal and formal assessment, and resources in this book assist teachers with planning for both.

2.1 Informal assessment

Informal assessment is ongoing and part of the teaching process as teachers listen to learners' responses and questions in class, and check their classwork and homework books. No record of the marks for informal assessment needs to be kept, but recording some of these will help you monitor learners' progress.

The CAPS for Mathematics in the FET Phase does not specify exactly what needs to be done for informal assessment, and consequently the planners do not schedule informal assessment activities. Teachers should use their discretion in this regard. All the LTSMs include activities that are either intended to be used for informal assessment, or which could effectively serve this purpose. You should think about which to use when you do your planning. Occasionally suggestions are made in the planners.

2.2 Formal assessment

Formal assessment is assessment for which marks are recorded. In South African schools, these marks should be entered into SA-SAMS.

The resources in this book help you plan when your learners will complete formal assessment tasks. Knowing this helps you to plan related activities such as when tasks and marking guidelines will be moderated, when marking will be completed and moderated, when marks will be recorded, and when feedback will be given to learners. All these activities are important in ensuring that assessment is at the correct level and that information from it can be used to support improved curriculum coverage.

Formal assessment tasks specified in the CAPS

The CAPS specifies two formal assessment tasks for Term 3 (both tests) and two for Term 4 (a test and an end-of-year examination).[1]

Formal assessment programmes in the LTSMs and planners

Resource 5 in Section C shows how the formal assessment tasks are integrated into the planners for Terms 3 and 4 respectively. They show when tasks are scheduled in the planner for each of the LTSMs. A note is also made of this date in the planners themselves by writing **Formal assessment** in the CAPS content column. You will see an example of this in Table 1, Lesson 25. The dates in the assessment programme provided for your LTSM might not suit your context for some reason. You should be sure to check this and schedule dates that are more appropriate where necessary.

Resource 5 also indicates what formal assessment resources are available in the LTSMs. Not all the LTSMs provide an example of all the assessment activities required for the assessment tasks, and some of those provided might not be suitable for your class. Some provide an exemplar test or examination in the learner's book, making it unsuitable for use as a formal assessment task as learners can prepare for it in advance. It is therefore essential that you check the assessment activities carefully before giving them to the learners and, if necessary, adapt them, set your own, use examples from a different set of LTSMs or the ones provided in Section C of this book. Where the province/district provides a common test or examination, you should of course use these and can use similar resources in the LTSMs or this planner for practice and informal assessment.

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1   The DBE makes changes to the assessment requirements from time to time. In such instances, you might need to change the assessment programme shown here to align with the revised requirements.

3. Resources to support content knowledge, pedagogy and assessment practices

Sound content and pedagogical knowledge and teaching and learning resources enable teachers to support learning, and thus have a positive impact on curriculum coverage. For this reason, where appropriate, guidelines for teaching certain topics or skills, explanatory information about the content, suggestions for sound structuring of lessons and exemplar assessment tasks are provided in this series of books. Below is a brief description of resources provided in the Resources section of this book.

3.1 Guidelines for preparing and presenting a Mathematics lesson

Section 1.3 above drew attention to the need for thorough preparation for a Mathematics lesson to be successful, and gave some brief pointers to effective preparation. Resource 3 in Section C gives more detail about the points made in 1.3, as well as suggestions for how to structure the main activities in a lesson. Following this format in most lessons will ensure that time is allocated to both the learning of new concepts and skills and opportunities for practising and consolidating these.

Note that the times suggested in Resource 3 in Section C are for a lesson of about one hour. You will need to make appropriate adjustments if you have lessons of a different length.

3.2 Supplementary information for Term 4

Resource 4 provides detailed descriptions of how to use two different scientific calculators to find the mean and standard deviation of data. Teachers can share this information with their learners.

3.3 Exemplar Term 3 tests, memorandums and analyses of cognitive levels

Two exemplar tests (Resources 6 and 9) are provided. The first is a 60-minute trigonometry test, and the second, to be written at the end of the term, is a 90-minute test and has questions on trigonometry, probability and measurement. A marking memorandum with an analysis of the cognitive level of each question and of the weighting of marks across the cognitive levels compared with that required by CAPS (p. 53) are also provided (Resources 7, 8, 10 and 11).

3.4 An exemplar end-of-year test, memorandum and analysis of cognitive levels

A term test is provided, together with a detailed memorandum and analysis of the cognitive level of each question and the weighting of marks across the cognitive levels compared with that required by the CAPS (p. 53) (see Resources 13 and 14). The topics covered in this test are finance and statistics. No end-of-year examination is provided as traditionally learners write a common paper provided by the Department of Education.

Assessment resources described in 3.3 and 3.4 above support curriculum coverage by:
- providing assessment tasks that are fully CAPS compliant, and which have been approved by district advisers (this ensures that learners will be assessed at the correct standard);
- providing correct marking guidelines so that learners' work will be marked to the same standard across different markers; and
- supporting teachers' ability to work with the levels of questions required by the CAPS by providing a detailed analysis of the levels of questions asked in the tasks (this strengthens their ability to set assessment tasks that comply with the weighting of cognitive levels themselves in future).

You can photocopy and use the exemplar tests as they are for formal or informal assessment, or adapt them in ways that make them more useful to you.

3.5 Exemplar formal assessment mark record sheets

Resources 15.1 and 15.2 provide templates on which to record formal assessment marks for Term 3 and Term 4 to help you see how individual learners are progressing, and which topics might need remedial work. Should you wish, you could also record any informal assessment marks that you have to give a fuller picture. Resource 15.3 is a promotion mark record sheet where you can list the results from each term and calculate the promotion mark for the year.

3.6 A template for tracking, reflecting and reporting for collaborative problem solving

Planning is one activity on the curriculum coverage support cycle (Figure 1), and you have seen how the material in this book supports teachers with planning. The templates provided as Resource 16 in Section C are tools to assist teachers with other aspects of the cycle. There is a template to use in conventional schools, and one for use in multigrade schools. The template for conventional schools is reproduced below, with annotations that show how it is used as a tool for curriculum coverage support. The template for multigrade schools works in the same way.

Teachers should print a copy of the relevant template for each week of the term and use it together with the teaching plan for that week. This teaching plan could be the planner for their LTSM in this book or the ATP or another daily planning resource. They record curriculum coverage information and their reflection on it for all the Mathematics lessons with each class they teach in the week.

Note that dates are not given in the tracking and reflecting template. Teachers should fill two dates into the spaces at the top of the template. Firstly, they should record the week in the planner when the work they are doing is scheduled to be done; secondly, they should record the week when they in fact are starting that work. These dates will help them see how well they are keeping up with the pace set in the planner they are following.

This is the no. of the week in the planner that is being followed.

This is the no. of the week in the term when the work actually starts. If curriculum coverage is behind, this might be a later week than the week in the planner.

Week no. in planner _____

Week no. in term when work planned for week started _____

Refer to the planner for details of the week's work (or the ATP for subjects without planners)

Class (or subject for FP)				
On track by end of week? (Yes/no)				
How many learners are working confidently? (Rough estimate)				
How many learners in this class?				

At the end of the week, the teacher uses evidence from informal and formal assessment, to estimate for each class how many learners out of the total are working confidently at Level 4 or above. They use this information, together with the amount of work planned that they have taught, to state whether or not their curriculum coverage is on track.

Prompts for daily reflection.

DAY	BRIEF NOTES ON THE DAY'S WORK: Consider such things as: *What concepts/skills did the learners struggle with or manage well in this lesson? What could be the reasons for this? Did the class complete the work you had planned? Do you need to change your plans for the next lesson? What changes will you make?*
1	
2	
3	
4	
5	

Each day, the teacher reflects on how their lesson went, and how they could improve it using the prompts provided. They also think about whether or not they can proceed as planned in the next lesson. This is a professional judgement they make based on informal and formal assessment. They note the main points here.

Reflection on the week:	
What concepts and skills for the week did learners struggle with? What could you do differently next time to better support or extend learning? What good practice could you share?	**Did you cover the curriculum for the week? If not, what were some of the challenges? What can you do to catch up? What help do you need? How will your progress this week affect your plan for next week?**

At the end of the week, the teacher reflects on the week's teaching and learning. They think about what learners found difficult, and how they can change their practice so learning improves.

At the end of the week, the teacher considers whether or not the work planned for the week has been taught and learnt, and if not, what can be done to solve curriculum coverage problems and get back on track.

The teacher writes their reflections here for their own professional development, but also to share them with their DH to get support in solving problems.

DH: **Date:**

At the end of the week, the DH reads the teacher's reflections and record of curriculum coverage and signs the template. S/he uses the information shared in a supportive conversation with the teacher. Together they consider any curriculum coverage problems the teacher faces and work towards finding solutions.

1. PLANNERS FOR TERM 3

1.1   *Clever: Keeping Maths Simple*

	CLEVER: KEEPING MATHS SIMPLE Week 1					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**TRIGONOMETRY CAPS pp. 32–33** Revise basic trigonometry, including quadrants and Theorem of Pythagoras type questions	220–225	7.1 (no. 1–6)	235–236	6-1 (pp. 240–246)	290–297
2	Revise simplification of expressions using special angles	224–225	7.1 (no. 7)	236		
3	Derive and use trigonometric identities to simplify expressions (explain *Example 1*)	225–227	7.2 (no. 1)	237	6-2 (pp. 247–252)	297–300
4	Prove trigonometric identities (explain *Example 2*)	227–228	7.2 (no. 2)	238		
5	Prove trigonometric identities (cont.)	228	7.2 (no. 3)	239		

	CLEVER: KEEPING MATHS SIMPLE Week 2 *Select*					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Derive and use reduction formulae involving function values of (180° ± θ), (360° − θ) to simplify expressions	228–230	7.3	239–241	6-3–6-4 (pp. 253–260)	300–306
7	Derive and use reduction formulae involving function values of (90° ± θ) to simplify expressions	230–233	7.4 (no. 1–2)	241–242	6-5 (pp. 260–264)	306–307
8	Prove identities, simplify expressions and determine values using reduction formulae	233–234	7.4 (no. 3–5)	242–244	6-6 (p. 265)	308–310
9	Reduce ratios of numerical angles using reduction formulae	234–236	7.5–7.6*	244–245		
10	Use reduction formulae to reduce ratios to ratios of acute special angles	237–239	7.7	246–248		

	CLEVER: KEEPING MATHS SIMPLE Week 3 *Select*					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	Derive and use reduction formulae involving function values of angles greater than 360° and negative angles	239–244	7.8–7.9*	248–253		
12	Use reduction formulae to express values of ratios in terms of variables (a letter)	244–245	7.10	253–255		
13	Revise trigonometric graphs learnt in Grade 10	181–188	6.1*	190–195	5-20 (pp. 197–199) 5-24 (pp. 209–211) 5-28 (pp. 222–224)	253–255 262–264 271–273
14	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$; Sketch these graphs	189–197	6.2–6.4 (no. 1)*	196–199	5-21 (pp. 199–203) 5-25 (pp. 211–215) 5-29 (pp. 224–227)	255–258 264–267 273–276
15	Sketch more graphs and determine values	197–199	6.4 (no. 2–4)*	199–202		

	CLEVER: KEEPING MATHS SIMPLE Week 4					
	*Select				*Siyavula Everything Maths*	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	LB ex.	TG pp.
16	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$; Sketch these graphs	200–205	6.5 6.6 (no. 1)*	202–205	5-22–5-23 (pp. 203–209) 5-26–5-27 (pp. 215–221) 5-30–5-31 (pp. 228–232)	258–261 267–270 276–279
17	Solve problems involving mixed graph questions; Sketch more complex graphs	205–209	6.6 (no. 2–5) 6.7*	206–208	5-32 (pp. 233–234)	280–282
18	Determine the general solutions of simple trigonometric equations (explain using basic trigonometric graphs)	209–214	6.8*–6.9*	209–212	6-7 (pp. 266–269)	310–315
19	Determine the general solutions of simple and complex trigonometric equations	214–217	6.10*–6.11	212–214	6-8 (pp. 269–275)	315–319
20	Determine the general solutions of complex trigonometric equations (cont.)	246–247	7.11*	256–258	6-9 (pp. 275–280)	319–325

	CLEVER: KEEPING MATHS SIMPLE Week 5					
	*Select #Supplement				*Siyavula Everything Maths*	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	LB ex.	TG pp.
21	Determine the general solutions of complex trigonometric equations (cont.); Determine for which values of a variable an identity holds	247–249 248–251	7.12* 7.13*	258–259 259–260		
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Revise solving right-angled triangles	330–333	10.1#	342		
23	Prove the area rule; Solve problems involving the area rule	333–337	10.2 (no. 1–6)	342–343	6-10 (pp. 280–285)	325–326
24	Solve problems involving the area rule (cont.)	337–338	10.2 (no. 7–12)	343–344		
25	**Formal assessment: Test**					

Notes:
1. The trigonometry revision exercise (LB pp. 251–252) may be done by learners at home. Full solutions can be photocopied for learners from the Teacher's Guide (pp. 261–265).
2. Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.

	CLEVER: KEEPING MATHS SIMPLE Week 6					
	#Supplement					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
26	Prove the sine rule; Solve problems involving the sine rule	338–343	10.3#	344–345	6-11 (pp. 286–294)	326–329
27	Solve problems involving the ambiguous case of the sine rule	344–346	10.4#	346–348		
28	Prove the cosine rule; Solve problems involving the cosine rule	346–352	10.5 (no. 1–2)	349–350	6-12 (pp. 294–298)	330–332
29	Solve problems involving the cosine rule (cont.)	353	10.5 (no. 3–4)	350–351		
30	Use the sine, cosine and area rules to determine the areas of different polygons; Review test done in previous week	354–357	10.6	352–353		

	CLEVER: KEEPING MATHS SIMPLE Week 7					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
31	Solve problems in two dimensions using the sine, cosine and area rules	357–363	10.7 (no. 1–3)	353–354	6-13 (pp. 299–300)	332–336
32	Solve problems in two dimensions using the sine, cosine and area rules (cont.)	363–365	10.7 (no. 4–6); Rev. ex.	355–356	6-14 no. 13–15 (pp. 304–305)	342–345
33	**PROBABILITY CAPS p. 38** Revise definitions and the addition law for probability	396–399	12.1	400–401	10-1 (pp. 402–406)	412–415
34	Revise the complementary rule; Use Venn diagrams to solve probability problems involving two or three events	399–401	12.2	401	10-2 (pp. 407–411)	416–417
35	Use Venn diagrams to solve probability involving three events	401–404	12.3 (no. 1–3)	402		

Notes:
1. Two revision worksheets with solutions on 2-D trigonometry in the Teacher's Guide (pp. 357–361) can be photocopied for learners to do at home.
2. Refer to Lesson 33: The page of definitions in the *Mind Action Series Mathematics* (LB p. 247) is very useful. It can be photocopied for learners and used even if that set of LTSMs is not being used by your school.

	CLEVER: KEEPING MATHS SIMPLE Week 8					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
36	Use Venn diagrams to solve probability involving three events (cont.)	405–406	12.3 (no. 4–7)	403		
37	Identify and solve problems involving independent events; Use tree diagrams for the probability of consecutive or simultaneous events	406–411	12.4 (no. 1–4)	404	10-3 (pp. 411–418)	417–419
38	Solve problems involving independent events (cont.)	411–412	12.4 (no. 5–11)	405		
39	Identify and solve problems involving dependent events; Use tree diagrams for the probability of consecutive or simultaneous events	412–414	12.5 (no. 1–4)	405–406	10-5 (pp. 426–431)	422–423
40	Identify and solve problems involving dependent events (cont.)	414–415	12.5 (no. 5–10)	406–407		

CLEVER: KEEPING MATHS SIMPLE Week 9 *Select						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
41	Use contingency (two-way) tables for independent or dependent events to calculate probability	415–420	12.6*	407–408	10-6 (pp. 431–434)	424–425
42	Use Venn diagrams for dependent or independent events	420–424	12.7	409–410	10-4 (pp. 419–425)	419–422
43	Using contingency tables, if events are dependent, give the expected numbers in the cells for the events to be perfectly independent	425–426	12.8	410–411		
44	Revise probability	426–427	Rev. ex.	412–413	10-7 (pp. 436–438)	426–434
45	**MEASUREMENT CAPS p. 34 (and Grade 10 on CAPS p. 28)** Revise basic definitions and formulae of 2-D and 3-D shapes	255–261	8.1	279	7-1 (pp. 308–311)	348–351

Notes:
1. Refer to Lesson 43: This lesson is optional – it is not clearly stipulated in the CAPS that it should be done.
2. Refer to Lesson 44: The revision exercise (10–7) in *Siyavula Everything Maths* is extensive and may be done by learners in class (time permitting) or at home. Alternatively, two revision worksheets with solutions on probability in the Teacher's Guide (pp. 414–418) can be photocopied for learners to do as consolidation.

CLEVER: KEEPING MATHS SIMPLE Week 10						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
46	Solve problems involving the surface area of prisms, pyramids, cylinders and spheres	262–264	8.2	280	7-2 (pp. 311–314)	351–352
47	Solve problems involving the surface area and volume of composite (complex) figures	265–267	8.3	280–282	7-3 (pp. 315–318)	353–354
48	Study the effect on volume and surface area when multiplying any dimension by a constant factor k	267–269	8.4	282	7-5 (pp. 322–326)	357–358
49	Revise Measurement	270	Rev. ex.	283	7-4 (pp. 318–322)	355–356
50	Revise Measurement (cont.) (use *Revision Worksheet no. 1–2** in the Teacher's Guide)	–	–	284–294	7-6 (pp. 326–329)	358–363

CLEVER: KEEPING MATHS SIMPLE   Week 11
Catch up, consolidation, revision and formal assessment: End-of-term test; Plan your week

1.2 *Mind Action Series Mathematics*

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths LB ex.	TG pp.
	MIND ACTION SERIES MATHEMATICS Week 1					
1	**TRIGONOMETRY CAPS pp. 32–33** Revise basic trigonometry, including quadrants and Theorem of Pythagoras type questions	135–138	Rev. ex.	157–159	6-1 (pp. 240–246)	290–297
2	Derive and use reduction formulae involving function values of (180° ± θ), (360° – θ) to simplify expressions	138–141	1	160	6-3–6-4 (pp. 253–260)	300–306
3	Derive and use reduction formulae involving function values of (90° ± θ) to simplify expressions	142–144	2	160–161	6-5 (pp. 260–264)	306–307
4	Reduce ratios of numerical angles using reduction formulae; Derive and use reduction formulae involving function values of angles greater than 360° and negative angles	145–148	3–4 (no. 1–2)	161–162	6-6 (p. 265)	308–310
5	Use reduction formulae involving function values of angles greater than and negative angles (cont.); Use reduction formulae to express values of ratios in terms of variables (letters)	149–150	4 (no. 3–5)	162–163		
	Notes: Read *An approach to teaching Trigonometry* (TG p. 155).					

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths LB ex.	TG pp.
	MIND ACTION SERIES MATHEMATICS Week 2					
6	Use reduction formulae to reduce ratios to ratios of acute special angles and evaluate expressions	150–153	6	163–167		
7	Derive and use the official trigonometric identities to simplify expressions	153–156	7	167		
8	Prove general trigonometric identities	156–157	8 (no. 1)	167–169	6-2 (pp. 247–252)	297–300
9	Prove general trigonometric identities (cont.)	158	8 (no. 2–3)	169–170		
10	Simplify expressions using reduction formulae and identities	158–159	9	170–171		

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths LB ex.	TG pp.
	MIND ACTION SERIES MATHEMATICS Week 3					
11	Solve simple trigonometric equations	159–161	10	171–172	6-7 (pp. 266–269)	310–315
12	Solve slightly more complex trigonometric equations	161–162	11	172–173		
13	Determine the general solutions of simple trigonometric equations (explain using basic trigonometric graphs)	162–163	12 (no. 1–2)	173–174	6-8 (pp. 269–275)	315–319
14	Determine the general solutions of slightly more complex trigonometric equations	164	12 (no. 3–6)	175		
15	Determine the general solutions of complex trigonometric equations (include *Worked example 18 Siyavula Everything Maths* LB p. 274)	164–166	13	175–178	6-9 (pp. 275–280)	319–325

Notes:
1. The *Revision Exercise on Trigonometry* (LB pp. 185–186; TG pp. 190–193) and/or *Some Challenges* no. 1–7 (LB p. 186; TG pp. 193–194) may be done by learners at home. Full solutions can be photocopied for learners from the Teacher's Guide.
2. *Some Challenges (Mathematical Modelling Problems)* (LB pp. 197–198; TG pp. 209–211) may also be done by those learners requiring enrichment.

| MIND ACTION SERIES MATHEMATICS   Week 4 | | | | | | |
*Select						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
16	Determine for which values of a variable an identity holds; Solve trigonometric equations using special angles	166–169	14–15*	178–182		
17	Revise trigonometric graphs learnt in Grade 10	188–189	1	201–203	5-20 (pp. 197–199) 5-24 (pp. 209–211) 5-28 (pp. 222–224)	253–255 262–264 271–273
18	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$; Sketch these graphs	189–192	2	204–205	5-21 (pp. 199–203) 5-25 (pp. 211–215) 5-29 (pp. 224–227)	255–258 264–267 273–276
19	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$; Sketch these graphs	192–195	3	205–207	5-22–5-23 (pp. 203–209) 5-26–5-27 (pp. 215–221) 5-30–5-31 (pp. 228–232)	258–261 267–270 276–279
20	Sketch more complex trigonometric graphs and solve mixed questions involving trigonometric graphs	195	Rev. ex. (no. 1–3)	207–208		

MIND ACTION SERIES MATHEMATICS Week 5						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
21	Determine the equations of trigonometric graphs and solve mixed problems	196	Rev. ex. (no. 4–6)	208	5-32 (pp. 233–234)	280–282
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Revise solving right-angled triangles	170–171	16	182		
23	Prove the sine rule; Solve problems involving the sine rule	171–174	17 (no. 1)	182–183	6-11 (pp. 286–294)	326–329
24	Solve problems involving the sine rule (cont.); Discuss the ambiguous case of the sine rule	174–176	17 (no. 2–4)	184		
25	**Formal assessment: Test**					
Note: Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.						

	MIND ACTION SERIES MATHEMATICS				Week 6	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
26	Prove the cosine rule; Solve problems involving the cosine rule	176–179	18	184–185	6-12 (pp. 294–298)	330–332
27	Prove the area rule; Solve problems involving the area rule	179–181	19 (no. 1)	185–186	6-10 (pp. 280–285)	325–326
28	Use the sine, cosine and area rules to determine the areas of different polygons	182	19 (no. 2–3)	186–187		
29	Solve problems in two dimensions using the sine, cosine and area rules	182–185	20 (no. 1–5)	187–189		
30	Solve problems in two dimensions using the sine, cosine and area rules (cont.); Review test done in previous week	185; 187	20 (no. 6); Some challenges (no. 8–12)	189; 194–196		

	MIND ACTION SERIES MATHEMATICS				Week 7	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
31	Solve problems in two dimensions using the sine, cosine and area rules (cont.) (use *Siyavula Everything Maths*)				6-13 (pp. 299–300)	332–336
32	Solve problems in two dimensions using the sine, cosine and area rules (cont.) (use *Siyavula Everything Maths*)				6-14 no. 13–15 (pp. 304–305)	342–345
33	**PROBABILITY CAPS p. 38** Revise definitions and concepts of Grade 10 probability	247–249	1 (Rev.)	258–260	10-1 (pp. 402–406)	412–415
34	Identify and solve problems involving independent events; Use tree diagrams for the probability of consecutive or simultaneous events	249–254	2 (no. 1–2)	260–261	10-3 (pp. 411–418)	417–419
35	Solve problems involving independent events (cont.)	254–255	2 (no. 3–5)	261–262		

Note: Refer to Lesson 33: The page of definitions in the LB (p. 247) is very useful. It can be photocopied for learners.

	MIND ACTION SERIES MATHEMATICS				Week 8	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
36	Identify dependent events and use tree diagrams to solve problems involving dependent events	255–257	3	262–264	10-5 (pp. 426–431)	422–423
37	Use Venn diagrams to solve probability problems involving two or three events	257–261	4 (no. 1–2)	264	10-2 (pp. 407–411)	416–417
38	Use Venn diagrams to solve probability problems involving two or three events (cont.)	261–262	4 (no. 3–7)	265–266	10-4 (pp. 419–425)	419–422
39	Use contingency (two-way) tables calculate probability	263–264	5	266	10-6 (pp. 431–434)	424–425
40	Revise probability	265	Rev. ex.	267–268		

Note: Refer to Lesson 39: It is necessary to introduce the concept of checking whether events are independent or dependent in contingency tables as it is not mentioned in this exercise.

MIND ACTION SERIES MATHEMATICS   Week 9
#Supplement

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
41	Revise probability (cont.)	266	Some challenges	268–269		
42	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 1–7 (p. 436)	426–430
43	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 8–12 (pp. 437–438)	430–434
44	**MEASUREMENT CAPS p. 34 (and Grade 10 CAPS p. 28)** Revise basic definitions and formulae of 2-D and 3-D shapes; Solve problems involving surface area and volume of composite (complex) figures	199–205	Rev. ex. (no. 1)#	214–215	7-1 (pp. 308–311)	348–351
45	Solve problems involving surface area and volume of composite (complex) figures (cont.)	205	Rev. ex. (no. 2–4)	215		

Note: Refer to Lesson 44: Thoroughly go through the definitions for surface area and volume, as well as the example provided, with your learners.

MIND ACTION SERIES MATHEMATICS   Week 10

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
46	Solve problems involving surface area and volume of composite (complex) figures (cont.)	206	Rev. ex. (no. 5–6) Challenge	215–217	7-2 (pp. 311–314)	351–352
47	Solve problems involving the surface area and volume of composite (complex) figures (use *Siyavula Everything Maths*)				7-3 (pp. 315–318)	353–354
48	Study the effect on volume and surface area when multiplying any dimension by a constant factor *k* (use *Siyavula Everything Maths*)				7-5 (pp. 322–326)	357–358
49	Revise Measurement (use *Siyavula Everything Maths*)				7-4 (pp. 318–322)	355–356
50	Revise Measurement (cont.) (use *Siyavula Everything Maths*)				7-6 (pp. 326–329)	358–363

Note: There is a shortage of material on measurement in *Mind Action Series Mathematics*. It is necessary to supplement it with measurement in *Siyavula Everything Maths*.

MIND ACTION SERIES MATHEMATICS   Week 11
Catch up, consolidation, revision and formal assessment: End-of-term test; Plan your week

1.3   *Platinum Mathematics*

	PLATINUM MATHEMATICS				Week 1	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**TRIGONOMETRY CAPS pp. 32–33** Revise basic trigonometry, including quadrants and evaluating ratios in different quadrants	138–140	1–2	148–150	6-1 (pp. 240–246)	290–297
2	Solve Theorem of Pythagoras type questions	141	3	150–152		
3	Derive and use the official trigonometric identities to simplify expressions	142–143	4	152–153		
4	Prove general trigonometric identities	143–144	5	153–154	6-2 (pp. 247–252)	297–300
5	Prove more complex trigonometric identities	145	6	155–156		

	PLATINUM MATHEMATICS *Select				Week 2	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Derive and use reduction formulae involving function values of (180° ± θ), (360° ± θ) to simplify expressions; Discuss angles which are bigger than (use *Siyavula Everything Maths*)	146–147	7	157	6-3–6-4 (pp. 253–260)	300–306
7	Derive and use reduction formulae involving function values of negative angles	147	8	158		
8	Derive and use reduction formulae involving function values of (90° ± θ) to simplify expressions	148–149	9	159	6-5 (pp. 260–264)	306–307
9	Reduce ratios of numerical angles using reduction formulae	149–151	10*–11*	160		
10	Use reduction formulae to express values of ratios in terms of variables; Use reduction formulae to reduce ratios to ratios of acute special angles and evaluate expressions	151–153	12–13	160–162	6-6 (p. 265)	308–310

Note: Refer to Lesson 7: If learners find that this method is too complicated, remember that negative angles can be converted to positive angles by adding 360°.

	PLATINUM MATHEMATICS *Select				Week 3	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	Simplify expressions involving numerical reductions with co-ratios; Solve simple trigonometric equations	153–155	14*–15	162–164	6-7 (pp. 266–269)	310–315
12	Solve slightly more complex trigonometric equations	156–157	16*	164–166		
13	Determine the general solutions of simple trigonometric equations (explain using basic trigonometric graphs)	157–158	17	166–168	6-8 (pp. 269–275)	315–319
14	Determine the general solutions of more complex trigonometric equations	159–160	18*	168–170		
15	Determine the general solutions of complex trigonometric equations (cont.)	160–161	19*–20*	170–173	6-9 (pp. 275–280)	319–325

PLATINUM MATHEMATICS   Week 4
*Select

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
16	Revise trigonometric graphs learnt in Grade 10	116–122	1 2* 3	123–127	5-20 (pp. 197–199) 5-24 (pp. 209–211) 5-28 (pp. 222–224)	253–255 262–264 271–273
17	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$; Sketch these graphs and solve mixed questions involving these graphs	123–124	4–5	127–130	5-21 (pp. 199–203) 5-25 (pp. 211–215) 5-29 (pp. 224–227)	255–258 264–267 273–276
18	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$; Sketch these graphs and solve mixed questions involving these graphs	125–127	6*	130–134	5-22–5-23 (pp. 203–209) 5-26–5-27 (pp. 215–221) 5-30–5-31 (pp. 228–232)	258–261 267–270 276–279
19	Identify complex trigonometric graphs; Determine equations of trigonometric graphs	127–131	7–9*	134–136	5-32 (pp. 233–234)	280–282
20	Sketch more complex graphs and solve mixed questions involving these graphs	132–135	10*	136–139		

Notes:
1. The *Revision* exercise on Trigonometry (LB pp. 163–165; TG pp. 175–179) may be done by learners at home. Full solutions can be photocopied for learners from the Teacher's Guide.
2. The *Revision* exercise on Trigonometric graphs (LB pp. 136–137; TG pp. 140–146) may also be done at home with full solutions photocopied.

PLATINUM MATHEMATICS   Week 5

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
21	Sketch more complex graphs and solve mixed questions involving these graphs (cont.)	135	11	139–140		
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Revise solving right-angled triangles	214–215	1	218–220		
23	Prove the sine rule; Solve problems involving the sine rule	215–217	2	220–221	6-11 (pp. 286–294)	326–329
24	Prove the cosine rule; Solve problems involving the cosine rule	217–219	3	221–222	6-12 (pp. 294–298)	330–332
25	**Formal assessment: Test**					

Note: Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.

PLATINUM MATHEMATICS				Week 6		
Lesson	**CAPS concepts and skills**	**LB pp.**	**LB ex.**	**TG pp.**	*Siyavula Everything Maths*	
					LB ex.	**TG pp.**
26	Prove the area rule; Solve problems involving the area rule	219–220	4	222–223	6-10 (pp. 280–285)	325–326
27	Solve problems involving the application of the sine, cosine and area rules	221–222	5 (no. 1)	223–224		
28	Solve problems involving the application of the sine, cosine and area rules (cont.)	222	5 (no. 2)	225		
29	Solve problems in two dimensions using the sine, cosine and area rules	223–224	6	225–227	6-13 (pp. 299–300)	332–336
30	Solve problems (involving symbols) in two dimensions using the sine, cosine and area rules; Review test done in previous week	225–226	7 (no. 1–2)	227–228	6-14 no. 13–15 (pp. 304–305)	342–345

PLATINUM MATHEMATICS				Week 7		
			Select			
Lesson	**CAPS concepts and skills**	**LB pp.**	**LB ex.**	**TG pp.**	*Siyavula Everything Maths*	
					LB ex.	**TG pp.**
31	Solve problems (involving symbols) in two dimensions using the sine, cosine and area rules (cont.)	227	7 (no. 3–6)	228–229		
32	Solve problems (involving navigation) in two dimensions using the sine, cosine and area rules; Solve problems involving circle geometry	228–231	8–9*	230–233		
33	**PROBABILITY CAPS p. 38** Revise definitions and the addition law for probability, including dependent and independent events	252–255	1	252–254	10-1 (pp. 402–406)	412–415
34	Use Venn diagrams to solve probability problems involving two or three events	256–261	2 (no. 1–2)	254–255	10-2 (pp. 407–411)	416–417
35	Use Venn diagrams to solve probability involving two or three events	262	2 (no. 3–6)	255–256	10-4 (pp. 419–425)	419–422

Notes:
1. The *Revision* exercise on the sine, cosine and area rules and applications (LB pp. 232–235; TG pp. 233–237) may be done by learners at home. Full solutions can be photocopied for learners from the Teacher's Guide.
2. Refer to Lesson 33: The page of definitions in the *Mind Action Series Mathematics* (LB p. 247) is very useful. It can be photocopied for learners and used, even if that set of LTSMs is not being used by your school.

PLATINUM MATHEMATICS				Week 8		
			#Supplement			
Lesson	**CAPS concepts and skills**	**LB pp.**	**LB ex.**	**TG pp.**	*Siyavula Everything Maths*	
					LB ex.	**TG pp.**
36	Use tree diagrams for the probability of consecutive or simultaneous events which may not necessarily be independent (thoroughly revise *Worked examples* 1–5)	263–268	3 (no. 1)	256–257	10-3 (pp. 411–418)	417–419
37	Use tree diagrams for the probability of consecutive or simultaneous events which may not necessarily be independent (cont.)	268	3 (no. 2–3)#	257–258	10-5 (pp. 426–431)	422–423
38	Use contingency (two-way) tables for independent or dependent events to calculate probability	269–274	4	258–259		
39	Use contingency (two-way) tables for independent or dependent events to calculate probability (cont.) (use *Siyavula Everything Maths*)				10-6 (pp. 431–434)	424–425
40	Revise Probability	275–276	Rev. (no. 1–4)	269–260		

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
41	Revise Probability (cont.)	276–277	Rev. (no. 5–8)	260–261		
42	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 1–7 (p. 436)	426–430
43	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 8–12 (pp. 437–438)	430–434
44	**MEASUREMENT CAPS p. 34 (and Grade 10 CAPS p. 28)** Revise basic definitions and formulae of 2-D and 3-D shapes; Solve problems involving the surface area and volume of composite (complex) shapes of prisms, pyramids, cylinders and spheres (work through *Worked examples* no. 1–4 thoroughly)	176–182	1 (no. 1–3)	193–195	7-1 (pp. 308–311)	348–351
45	Solve problems involving the surface area and volume of composite (complex) shapes (cont.)	182–183	1 (no. 4–10)	195–196	7-2 (pp. 311–314)	351–352

PLATINUM MATHEMATICS   Week 10

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
46	Study the effect on volume and surface area when multiplying any dimension by a constant factor *k* (use *Siyavula Everything Maths*)				7-5 (pp. 322–326)	357–358
47	Solve problems involving changes in dimensions of 3-D shapes	183–184	2	197		
48	Revise Measurement	185	Rev. (no. 1–3)	198	7-3 (pp. 315–318)	353–354
49	Revise Measurement (cont.)	186	Rev. (no. 4–8)	198–199	7-4 (pp. 318–322)	355–356
50	Revise Measurement (cont.)	187	Rev. (no. 9–11)	199–200	7-6 (pp. 326–329)	358–363

PLATINUM MATHEMATICS   Week 11
Catch up, consolidation, revision and formal assessment: End-of-term test; Plan your week

1.4 *Siyavula Everything Maths*

	SIYAVULA EVERYTHING MATHS Week 1			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
1	**TRIGONOMETRY CAPS pp. 32–33** Revise basic trigonometry, including quadrants, special angles and Theorem of Pythagoras type questions	240–246	6-1	290–297
2	Derive and use trigonometric identities to simplify expressions (explain *Worked example* 5)	247–250 252	6-2 no. 1	
3	Prove trigonometric identities (explain *Worked example* 6)	251–252	6-2 no. 2	297–300
4	Prove trigonometric identities (cont.) (use *Intelligent Practice Service* for more questions)	252	Intelligent Practice Service	
5	Derive and use reduction formulae involving function values of (180° ± θ)	253–256	6-3	300–302

Note: A reminder that the *Intelligent Practice Service* can be found on www.everythingmaths.co.za on computers or on m.everythingmaths.co.za on cell phones.

	SIYAVULA EVERYTHING MATHS Week 2			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
6	Derive and use reduction formulae involving function values of (360° ± θ) and – θ to simplify expressions	256–260	6-4	303–306
7	Derive and use reduction formulae involving function values of (90° ± θ) to simplify expressions	260–264	6-5	306–307
8	Prove identities, simplify expressions and determine values using reduction formulae	265	6-6	308–310
9	Solve simple trigonometric equations	266–269	6-7	310–315
10	Determine the general solutions of simple trigonometric equations (explain using basic trigonometric graphs)	269–275	6-8 no. 1	315–319

Note: Refer to Lesson 8: To explain for which values of a variable an identity holds (i.e. restrictions), it may be necessary to source another set of LTSMs as this is not dealt with in *Siyavula Everything Maths.*

	SIYAVULA EVERYTHING MATHS Week 3			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
11	Determine the general solutions of slightly more complex trigonometric equations	275	6-8 no. 2	
12	Determine the general solutions of complex trigonometric equations	275–280	6-9 no. 1	319–325
13	Determine the general solutions of complex trigonometric equations (cont.)	280	6-9 no. 2–4	
14	Revise trigonometric graphs learnt in Grade 10	197–199 209–211 222–224	5-20 5-24 5-28	253–255 262–264 271–273
15	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$; Sketch these graphs	199–203 211–215 224–227	5-21 5-25 5-29	255–258 264–267 273–276

Notes:
1. Refer to Lesson 11: Pay special attention to *Worked example* 18 (LB p. 274).
2. For revision purposes, the *End of chapter exercises*, Ex. 6-14 (no. 1–12) (LB pp. 302–304, TG pp. 336–342) may be done by learners at home with full solutions photocopied from the Teacher's Guide. This exercise **excludes** trigonometric graphs.

SIYAVULA EVERYTHING MATHS — Week 4

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
16	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$; Sketch these graphs	203–206 215–218 228–230	5-22 5-26 5-30	258–260 267–268 276–278
17	Practice sketching more complex sine graphs	206–209	5-23	260–261
18	Practice sketching more complex cosine graphs	218–221	5-27	269–270
19	Practice sketching more complex tangent graphs	231–232	5-31	278–279
20	Determine equations of trigonometric functions; Solve problems involving mixed graph questions	233–234	5-32	280–282

SIYAVULA EVERYTHING MATHS — Week 5
#Supplement

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
21	Revise trigonometric functions	236 238	5-33 no. 11#	285–287
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Prove the area rule; Solve problems involving the area rule	280–285	6-10#	325–326
23	Prove the sine rule; Solve problems involving the sine rule (omit *Worked examples* 26 and 27)	286–291 293	6-11 no. 1	326–328
24	Solve problems involving the ambiguous case of the sine rule and two dimensional applications (explain *Worked examples* 26 and 27)	291–294	6-11 no. 2–6	328–329
25	**Formal assessment: Test**			

Notes:
1. Refer to Lessons 21 and 22: Supplementary material may be found on the Intelligence Practice Service.
2. Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.

SIYAVULA EVERYTHING MATHS — Week 6
#Supplement

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
26	Prove the cosine rule; Solve problems involving the cosine rule	294–298	6-12 no. 1	330–331
27	Solve problems involving the cosine rule (cont.)	298	6-12# no. 2–3	331–332
28	Solve problems in two dimensions using the sine, cosine and area rules	299	6-13 no. 1–4	332–334
29	Solve problems in two dimensions using the sine, cosine and area rules (cont.)	300	6-13 no. 5–7#	334–336
30	Solve problems in two dimensions using the sine, cosine and area rules (cont.); Review test done in previous week	304–305	6-14 no. 13–15	342–345

Note: Supplementary material may be found on the Intelligence Practice Service.

SIYAVULA EVERYTHING MATHS — Week 7

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
31	Revise solving problems in two dimensions using the sine, cosine and area rules	–	–	–
32	Revise solving problems in two dimensions using the sine, cosine and area rules (cont.)	–	–	–

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
33	**PROBABILITY CAPS p. 38** Revise definitions and the addition law for probability	402–406	10-1	412–415
34	Use Venn diagrams to solve probability problems involving two or three events	407–411	10-2	416–417
35	Identify and solve problems involving independent events using Venn diagrams	411–418	10-3	417–419

Notes:
1. Refer to Lessons 31 and 32: There is a shortage of material for this section so it is advisable to source further questions from another set of LTSMs.
2. Refer to Lesson 33: The page of definitions in the *Mind Action Series Mathematics* (LB p. 247) is very useful. It can be photocopied for learners and used even if that set of LTSMs is not being used by your school.

SIYAVULA EVERYTHING MATHS   Week 8

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
36	Use Venn diagrams to solve probability involving three events	419–425	10-4	419–422
37	Use tree diagrams for the probability of consecutive or simultaneous events	426–431	10-5	422–423
38	Use contingency (two-way) tables for independent or dependent events to calculate probability	431–434	10-6	424–425
39	Revise probability	436	10-7 no. 1–7	426–430
40	Revise probability (cont.)	437–438	10-7 no. 8–12	430–434

SIYAVULA EVERYTHING MATHS   Week 9

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
41	Revise Probability (cont.)	–	–	–
42	Revise Probability (cont.)	–	–	–
43	**MEASUREMENT CAPS p. 34 (and Grade 10 CAPS p. 28)** Revise the area of polygons	308–311	7-1	348–351
44	Solve problems involving the surface area of prisms and cylinders	311–314	7-2	351–352
45	Solve problems involving the volume of prisms and cylinders	315–318	7-3	353–354

Note: Refer to Lessons 41 and 42: There is a slight shortage of material for this section so it is advisable to source further questions on the Intelligence Practice Service or from another set of LTSMs.

SIYAVULA EVERYTHING MATHS   Week 10

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
46	Solve problems involving the surface area and volume of right pyramids, right cones and spheres	318–322	7-4	355–356
47	Study the effect on volume and surface area when multiplying any dimension by a constant factor k	322–326	7-5	357–358
48	Revise Measurement	326–329	7-6	358–363
49	Revise Measurement (cont.)	–	–	–
50	Revise Measurement (cont.)	–	–	–

Note: Refer to Lessons 49 and 50: Source surface area and volume problems involving composite (complex) 3-D shapes from other sets of LTSMs as *Siyavula Everything Maths* does not provide these.

SIYAVULA EVERYTHING MATHS   Week 11
Catch up, consolidation, revision and formal assessment: End-of-term test;
Plan your week

1.5 *Via Afrika Mathematics*

	VIA AFRIKA MATHEMATICS Week 1 *Select*					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**TRIGONOMETRY CAPS pp. 32–33** Revise basic trigonometry, including quadrants and Theorem of Pythagoras type questions	148–151	Questions (no. 1–6)	179–180	6-1 (pp. 240–246)	290–297
2	Revise simplification of expressions using special angles	151	Questions (no. 7)	180		
3	Derive and use trigonometric identities to simplify expressions	152–154	1–2	181–184	6-2 (pp. 247–252)	297–300
4	Prove more complex trigonometric identities	155–156	3	185–186		
5	Determine for which values of a variable an identity holds; Prove more complex trigonometric identities (cont.)	156–159	4*–5*	186–189		

	VIA AFRIKA MATHEMATICS Week 2					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Derive and use reduction formulae involving function values of (90° ± θ) to simplify expressions	160–164	6–8	190–192	6-5 (pp. 260–264)	306–307
7	Derive and use reduction formulae involving function values of (180° ± θ), (360° ± θ) to simplify expressions (explain *Examples* 5–7)	165–169	9–13 (no. 1–3)	193–194	6-3–6-4 (pp. 253–260)	300–306
8	Prove identities, simplify expressions and determine values using reduction formulae (explain *Examples* 8–10)	168–170	13 (no. 4–8)	194–195	6-6 (p. 265)	308–310
9	Investigate negative angles	171	Investigation	195–196		
10	Derive and use reduction formulae involving function values of angles	172–173	14	197–199		

	VIA AFRIKA MATHEMATICS Week 3 *Select*					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	Solve simple trigonometric equations	174–175	15 (no. 1–2)*	200–202	6-7 (pp. 266–269)	310–315
12	Solve slightly more complex trigonometric equations	176	15 (no. 3–9)	202–203		
13	Determine the general solutions of simple trigonometric equations (explain using basic trigonometric graphs)	176–179	16*	203–205	6-8 (pp. 269–275)	315–319
14	Determine the general solutions of more complex trigonometric equations	179–181	17–18	205–206		
15	Determine the general solutions of complex trigonometric equations (cont.)	181	19	206–207		

	VIA AFRIKA MATHEMATICS Week 4					
	*Select					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
16	Determine the general solutions of complex trigonometric equations (cont.)	182–183	20–21	207–210	6-9 (pp. 275–280)	319–325
17	Revise trigonometric graphs learnt in Grade 10; Sketch trigonometric graphs, extending the domain to include negative angles	116–125	Questions* 14*	159–164	5-20 (pp. 197–199) 5-24 (pp. 209–211) 5-28 (pp. 222–224)	253–255 262–264 271–273
18	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$; Sketch these graphs	125–129	15	165	5-21 (pp. 199–203) 5-25 (pp. 211–215) 5-29 (pp. 224–227)	255–258 264–267 273–276
19	Investigate the effect of the parameter k on the graphs of the functions defined by $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$; Identify equations of functions and sketch graphs	129–133	16*	166–170	5-22–5-23 (pp. 203–209) 5-26–5-27 (pp. 215–221) 5-30–5-31 (pp. 228–232)	258–261 267–270 276–279
20	Sketch and determine equations of more complex trigonometric functions	134–139	17*	170–172		

Note: The *Questions* exercise on trigonometry revision (LB pp. 184–185; TG pp. 210–214) may be done by learners at home. Full solutions can be photocopied for learners from the Teacher's Guide.

	VIA AFRIKA MATHEMATICS Week 5					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
21	Solve problems involving mixed graph questions	139–143	18	173–174	5-32 (pp. 233–234)	280–282
22	**TRIGONOMETRY** **Sine, cosine and area rules CAPS p. 37** Revise solving right-angled triangles; Revise angles of elevation and depression and direction and bearing	226–229	Questions (no. 1–4)	250–251		
23	Revise solving right-angled triangles (cont.)	229	Questions (no. 5–9)	251		
24	Prove the area rule; Solve problems involving the area rule	230–232	1 (no. 1–3)	252–253	6-10 (pp. 280–285)	325–326
25	**Formal assessment: Test**					

Notes:
1. The *Questions* exercise on trigonometric graphs revision (no. 6–12) (LB pp. 146–147; TG pp. 175–178) may be done at home with full solutions photocopied.
2. Refer to Lesson 22: The **proofs** of the sine, cosine and area rules are examinable.

VIA AFRIKA MATHEMATICS   Week 6
*Select

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
26	Solve problems involving the area rule (cont.)	232–233	1 (no. 4–8)	253–254		
27	Prove the sine rule; Solve problems involving the sine rule (omit *Example* 4)	234–238	2 (no. 1–6)	255–257	6-11 (pp. 286–294)	326–329
28	Solve problems involving the sine rule (cont.) (explain *Example* 4)	237–239	2 (no. 7–14)*	257–258		
29	Prove the cosine rule; Solve problems involving the cosine rule	240–243	3 (no. 1–3)	259–260	6-12 (pp. 294–298)	330–332
30	Solve problems involving the cosine rule (cont.); Review test done in previous week	243	3 (no. 4–9)	260–261		

VIA AFRIKA MATHEMATICS   Week 7

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
31	Solve problems in two dimensions using the sine, cosine and area rules	244–246	4	262–264	6-13 (pp. 299–300)	332–336
32	Solve problems in two dimensions (involving variables) using the sine, cosine and area rules (cont.)	247–249	5	264–266	6-14 no. 13–15 (pp. 304–305)	342–345
33	**PROBABILITY CAPS p. 38** Revise definitions and the addition law for probability	274–275	Questions	284–286	10-1 (pp. 402–406)	412–415
34	Use Venn diagrams to solve probability problems involving two or three events	276–278	1	287–290	10-2 (pp. 407–411)	416–417
35	Identify and solve problems involving independent and dependent events	280–281	2	291–293	10-3 (pp. 411–418)	417–419

Notes:
1. Refer to Lessons 31 and 32: If Exercises 4 and 5 are not complete within the specified time, they may be finished by learners at home (and solutions can be provided).
2. *Questions* (revision) involving sine, cosine and area rules and two dimensional problems (LB pp. 250–251; TG pp. 267–268) may be done by learners at home. Full solutions can be photocopied from the Teacher's Guide.
3. Refer to Lesson 33: The page of definitions in the *Mind Action Series Mathematics* (LB p. 247) is very useful. It can be photocopied for learners and used even if that set of LTSMs is not being used by your school.

VIA AFRIKA MATHEMATICS   Week 8
#Supplement

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
36	Identify and solve problems involving independent and dependent events (cont.)	281–283	3#	293–294	10-4 (pp. 419–425)	419–422
37	Use tree diagrams for the probability of consecutive or simultaneous events (use *Siyavula Everything Maths*)				10-5 (pp. 426–431)	422–423
38	Use contingency (two-way) tables for independent or dependent events to calculate probability (use *Siyavula Everything Maths*)				10-6 (pp. 431–434)	424–425
39	Use tree diagrams for the probability of consecutive or simultaneous events; Use contingency (two-way) tables for independent or dependent events to calculate probability	284–289	4 (no. 1–4)	295–297		
40	Use tree diagrams or contingency (two-way) tables for independent or dependent events to calculate probability (cont.)	289	4 (no. 5–8)	297–299		

VIA AFRIKA MATHEMATICS Week 9						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
41	Revise Probability	290–291	Questions	299–300		
42	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 1–7 (p. 436)	426–430
43	Revise probability (cont.) (use *Siyavula Everything Maths*)				10-7 no. 8–12 (pp. 437–438)	430–434
44	**MEASUREMENT CAPS p. 34 (and Grade 10 CAPS p. 28)** Revise basic definitions and formulae of 2-D and 3-D shapes; Analyse the effect of changes in a dimension by a factor of *k*	194–195	Questions	224–225	7-1 (pp. 308–311)	348–351
45	Analyse the effect on volume and surface area of changes in a dimension by a factor of *k* (cont.) (use *Siyavula Everything Maths*)				7-5 (pp. 322–326)	357–358

VIA AFRIKA MATHEMATICS Week 10						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
46	Solve problems involving the surface area and volume of prisms, pyramids, cylinders and spheres	196–197	1	226	7-2 (pp. 311–314)	351–352
47	Solve problems involving the surface area and volume of composite (complex) figures	198–199	2	227–228	7-3 (pp. 315–318)	353–354
48	Revise Measurement	200–201	Questions (no. 1–6)	228–229	7-4 (pp. 318–322)	355–356
49	Revise Measurement (cont.)	201	Questions (no. 7–11)	229		
50	Revise Measurement (cont.) (use *Siyavula Everything Maths*)				7-6 (pp. 326–329)	358–363

VIA AFRIKA MATHEMATICS   Week 11
Catch up, consolidation, revision and formal assessment: End-of-term test;
Plan your week

2. PLANNERS FOR TERM 4

2.1 *Clever: Keeping Maths Simple*

					Siyavula Everything Maths	
CLEVER: KEEPING MATHS SIMPLE Week 1 *Select*						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths* LB ex.	TG pp.
1	**FINANCE, GROWTH AND DECAY CAPS p. 37** Use simple interest to solve problems and compound interest formulae involving interest compounded annually to solve problems	366–369	11.1	371	9-1 (pp. 374–376)	392–393
2	Calculate interest rates involving simple interest and compound interest	370–371	11.2	372–374	9-4 (pp. 386–388)	397–398
3	Solve problems involving compound interest over different time periods	371–374	11.3 (no. 1–5)	374		
4	Solve problems involving compound interest over different time periods (cont.)	374–375	11.3 (no. 6–10)	374–375		
5	Solve problems involving changing interest rates; Use timelines	375–377	11.4*	375	9-5 (pp. 388–394)	398–401

CLEVER: KEEPING MATHS SIMPLE Week 2 *Select*						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths* LB ex.	TG pp.
6	Solve problems involving more than one transaction and changing interest rates; Use timelines	378–383	11.5* 11.6*	376–379		
7	Solve problems involving loan repayments	383–385	11.7*	379–381		
8	Solve problems converting from nominal to effective interest rates and vice versa	385–389	11.8*	381–384	9-6 (pp. 394–398)	401–404
9	Use simple and compound decay (depreciation) formulae to solve problems	389–394	11.9*	384–386	9-2, 9-3 (pp. 377–386)	393–396
10	Revise Finance, Growth and Decay	394–395	Rev. ex.	386–388	9-7 (pp. 399–400)	404–410

CLEVER: KEEPING MATHS SIMPLE Week 3						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths* LB ex.	TG pp.
11	**STATISTICS CAPS p. 39** Revise measures of central tendency, measures of dispersion and five-number summary (use *Siyavula Everything Maths*)				11-1 (pp. 440–444)	436–438
12	Draw and interpret histograms; Draw and interpret frequency polygons (go over the examples provided)	428–435			11-2 (pp. 444–450)	438–439
13	Draw and interpret histograms; Draw and interpret frequency polygons (cont.)	436–438	13.1	423–425		
14	Discuss, recognize and work with symmetric and skewed data (grouped and ungrouped)	438–442	13.2 (no. 1–2)	425–426	11-5 (pp. 461–463)	445–447
15	Discuss, recognize and work with symmetric and skewed data (grouped and ungrouped)	443–444	13.2 (no. 3–5)	426–427		

	CLEVER: KEEPING MATHS SIMPLE Week 4					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
16	Identify outliers in a scatter plot and in a box and whisker diagram; Discuss the outlier formula	444–447	13.3	427–428	11-6 (pp. 464–466)	447–448
17	Work with cumulative frequency and cumulative frequency curves (ogives)	448–454	13.4 (no. 1–2)	428–433	11-3 (pp. 451–455)	440–443
18	Work with cumulative frequency and cumulative frequency curves (ogives) (cont.)	455–458	13.4 (no. 3–7)	433–437		
19	Determine the variance and standard deviation using the calculator and using a table; Interpret the standard deviation	458–467	13.5 (no. 1–2)	437	11-4 (pp. 455–460)	443–445
20	Determine the variance and standard deviation; Interpret the standard deviation (cont.)	467–471	13.5 (no. 3–9)	437–438		

Notes:
1. Refer to Lessons 17 and 18: Grids for photocopying are provided for drawing ogives (LB pp. 429–431).
2. Refer to Lesson 19: Step-by-step instructions on how to use the calculator can be found in the Appendix at the end of this book.

	CLEVER: KEEPING MATHS SIMPLE Week 5 Revise for end-of-year examinations					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
21	Revise Statistics	472–476	Rev. ex.	438–442	11-7 (pp. 467–469)	449–453
22	**Formal assessment: Test**					
23						
24						
25						

Notes:
1. Refer to Lesson 21: Grids are provided for the Revision exercise (LB p. 439).
2. Refer to Lessons 23–25: Revise from the revision worksheets and the practice tests provided at the end of each section in the Teacher's Guide. Choose the ones which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

	CLEVER: KEEPING MATHS SIMPLE Week 6 Revise for end-of-year examinations					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
26	Review test done in previous week					
27						
28						
29						
30						

Note: Revise from the revision worksheets and the practice tests provided at the end of each section in the Teacher's Guide. Choose the ones which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

CLEVER: KEEPING MATHS SIMPLE   Weeks 7–9   End-of-year examinations

2.2 *Mind Action Series Mathematics*

MIND ACTION SERIES MATHEMATICS Week 1 *Select*						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**FINANCE, GROWTH AND DECAY CAPS p. 37** Revise simple and compound interest	267–270	1	270	9-1 (pp. 374–376)	392–393
2	Use simple and compound decay (depreciation) formulae to solve problems	270–275	2	271	9-2–9-3 (pp. 377–386)	393–396
3	Solve problems involving compound interest over different time periods	275–279	3	272	9-4 (pp. 386–388)	397–398
4	Solve problems converting from nominal to effective interest rates and vice versa	279–285	4*	272–274	9-6 (pp. 394–398)	401–404
5	Solve problems involving changing interest rates; Use timelines	283–285	5*	274–275		

MIND ACTION SERIES MATHEMATICS Week 2						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Solve problems involving more than one transaction and changing interest rates; Use timelines	286–289	6 (no. 1–4)	275	9-5 (pp. 388–394)	398–401
7	Solve problems involving more than one transaction and changing interest rates (cont.)	290	6 (no. 5–11)	275–276		
8	Revise Finance, Growth and Decay	291–292	Rev. ex.	276–277		
9	Revise Finance, Growth and Decay (cont.)	292	Some challenges	277–278		
10	Revise Finance, Growth and Decay (use *Siyavula Everything Maths*)				9-7 (pp. 399–400)	404–410

MIND ACTION SERIES MATHEMATICS Week 3 #Supplement						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	**STATISTICS CAPS p. 39** Revise measures of central tendency, measures of dispersion and five-number summary	293–295	1	279, 291–294	11-1 (pp. 440–444)	436–438
12	Draw and interpret histograms; Draw and interpret frequency polygons (use *Siyavula Everything Maths*)				11-2 (pp. 444–450)	438–439
13	Work with cumulative frequency and cumulative frequency curves (ogives)	296–300	2 (no. 1–3)	294–297		
14	Work with cumulative frequency and cumulative frequency curves (ogives) (cont.)	300–301	2 (no. 4–5)#	297–298	11-3 (pp. 451–455)	440–443
15	Determine the variance and standard deviation of ungrouped data using a table and using the calculator; Interpret the standard deviation	302–306	3	299–301		

Notes:
1. Grids for photocopying are provided in the Teacher's Guide for certain questions in the exercises (TG pp. 280–287).
2. See *Extension notes on the position of quartiles (Optional)* in the Teacher's Guide (TG pp. 288–290).
3. Refer to Lesson 15: Step-by-step instructions on how to use the calculator can be found in the Appendix at the end of this book.

MIND ACTION SERIES MATHEMATICS Week 4						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
16	Determine and interpret the variance and standard deviation (cont.) (use *Siyavula Everything Maths*)				11-4 (pp. 455–460)	443–445
17	Discuss, recognize and work with symmetric and skewed data (grouped and ungrouped)	306–308	4	302–204	11-5 (pp. 461–463)	445–447
18	Identify outliers in a box and whisker diagram; Discuss the outlier formula	308–313	5	305–307	11-6 (pp. 464–466)	447–448
19	Identify outliers in a scatter plot	313–317	6	307–309		
20	Revise Statistics (*Some Challenges* is optional)	317–319	Rev. ex. and Some Challenges	309–313		

Mind Action Series Mathematics Week 5 Revise for end-of-year examinations						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
21	Revise Statistics (use *Siyavula Everything Maths*)				11-7 (pp. 467–469)	449–453
22	**Formal assessment: Test**					
23						
24						
25						

Note: Refer to Lessons 23–25: Use the end-of-year exemplar examinations in the Teacher's Guide for revision (TG pp. 314–346). Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

MIND ACTION SERIES MATHEMATICS Week 6 Revise for end-of-year examinations						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
26	Review test done in previous week					
27						
28						
29						
30						

Note: Use the end-of-year exemplar examinations in the Teacher's Guide for revision (TG pp. 314–346). Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

MIND ACTION SERIES MATHEMATICS   Weeks 7–9   End-of-year examinations

2.3 *Platinum Mathematics*

PLATINUM MATHEMATICS					Week 1	
					#Supplement	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**FINANCE, GROWTH AND DECAY CAPS p. 37** Revise simple and compound interest (use *Siyavula Everything Maths*)				9-1 (pp. 374–376)	392–393
2	Use simple and compound decay (depreciation) formulae to solve problems	236–241	1	239–241	9-2–9-3 (pp. 377–386)	393–396
3	Solve problems converting from nominal to effective interest rates and vice versa	242–243	2 (no. 1–3)#	242, 244–245	9-6 (pp. 394–398)	401–404
4	Calculate interest rates (use *Siyavula Everything Maths*)				9-4 (pp. 386–388)	397–398
5	Solve problems involving compound interest over different time periods, changing interest rates and/or more than one transaction; Use timelines	244–246	2 (no. 4–7)#	243–246	9-5 (pp. 388–394)	398–401

PLATINUM MATHEMATICS					Week 2	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Solve problems involving loan repayments; Use timelines	246–249	2 (no. 8–9)	246		
7	Revise Finance, Growth and Decay	250	Rev. (no. 1–6)	247		
8	Revise Finance, Growth and Decay (cont.)	250–251	Rev. (no. 7–12)	248–249		
9	Revise Finance, Growth and Decay (cont.)	251	Rev. (no. 13–17)	249–250		
10	Revise Finance, Growth and Decay (cont.) (use *Siyavula Everything Maths*)				9-7 (pp. 399–400)	404–410

PLATINUM MATHEMATICS					Week 3	
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	**STATISTICS CAPS p. 39** Revise measures of central tendency, measures of dispersion and five-number summary (use *Siyavula Everything Maths*)			269	11-1 (pp. 440–444)	436–438
12	Draw and interpret histograms; Draw and interpret frequency polygons (do the *worked examples* together)	290–295		270–271		
13	Draw and interpret histograms; Draw and interpret frequency polygons (cont.) (use Ex. 11-2 in *Siyavula Everything Maths*)				11-2 (pp. 444–450)	438–439
14	Work with cumulative frequency and ogive curves (cumulative frequency curves)	296–300	1	271–272		
15	Work with cumulative frequency and ogive curves (cumulative frequency curves) (cont.) (use *Siyavula Everything Maths*)				11-3 (pp. 451–455)	440–443

	PLATINUM MATHEMATICS	Week 4					
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
16	Determine the variance and standard deviation using a table and using the calculator; Interpret the standard deviation	301–305	2	272–273		
17	Determine the variance and standard deviation; Interpret the standard deviation (cont.) (use Siyavula Everything Maths)				11-4 (pp. 455–460)	443–445
18	Discuss, recognize and work with symmetric and skewed data (grouped and ungrouped) (use Ex. 11-5 in Siyavula Everything Maths)	306–307		273	11-5 (pp. 461–463)	445–447
19	Identify outliers in a scatter plot and in a box and whisker diagram; Discuss the outlier formula	308–312	3	274–275	11-6 (pp. 464–466)	447–448
20	Revise Statistics	313–315	Rev. (no. 1–4)	272–273		

Note: Refer to Lesson 16: Step-by-step instructions on how to use the calculator can be found in the Appendix at the end of this book.

	PLATINUM MATHEMATICS	Week 5	Revise for end-of-year examinations			
		#Supplement				
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
21	Revise Statistics (cont.)	315	Rev. (no. 5–6)#	277–278	11-7 (pp. 467–469)	449–453
22	**Formal assessment: Test**					
23						
24						
25						

Note: Refer to Lessons 23–25: Use the end-of-year exemplar examinations for revision (LB pp. 320–327; Solutions TG pp. 281–289) as well as the *Basic Target* and *Advanced Target* worksheets which cover all topics (found at the back of the Teacher's Guide). Choose the ones which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

	PLATINUM MATHEMATICS	Week 6	Revise for end-of-year examinations			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
26	Review test done in previous week					
27						
28						
29						
30						

Note: Use the end-of-year exemplar examinations for revision (LB pp. 320–327; Solutions TG pp. 281–289) as well as the *Basic Target* and *Advanced Target* worksheets which cover all topics (found at the back of the Teacher's Guide). Choose the ones which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

	PLATINUM MATHEMATICS	Weeks 7–9	End-of-year examinations

2.4 *Siyavula Everything Maths*

	SIYAVULA EVERYTHING MATHS Week 1			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
1	**FINANCE, GROWTH AND DECAY CAPS p. 37** Use simple interest to solve problems and compound interest formulae involving interest compounded annually to solve problems	374–376	9-1	392–393
2	Solve problems involving simple decay (straight-line depreciation)	377–381	9-2	
3	Solve problems involving compound decay (reducing-balance depreciation)	382–386	9-3	
4	Calculate interest rates involving simple interest and compound interest	386–388	9-4	397–398
5	Solve problems involving changing interest rates and/or more than one transaction; Use timelines	388–394	9-5	398–401

	SIYAVULA EVERYTHING MATHS Week 2			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
6	Solve problems converting from nominal to effective interest rates and vice versa	394–398	9-6	401–404
7	Revise Finance, Growth and Decay	399	9-7 (no. 1–5)	404–406
8	Revise Finance, Growth and Decay (cont.)	399–400	9-7 (no. 6–11)	406–410
9	Revise Finance, Growth and Decay (cont.)			
10	Revise Finance, Growth and Decay (cont.)			

Note: Refer to Lessons 9 and 10: There is a shortage of material in *Siyavula Everything Maths*. If time permits, revision material for Finance, Growth and Decay can be sourced from other sets of LTSMs or from past examination papers.

	SIYAVULA EVERYTHING MATHS Week 3			
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
11	**STATISTICS CAPS p. 39** Revise measures of central tendency, measures of dispersion and five-number summary	440–444	11-1	436–438
12	Draw and interpret histograms; Draw and interpret frequency polygons (do *Worked Examples* together)	444–449		438–439
13	Draw and interpret histograms; Draw and interpret frequency polygons	450	11-2	
14	Work with cumulative frequency and cumulative frequency curves (ogives)	451–455	11-3	440–443
15	Determine the variance and standard deviation using the calculator and using a table; Interpret the standard deviation	455–460	11-4	443–445

Note: Refer to Lesson 15: Step-by-step instructions on how to use the calculator can be found in the Appendix at the end of this book.

SIYAVULA EVERYTHING MATHS Week 4				
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
16	Discuss, recognize and work with symmetric and skewed data (grouped and ungrouped)	461–463	11-5	445–447
17	Identify outliers in a scatter plot and in a box and whisker diagram; Discuss the outlier formula	464–466	11-6	447–448
18	Revise Statistics	467–469	11-7	449–453
19	Revise Statistics (cont.)			
20	Revise Statistics (cont.)			

Notes:
1. Refer to Lesson 17: The outlier formula has not been provided. This can be found in another set of LTSMs if necessary.
2. There is a slight shortage of material according to the time allocated to Statistics. More material may be found on *Intelligence Practice Service* offered on the internet (www.everythingmaths.co.za) or on cell phones (m.everythingmaths.co.za). Alternatively, worksheets can be compiled from other sources.

SIYAVULA EVERYTHING MATHS Week 5 Revise for end-of-year examinations				
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
21	Revise Statistics (cont.)			
22	**Formal assessment: Test**			
23				
24				
25				

Note: Refer to Lessons 23–25: Revision questions are provided on *Intelligence Practice Service* offered on the internet (www.everythingmaths.co.za) or on cell phones (m.everythingmaths.co.za). There are *End of Chapter Exercises* which can be used for revision if they were not used during the year. Alternatively, questions from past examinations or from other sets of LTSMs can be photocopied for learners.

SIYAVULA EVERYTHING MATHS Week 6 Revise for end-of-year examinations				
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.
26	Review test done in previous week			
27				
28				
29				
30				

Note: Revision questions are provided on *Intelligence Practice Service* offered on the internet (www.everythingmaths.co.za) or on cell phones (m.everythingmaths.co.za).
There are *End of Chapter Exercises* which can be used for revision if they were not used during the year. Alternatively, questions from past examinations or from other sets of LTSMs can be photocopied for learners.

SIYAVULA EVERYTHING MATHS Weeks 7–9 End-of-year examinations

2.5 *Via Afrika Mathematics*

VIA AFRIKA MATHEMATICS Week 1 *Select*						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
1	**FINANCE, GROWTH AND DECAY CAPS p. 37** Revise simple and compound interest	252–253	Questions (no. 1–5)	269–271	9-1 (pp. 374–376)	392–393
2	Calculate interest rates involving simple interest and compound interest	253	Questions (no. 6–11)	271–272	9-4 (pp. 386–388)	397–398
3	Solve problems involving compound interest over different time periods	254–255	1	273–275		
4	Solve problems involving changing interest rates and/or more than one transaction; Use timelines	256–259	2	276	9-5 (pp. 388–394)	398–401
5	Solve problems converting from nominal to effective interest rates and vice versa	259–263	3*	277–278	9-6 (pp. 394–398)	401–404

VIA AFRIKA MATHEMATICS Week 2 #Supplement						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
6	Solve problems involving simple decay (straight line depreciation)	264–266	4	279–280	9-2 (pp. 377–381)	393–395
7	Solve problems involving compound decay (reducing balance method)	266–269	5	281–282	9-3 (pp. 382–386)	395–396
8	Solve problems involving compound increase and compound decrease	270–271	6	282		
9	Revise Finance, Growth and Decay	272	Questions (no. 1–9)	282–283		
10	Revise Finance, Growth and Decay (cont.)	273	Questions (no. 10–14)#	283	9-7 (pp. 399–400)	404–410

VIA AFRIKA MATHEMATICS Week 3 #Supplement						
Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	*Siyavula Everything Maths*	
					LB ex.	TG pp.
11	**STATISTICS CAPS p. 39** Revise measures of central tendency, measures of dispersion and five-number summary	300–301	Questions	301–302	11-1 (pp. 440–444)	436–438
12	Draw and interpret histograms; Draw and interpret frequency polygons	302–307	1, 2 (no. 1–3)	303–307	11-2 (pp. 444–450)	438–439
13	Draw and interpret histograms; Draw and interpret frequency polygons (cont.)	307	2 (no. 4–5)#	307–308		
14	Work with cumulative frequency and ogives (cumulative frequency curves)	308–309	3	309–311		
15	Work with cumulative frequency and ogives (cumulative frequency curves) (cont.) (use *Siyavula Everything Maths*)				11-3 (pp. 451–455)	440–443

VIA AFRIKA MATHEMATICS   Week 4
#Supplement

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
16	Determine the variance and standard deviation using a table; Interpret the standard deviation	310–313	4–6	312–315		
17	Determine the variance and standard deviation using a calculator; Interpret the standard deviation (cont.)	314–315	7	315–316	11-4 (pp. 455–460)	443–445
18	Discuss, recognize and work with symmetric and skewed data	316–317	8	317–318	11-5 (pp. 461–463)	445–447
19	Identify outliers in a scatter plot and in a box and whisker diagram; Discuss the outlier formula	318–319	9#	319–320	11-6 (pp. 464–466)	447–448
20	Revise Statistics	320–321	Questions (no. 1–6)	321–324	11-7 (pp. 467–469)	449–453

Note: Refer to Lesson 17: Step-by-step instructions on how to use the calculator can be found in the Appendix at the end of this book.

VIA AFRIKA MATHEMATICS   Week 5   Revise for end-of-year examinations

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
21	Revise Statistics (cont.)	321–323	Questions (no. 7–13)	324–327		
22	**Formal assessment: Test**					
23						
24						
25						

Note: Refer to Lessons 23–25: Use the end-of-year exemplar examinations for revision (LB pp. 331–334; Solutions: TG pp. 328–341) as well as *Additional Exemplar Papers* (TG pp. 363–395). There are more questions found in the *Revision Questions* at the end of each topic and at the end of the term which cover all topics. Choose the questions which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

VIA AFRIKA MATHEMATICS   Week 6   Revise for year-end examinations

Lesson	CAPS concepts and skills	LB pp.	LB ex.	TG pp.	Siyavula Everything Maths	
					LB ex.	TG pp.
26	Review test done in previous week					
27						
28						
29						
30						

Note: Use the end-of-year exemplar examinations for revision (LB pp. 331–334; Solutions: TG pp. 328–341) as well as *Additional Exemplar Papers* (TG pp. 363–395). There are more questions found in the *Revision Questions* at the end of each topic and at the end of the term which cover all topics. Choose the questions which have not been used for revision during the year. Alternatively, photocopy questions from past examinations or from other sets of LTSMs.

VIA AFRIKA MATHEMATICS   Weeks 7–9   End-of-year examinations

3. Guidelines for preparing a Mathematics lesson

The planner provides a detailed programme to guide you through the daily content you need to teach your class, and when to do formal assessments. You are still required to draw up your own lesson plans and will still make the final professional choices about which examples and explanations to give, which activities to set for your class and how to manage your class on a daily basis. It is a good idea that you and your Mathematics colleagues agree on a day that you can get together to plan your lessons as a group and submit your plans to your DH for quality assurance. To deliver the lessons successfully **you must do the necessary preparation yourself**. Bear in mind that your lessons will not succeed if you have not prepared properly for them. This entails a number of key steps, such as those noted below.

1. **Review the term focus:** Start by looking at the CAPS and *orientating* yourself to the CAPS content focus for the year and the term. It is important that you are clear about the content focus, as this will frame everything you do in your Mathematics lessons during the term. **The time allocation per term** is given in the CAPS document on page 17. This indicates how many hours are to be spent on each topic. Note that where the term length is different to the total number of weeks specified in the CAPS, you will have to adjust the pace at which you work on each topic.

2. **Prepare resources:** It is very important that you *check what is required for each lesson ahead of time* so that you have all your resources available and ready for use.

3. **Prepare the content:** Think carefully about what it is that you will teach your learners in each lesson. Think about the prior knowledge of the content that learners should have learned in earlier grades that will be built on in the lesson. You should refer to the CAPS content and skills clarification column for further guidance while you prepare.
   - Prepare *a short introduction* to the topic so that you can explain it in simple terms to your learners. The Learner's Book and Teacher's Guide will assist you. Also think about how learners will develop an understanding of the main concepts of the lesson topic. You need to think about how to explain new Mathematics content and skills to your learners.
   - *Make sure you have prepared for teaching concepts before you teach.* Prepare yourself to assist learners with any questions they might have during the lesson. Look at the activities in the Learner's Book and in the *Siyavula Everything Maths* Learner's Book and think about how best to help your learners engage with them. Consider what will be done in class and at home. Be sure to have some extension and remediation activities ready to use as needed. It is a good idea to do your own answers to the exercises/activities you will be giving your learners so that you are aware of where learners may have difficulties. Also identify any common misconceptions and plan how you will address these.

   Consider the needs of any learners with barriers to learning in your class and how best you can support them. The DBE has published some excellent materials to support you in working with learners with learning barriers.

4. **Plan the steps in your lesson, and think carefully about how much time to allocate to different learner activities.** Also think about how to organise the learners when they work. Most lessons should include the steps below and we have suggested the time to be spent on each (for a 55 minute lesson) – but you might find that you need to work differently in some lessons, such as when a test is being written.
   - **Homework review/reflection (10 minutes):** This is the first activity of the lesson. During this part of the lesson you may reflect on the previous day's work. We recommend that you use these 10 minutes to remediate and correct the previous day's homework and do spot testing. Learners should have marked their work from the answers provided at the back of their Learner's Book. Choose one or two activities that you noted were problematic to go over more thoroughly. Allow learners the opportunity to write corrections as needed. If peer or individual marking has been done, you should regularly sample some learners' books to moderate this marking and to see what errors are being made so you can remediate these.
   - **Lesson content – introduction and concept development (10 minutes):** This is the second activity of the lesson. We recommend that you are actively involved with your class for 10 minutes – going through examples interactively with your learners or assisting them with introductory investigations. There are worked examples, suggested explanations and introductory investigations in the Learner's Book or Teacher's Guide that you should go through with your class as a whole. The CAPS content clarification column would also be a useful reference should you need further examples or ideas to enrich your explanations. You should elaborate on these explanations and provide additional examples if necessary.
   - **Classwork activity (30 minutes):** This is the third activity of the lesson. This part of the lesson provides an opportunity for learners to consolidate new concepts by doing activities or exercises from the Learner's Book or the *Siyavula Everything Maths* Learner's Book. These activities allow learners to practise their mathematical and problem solving skills. It is important that you **prepare yourself for the classwork activity** because you need to assist learners as they do the classwork. You may also need to select particular questions from each activity for the classwork in advance. This will ensure that all activity types and concepts are covered each day and enable you to give quick and clear instructions to your learners about which exercise they should do, which is necessary as the **exercises given in the various Learner's Books vary greatly in length**.

- Depending on your learners and the activities, you could discuss one or two of the classwork activities with the whole class before allowing the learners to work independently. Give the learners an opportunity to complete these activities alone, in pairs, and in groups, so that they experience working alone as well as with their peers. Encourage learners, where appropriate, to write the questions with their answers and to show their working neatly and systematically in their workbooks. Plan the timing of the lesson so that you and the learners can go over some of the classwork together and they can do corrections in the lesson.

  If you require your learners to work in groups, carefully assign learners in such a way that there are learners with mixed abilities who can assist each other in each group.

  This is also the part of the lesson where you can assist learners who need extra support and extend those who need enrichment. Throughout the lesson, try to identify learners who need additional support or extension by paying attention to how well they managed the homework, how they respond when you develop the new content, and how they cope with the class activities. While the rest of the class is busy working through the classwork activities, you should spend some time with those that need extra support and help them to work through the remediation activities. If learners successfully complete the daily classwork activities ahead of the rest of the class, be prepared to give them extension activities to do. All the LTSMs provide activities and ideas for remediation and extension.

- **Allocate homework (5 minutes):** This is the fourth and final activity of the lesson. In this step you should tell the learners about the homework for the day and make sure they know what is expected of them and understand what it is that they have to do. It is a good idea to get learners into the habit of regular daily homework such as completing unfinished classwork, revising what was done in class and noting what they did not understand. Once they have done this they should complete any additional work that you have set them to do for homework, such as specific questions that you have chosen from the classwork to be done as homework, or some of the remediation or extension activities given in the LTSMs you are using.

  Homework enables the learners to consolidate the Mathematics that you have taught them in class. It also promotes learner writing, development of mathematical knowledge and language and the development of regular study habits. Encourage your learners to show their parent(s) or their guardian(s) the work they have done.

5. **After each lesson, reflect on how it went:** The tracking template has prompts to assist you, and spaces where you can note your thoughts about your lessons. You will use these notes as you plan and prepare for your teaching and in discussions with your DH and peers.

4. Supplementary information for Term 4

Using a scientific calculator to find the mean and the standard deviation of data

1. **Using a scientific calculator to find the mean and the standard deviation of data if the data is not repeated**

    Find the mean and the standard deviation of the following data: 4; 7; 1; 9; 8; 11; 10; 19; 2; 5; 7; 3

    CASIO *fx-82ZA* PLUS:

    [MODE] [2 : STAT] [1: 1 – VAR]

    4 [=] 7 [=] 1 [=] 9 [=] 8 [=] 11 [=] 10 [=] 19 [=] 2[=] 5 [=] 7 [=] 3 [=] [AC]

    For the mean: [SHIFT] [1 : STAT] [4 : VAR] [2 : $\bar{x}$] [=]

    For the standard deviation: [SHIFT] [1 : STAT] [4 : VAR] [3 : σx] [=]

    SHARP EL-W535HT

    [MODE] [1 : STAT] [0 : SD] [2ndF] [CA]

    4 [DATA] 7 [DATA] 1 [DATA] 9 [DATA] 8 [DATA] 11 [DATA]

    10 [DATA] 19 [DATA] 2 [DATA] 5 [DATA] 7 [DATA] 3 [DATA]

    For the mean: [ALPHA] [4] [$\bar{x}$]

    For the standard deviation: [ALPHA] [6] [σx]

    Both calculators give the mean value: $\bar{x} \approx 7{,}17$ and the standard deviation: $\sigma x \approx 4{,}69$

2. **If data is repeated, use a frequency column:**

    Find the mean and the standard deviation of the following data:

    24; 24; 24; 25; 25; 25; 25; 26; 26; 27; 27; 27; 27; 28; 28; 28; 28; 28; 28; 29; 29; 30; 30; 31; 31; 31

1. First add in a frequency column:	[MODE] [1 : STAT] [0 : SD]
[SHIFT] [SETUP] [▼] [3:STAT]	[2ndF] [MODE] [CA]
[1:ON]	24 [(*x* ; *y*)] 3 [DATA]
2. Then enter the data	25 [(*x* ; *y*)] 4 [DATA]
[SETUP] [2:STAT] [1:1-VAR]	26 [(*x* ; *y*)] 2 [DATA]
24 [=] 25 [=] 26 [=] 27 [=] 28 [=] 29 [=] 30 [=] 31 [=]	27 [(*x* ; *y*)] 4 [DATA]
[▼] [▶]	28 [(*x* ; *y*)] 6 [DATA]
3 [=] 4 [=] 2 [=] 4 [=] 6 [=] 2 [=] 2 [=] 3 [=]	29 [(*x* ; *y*)] 2 [DATA]
[AC]	30 [(*x* ; *y*)] 2 [DATA]
For the mean: [SHIFT] [STAT] [1] [4: VAR] [2 : $\bar{x}$]	31 [(*x* ; *y*)] 3 [DATA]
For the standard deviation: [SHIFT]	For the mean: [ALPHA] [4] [$\bar{x}$]
[1 : STAT] [4 : VAR] [3 : σx] [=]	For the standard deviation: [ALPHA] [6] [σx]

Both calculators give the mean: $\bar{x} \approx 27{,}35$ and the standard deviation: $\sigma x \approx 2{,}17$

5. Assessment term plans

5.1 Term 3: Formal assessment tasks included in each set of LTSMs

LTSMs	Test 1 Trigonometry	End-of-term test
Clever: Keeping Maths Simple	**Week 5 – Lesson 25** Exemplar test (60 minutes): Section C of this planner	**Week 11** Exemplar test (90 minutes): Section C of this planner
	Practice test 1: Trigonometric functions and graphs TG pp. 227–228 Memorandum: TG pp. 229–230 Practice test 2: Trigonometric graphs and equations TG pp. 231–232 Memorandum: TG pp. 233–234 Practice test 1: Trigonometry TG p. 273 Memorandum: TG pp. 274–276 Practice test 2: Trigonometry TG p. 276 Memorandum: TG pp. 277–278	**Other assessment material available** Practice test 1: Area, sine and cosine rules TG pp. 362–363 Memorandum: TG pp. 364–365 Practice test 2: Area, sine and cosine rules TG pp. 366–367 Memorandum: TG pp. 368–370 Practice test 1: Probability TG p. 419 Memorandum: TG p. 420 Practice test 2: Probability TG p. 421 Memorandum: TG p. 422 Practice test: Measurement TG p. 295 Memorandum: TG pp. 296–297
Mind Action Series Mathematics	**Week 5 – Lesson 25** Exemplar test (60 minutes): Section C of this planner	**Week 11** Exemplar test (90 minutes): Section C of this planner
		Other assessment material available Assignment: Sine, cosine and area rules: 2-D applications TG pp. 197–198 Memorandum: TG pp. 198–200 Metacog: All trigonometry TG p. 212 Real-world assignment: 2-D trigonometric applications TG p. 212 Memorandum: TG p. 213
Platinum Mathematics	**Week 5 – Lesson 25** Exemplar test (60 minutes): Section C of this planner	**Week 11** Exemplar test (90 minutes): Section C of this planner
	Only for revision Assignment: Trigonometric functions LB p. 167 (only Questions no. 4–5) Memorandum: TG pp. 180–182	**Other assessment material available (only for revision purposes)** Test: Measurement Term 3 Test 1 LB p. 278 (only Questions no. 1–2) Memorandum: TG p. 262 Test: Measurement, 2-D trigonometry, probability Term 3 Test 2 LB pp. 280–283 (Questions no. 1–2, 5–6, 9–10) Memorandum: TG pp. 264–266 Resource CD with test questions and memorandums is provided; the Control Test book provides a number of tests, parts of which are relevant to these Term 3 topics
Siyavula Everything Maths	**Week 5 – Lesson 25** Exemplar test (60 minutes): Section C of this planner	**Week 11** Exemplar test (90 minutes): Section C of this planner
	There are no formal assessment tasks offered in this set of LTSMs Extra questions on the Intelligence Practice Service may be found online on www.everythingmaths.co.za or on your cell phone m.everythingmaths.co.za Guidelines on setting assessment tasks are given in the TG pp. 12–27	

LTSMs	Test 1 Trigonometry	End-of-term test
Via Afrika Mathematics	**Week 5 – Lesson 25** Exemplar test (60 minutes): Section C of this planner	**Week 11** Exemplar test (90 minutes): Section C of this planner
	Other assessment material available Investigation: Trigonometry (negative angles) LB p. 171 Memorandum: TG pp. 195–196	**Other assessment material available** Investigation: Measurement TG p. 347 Marking rubric: TG p. 348 Term 3 test 1: 2-D trigonometry, probability TG pp. 355–356 (omit Questions no. 4–5) Memorandum: TG pp. 357–358 Term 3 test 2: 2-D trigonometry, probability TG pp. 359–360 (omit Questions no. 3–4) Memorandum: TG pp. 361–362 CD with item bank of questions and answers is provided
		Topics in exemplar end-of-term test 1. Trigonometry (identities, reduction formulae, graphs, equations) 2. Trigonometry (sine, cosine and area rules) 3. Probability 4. Measurement

5.2 Term 4: Formal assessment tasks included in each set of LTSMs

LTSM	Test	Final examinations: Provincial
Clever: Keeping Maths Simple	**Week 5 – Lesson 22** Exemplar test (60 minutes): Section C of this planner	
	Other possible tests: <u>Practice test 1:</u> Finance, Growth and Decay TG p. 395 Memorandum: TG p. 396 <u>Practice test 2:</u> Finance, Growth and Decay TG p. 397 Memorandum: TG pp. 398–399 <u>Practice test 1:</u> Statistics TG pp. 455–456 Memorandum: TG pp. 457–458 <u>Practice test 2:</u> Statistics TG pp. 459–462 Memorandum: TG pp. 463–465	End-of-year examination exemplars not available
Mind Action Series Mathematics	**Week 5 – Lesson 22** Exemplar test (60 minutes): Section C of this planner	The following exemplars may be used for revision: **End-of-year exemplar examinations** <u>Paper 1:</u> LB pp. 314–320 Memorandum: LB pp. 321–330 <u>Paper 2:</u> LB pp. 331–337 Memorandum: LB pp. 338–346
Platinum Mathematics	**Week 5 – Lesson 22** Exemplar test (60 minutes): Section C of this planner	The following exemplars may be used for revision: **End-of-year exemplar examinations** <u>Paper 1:</u> LB pp. 320–322 Memorandum: TG pp. 281–284 <u>Paper 2:</u> LB pp. 323–327 Memorandum: TG pp. 285–289
	Other possible tests: <u>Practice test 1:</u> Finance, Growth and Decay Select Questions 7–8 from Term 3 Test 2: LB p. 282 Memorandum: TG p. 264 <u>Practice test 2:</u> Statistics Term 4 Test: LB pp. 316–317 Memorandum: TG pp. 279–280 **Control Test Book:** Resource CD with test questions and memorandums is provided The Control Test Book provides a number of tests, parts of which are relevant to these Term 4 topics	
Siyavula Everything Maths	**Week 5 – Lesson 22** Exemplar test (60 minutes): Section C of this planner	End-of-year examination exemplars not available
	There are no formal tasks offered in this set of LTSMs. Extra questions on the Intelligence Practice Service may be found online on www.everythingmaths.co.za or on your cell phone on m.everythingmaths.co.za Guidelines on setting assessment tasks are given in the TG pp. 12–27	
Via Afrika Mathematics	**Week 5 – Lesson 22** Exemplar test (60 minutes): Section C of this planner	The following exemplars may be used for revision: **End-of-year exemplar papers** <u>Paper 1:</u> LB pp. 331–332 Memorandum: TG pp. 383–389 <u>Paper 2:</u> LB pp. 333–334 Memorandum: TG pp. 390–395
	CD with item bank of questions and answers is provided.	
	The exemplar test in this planner includes questions on: • Finance, Growth and Decay • Statistics	

6. The exemplar Term 3 Trigonometry test

Time: 60 minutes   *Total: 55 marks*

> **INSTRUCTIONS TO LEARNERS:**
> 1. There are four questions. Answer all questions on your answer paper.
> 2. Show all your working where necessary. Marks will not be given where working out should be shown but is not.
> 3. Scientific non-programmable calculators may be used. Round off to two decimal places, unless stated otherwise.
> 4. Number the questions according to the numbering system used in this question paper.
> 5. Write neatly and legibly.

QUESTION 1

A calculator may not be used for this question!

1.1   If $3 \tan \beta - 4 = 0$ and $\beta \in (90°; 360°)$, evaluate $2\sin \beta + \dfrac{\cos \beta}{2}$ (5)

1.2   If $\cos 32° = k$ determine the following in terms of k:

    1.2.1 $\cos(-212°)$ (2)

    1.2.2 $\sin 148°$ (3)

1.3   Simplify:

    1.3.1 $\dfrac{\cos(-180° - \alpha).\tan(360° - \alpha).\cos^2(90° - \alpha)}{\sin \alpha.\sin(-\alpha)}$ (6)

    1.3.2 $\dfrac{\cos 80°.\cos 120°}{\sin 10°.\sin 945°}$ (5)

    [21]

QUESTION 2

2.1   Show that $\tan^2 x - \sin^2 x = \sin^2 x.\tan^2 x$ (5)

2.2   2.2.1 Prove: $\dfrac{2 - 2\cos^2 x - \sin x}{2\sin x.\cos x - \cos x} = \tan x$ (5)

    2.2.2 Hence solve for x if $\dfrac{2 - 2\cos^2 x - \sin x}{2\sin x.\cos x - \cos x} = 2{,}64$ and $x \in [-180°;180°]$ (4)

2.3   Give the general solution for: $\sin(2\theta + 25°) = -0{,}834$ (3)

    [17]

QUESTION 3

3.1   Sketch the graphs of $f(x) = \cos 2x$ and $g(x) = \sin(x - 30°)$ for $x \in [-90°;270°]$ on the same system of axes, clearly showing intercepts and turning points.   (5)

3.2   **Calculate** the points of intersection of f and g for $x \in [-90°;270°]$ (6)

    [11]

QUESTION 4

Complete on your answer paper:

(a) $\sin^2\alpha + \cos^2\alpha =$ _____ (1)

(b) $\sin^2(90° - \alpha) =$ _____ (1)

(c) Use the above to evaluate the following sum of a sequence of numbers (without using a calculator):

$\sin^2 1° + \sin^2 2° + \sin^2 3° + \ldots \ldots + \sin^2 88° + \sin^2 89° + \sin^2 90°$ (4)

[6]

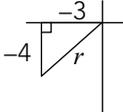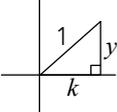## 7. Memorandum and analysis of cognitive levels in the Term 3 Trigonometry test

Note: The last column in the memorandum shows the cognitive level for each question in the test. The levels are:

K	**Knowledge** – straight recall of facts
R	**Routine procedures** – well-known, simple applications and calculations
C	**Complex procedures** – procedures involving complex calculations and/or higher reasoning
P	**Problem solving** – solving problems for which higher order reasoning and processes are involved
More information about these levels can be found in the CAPS (p. 53).	

A suggestion for test and exam marking

Underline errors committed by learners and apply Consistent Accuracy (CA) marking. This means the learner loses the mark for each mistake made and you mark the rest of the answer according to their mistake(s). However, if the learner shows a lack of understanding of the concept, no marks are given. Also, if the learner has made the question easier, no marks are given from that part onwards.

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
QUESTION 1		
1.1 $3 \tan \beta - 4 = 0$ and $\beta \in (90°; 360°)$ $3 \tan \beta = \dfrac{4}{3} = \dfrac{-4}{-3} = \dfrac{y}{x}$ (y and x are neg. in Q3) ✓✓ ratio & quadrant $x^2 + y^2 = r^2$ (Pythagoras) $(-3)^2 + (-4)^2 = r^2$ $r^2 = 25$ $\therefore r = 5$ $(r > 0)$ ✓ r-value $\therefore 2 \sin \beta + \dfrac{\cos \beta}{2}$ $= 2\left(\dfrac{-4}{5}\right) + \dfrac{\frac{-3}{5}}{2}$ ✓ substitution $= \dfrac{-8}{5} - \dfrac{3}{5} \times \dfrac{1}{2}$ $= \dfrac{-8}{5} - \dfrac{3}{10}$ $= \dfrac{-19}{10}$ OR $-1\dfrac{9}{10}$ ✓ answer	(5)	R
1.2 $\cos 32° = k$ 1.2.1 $\cos(-212°) = \cos(-212° + 360°)$ $\quad = \cos 148°$ ✓ reduction $\quad = \cos(180° - 32°)$ $\quad = -\cos 32°$ $\quad = -k$ ✓ answer in terms of k	(2)	R
1.2.2 $\sin 148° = \sin(180° - 32°)$ $\quad = \sin 32°$ ✓ $\quad = \sqrt{1 - k^2}$ ✓ square root	(3)	C
Note: $\cos 32° = k$ $y^2 + k^2 = 1^2$ (Theorem of Pyth.) ✓ Pyth. $y^2 = 1 - k^2$ $y = \sqrt{1 - k^2}$; $y > 0$ in quad.1		

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

OR

$\sin^2 32° + \cos^2 32° = 1$ ✓

$\therefore \sin^2 32° = 1 - \cos^2 32°$

$\sin 32° = \sqrt{1 - \cos^2 32°}$ ✓

$= \sqrt{1 - k^2}$ ✓

1.3 **1.3.1** $\dfrac{\cos(-180° - \alpha).\tan(360° - \alpha).\cos^2(90° - \alpha)}{\sin \alpha.\sin(-\alpha)}$

$= \dfrac{\cos(-180° - \alpha + 360°).(-\tan \alpha).\sin^2 \alpha}{\sin \alpha.(-\sin \alpha)}$ ✓✓✓ reductions

$= \dfrac{\cos(180° - \alpha).(-\tan \alpha).\sin^2 \alpha}{-\sin^2 \alpha}$

$= \dfrac{\cos \alpha.(-\tan \alpha).\sin^2 \alpha}{-\sin^2 \alpha}$ ✓ $\cos \alpha$ and simplification

$= -\cos \alpha.\tan \alpha$

$= -\cos \alpha \times \dfrac{\sin \alpha}{\cos \alpha}$ ✓ cancellation and conversion of ratio

$= -\sin \alpha$ ✓ answer   (6)   R

Note: *There are a number of other ways to reduce negative angles. For example,*

$\cos(-180° - \alpha) = \cos(-(180° + \alpha))$

$= \cos(180° + \alpha)$

$= -\cos \alpha$

1.3.2 $\dfrac{\cos 80°.\cos 120°}{\sin 10°.\sin 945°}$

$= \dfrac{\sin 10°.\cos(180° - 60°)}{\sin 10°.\sin(720° + 225°)}$ ✓ co-ratio conversion

$= \dfrac{-\cos 60°}{\sin 225°}$ ✓ $-\cos 60°$; cancellation of $\sin 10°$

$= \dfrac{-\cos 60°}{\sin(180° + 45°)}$

$= \dfrac{-\cos 60°}{-\sin 45°}$ ✓ $-\sin 45°$

$= \dfrac{\frac{1}{2}}{\frac{\sqrt{2}}{2}}$ ✓ substitution

$= \dfrac{1}{2} \times \dfrac{2}{\sqrt{2}} = \dfrac{1}{\sqrt{2}}$ or $\dfrac{\sqrt{2}}{2}$ ✓ answer   (5)   R

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		
QUESTION 2	*NOTE:*	
2.1 LHS: $\tan^2 x - \sin^2 x$ RHS: $\sin^2 x . \tan^2 x$	*–1 if LHS and RHS are not separated in 2.1 and 2.2 from the start*	
$\quad = \dfrac{\sin^2 x}{\cos^2 x} - \sin^2 x$ ✓ conversion $= \sin^2 x . \dfrac{\sin^2 x}{\cos^2 x}$		
$\quad = \dfrac{\sin^2 x - \sin^2 x . \cos^2 x}{\cos^2 x}$ ✓ LCD simpl. $= \dfrac{\sin^4 x}{\cos^2 x}$ ✓ simpl.		
$\quad = \dfrac{\sin^2 x \,(1 - \cos^2 x)}{\cos^2 x}$ ✓ factorisation		
$\quad = \dfrac{\sin^2 x \,(\sin^2 x)}{\cos^2 x}$ ✓ identity		
$\quad = \dfrac{\sin^4 x}{\cos^2 x}$ ∴ *LHS = RHS*	(5)	(1) – K (4) – C *Knowledge for tan identity*
OR		
LHS: $= \dfrac{\sin^2 x \,(\sin^2 x)}{\cos^2 x} = \sin^2 x . \dfrac{\sin^2 x}{\cos^2 x} = \sin^2 x . \tan^2 x$ = RHS		
2.2 2.2.1 Prove: $\dfrac{2 - 2\cos^2 x - \sin x}{2 \sin x . \cos x - \cos x} = \tan x$		
$\quad$ LHS: $\dfrac{2 - 2\cos^2 x - \sin x}{2 \sin x . \cos x - \cos x}$ RHS: $\tan x$		
$\quad = \dfrac{2 - 2(1 - \sin^2 x) - \sin x}{\cos x \,(2\sin x - 1)}$ ✓✓ factorisation (denominator); identity: $1 - \sin^2 x$		
$\quad = \dfrac{2 - 2 + 2\sin^2 x - \sin x}{\cos x \,(2\sin x - 1)}$		
$\quad = \dfrac{2\sin^2 x - \sin x}{\cos x \,(2\sin x - 1)}$ ✓ simplification		
$\quad = \dfrac{\sin x \,(2\sin x - 1)}{\cos x \,(2\sin x - 1)}$ ✓ factorisation (numerator)		
$\quad = \tan x$ ✓ answer		
$\quad$ ∴ LHS = RHS	(5)	(1) – K (4) – C *Knowledge for square identity*
$\quad$ 2.2.2 $\dfrac{2 - 2\cos^2 x - \sin x}{2 \sin x . \cos x - \cos x} = 2{,}64$ and $x \in [-180°;180°]$		
$\qquad$ then from 2.2.1:		
$\qquad \tan x = 2{,}64$ ✓ connection to previous question		
$\qquad$ Ref. ∠: $69{,}253…°$		
$\qquad x = 69{,}25° + k.180°$ $(k \in \mathbb{Z})$ ✓ general solution		
$\qquad k = -1: x = -110{,}75°$ ✓ answer		
$\qquad k = 0: x = 69{,}25°$ ✓ answer	(4)	R
2.3 $\sin(2\theta + 25°) = -0{,}834$		
$\quad$ Ref.∠: $56{,}511…°$ ✓ Ref.∠		
$\quad 2\theta + 25° = 180° + 56{,}511° + k.360°$ $(k \in \mathbb{Z})$		
$\quad \theta = 105{,}76° + k.180°$ ✓ answer		
$\quad$ Or		
$\quad 2\theta + 25° = 360° - 56{,}511° + k.360°$		
$\quad \theta = 139{,}24° + k.180°$ ✓ answer	(3)	R

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
ALTERNATIVE METHOD: $2\theta + 25° = -56,511…° + k.360°$ $\theta = -40,76° + k.180°$ ✓ Or $2\theta + 25° = 180° - (-56,511°) + 360°$ ✓ $\theta = 105,76° + k.180°$ ✓ $(k \in \mathbb{Z})$		

QUESTION 3

3.1 $f(x) = \cos 2x$, $g(x) = \sin(x - 30°)$ for $x \in [-90°; 270°]$
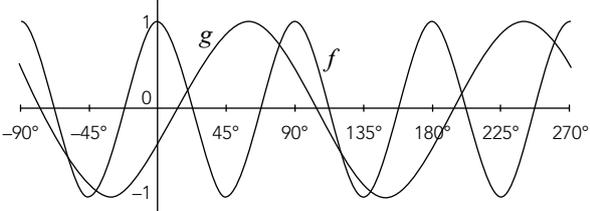
$f(x) = \cos 2x$ ✓✓ shape and period change

$g(x) = \sin(x - 30°)$ ✓✓✓ shape, horizontal shift and intercepts   (5)   R

3.2 $\cos 2x = \sin(x - 30°)$
$\cos 2x = \cos(90° - (x - 30°))$ ✓ co-ratios
$\cos 2x = \cos(90° - x + 30°)$
$\cos 2x = \cos(120° - x)$

Ref. ∠: $120° - x$
∴ $2x = 120° - x + k.360°$ ✓ angle relationship
$3x = 120° + k.360°$
$x = 40° + k.120°$

OR
$2x = 360° - (120° - x) + k.360°$ $(k \in \mathbb{Z})$ ✓ angle relationship
$2x = 360° - 120° + x + k.360°$
$x = 240° + k.360°$ ✓ simplification
$k = -1: x = -80°$
$k = 0: x = 40°; x = 240°$
$x \in \{-80°; 40°; 240°\}$ ✓✓ final answers   (6)   C

OR instead of ref. ∠: $x = \pm(120° - x)$ etc.

OR $\sin(x - 30°) = \cos 2x$
      $\sin(x - 30°) = \sin(90° - 2x)$ etc.

QUESTION 4

(a) $\sin^2 \alpha + \cos^2 \alpha = 1$ ✓ identity   (1)   K

(b) $\sin^2(90° - \alpha) = \cos^2 \alpha$ ✓ co-ratios   (1)   K

(c) $\sin^2 1° + \sin^2 2° + \sin^2 3° + … … + \sin^2 88° + \sin^2 89° + \sin^2 90°$

= $\sin^2 1° + \sin^2 2° + \sin^2 3° + … … + \cos^2 2° + \cos^2 1° + 1$ ✓ co-ratios

= $(\sin^2 1° + \cos^2 1°) + (\sin^2 2° + \cos^2 2°) + …$

   $(\sin^2 44° + \cos^2 44°) + \sin^2 45° + 1$ ✓ identities; $\sin^2 45°$

= $(1 + 1 + …) 44 + \left(\frac{\sqrt{2}}{2}\right)^2 + 1$ ✓ special angle substitution

= $45 + \frac{2}{4}$

= $45\frac{1}{2}$ ✓ final answer   (4)   P

8. Weighting of cognitive levels in the Term 3 Trigonometry test

The table below shows the weighting of marks across the cognitive levels in the exemplar test provided above. As can be seen, this differs slightly from the suggested weightings in the CAPS. This is acceptable, provided the two lower cognitive levels add up to approximately 55%, while the two higher levels add up to approximately 45%. In this exemplar test, the two lower levels together account for 62% of the marks, and the two higher for 38%.

Cognitive levels	Mark out of 55	Percentage of marks in the test	Percentage of marks at each level prescribed by the CAPS (p. 53)
Knowledge (K)	4	7%	≈ 20%
Routine procedures (RP)	30	55%	≈ 35%
Complex procedures (CP)	17	31%	≈ 30%
Problem solving (PS)	4	7%	≈ 15%

9. The exemplar Term 3 end-of-term test

Time: 90 minutes   *Total: 75 marks*

INSTRUCTIONS TO LEARNERS:

1. There are six questions. Answer all questions on your answer paper.
2. Show all your working and give reasons where necessary.
3. Diagrams are not drawn to scale.
4. Scientific non-programmable calculators may be used. Answer correct to two decimal places, unless stated otherwise.
5. Number the questions according to the numbering system used in this question paper.
6. Write neatly and legibly.

QUESTION 1

1.1   If $17 \sin \beta + 15 = 0$ and $90° < \beta < 270°$, evaluate $\sin^2 \beta - \cos^2 \beta$ without using a calculator.   (4)

1.2   If $\cos 20° = p$ determine the following in terms of p:

    1.2.1 $\cos 340°$ (2)

    1.2.2 $\sin 200°$ (3)

1.3   Simplify, without using a calculator:

    1.3.1 $\dfrac{\cos(90° + \alpha).\sin(-\alpha)}{\sin(180° + \alpha).\tan(360° - \alpha)}$ (6)

    1.3.2 $\dfrac{\sin 203°.\cos(-150°)}{\cos(247°)} + \dfrac{\sin(-960°)}{\tan 1\ 125°}$ (6)

                                                [21]

QUESTION 2

2.1   Prove that $\tan \alpha + \dfrac{\cos \alpha}{1 + \sin \alpha} = \dfrac{1}{\cos \alpha}$ (5)

2.2   Give the general solution for x: $2 \sin^2 x + 7 \sin x - 4 = 0$ (5)

                                                [10]

QUESTION 3

Trigonometric functions $f(x) = \cos bx$ and $g(x) = a \cos x$ are given below, with $x \in [-90°;360°]$:
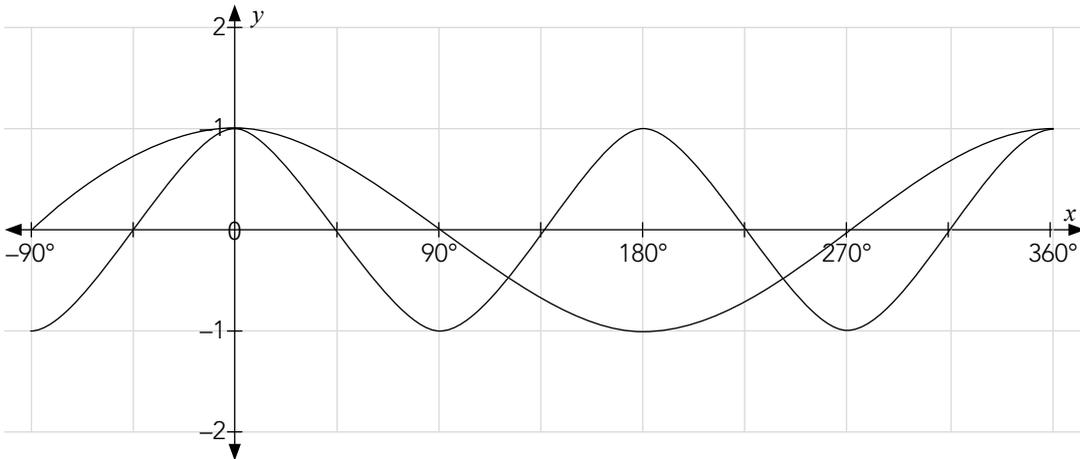
3.1 Determine the values of a and b. (NOTE: $b \neq 1$) (2)

3.2 Write down the amplitude of g. (1)

3.3 Determine the values of x where for $f(x).g(x) \geq 0$ for $x \in [90°;270°]$ (3)

3.4 Give the equation of the function if f is shifted 30° to the right. (2)

[8]

QUESTION 4

4.1 State the Cosine Rule for any $\triangle ABC$: If $a = BC$, then $a^2 = \ldots$ (1)

4.2 The sketch shows one side of the elevation of a house. ED = 7,5 m, AD = 3,5 m and AB = 9,4 m. The angle of elevation from D to E is 32° and $\hat{A} = 90°$. EGF is perpendicular to DC and AB.
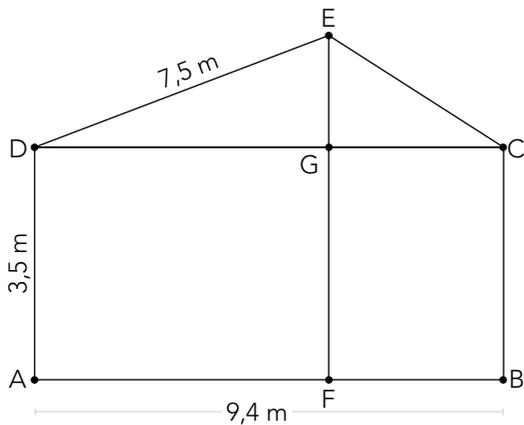
4.2.1 Show that EC = 5 m. (3)

4.2.2 Calculate the values of:

(a) $D\hat{C}E$ (3)

(b) the area of $\triangle DEC$ (2)

(c) the height EF (3)

[12]

QUESTION 5

5.1   The probability that Jo's favourite hiking spot is fully booked for the weekend is 30%. When his favourite hiking spot is fully booked the probability for him hiking is 20%. If his favourite hiking spot is not fully booked the probability that Jo will hike during the weekend becomes 60%. Use a tree diagram to represent the situation and hence calculate the probability of Jo hiking during the weekend.   (4)

5.2   At a supermarket, 270 shoppers bought food. Of these, 90 bought milk only, 32 bought fruit only and 16 bought bread only: 48 bought milk and fruit, 40 bought milk and bread, 62 bought fruit and bread: 18 bought none of these items.

Let x be the amount of shoppers who bought all three items.

     5.2.1   Draw a Venn diagram representing the above information, and then answer the questions which follow.   (4)

     5.2.2   How many shoppers bought all three items? (i.e. Determine the value of x.)   (3)

     5.2.3   What is the probability that a shopper, chosen at random, bought:

         (a)   bread, but not milk or fruit?   (1)

         (b)   milk or fruit?   (1)

         (c)   bread and fruit, but no milk?   (1)

5.3   A and B are independent but not mutually exclusive events. $P(A) = \frac{2}{5}$ and $P(B) = \frac{1}{3}$

Determine $P(A \cup B)$ (4)

                                                [18]

QUESTION 6

This sketch shows a cylindrical gas cylinder with hemispherical ends.

Its radius is r cm and its **overall height** is h cm.
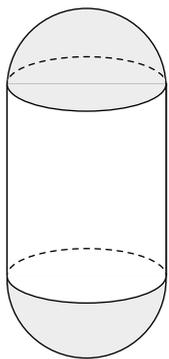
6.1   Show that the formula for its volume is $V = \frac{\pi r^2}{3}(3h - 2r)$ (4)

6.2   Calculate the volume if $r = 9{,}2$ cm and $h = 19{,}6$ cm   (2)

                                                [6]

> Useful formula: and $V = \frac{4}{3}\pi r^3$ and $V = \pi r^2 h$
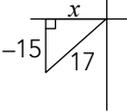
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SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
QUESTION 1		
1.1 $17 \sin \beta + 15 = 0$ and $90° < \beta < 270°$ $\sin B = \frac{-15}{17} = \frac{y}{r}$ $x^2 + y^2 = r^2$ (Pythagoras) $x^2 + (-15)^2 = 17^2$ ✓ substitution $x^2 + 225 = 289$ $x^2 = 289 - 225$ $x^2 = 64$ $\therefore x = \pm 8$ $x = -8$ in Q3 ✓ correct x-value $\therefore \sin^2 \beta - \cos^2 \beta$ $= \left(\frac{-15}{17}\right)^2 - \left(\frac{-8}{17}\right)^2$ ✓ substitution $= \frac{225}{289} - \frac{64}{289}$ $= \frac{161}{289}$ ✓ answer	(4)	R
1.2 If $\cos 20° = p$ determine the following in terms of p: 1.2.1 $\cos 340° = \cos (360° - 20°)$ $= \cos 20°$ ✓ reduction $= p$ ✓ value	(2)	R

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

1.2.2 $\sin 200°$

$= \sin(180° + 20°)$

$= -\sin 20°$ ✓ reduction

$= -\sqrt{1 - p^2}$ ✓ square root   **(3)**   **C**

Note:

$\cos 20° = p$

$y^2 + p^2 = 1^2$ (Theorem of Pyth.)
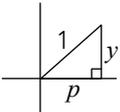
$y^2 = 1 - p^2$

$y = \sqrt{1 - p^2}$; $y > 0$ in quad.1 ✓ y – value in terms of p

OR

$\sin^2 20° + \cos^2 20° = 1$ ✓

$\sin^2 20° = 1 - \cos^2 20°$

$\sin 20° = \sqrt{1 - \cos^2 20°}$

$\qquad = \sqrt{1 - p^2}$ ✓

$\therefore -\sin 20° = -\sqrt{1 - p^2}$ ✓

1.3   1.3.1 $\dfrac{\cos(90° + \alpha).\sin(-\alpha)}{\sin(180° + \alpha).\tan(360° - \alpha)}$

$= \dfrac{-\sin \alpha(-\sin \alpha)}{-\sin \alpha(-\tan \alpha)}$ ✓ $-\sin \alpha$ ✓ $-\sin \alpha$ ✓ $-\sin \alpha$ ✓ $-\tan \alpha$

$= \dfrac{\sin \alpha}{\frac{\sin \alpha}{\cos \alpha}}$ ✓ identity   **(1) – K**

$= \sin \alpha \times \dfrac{\cos \alpha}{\sin \alpha}$ **(5) – R**

$= \cos \alpha$ ✓ answer   **(6)**   *Knowledge* is for the identity

1.3.2 $\dfrac{\sin 203°.\cos(-150°)}{\cos(247°)} + \dfrac{\sin(-960°)}{\tan 1\,125°}$

$= \dfrac{\sin(180° + 23°).\cos(-150° + 360°)}{\cos(180° + 67°)} + \dfrac{\sin 120°}{\tan 45°}$

$= \dfrac{-\sin 23°.\cos 210°}{-\cos 67°} + \dfrac{\sin 60°}{\tan 45°}$ ✓✓✓✓ each reduction

$= \dfrac{-\cos 67°.-\cos 30°}{-\cos 67°} + \dfrac{\sin 60°}{\tan 45°}$ ✓ simplification to ratio of 67°

$= \dfrac{\frac{\sqrt{3}}{2}}{1} - \dfrac{\frac{\sqrt{3}}{2}}{1}$

$= \dfrac{-2\sqrt{3}}{2}$

$= -\sqrt{3}$ ✓ final answer   **(6)**   **C**

OR

$= \dfrac{-\sin 23°.-\cos 30°}{-\sin 23°} + \dfrac{\sin 60°}{\tan 45°}$ ✓ simplification to ratio of 23°

Note: *There are different methods to reduce negative angles. Any correct method is acceptable.*

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

QUESTION 2

2.1   Prove that $\tan \alpha + \dfrac{\cos \alpha}{1 + \sin \alpha} = \dfrac{1}{\cos \alpha}$

     LHS: $\tan \alpha + \dfrac{\cos \alpha}{1 + \sin \alpha}$ RHS: $\dfrac{1}{\cos \alpha}$

     $= \dfrac{\sin \alpha}{\cos \alpha}$ ✓ $+ \dfrac{\cos \alpha}{1 + \sin \alpha}$

     $= \dfrac{\sin \alpha (1 + \sin \alpha) + \cos^2 \alpha}{\cos \alpha (1 + \sin \alpha)}$ ✓ equivalent fraction (LCD)

     $= \dfrac{\sin \alpha + \sin^2 \alpha + \cos^2 \alpha}{\cos \alpha (1 + \sin \alpha)}$ ✓ simplification of numerator

     $= \dfrac{\sin \alpha + 1}{\cos \alpha (1 + \sin \alpha)}$ ✓ square identity

     $= \dfrac{1}{\cos \alpha}$ ✓ simplification

     $\therefore$ LHS = RHS

Marks column: ***NOTE:*** *–1 if LHS and RHS are not separated in 2.1 from the start*   (5)

Cognitive levels column: (1) – K   (4) – C   *Knowledge is for the identity*

2.2 $2 \sin^2 x + 7 \sin x - 4 = 0$

     $(2 \sin x - 1)(\sin x + 4) = 0$ ✓ factors

     $\therefore \sin x = \dfrac{1}{2}$ ✓ or $\sin x = -4$ N/A ✓ answers

     Ref.$\angle$: 30°

     $x = 30° + k.360°$ or $x = 150° + k.360°$ $(k \in \mathbb{Z})$ ✓✓ answers

     Note: *The use of the reference angle method is optional.*

Marks: (5)   *Cognitive:* C

QUESTION 3

3.1 $a = 1$ ✓ value

     $b = 2$ ✓ value   (2)   K

3.2   amplitude of g: 1 ✓   (1)   K

3.3 $f(x).g(x) \geq 0$ for $x \in [90°;135°] \cup [225°;270°]$ ✓✓ intervals ✓ correct brackets   (3)   C

3.4 $f(x) = \cos 2x$

     $\therefore y = \cos (2(x - 30°))$ ✓ shift

       $= \cos (2x - 60°)$ ✓ answer   (2)   K

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

QUESTION 4

4.1 $a^2 = b^2 + c^2 - 2bc \cos \hat{A}$ ✓   (1)   K

4.2.1 $E\hat{D}G = 32°$ (angle of elevation)

       DC $= 9,4$ m (opp. sides of rectangle)

       $EC^2 = 7,5^2 + 9,4^2 - 2(7,5)(9,4) \cos 32°$ ✓✓ cosine rule

           $= 25,035...$

       $\therefore$ EC $= 5$ cm ✓ answer   (3)   R

4.2.2   (a)   In $\triangle$DEC:

            $\dfrac{\sin D\hat{C}E}{7,5} = \dfrac{\sin 32°}{5}$ ✓ rule

            $\sin D\hat{C}E = \dfrac{7,5 \sin 32°}{5}$

            $\sin D\hat{C}E = 0,794...$ ✓ sine value

            $D\hat{C}E = \sin^{-1}\left(\dfrac{7,5 \sin 32°}{5}\right)$

            $\therefore D\hat{C}E = 52,64°$ ✓ angle value   (3)   R

            OR

            $\cos D\hat{C}E = \dfrac{EC^2 + DC^2 - DE^2}{2(EC)(DC)}$

                     $= \dfrac{5^2 + 9,4^2 - 7,5^2}{2(5)(9,4)}$

            $\therefore D\hat{C}E = 52,59°$ (NOTE: slight rounding off error)

      (b)   Area $\triangle$DEC $= \dfrac{1}{2}(7,5)(9,4) \sin 32°$ ✓ rule

                      $= 18,68$ m^2 ✓ value   (2)   R

            OR

            Area $\triangle$DEC $= \dfrac{1}{2}(5)(9,4) \sin 52,64°$ ✓

                     $= 18,68$ m^2 ✓

      (c)   In $\triangle$EGD: $\dfrac{EG}{7,5} = \sin 32°$ ✓ ratio

            EG $= 7,5 \sin 32°$

               $= 3,97$ m ✓ answer

            $\therefore$ EF $= 3,5 + 3,97$

               $= 7,47$ m ✓ total   (3)   R

            OR

            In $\triangle$EGC: $\dfrac{EG}{5} = \sin 52,64°$ ✓

            EG $= 5 \sin 52,64°$

               $= 3,97$ m ✓

            $\therefore$ EF $= 3,5 + 3,97$

               $= 7,47$ m ✓

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
QUESTION 5		

5.1 FB = fully booked   H = hiking

✓ tree diagram with values

P(H) = P(FB and H) + P(FB' and H)

= P(FB) × P(H) + P(FB') × P(H)

= 30% × 20% + 70% × 60% ✓✓ correct combination

= 0,3 × 0,2 + 0,7 × 0,6

= 0,48 or 48% or $\frac{12}{25}$ ✓ answer   (4)   P

5.2 5.2.1 n(s) = 270

✓✓✓✓ Venn diagram (1 mark off for an incorrect entry)   (4)   P

5.2.2 $x + 40 - x + 48 - x + 62 - x + 90 + 32 + 16 + 18 = 270$

$-2x = 270 - 306$ ✓✓ equation

$-2x = -36$

∴ $x = 18$ ✓ answer   (3)   R

5.2.3 (a) P(B only) = $\frac{16}{270} \approx 0,06$ ✓ answer   (1)   R

(b) P(M or F) = $\frac{236}{270} \approx 0,87$ ✓ answer   (1)   R

(c) P(B and F and M') = $\frac{44}{270} \approx 0,16$ ✓ answer   (1)   R

5.3 If independent: P(A and B) = P(A) × P(B) ✓ definition

$= \frac{2}{5} \times \frac{1}{3}$

$= \frac{2}{15}$ ✓ answer

P(A or B) = P(A) + P(B) − P(A and B)   (1) – K

P(A or B) = $\frac{2}{5} + \frac{1}{3} - \frac{2}{15}$ ✓ definition application   (3) – R

$= \frac{6 + 5 - 2}{15}$ *Knowledge* is for the definition

$= \frac{9}{15}$ ✓ answer   (4)

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

QUESTION 6

6.1
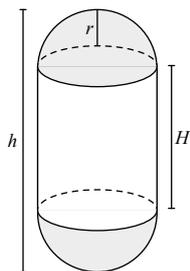
Height of cylinder: $H = h - 2r$ ✓ value of H

Volume: $V = \frac{4}{3}\pi r^3 + \pi r^2 H$ ✓ formulae

$= \frac{4}{3}\pi r^3 + \pi r^2(h - 2r)$

$= \frac{4}{3}\pi r^3 + \pi r^2 h - 2\pi r^3$

$= \frac{4}{3}\pi r^3 - \frac{6}{3}\pi r^3 + \pi r^2 h$

$= -\frac{2}{3}\pi r^3 + \pi r^2 h$ ✓ simplification

$= \frac{\pi r^2}{3}(-2r + 3h)$ ✓ factorisation

$= \frac{\pi r^2}{3}(3h - 2r)$ (4)   P

6.2 $V = \frac{\pi r^2}{3}(3h - 2r)$

$= \frac{\pi (9,2)^2}{3}(3(19,6) - 2(9,2))$ ✓ substitution

$\approx 3\ 580,85 \text{ cm}^3$ ✓ answer   (2)   R

11. Weighting of cognitive levels in the Term 3 end-of-term test

The table below shows the weighting of marks across the cognitive levels in the exemplar test provided above. As can be seen, this differs slightly from the suggested weightings in the CAPS. This is acceptable, provided the two lower cognitive levels add up to approximately 55%, while the two higher levels add up to approximately 45%. In this exemplar test, the two lower levels together account for 56% of the marks, and the two higher for 44%.

Cognitive levels	Mark out of 75	Percentage of marks in the test	Percentage of marks at each level prescribed by the CAPS (p. 53)
Knowledge (K)	9	12%	≈ 20%
Routine procedures (RP)	33	44%	≈ 35%
Complex procedures (CP)	21	28%	≈ 30%
Problem solving (PS)	12	16%	≈ 15%

12. The exemplar end-of-year Finance and Statistics test

Time: 60 minutes   *Total: 50 marks*

INSTRUCTIONS TO LEARNERS

1. There are three questions. Answer all questions.

2. Show necessary working out. Full marks will not necessarily be awarded for answers only.

3. Scientific non-programmable calculators may be used.

4. Round off to two decimal places where applicable.

5. Number the questions according to the numbering system used in this question paper.

6. A diagram sheet is attached. Hand it in with your answer paper.

7. Write neatly and legibly.

QUESTION 1

1.1 After 2 years, a computer is one third of its original value. Assuming depreciation is based on a reducing balance, what is the annual rate of depreciation? (4)

1.2 Convert an effective interest rate of 11,5% per annum to a nominal interest rate which is compounded monthly. (4)

1.3 Simphiwe invests R2 500 for 8 years. The interest rate for the first 4 years is 8% per annum compounded quarterly and then changes to 9,5% per annum compounded semi-annually for the remaining 4 years. How much will the investment be worth at the end of the eighth year? (5)

1.4 Portia opens a savings account with R5 000 and adds R2 400 to the savings account two years later. She withdraws R1 200 eighteen months later. Calculate how much she will have in her account at the end of 5 years if interest is calculated at 12,5% per annum compounded quarterly. (6)

1.5 I deposit the same amount, Rx, into a savings account at the beginning of each year starting immediately with the aim of saving R10 500 in total at the end of three years. If the interest rate is 8,5% per annum compounded yearly, determine the value of x. (6)

[25]

QUESTION 2

2.1 The following table shows the absenteeism of 280 employees of a company in one year. Complete the table on the diagram sheet provided. (1)

Number of days absent	Frequency	Cumulative frequency
$0 < d \leq 5$	32	
$5 < d \leq 10$	67	
$10 < d \leq 15$	131	
$15 < d \leq 20$	43	
$20 < d \leq 25$	7	

2.2 On the grid provided, draw an ogive, using the information in the completed table (4)

2.3 Use the information in the ogive to determine the approximate number of employees absent for:

    2.3.1 13 days or less (1)

    2.3.2 more than 17 days (1)

2.4 Use your ogive to determine: *(mark off where you have taken your readings)*

    2.4.1 the median number of days absent (1)

    2.4.2 the inter-quartile range of days absent (3)

    2.4.3 the percentage of workers absent for more than 20 days. (2)

[13]

QUESTION 3

3.1 The times taken, in minutes, for 10 athletes to complete a 5 kilometre race are given below:

17	27	24	35	29	15	38	22	23	26

    3.1.1 Calculate the mean time take to complete the race. (2)

    3.1.2 Calculate the standard deviation. (2)

    3.1.3 What percentage of athletes completed the race within one standard deviation of the mean? (2)

3.2 A mathematics test gave the following results:

Standard deviation	8%
Mean	65%
Median	61%

It was decided to adjust the results by adding 5% to each person's mark.

For the *new* set of marks, discuss the changes (if any) in the standard deviation, the mean and the median. (3)

3.3 The following scores (in ascending order) were obtained in six matches by a netball team:

16	20	*a*	29	32	*b*

The median is 26,5.

The range is 19.

Determine the values of *a* and *b*. (3)

[12]

DIAGRAM SHEET *(Hand in with your answer paper)*

2.1

Number of days absent	Frequency	Cumulative frequency
$0 < d \leq 5$	32	
$5 < d \leq 10$	67	
$10 < d \leq 15$	131	
$15 < d \leq 20$	43	
$20 < d \leq 25$	7	

2.2

Employee absenteeism for one year

Cumulative frequency

Number of days absent
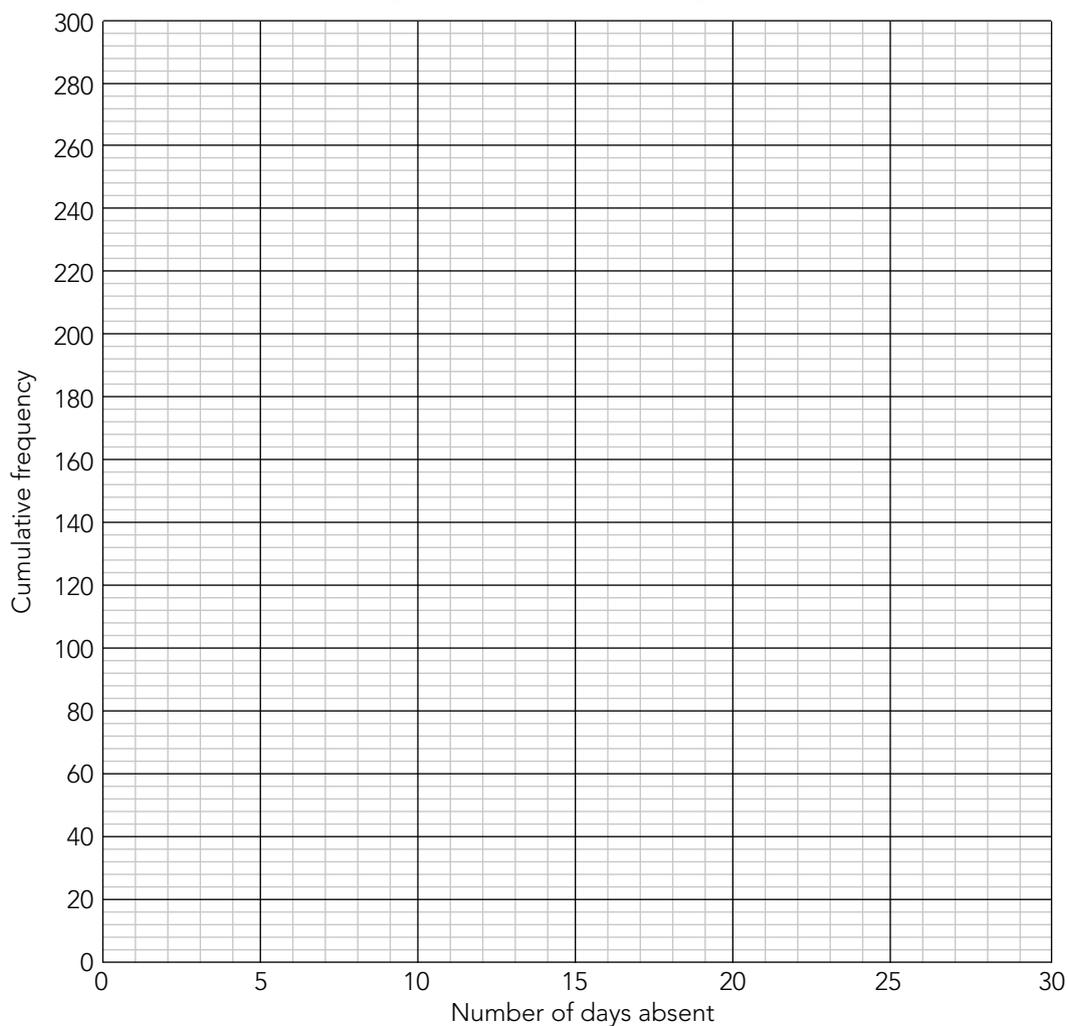
13. Memorandum and analysis of cognitive levels in the end-of-year Finance and Statistics test

Note: The last column in the memorandum shows the cognitive level for each question in the test. The levels are:

K	**Knowledge** – straight recall of facts
R	**Routine procedures** – well-known, simple applications and calculations
C	**Complex procedures** – procedures involving complex calculations and/or higher reasoning
P	**Problem solving** – solving problems for which higher order reasoning and processes are involved
	More information about these levels can be found in the CAPS (p. 53).

A suggestion for test and exam marking

Underline errors committed by learners and apply Consistent Accuracy (CA) marking. This means the learner loses the mark for each mistake made and you mark the rest of the answer according to their mistake(s). However, if the learner shows a lack of understanding of the concept, no marks are given. Also, if the learner has made the question easier, no marks are given from that part onwards.

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
QUESTION 1 1.1 $A = P(1 - i)^n$ ✓ formula Let the original value of the computer be Rx. $\frac{1}{3}x = x(1 - i)^2$ ✓ substitution $\frac{1}{3} = (1 - i)^2$ $\sqrt{\frac{1}{3}} = 1 - i$ ✓ simplification process $\sqrt{\frac{1}{3}} - 1 = -i$ $-0{,}4226\ldots = -i$ $\therefore i = 0{,}42264\ldots$ Rate = 42,26% ✓ answer	(4)	R
1.2 $1 + i_{eff} = (1 + \frac{i_{nom}}{12})^{12}$ ✓ formula $1 + 11{,}5\% = (1 + \frac{i_{nom}}{12})^{12}$ ✓ substitution $\sqrt[12]{1 + 11{,}5\%} = 1 + \frac{i}{12}$ ✓ simplification process $1{,}0091\ldots - 1 = \frac{i}{12}$ $(1{,}0091\ldots - 1) \times 12 = i$ $i = 0{,}10934\ldots$ *nominal rate* = 10,93% ✓ answer	(4)	R

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
1.3 T_0 T_1 T_2 T_3 T_4 T_5 T_6 T_7 T_8 R2 500 8% per annum c.q. 9,5% per annum s.a. ✓ principal amount $A = 2\,500(1 + \frac{0,08}{4})^{4 \times 4}(1 + \frac{0,095}{2})^{2 \times 4}$ ✓ interest rates ✓ time periods ✓ correct formula $= R4\,974,79$ ✓ **OR** $A = 2\,500(1 + \frac{0,08}{4})^{4 \times 4}$ ✓ initial formula $= 3431,964263$ ✓ interim answer $\therefore A_2 = 3431,964263(1 + \frac{0,095}{2})^{2 \times 4}$ ✓ new principal amount ✓ formula $= R4\,974,79$ ✓ final answer	(5)	C
1.4 T_0 T_1 T_2 T_3 T_4 T_5 R5 500 R2 400 −R1 200 12,5% per annum c.q. $A = 5\,000(1 + \frac{0,125}{4})^{4 \times 5}$ ✓ $+ 2\,400(1 + \frac{0,125}{4})^{4 \times 3}$ ✓✓ $-1\,200(1 + \frac{0,125}{4})^{4 \times \frac{3}{2}}$ ✓✓ marks for correct principal amounts and time period calculations $= R11\,280,95$ ✓answer **OR** $A_1 = 5\,000(1 + \frac{0,125}{4})^{4 \times 2}$ ✓ initial formula $= 6\,395,605934$ ✓ interim answer $P_2 = 6\,395,605934 + 2\,400 = 8\,795,605934$ $\therefore A_2 = 8\,795,605934(1 + \frac{0,125}{4})^{4 \times 1,5}$ ✓ new principal amount $= R10\,579,11975$ ✓ answer $P_3 = R10\,579,11975 - 1\,200 = 9\,379,119745$ ✓ new principal amount $\therefore A_3 = 9\,379,119745(1 + \frac{0,125}{4})^{4 \times 1,5}$ $= R11\,280,95$ ✓ answer	(6)	C
1.5 T_0 T_1 T_2 T_3 x x x 8,5% per annum c.a. $10\,500 = x(1 + 0,085)^3$ ✓ $+ x(1 + 0,085)^2$ ✓ $+ x(1 + 0,085)^1$ ✓ $10\,500 = x((1,085)^3 + (1,085)^2 + (1,085)^1)$ ✓ 3 marks for sequence & 1 for factorising $\frac{10\,500}{(1,085)^3 + (1,085)^2 + (1,085)^1} = x$ $\therefore x = R2\,966,51$ ✓✓ final answer	(6)	P

SOLUTIONS	MARKS	COGNITIVE LEVELS
Note: Other methods for the solutions are acceptable (provided they are mathematically sound)		

QUESTION 2

2.1

Number of days abs.	Frequency	Cumulative freq.			
$0 < d \leq 5$	32	32			
$5 < d \leq 10$	67	99			
$10 < d \leq 15$	131	230			
$15 < d \leq 20$	43	273			
$20 < d \leq 25$	7	280	✓ table	(1)	R

2.2

Employee absenteeism for one year

ogive: ✓ axes ✓ upper class boundaries ✓ curve ✓ shape   (4)   R

2.3   2.3.1   Approximately 180 employees ✓ (a value close to this is acceptable)   (1)   R

2.3.2   Approximately 280 – 257 = 23 employees ✓ (a value close to this is acceptable)   (1)   R

2.4   2.4.1   Median (Q_2) ≈ 11,5 days ✓ (a value close to this is acceptable)   (1)   R

2.4.2 $IQR = Q_3 - Q_1$

$\qquad = 14 - 8$

$\qquad \approx 6$ days ✓✓✓ 1 mark per value

(a value close to this is acceptable)   (3)   R

2.4.3 $\frac{7}{280} \times 100 = 2,5\%$ ✓✓ fraction & answer   (2)   R

SOLUTIONS **Note:** Other methods for the solutions are acceptable (provided they are mathematically sound)	MARKS	COGNITIVE LEVELS
QUESTION 3		
3.1 3.1.1 $\bar{x}$ = 25,6 minutes ✓✓ answer (calculator usage)	(2)	**R**
3.1.2 *S.D.* = 6,81 minutes ✓✓ answer (calculator usage)	(2)	**R**

3.1.3 $\overline{}$ 1 *S.D.* $\overline{}$
            −6,81 $\bar{x}$ +6,81
     18,79 $\overline{}$ 25,6 $\overline{}$ 32,41
 	
       Percentage athletes within one standard deviation of the mean:
       $\frac{6}{10}$ = 60% ✓✓ 2 marks for analysis and final answer
	(2)	**R**

3.2 The standard deviation does not change but the mean and the median both will change with an increase of 5 marks each. ✓✓✓ (an explanation along these lines)	(3)	**K**

3.3 $\frac{a+29}{2}$ = 26,5 ✓ equation
     a + 29 = 53
     a = 24 ✓ value of a
     Range: 19
     ∴ b − 16 = 19
       b = 35 ✓ value of b
	(3)	**P**

14. Weighting of cognitive levels in the end-of-year Finance and Statistics test

The table below shows the weighting of marks across the cognitive levels in the exemplar test provided above. As can be seen, this differs slightly from the suggested weightings in the CAPS. This is acceptable, provided the two lower cognitive levels add up to approximately 55%, while the two higher levels add up to approximately 45%. In this exemplar test, the two lower levels together account for 60% of the marks, and the two higher for 40%. The higher weighting in the lower level is ascribable to the inclusion of work on statistics, with questions that are generally at Level 2 in this grade.

Cognitive levels	Mark out of 50	Percentage of marks in the test	Percentage of marks at each level prescribed by the CAPS (p. 53)
Knowledge (K)	3	6%	≈ 20%
Routine procedures (RP)	27	54%	≈ 35%
Complex procedures (CP)	11	22%	≈ 30%
Problem solving (PS)	9	18%	≈ 15%

15. Exemplar formal assessment mark record sheets

15.1 Term 3

Grade 11 Mathematics Suggested Assessment Record Term 3	Test 1		Test 2		Term 3		
	Original mark	SBA Weighting /10	Original mark	SBA Weighting /10	Total	Term 3 %	Rating (1–7)
Date of assessment:							
NAME AND SURNAME							

15.2 Term 4

Grade 11 Mathematics Suggested Assessment Record Term 4

NAME AND SURNAME	Test Original mark	Test SBA Weighting	Term 4 Term 4 %	Term 4 Rating	End-of-year examination Original mark	End-of-year examination Original mark	End-of-year examination Percentage	End-of-year examination Weighting
Mark out of	…	10	%	1–7	…	…	100	75
Date of assessment:								

15.3 Suggested promotion mark record

		Mark out of	NAME AND SURNAME																	
Term 1 SBA	Investigation/ Project	20																		
	Test	10																		
Term 2 SBA	Assignment/ Test	10																		
	Mid-year examination	30																		
Term 3 SBA	Test 1	10																		
	Test 2	10																		
Term 4 SBA	Test	10																		
SBA	Total	10																		
SBA	Weighted	25																		
End-of-year examination	Weighted	75																		
Promotion mark	Percentage	100																		

Grade 11 Mathematics Suggested Promotion Mark Record

16. Templates for tracking, reflecting on and reporting curriculum coverage

16.1 Conventional schools[1]

NAME OF TEACHER:_____ SUBJECT/GRADE: _____

Week no. in planner _____

Week no. in term when work planned for week started _____

Refer to the planner[2] for details of the week's work (or the ATP for subjects without planners)

Class (or subject for FP)				
On track by end of week? (Yes/no)				
How many learners are working confidently?[3] (Rough estimate)				
How many learners in this class?				

DAY[4]	BRIEF NOTES ON THE DAY'S WORK: Consider such things as: *What concepts/skills did the learners struggle with or manage well in this lesson? What could be the reasons for this? Did the class complete the work you had planned? Do you need to change your plans for the next lesson? What changes will you make?*
1	
2	
3	
4	
5	

Reflection on the week: Think about and make a note of:	
What concepts and skills for the week did learners struggle with? What could you do differently next time to better support or extend learning? What good practice could you share?	**Did you cover the curriculum for the week? If not, what were some of the challenges? What can you do to catch up? What help do you need? How will your progress this week affect your plan for next week?**
DH:	Date:

---

1   Please amend this draft template to suit the needs of your school.
2   You can use any planning document (such as the CAPS planner, the ATP or printed lesson plans) as the basis for your tracking.
3   Estimate of learners in that grade that are working confidently at Level 4 (adequate achievement) or above.
4   This can also be lessons if there are more than five lessons a week.

16.2 Multigrade schools[1]

NAME OF TEACHER:_____

Week no. in planner _____							
Week no. in term when work planned for week started _____							
Refer to the planner[2] for details of the week's work (or the ATP for subjects without planners)							
Subjects							
GRADE	On track this week? [3]						
	Est. learners > Level 4 [4]						
	# learners in grade						
GRADE	On track this week?						
	Est. learners > Level 4						
	# learners in grade						
GRADE	On track this week?						
	Est. learners > Level 4						
	# learners in grade						
DAY	**BRIEF NOTES ON THE DAY'S WORK: Consider such things as:** *What concepts/skills did the learners struggle with or manage well in this lesson? What could be the reasons for this? Did the class complete the work you had planned? Do you need to change your plans for the next lesson? What changes will you make?*						
1							
2							
3							
4							
5							
Reflection on the week: Think about and make a note of:							
SUBJECT	**What concepts and skills for the week did learners struggle with? What could you do differently next time to better support or extend learning? What good practice could you share?**			**Did you cover the curriculum for the week? If not, what were some of the challenges? What can you do to catch up? What help do you need? How will your progress this week affect your plan for next week?**			
Principal:				**Date:**			

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1 Please amend this draft template to suit the needs of your school.
2 You can use any planning document (such as the CAPS planner, the ATP or printed lesson plans) as the basis for your tracking.
3 Yes/no?
4 Estimate of learners in that grade that are working confidently at Level 4 (adequate achievement) or above.