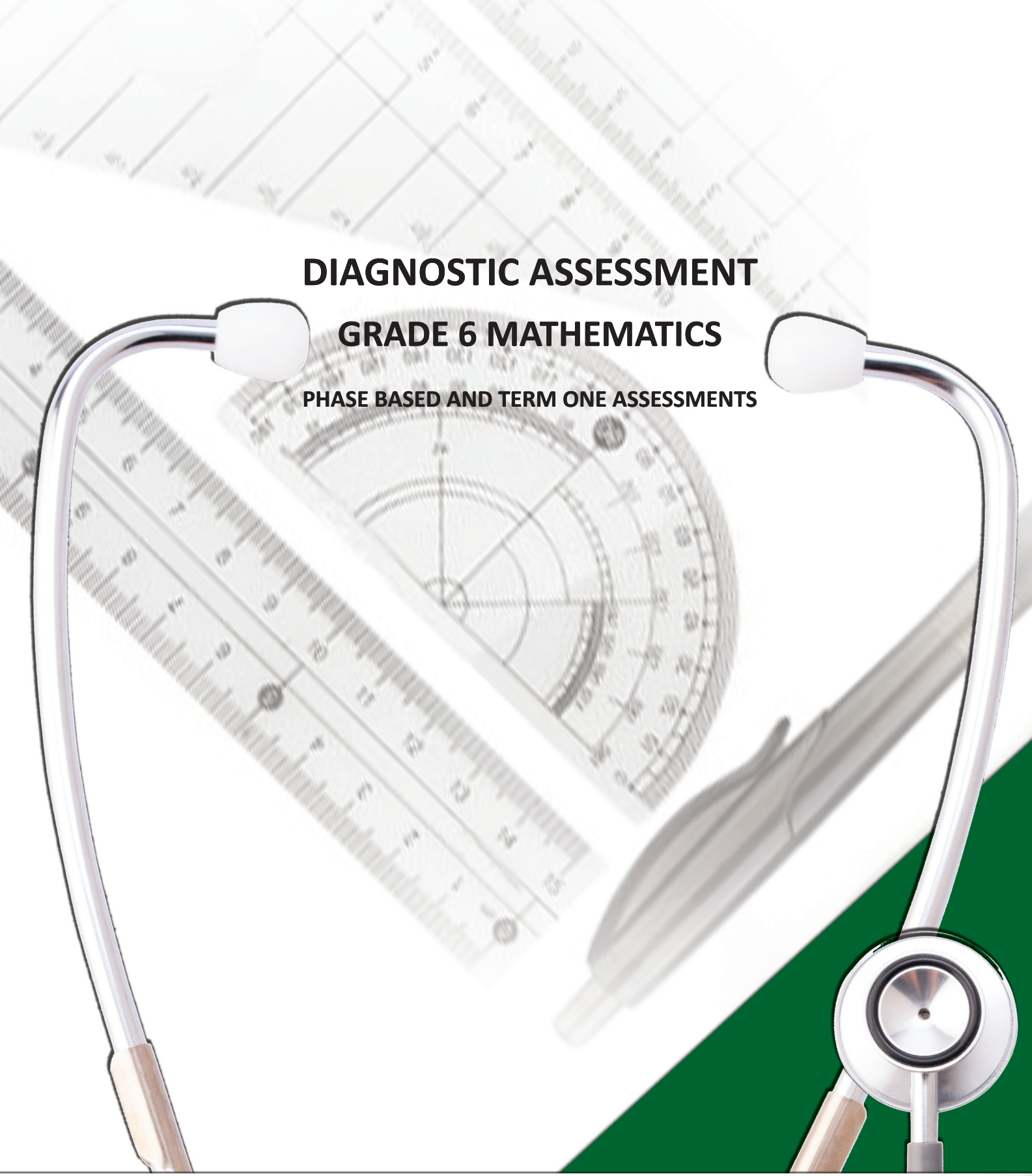
DIAGNOSTIC ASSESSMENT

GRADE 6 MATHEMATICS

PHASE BASED AND TERM ONE ASSESSMENTS



basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

Read to Lead
A Reading Nation is a Leading Nation

2030 NDP

CONTENTS

PART ONE
UNDERSTANDING DIAGNOSTIC ASSESSMENTS

1. INTRODUCTION

The diagnostic resource bank aims to improve the relationship between assessment and classroom instruction. Assessment for learning is the process of gathering information about a learner's learning from a variety of sources, using a variety of approaches, or 'assessment tools', and interpreting that evidence to enable both the teacher and the learner to determine where the learner is in his or her learning; where the learner needs to go; and how best to get there. Teachers can adjust instructional strategies, resources, and environments effectively to help all learners achieve grade specific outcomes only if they have accurate and reliable information about what their learners know and are able to do at a given time.

When findings of assessment results are used to improve classroom practice, learner performance in general can improve. The diagnostic assessment tests/questions are designed to fulfil three purposes of assessment namely to;

- reveal the misconceptions learners bring as prior knowledge to a class;
- measure the conceptual gains of a class as a whole; and
- identify concepts that are weak areas of understanding for the individual learner or as a class/grade.

A traditional multiple choice question(MCQ) provides little information about the learner's understanding of the concept/skill tested. The DBE has embarked on the design of diagnostic assessments using MCQs and assessment rubrics (for Languages) that are designed to assist teachers to diagnose learner misconceptions using the Pearson distractor rationale model as a basis for the classification of learner misconceptions. The diagnosis is also linked to the CAPS learning outcomes and skill acquisition.

MCQs designed for the diagnostic questions included in this package, include a breakdown of learners' understanding through the incorrect responses.All distractors are written not only to focus the attention of the teacher on those learners who are able to identify the correct response, but also to assist the teacher in identifying and understanding the misconceptions captured in the incorrect responses.

2. PURPOSE OF THE DIAGNOSTIC TEST ITEMS

This diagnostic resources should be used in conjunction with the requirements as stipulated in the CAPS document. It therefore does not replace the curriculum or the Annual Teaching Plan (ATP). The content therefore includes coverage from terms one to four. However, teachers may include questions from the resource bank into the ATP to facilitate assessment for learning. These diagnostic assessments/questions are a phase based assessment. It also includes questions from four grades.

There are questions set on the critical skills from the two earlier grades, the current grade and the next grade. The selection of questions from the four grades was done by looking at those concepts that were taught in the two earlier grades and were then extended in the next two grades as well.This would enable the teacher to identify at which specific grade the knowledge gap is.

The assessment guidelines per subject and grade have a detailed explanation of the topics/skills that are in this category. The spread of questions in the composite assessment is weighted to facilitate a phase based assessment and is broken down into the four composite grades as illustrated hereafter:

Table 1: Percentage spread of questions

	Spread of Questions			
Weighting	±10%	±20%	±60%	±10%
Grade 6	4	5	6	7

The purpose of including the content of the other grades is to diagnose the skill/concept acquisition at the earlier grade, the current grade as well as to ascertain whether the learner is ready to make the transition to the next grade. Once the teacher has identified the gaps in the conceptual knowledge/ skill acquisition it would be easier to design targeted intervention programmes to bring learners on par for the transition to subsequent grades/topics.
These diagnostic questions should be used as a tool for teachers to assess the strengths and weaknesses of learners for the purpose of designing teaching and learning strategies that will address the individual needs of the learner.

This assessment should not be used for grading a learner; as the intended purpose is to facilitate learning.

3. THE STRUCTURE OF THE DIAGNOSTIC TEST ITEMS

The diagnostic resource is divided into sections or questions. Questions are framed to direct teachers to possible misconceptions which could be as a result of an earlier grade knowledge deficit, erroneous conceptual knowledge or lack of comprehension. Each paper has a spread of the content areas and skills that span the entire phase and is extended into the next phase. The texts/topics that have been selected for the Language questions indicate the concept/skill progression from one grade to the next.
The Mathematics questions are clustered according to content areas.
MCQs are constructed in such a way that each distractor provides information on whether the learner has mastered the skill/concept or whether there is a misconception. The distractors are graded according to four levels of understanding. Levels one, two and three enlighten the teacher about the nature of the misconception. Level four is the correct response, see Table 3 for further clarity. Short questions are constructed to assess writing skills, mental computations, knowledge recall and application of rules or theorems. Longer responses are constructed so that thought process, writing skills and consolidation and application of content areas and concepts across the subject are consolidated to arrive at the intended response.

4. PROPOSED USE OF THE MATHEMATICS ITEMS/QUESTIONS

4.1 Parts of the paper may be used independently at different intervals i.e. as a revision activity, formative task, etc.
4.2 Certain questions per topic or skill assessed may be selected from each section to compile a shorter testlet.
4.3 Questions may be selected according to **levels of difficulty** and can be used to support learning according to different cognitive demands or be used to support progressed learners. E.g. Levels of difficulty (easy, moderate & difficult)

Table 2: Levels of difficulty using the Bloom's taxonomy

Easy	Remembering and Understanding	Label, list, name, relate, recall, repeat, state, classify, re-group, rearrange, assemble, collect, categorise, select, recognise, supply, separate, isolate	Literal comprehension/ Reorganisation	MCQ, Closed response Short response Fill in the blank Choose correct response
Moderate	Application and Analysis	Predict, infer, guess, translate, summarise, interpret, understand, rewrite, apply, demonstrate, illustrate, investigate, diagnose	Inferential comprehension	Short response MCQ Matching Directed response Closed response Open response
Difficult	Evaluating and Creating	Analyse, appraise, evaluate, justify, reason, criticise, judge, comment, appreciate, create, derive, combine, construct, devise, synthesise	Evaluation and Appreciation	MCQ Essay writing Transactional writing

4.4 Questions may also be used as a baseline assessment if administered prior to teaching a particular lesson. A teacher may want to establish whether learners meet the basic skills and knowledge acquired from the lower grades. This will assist the teacher to know learners' level of proficiency.

4.5 Diagnostic questions can also be selected according to cognitive levels.

4.6 The teacher should decide when, where and how the assessment may be used to enhance teaching and learning.

4.7 The questions may be used at the beginning of a phase to establish whether learners meet the conceptual knowledge for the new grade/phase.

5. DESIGN

The table below lists and describes the types of errors that correspond to each of the four levels of understanding encapsulated in the Mathematics MCQs. The distractor rationale as advocated by Pearson, 2004, forms the basis for diagnosing misconceptions. The taxonomies and cognitive levelsas stipulated in CAPS (for Grades 4-9) are incorporated into the levels of understandings to provide the teacher with holistic information about the level of performance. The cognitive levels are now introduced in the Foundation Phase CAPS.

A more detailed unpacking of the nature of the misconceptions is addressed in the marking guidelines of each diagnostic question.

Table 3: Levels of understanding (thought process)

Levels of understanding	Descriptors for the levels of understanding.
Level 1	Learners demonstrate (i.e. a combination but may not be all of the following) that they: - have no understanding of the question or a conceptual misunderstanding; - are unfamiliar with operational procedures but can compute basic straight forward operations; - are not able to implement (un)related strategies to solve a problem; - excessive depend on the information that is provided in the question and is incorrectly used/duplicated; - utilise unrelated vocabulary to the question. - Etc.
Level 2	Learners demonstrate (i.e. a combination but may not be all of the following) that they: - can apply some computational ability that may not necessarily relate to the question or that demonstrate inadequate conceptual knowledge and flawed reasoning to support conclusions/inferences; - can apply basic mathematical knowledge in straight forward situations; - demonstrate a limited knowledge of some concepts and some procedures; - Etc.
Level 3	Learners demonstrate (i.e. a combination but may not be all of the following) that they can: - apply some conceptual knowledge and ability to analyse but is inconsistent in computational and reasoning skills; - apply their knowledge and understanding to solve problems. - solve word problems involving operations with whole numbers and use division in a variety of problem solving situations. - interpret and use data to solve problems with minimal error of judgement; - use given information to complete various graphs; - Etc.

Levels of understanding	Descriptors for the levels of understanding.
Level 4	Correct response. Learners demonstrate (i.e. a combination but may not be all of the following) that they: - consistently apply/demonstrate correct computational and reasoning skills required in the question; - apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning; - solve a variety of multi-step word problems; - apply geometric knowledge of a range of two-and three-dimensional shapes in a variety of situations; - draw a conclusion from given data and justify their conclusion. - Etc.

Each level of understanding is captured in the distractors of all the multiple-choice questions. A question will include distractors that correspond to each level of understanding set out in the table above.

When learner responses are analysed the diagnostic distractors will reveal patterns in a learner's understanding of the content being tested. The teacher is thus guided towards instruction that specifically addresses a learner's understanding of a concept in the specific content.

6. MARKING GUIDELINES:

6.1 Multiple Choice Questions (MCQs): Marks are allocated according to the cognitive demand of the question. However, the focus of these assessments is not on scoring the learner, but rather on what the learner is able to do or not do.
6.2 Section A and B are allocated a mark each per answer. Marks for Section C are allocated according to the demand of the question.
6.3 The marking guideline has columns indicating the number for each question, the expected answer per question, the level of understanding/error analysis (for Section A), the cognitive level, the level of difficulty,the grade level at which a question and its answer are pitched.The mark allocation is merely a guide for the learner's response and should not be the focus of the task.
6.4 The levels of difficulty indicate the cognitive demands of the question which are: Easy (E), Moderate (M) and difficult (D).
6.5 The Cognitive levels are as prescribed in the CAPS for the Intermediate and Senior Phases and will now be introduced in the Foundation Phase.The cognitive levels, their descriptors and examples are indicated in Table 5.

Table 4: Example of the Marking Guideline(for Mathematics)

1. Complete: 2 + 2 + 2 + 2 =

No.		Expected answer	Level of understanding or error analysis		Cognitive level	Level of difficulty	Grade level
1.	A	6	3	Added only the first 3 numbers	R	E	1
	B	4	2	Added the first two numbers only.			
	C	2	1	Thought it is a number pattern			
	D	8✓	4	Correct response			

In cases where learners are required to display multiple steps/procedures in order to solve a problem, apply the following techniques when marking:

a. Where there is clear evidence of a misread/misinterpretation, a penalty of 1 mark is generally appropriate. A learner should not be penalised for the same error throughout the assessment.
b. If a learner has knowledge of the method but could not get the final correct answer, award a method(M) mark but not an accuracy(A) mark. If the method is incorrect but the answer is correct, award a mark for the answer only.
c. Consistent Accuracymark is applied when an answer is correctly followed through from an incorrect previous answer.

E.g. Grade 3 question
1.What is the number that is 5 more than 20?
1.1 Write the number symbol for the number.
1.2 Write the number name for the same number you wrote in 1.1 above.

Learner response

1.1 205 (the answer is incorrect)
1.2 **Two hundred and five.** (The number name is correct according to the number symbol provided by the learner in number 1.1 even though it was not the expected answer.)

In this instance do not award a mark for the 1st answer (in 1.1) but do award a mark for the 2nd answer(in 1.2) because it was correctly followed through from an incorrect answer.
This is how to apply **consistent accuracy** (CA) marking.

Table 5: MATHEMATICS COGNITIVE LEVELS

LEVEL 1:	**LEVEL 2:**
KNOWLEDGE (K)	**ROUTINE PROCEDURES (R)**
• **Knowing** • **Remember/Recall**	• **Applying routine procedures in familiar contexts** • **Understanding**
• Straight recall • Identification of correct formula • Know and use formulae such as the area of a rectangle, a triangle and a circle where each of the required dimensions is readily available. • Read information directly from a table (e.g. the time that bus number 1 234 departs • Use of mathematical facts • Appropriate use of mathematical vocabulary • Know appropriate vocabulary such as equation, formula, bar graph, pie chart, Cartesian plane, table of values, mean, median and mode. • Write the next three numbers in the sequence: 103; 105; 107… • Determine the factors of 64	• Perform well-known procedures. • Learners know what procedure is required from the way the problem is posed. • Simple applications and calculations using the basic operations including: ◦ algorithms for +, -, ×, and ÷ ◦ calculating a percentage of a given amount • Calculations which might involve many steps • Derivation from given information may be involved • All of the information required to solve the problem is immediately available to the student and where each of the required dimensions is readily available. • Estimation and appropriate rounding off of numbers • Measure dimensions such as

LEVEL 3:	LEVEL 4:
COMPLEX PROCEDURES (C)	**PROBLEM-SOLVING (P)**
• **Applying multi-step procedures in a variety of contexts (including word sums)**	• **Reasoning and reflecting**
• Problems involving complex calculations and/or higher order reasoning • The required procedure is not immediately obvious from the way the problem is posed. • Learners will have to decide on the most appropriate procedure to solve the solution to the question and may have to perform one or more preliminary calculations before determining a solution. • Investigations to describe rules and relationships - • There is often not an obvious route to the solution • Problems not based on a real world context - could involve making significant connections between different representations • Conceptual understanding • One or more preliminary	• Unseen, non-routine problems (which are not necessarily difficult) • Higher order understanding and processes are often involved • Might require the ability to break the problem down into its constituent parts • Generalise patterns observed in situations, • Make predictions based on these patterns and/or other evidence and determine conditions that will lead to desired outcomes. • Pose and answer questions about what mathematics they require to solve a problem and then to select and use that mathematical content. • The sum of three consecutive whole numbers is 27. Find the numbers. • Sarah divided a certain number by 16. She found an answer of 246 with a remainder of 4. What is the number? • Busi has a bag containing three coloured balls: 1 blue, 2 red ball and 3 yellow balls. She puts her hand in the

7. MODERATION

Internal moderation is important in assuring that the marking criteria/guideline is consistently applied, and that there is a shared understanding of the academic standards learners are expected to achieve. There should be processes in place for assuring comparability of marks for alternative assessments. Schools may therefore determine the format for moderation as a standardisation and quality-assurance measure.

8. DATA ANALYSIS AND UTILISATION

The teacher would be able to collect data on an individual learner, a class, a grade or for the entire grade and report at each level. Further data can be collected per topic/skill/content area. The teacher is also able to use the phase test and identify at which grade the knowledge deficit is. Since this is an exercise in assessment for learning, targeted interventions can be designed to address strengths and weaknesses. Teachers would be able to give feedback to parents on learning gaps, deficits and strengths per learner.

8.1 Purpose of the data analysis

After administering a test the teacher can do own diagnostic analysis to identify:-
a) The overall level of performance of the class or school;
b) Individual learners or schools that need special intervention;
c) Groups of learners or schools that need special support and
d) Subject content areas that require priority attention in teaching and learning.

8.2 Use of basic statistics for analysis

Basic statistics that can be used to summarize the data from a test include the following:-

i. Mean (often called average) - calculated by adding the scores of all the learners and dividing the sum by the number of learners. The mean is one score that is used to summarize all the scores obtained by learners in a test. A high mean score represents high performance and a low mean score represents low performance. However, the mean score does not indicate how learner scores are spread from the highest to the lowest and thus is not adequate for identifying individuals who either over-perform or under-perform.

ii. Median (or middle score) - calculated by first arranging the scores from the highest to the lowest and then determining the score that divides the data into two equal halves. Half of the learners who wrote a test will have scores above the median score and the other half will have scores below the median score. If the number of learners is an odd number the median will be a real score that sits half-way between the extreme scores, e.g. 76, 57, 49, 45 and 39 have 49 as the median score. However, if the number of learners is an even number the median will be a score that may not belong to any of the learners calculated by adding the two adjacent scores that are half-way between the extremes and dividing their sum by two (2), e.g. the median of 76, 57, 49 and 45 is calculated by adding 57 and 49 and dividing the sum by two,
i.e. (57 + 49)/2 = 106/2 = 53. As can be observed, 53 is not one of the four given scores but it is the median score that sits half-way between the extreme scores, viz. 76 and 45.

The median does not show what the extreme scores, i.e. the highest and the lowest scores, are.

iii. Maximum is the highest score obtained by a learner in a test.
iv. Minimum is the lowest score obtained by a learner in a test.
v. Range is the difference between the Maximum and the Minimum scores. The larger the range, the more diverse the ability levels of the test takers while a relatively small range indicates that the class of test takers has a relatively homogeneous ability profile.

8.3 Available tools for data analysis

Tools that are available for analysis of data include pre-programmed computer software such as the SA-SAMS in schools, the Microsoft Excel programme and even hand calculators. The Microsoft Excel programme, which comes with almost every computer software, is a reasonably easy-to-use tool for performing item-level diagnostic analysis of test data. An Excel spreadsheet is arranged in columns and rows.

8.4 Preparing data for analysis on Excel

Excel makes available useful formulae to calculate basic statistics. To prepare for analysis of data from an administered test, do the following:-

i. Mark the test and write the scores obtained by each learner next to the relevant question/item number in their books or scripts;
ii. Enter learner names and other particulars (e.g. the gender of each learner) in the rows,one after another;
iii. Enter test item numbers in the columns, one after another;
iv. Enter the score of each learner on each item in the correct cell (i.e. where the relevant column and row meet);
v. Check if all data has been entered correctly (i.e. do thorough data cleaning);
vi. Use correct formulae to calculate the statistics that you want to use to summarize and analyse the test data; and
vii. Interpret the statistics in terms of what they suggest about performance of individuals in your class, performance of identifiable groups of learners (e.g. boys and girls) and performance in specific content areas.

8.5 Analysis and interpretation

To summarise the data calculate the average percentage score, the median, maximum and minimum score percentages and you may do this separately for boys and girls.To make sense of the analysis it is recommended that different colour codes be used to mark specific observations (Excel provides a wide range of colour codes) and also represent findings with appropriate graphs to enhance visual impressions to aid decision-making on where to focus improvement interventions. For instance, the following observations can be made from the analysis that has been done:

a) Overall performance

Overall performance in this class, measured through the mean score, may be e.g. 54,4% which is relatively acceptable but still leaves room for improvement. The median score for the class may be 56% which means that half of the learners obtained scores above 56% and another half obtained scores below 56%.

b) Performance spread

Although the mean and median scores were both above 50%, learner scores may range between eight percent (8%) and 100% which is a fairly wide range that suggests diverse abilities in this class. This implies that intervention strategies will have to be diversified in order to meet the learning needs of different learners, i.e. a one-size-fits-all improvement strategy will not work in this class.

c) Individual learner differences in performance

Individual learners who were identified to be particularly at risk have been indicated with e.g. red colour coding. They obtained scores below 40% and thus fall within the "Not achieved" and "Elementary achievement" levels. They require special attention in terms of teaching strategies and learning opportunities.

d) Group differences in performance

Analysis was done at two group levels, viz. boys and girls. All the summary statistics indicate that the boys performed much lower than the girls. Their mean score was 49,3% against the 60% mean score obtained by girls. The median score for the boys was four percent (4%) lower than of the girls, viz. 52% as against 56%. Boys' scores ranged between eight percent (8%) and 88% while the lowest score for the girls was 32% and the highest was 100%. It is evident that in this class boys require a different or more focused intervention than the girls.

e) Performance in specific topics or skills

The percentage scores per item indicate the items and, therefore, the topic or skill where interventions must focus.The analysis and diagnosis (from 'a' to 'e' above) identifies:-

i. Which learners need special attention?; and
ii. Which content areas require special focus? The analysis also suggests what materials will be required to improve on the identified areas, what extra support the teacher will need (if necessary), whether additional time will be required, who else should be involved in the interventions and a host of other possibilities that the data analyser may see fit in their context.

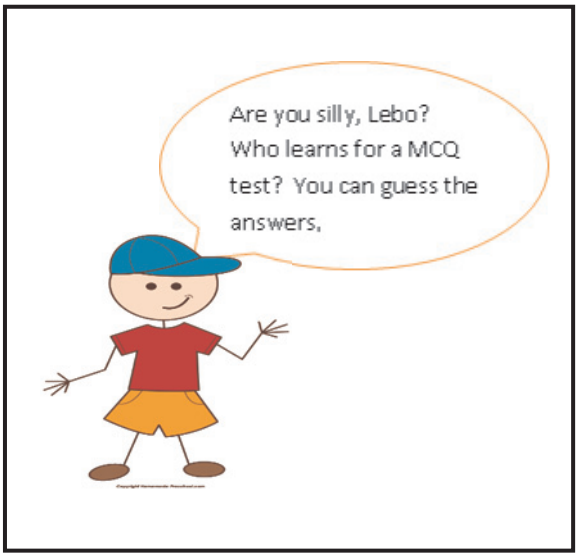
8.6 Diagnostic or error analysis

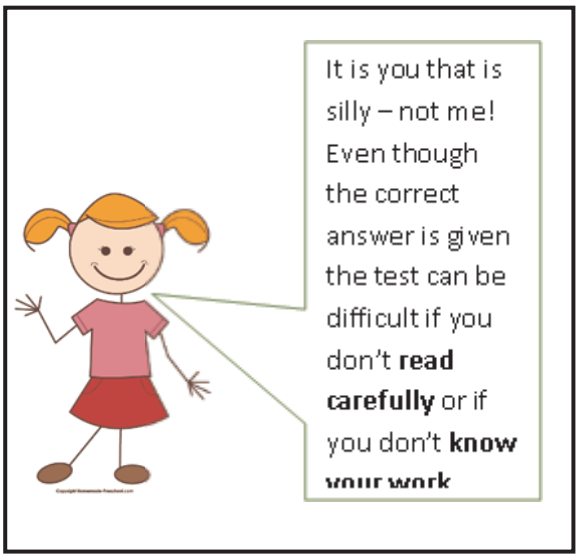
Error analysis is the study of errors in learners' responses with a view to look for possible explanations for these errors. It provides specific information about the relative skill proficiency or misconception a learner has in his/her response, in order to understand what the learner can or cannot do. It is a multifaceted activity for the teacher, because it involves analysis of the correct, partially correct and incorrect thought processes of the learners' individual responses and thinking about possible remediating interventions that might work well.

Understanding the errors a learner or a group of learners make will determine how learners are grouped in a certain subjects to enhance effective teaching.

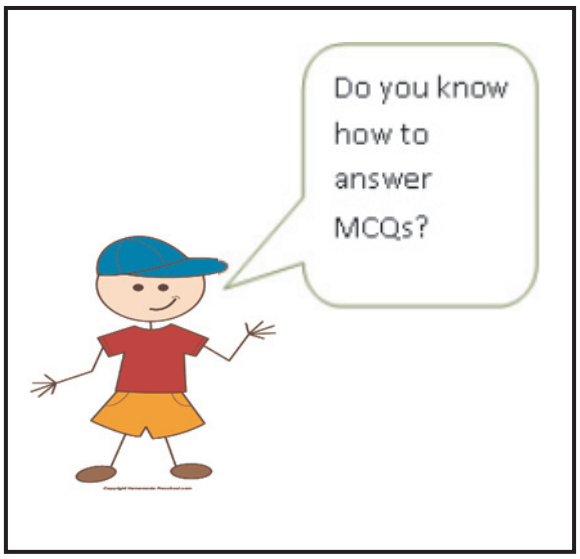
PART TWO
ANSWERING MULTIPLE CHOICE QUESTIONS (MCQs)


Hey Thabo, please don't forget our test tomorrow


Are you silly, Lebo? Who learns for a MCQ test? You can guess the answers.


It is you that is silly – not me! Even though the correct answer is given the test can be difficult if you don't **read carefully** or if you don't **know**


Girls are so boring. All they want to do is study.


Do you know how to answer MCQs?


I have an idea. Let's ask our teacher to help us

ANSWERING MULTIPLE CHOICE QUESTIONS (MCQs)

NOTE TO THE TEACHER:

1. The Structure of a MCQ
Example:

What is the number symbol for six hundred and ninety-eight? **STEM**

A 60098
B 6098
C 968
} **DISTRACTORS**

D 698
} **KEY**

EXPLANATION	
STEM	QUESTION
DISTRACTORS	INCORRECT OPTIONS
KEY	ANSWER

2. Strategies for answering MCQs

2.1 Read the question carefully. Understand the question and be sure of what is expected of you. Underline the key words in the question. You may need to read the question more than once.
2.2 Try to answer the question before you check out the options. You may be required to work out the answer before you are able to choose the correct option.
2.3 Read each option cautiously. Delete the options that you know are incorrect, until you are left with the correct option.
2.4 Make sure that the option you have chosen matches what the question requires.
2.5 Most often there will be an option that will be obviously wrong. Eliminate this option.
2.6 Two options may sound alike. However, one of the options may be partially correct; it may be a partial answer to the question. Reread the question to make sure that the option fully answers the question.
2.7 If you are unsure of which options are incorrect, leave the question and move to the questions you are sure of. However, make sure that you come back to the question. Don't leave blanks.**CHOOSE AN OPTION FOR EVERY QUESTION**.

2.8 There will only be **ONE** correct option.

NOTE TO THE LEARNER:

1. There is no pattern in which the answers are arranged.
2. Check your work. If you make a mistake, strike out the incorrect option and circle the correct answer.
3. Do not leave any question unanswered.

PART THREE
PHASE BASED DIAGNOSTIC ITEMS

Please note the following keys:

	Content Area	Cognitive levels	Levels of difficulty
NOR	Numbers, Operations and Relationships	**K:** knowledge	**E:** easy
PFA	Patterns, Functions and Algebra	**R:** routine procedure	**M:** moderate
SS	Space and Shape (Geometry)	**C:** complex procedure	**D:** difficult
M	Measurement	**P:** problem solving	
DH	Data Handling		
G (6)	Grade 6		

Please note that the tag above each question, as shown below, provides the following information in this order: content area, topic, grade level of the question, cognitive level and difficulty level e.g.:

Content area	Topic	Level of Difficulty	Cognitive Level
NOR	Common fractions	E	R

It is thereafter written in the format: **NOR/common fractions/R/E** above each question.

Please note that the tag above each question, as shown below, provides the following information in this order: content area, topic, grade level of the question, cognitive level and difficulty level e.g.:

Content area	Topic	Grade 4	Cognitive level	Level of difficulty
NOR	common fractions	G4	R	E

It is thereafter written above each question in the format:
NOR/common fractions/G4/R/E above each question.

ASSESSMENT ITEMS

SECTION A

Circle the letter of the correct answer from question 1 to question 30.

NOR/ Place Value/ G4/K/E

1. Write the number that is equal to
6 units + 2 tens + 7 hundred + 5 thousand.

A 7562
B 6275
C 5726
D 2756

(1)

NOR/Number Patterns/G5/K/R

2. Which number in this number pattern is INCORRECT?
7; 9; 12; 16; 21; 28

A 28
B 21
C 16
D 12

(1)

NOR/Place Value/G5/K/E

3. What is the value of the underlined digit in 29 072?

A 7 thousand
B 7 hundred
C 7 units
D 7 tens

(1)

NOR/Whole Numbers/G6/K/M

4. Which one of the following numbers is bigger than 765 000 000?

A 766 000000
B 765 000000
C 756 000000
D 764 000000

(1)

NOR/Rounding Off/G5/R/M

5. Was 39 569 rounded off to the nearest 5, 10,100 or 1000 to give an answer of 40 000?

A 1 000
B 100
C 10
D 5

(1)

NOR/Common Fractions/G6/K/M

6. What fraction of the following 2-D shape is shaded?

A $\frac{3}{3}$

B $\frac{6}{3}$

C $\frac{1}{2}$

D $\frac{2}{1}$

(1)

NOR/ Ratio/G6/R/M

7. What is the ratio of the number of black balls to the number of white balls?

A 4:8
B 2:1
C 4:1
D 1:2

(1)

NOR/Number Operations/G6/R/M

8. Which number sentence below has the same value as 5 × (6 + 2)?

A (5 × 6) +2
B (5 × 2) +6
C (6 + 2) ×5
D (5 + 2) ×6

(1)

NOR/Word Sum/G6/R/M

9. There are 5 boxes, each containing 125 apples. What is the total number of apples?

A 600
B 625
C 130
D 25

(1)

NOR/Word Sum/G6/P/D

10. Faiza opens a book. She multiplies the two consecutive page numbers and gets 1332. What is the left-hand page number?

A 666
B 667
C 36
D 37

(1)

NOR/Word Sum/G6/P/M

11. Tozi saves R440. Charlene saves double the amount. Charlene then spends R100. How much does Charlene have now? Choose the number sentence that can help you find the answer.

A 440 + 440 -100
B 440 + 440 +100
C 440 +100
D 440 -100

(1)

NOR/ Multiples/G4/K/M

12. Which one of the number patterns below contains multiples of 6?

A 1; 2; 3; 4; 5; 6
B 6; 12; 18; 24
C 6; 9; 12;15
D 1; 2; 3; 6

(1)

NOR/ Number Operations/G6/R/M

13. Which operation sign should replace the * to make the number sentence true?

8 × 7 = 67 * 11

A ×
B -
C ÷
D +

(1)

NOR/Ratio/G7/R/M

14. Complete: The simplest form of writing the ratio 9:39 is …

A 3:13
B 3:12
C 1:4
D 1:6

(1)

NOR/Factors/G7/R/D

15. Which one of the following is the product of prime factors of 36?

A 2 x 2 x 3 x3
B 3 x 3 x4
C 2 x 2 x9
D 2 x 3 x6

(1)

PFA/Numerical Patterns/G6/R/E

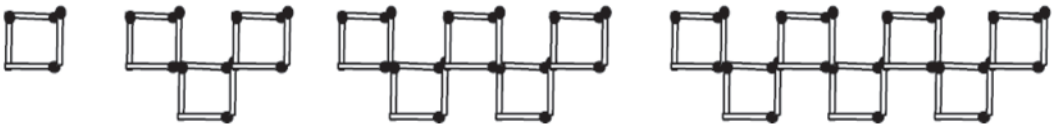
16. Which rule would best describe the number sequence below?
2 525; 2 550; 2 600; 2 625; 2 675; 2 700;_.

A Add 50 and then add 25
B Add 25 and then add 50
C Add 50
D Add 25

(1)

PFA/Geometrical Patterns/G6/R/M

17. Jani builds shapes with matchsticks.
How many matchsticks does she use to build the shape in the 20th position if the pattern continues?



Shape 1 Shape 2 Shape 3 Shape 4

A 160
B 164
C 158
D 156

(1)

SS/Symmetry/G5/K/E

18. How many lines of symmetry does the rectangle below have?

A 6
B 4
C 2
D 1

(1)

SS/3-D Object/G6/K/M

19. Look at the picture of the house below.
Which shape describes the shape of the roof?

A A rectangular-based pyramid
B A rectangular prism
C A cylinder
D A cone

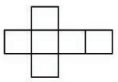
(1)

SS/3-D Objects/G6/K/M

20. Which one of the following is a net of a square-based pyramid?

A 

B 

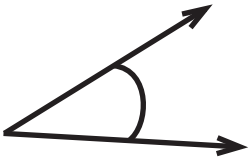
C 

D 

(1)

SS/Angles/G6/K/M

21. Identify the kind of angle shown below. Complete: It is …

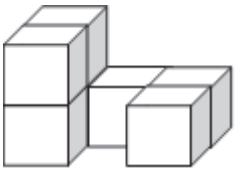


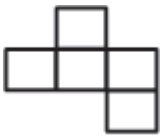
A an obtuse angle
B an acute angle
C a right angle
D a reflex angle

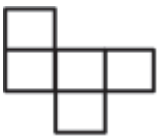
(1)

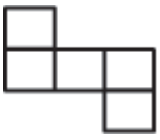
SS/Views/G6/K/M

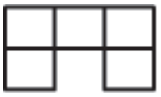
22. Which one of the following diagrams shows the top view of the given 3-D object?



A 

B 

C 

D 

(1)

23. Dix wants to watch a film that is between 1½ and 2 hours long. Which one of the following films should she choose? A …

A 102 - minute film
B 121 - minute film
C 150 - minute film
D 59 - minute film

(1)

M/Capacity/G5/R/E

24. A glass has a capacity of 250 millilitres. How many glasses can be filled from a litre bottle of cool drink?

A 25 glasses
B 10 glasses
C 4 glasses
D 1 glass

(1)

M/Time/G6/R/M

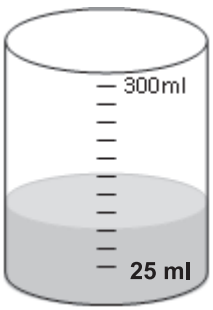
25. How many decades are there in 2 150 years?

A 21 500
B 2 150
C 21,5
D 215

(1)

M/Capacity/G6/R/M

26. How much water is shown in the given figure?

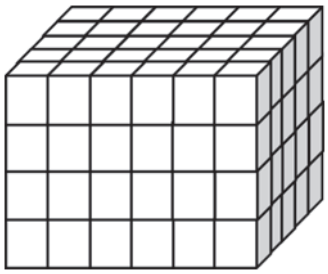


A 250 ml
B 100 ml
C 300 ml
D 275 ml

(1)

M/Volume/G6/R/M

27. How many cubes were used to build the 3-D object shown below?



A 120 cubes

B 24 cubes

C 60 cubes

D 30 cubes

(1)

DH/Mode/G5/K/E

28. What is the mode of the following data set?

4 4 5 5 5 6 6 7 7 7 7 7 8

A 5
B 6
C 7
D 8

(1)

DH/Median/G6/K/M

29. What is the median of the following masses?

39kg 40kg 42kg 45kg 46kg 50 kg 60kg

A 46 kg
B 60kg
C 45kg
D 39kg

(1)

DH/Interpretation/G6/P/D

30. The Pie chart below shows how the children in a class travel to school. Which one of the statements below is true?

A More than half the learners either take the bus or cycle to school.
B More than a quarter of the learners walk to the school.
C More than half the learners either walk or cycle to school.
D More learners walk to school than come by car.

SECTION B

NOR/Rounding Off/G4/R/E

1. Complete: 1 369 rounded off to the nearest 10 is … (1)

NOR/Operations/G5/K/E

2. Complete:

2 x (3 x 4) = (2 x 3)x(_____) (1)

NOR/Operations/G6/R/M

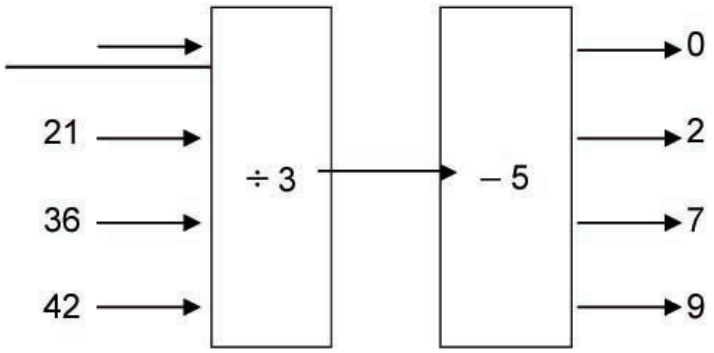
3. What is the value of (6250 ÷ 125) × 0 + 14? (1)

NOR/Operations/G6/R/D

4. Insert brackets to make the following statement true.
4 + 3 x 7- 10=39 (1)

NOR/Flow Diagrams/G6/R/M

5. Complete the flow diagram by filling in the missing number. (1)



NOR/ Whole Numbers/G5/K/E

6. Write the biggest number that can be made using each of the digits 5, 9, 6, 1, 7, 2 only once. (1)

NOR/Operations/G6/K/M

7. Complete: If 387 x 24 = 9 288, then 9 288 ÷ 24 =… (1)

NOR/Factors/G7/K/D

8. List all the factors of 625. (1)

PFA/Number Patterns/G6/R/M

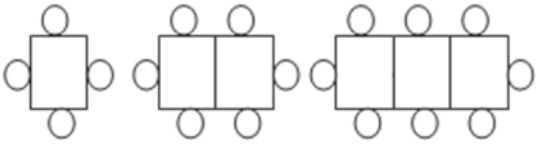
9. Balls are arranged in groups as indicated in the table below.
Complete the table by filling in the missing number in the shadedblock.

Group	**1**	**2**	**3**	**9**	
Number of balls	**3**	**5**	**7**	**19**	**51**

(1)

PFA/Geometric Patterns G4/R/M

10. Draw the next figure in the diagram pattern. (1)

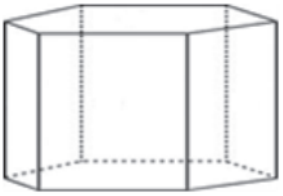


PFA/Number Patterns/G6/P/D

11. If we write the natural numbers from 1 to 100, then how many times will we write the digit 5?

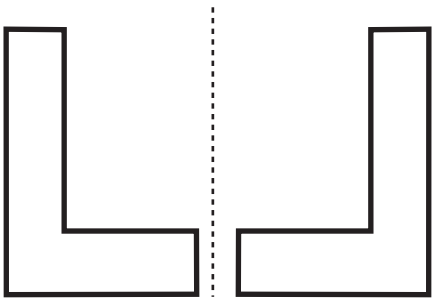
SS/Properties of Prisms/G6/K/M

12. How many edges does a hexagonal prism have? (1)



SS/Transformation/G6/K/E

13. Study the shapes below and name the kind of transformation. (1)



SS/Properties of a 2-Shape/G6/K/M

14. Name the 2-D shape that has the following properties:
Two pairs of opposite sides are equal, one angle is equal to 90° and has four lines of symmetry.

(1)

SS/Polygons/G4/K/E

15. Name the 2-D shape illustrated in the diagram below?

(1)

M/Conversion/G4/K/E

16. Complete: 1 000 m = … km (1)

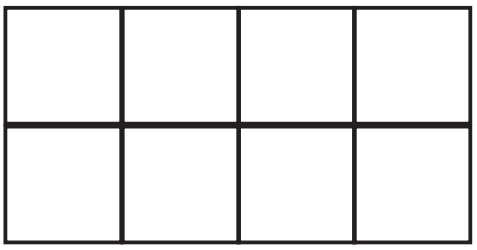
M/Temperature/G5/K/E

17. Which one of the following temperatures would you consider as very cold?

22 $^{\circ}$C,12 $^{\circ}$C, 2° C (1)

M/Perimeter/Area/G5/R/E

18. The length of the side of each square is 1 cm.



Calculate:

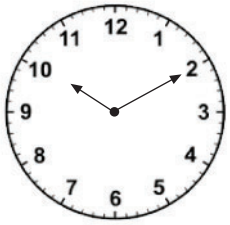
18.1 the perimeter of the shape above. (1)
18.2 the area of the shape above. (1)

M/Time/G7/P/M

19. An adult's heart beat is about 78 beats per minute.
How many times will a heart beat in one hour? (1)

M/Time/G6/K/M

20. The analogue clock face below shows the time after sunset on a particular day.



Write the time indigital form. (1)

M/Time/G6/R/M

21. Use the times listed in the frame to answer the questions that follow.

Times of cities in different time zones.	
Name of city	Time
Paris	13:57
London	12:57
New York	07:57
San Francisco	04:57

21.1 What is the time difference between London and New York? (1)
21.2 What time will it be in Paris if it is 13:45 in San Francisco? (1)

M/Length/G6/R/M

22. Below are the results in the school's final long-jump challenge.

Peggy	4,95 m
Zanele	4,29 m
Busi	4,08 m
Laetitia	4,87 m

Who came second? (1)

DH/ ProbabilityG6/CR/D

23. The likelihood of getting heads when flipping a coin is 1 out of 2. The likelihood of tossing a die and getting a 3 is 1 out of 6. What is the likelihood of drawing one card from a 52 card deck and getting a two? (1)

DH/Pictograph/G6/R/M

24. Study the following pictograph and then answer the question.
Key: Each  represents 10 glasses of juice.

Number of glasses of juice sold each day	
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

How many glasses were sold on Friday? (1)

DH/Data/G6/P/D

25. Leon interviewed 50 Grade 6 learners about their kind of TV show ,41 said they like comedy, 35 said they enjoy action films and 30 said they like both.

How many of the learners like neither? (1)

SECTION C

Show all the calculation steps.

NOR/Addition/G4/R/M

1. 6 254 + 3 874 (2)

NOR/Subtraction/G5/R/M

2. 69 157 - 17 239

NOR/Common Fractions/G5/R/M (2)

3. $5\frac{1}{8} + 3\frac{3}{8}$ (2)

NOR/Multiplication/G6/R/M

4. 6 907 × 28 (3)

NOR/Division/G6/R/D

5. 8 775 ÷ 26 (3)

NOR/Common Fractions/G6/R/D

6. $5\frac{11}{12} - 3\frac{3}{6}$ (3)

NOR/Percentage/G7/C/M

7. What is the amount of profit made when a car is bought for R120 000 and sold at a profit of 30%. (3)

MARKING GUIDELINES

Sections	Levels of difficulty	Cognitive levels
A: multiple-choice questions	**E:** easy	**K:** knowledge
B: short answer questions	**M:** moderate	**R:** routine procedure
C: multiple step questions	**D:** difficult	**C:** complex procedure
		P: problem solving

Levels of understanding
1: There are unrelated strategies or excessive dependence on the information that is provided in the question and is incorrectly used/is duplicated.
2: There is some computational ability that **may** not relate to the question/topic.
3: There is some conceptual knowledge and ability to analyse but is inconsistent in computational and/reasoning skills.
4: correct response. The learner is able to consistently apply/demonstrate correct computational and reasoning skills required in the question.

SECTION A
1 mark per answer.

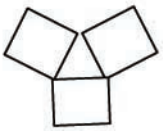
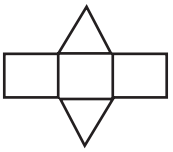
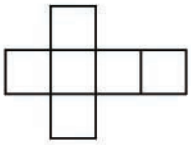
No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
1.	A	7 562	1	lacks knowledge of place value	K	E	4
	B	6 275	1	lacks knowledge of place value			
	C	5 726 ✓	4	correct response arrange from thousand to units			
	D	2 756	1	lacks knowledge of place value			
2.	A	28 ✓	4	correct response starting from 2, the difference between consecutive numbers is increased by 1.	R	E	5
	B	21	1	Identified the incorrect number in the pattern			
	C	16	1	Identified the incorrect number in the pattern			
	D	12	1	Identified the incorrect number in the pattern			

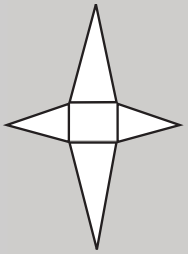
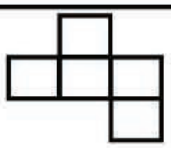
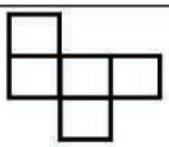
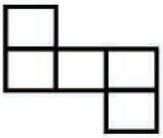
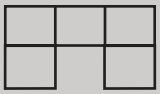
No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
3.	A	7 thousand	1	lacks knowledge of place value	K	E	5
	B	7 hundred	1	lacks knowledge of place value			
	C	7 units	1	lacks knowledge of place value			
	D	7 tens ✓	4	correct response the tens digit underlined			
4.	A	766 000 000 ✓	4	correct response 766 000 000 is bigger	K	M	6
	B	765 000 000	1	lacks knowledge of comparing numbers			
	C	756 000 000	1	lacks knowledge of comparing numbers			
	D	764 000 000	1	lacks knowledge of comparing numbers			
5.	A	1 000✓	4	correct response rounded off to the nearest 1 000	R	M	5
	B	100	1	lacks knowledge of rounding off			
	C	10	1	lacks knowledge of rounding off			
	D	5	1	lacks knowledge of rounding off			
6.	A	$\frac{3}{3}$	1	counted the number of shaded parts only			
	B	$\frac{6}{3}$	2	swopped the numerator and denominator			
	C	$\frac{1}{2}$ ✓	4	correct response $\frac{3}{6}$ simplified	K	M	6
	D	$\frac{2}{1}$	2	swopped the numerator and the denominator and simplified			
7.	A	4:8	3	the ratio of white to black balls was chosen			
	B	2:1 ✓	4	correct response 8:4 simplified	R	M	6
	C	4:1	1	simplified the ratio incorrectly			

No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
	D	1:2	3	the ratio of white to black balls was chosen and simplified			
8.	A	$(5 \times 6) + 2$	1	used associative property incorrectly			
	B	$(5 \times 2) + 6$	1	used associative property incorrectly			
	C	$(6 + 2) \times 5$ ✓	4	correct response applied commutative property correctly	R	M	6
	D	$(5 + 2) \times 6$	1	confused commutative property			
9.	A	600	2	incorrectly multiplied			
	B	625 ✓	4	correct response 125 x 5	R	M	6
	C	130	1	added the 2 numbers			
	D	25	2	divided the numbers			
10.	A	666	1	divided by 2 - page on left			
	B	667	4	divided by 2 - page on right			
	C	36✓	1	correct response calculation by estimation 36 x 37	P	D	6
	D	37	3	page on right			
11.	A	$440 + 440 - 100$✓	4	correct response 440 doubled −100	P	M	6
	B	$440 + 440 + 100$	3	mixed the 2 operations			
	C	$440 + 100$	1	just added the numbers			
	D	$440 - 100$	1	just subtracted the numbers			
12.	A	1; 2; 3; 4; 5; 6	1	numbered from 1 to 6			
	B	6; 12; 18. 24 ✓	4	correct response multiples of 6	K	M	6
	C	6; 9; 12; 15	1	multiples of 3			

No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
	D	1; 2; 3; 6	1	factors of 6			
13.	A	×	1	used the same operation as the one given			
	B	– ✓	4	correct response	R	M	6
	C	÷	1	incorrect operation sign due to incorrect calculation on the left of the equal sign			
	D	+	1	incorrect operation sign due to incorrect calculation on the left of the equal sign			
14.	A	3:13 ✓	4	correct response simplest form	R	M	7
	B	3:12	2	unable to identify the correct factors of 9 and 39			
	C	1:4	1	unable to identify the correct factors of 9 and 39			
	D	1:6	1	unable to identify the correct factors of 9 and 39			
15.	A	2 × 2 × 3 × 3 ✓	4	correct response all prime factors	R	D	7
	B	3 × 3 × 4	2	4 is not a prime number			
	C	2 × 2 × 9	2	9 is not a prime number			
	D	2 × 3 × 6	2	6 is not a prime number			
16.	A	add 50 and then25	3	incorrect addition			
	B	add 25 and then 50 ✓	4	correct response	R	E	6
	C	add 50	2	only found the common difference between the second and third number			
	D	add 25	2	only found the common difference between the first and second number			

No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
17.	A	160	1	did not subtract the 4 given the rule 8n – 4			
	B	164	1	added the 4 given the rule 8n – 4			
	C	158	1	calculation error			
	D	156 ✓	4	correct response applied the rule 8n – 4	R	M	6
18.	A	6	1	counted the 4 sides and added two diagonals			
	B	4	1	assumed that the rectangle has the same number as a square			
	C	2✓	4	correct response	K	E	5
	D	1	1	gave one vertical line of symmetry			
19.	A	arectangular-based pyramid ✓	4	correct response	K	M	6
	B	a rectangular prism	2	looked at the base of the pyramid			
	C	a cylinder	1	unable to identify properties of 3-D objects			
	D	a cone	2	confused the pyramid with the cone			

20.	A		1	unable to identify the appropriate net			
	B		3	confused a pyramid with a prism			
	C		1	unable to identify the appropriate net			

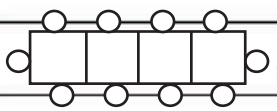
No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
	D	 ✓	4	correct response correct net	K	M	6
21.	A	An obtuse angle	2	incorrect naming of angles			
	B	An acute angle✓	4	correct response correct name	K	M	6
	C	A right angle	1	incorrect naming of angles			
	D	A reflex angle	2	incorrect naming of angles			
22.	A		1	unable to visualise and identify views			
	B		1	unable to visualise and identify views			
	C		2	displayed partial knowledge to identify views			
	D	 ✓	4	correct response	K	M	6
23.	A	a 102 - minute film ✓	4	correct response between 9 and 120 minutes	R	E	4
	B	a 121 - minute film	3	incorrect conversion			
	C	a 150 - minute film	2	incorrect conversion			
	D	a 59 - minute film	1	incorrect conversion			
24.	A	25 glasses	2	divided by 10			
	B	10 glasses	2	divided by 25			
	C	4 glasses✓	4	correct response first convert 1 ℓ to 1 000 m ℓ	R	E	5

No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
				then divide 1 000 m ℓ by 250 m ℓ			
	D	1 Glass	1	unable to convert			
25.	A	21 500	3	multiplied by ten instead of dividing			
	B	2 150	1	the number of years were given			
	C	21,5	2	confused decades with centuries			
	D	215 ✓	4	correct response divide 2 150 by 10	R	M	6
26.	A	250 mℓ	1	multiplied by ten			
	B	100 mℓ ✓	4	correct response 4 x 25 mℓ	R	M	6
	C	300 mℓ	1	read off the maximum volume			
	D	275 mℓ	1	subtracted 25 from the maximum volume			
27.	A	120 cubes✓	4	correct response 4 x 5 x 6 = 120 cubes	R	M	6
	B	24 cubes	2	counted the front blocks only			
	C	60 cubes	2	counted all the visible blocks			
	D	30 cubes	2	Counted the top blocks			
28.	A	5	1	counted the total number of 7	K	E	5
	B	6	2	confused mode and median			
	C	7 ✓	4	correct response the number that appears the most			
	D	8	1	chose the largest number			
29.	A	46 kg	2	counted number of items incorrectly			
	B	60 kg	1	chose the largest number			
	C	45 kg ✓	4	correct response the median	K	M	6
	D	39 kg	1	no knowledge of the meaning of median			
30.	A	More than half the students either take the bus or cycle to school. ✓	4	correct response	P	D	6

No.		Expected answer	Level of understanding		Cognitive level	Level of difficulty	Grade
	B	More than a quarter of the students walk to school.	1	cannot read a pie chart			
	C	More than half the students either walk or cycle.	1	cannot read a pie chart			
	D	More students walk to school than come by car	1	cannot read a pie chart			

SECTION B: one mark per answer

- Accept any alternative correct solution that may not be included in the memorandum unless otherwise stated.
- Penalise only once for the same error where applicable.
- Ignore minor spelling errors.
- Accept answers that may be in any official language i.e. if it is a word.

No.		Expected answer	Clarification	Mark	Cognitive level	Level of difficulty	Grade
1.		1 370 ✓		1	R	E	4
2.		4 ✓		1	K	E	5
3.		14 ✓		1	R	M	6
4.		$(4 + 3) \times 7 - 10 = 39$ ✓		1	R	D	6
5.		15 ✓	0 + 5 x 3 = 15	1	R	M	6
6.		976 521 ✓		1	K	E	5
7.		387 ✓		1	K	M	6
8.		625, 125, 25, 5, 1 ✓	Do not have to be in order.	1	K	D	7
9.		25 ✓	Rule 3 = 2 × 1 + 1 5 = 2 × 2 + 1 7 = 2 × 3 + 1 19 = 2× 9 + 1 51 = 2 x 25 + 1	1	R	M	6
10.		 ✓		1	R	M	4

No.		Expected answer	Clarification	Mark	Cognitive level	Level of difficulty	Grade
11.		20✓	1 – 49 :5 times 60 – 100:4times 50 – 59:11times	1	P	D	6
12.		18 Edges ✓		1	K	M	6
13.		Reflection or Flipping ✓		1	K	E	6
14.		A square ✓		1	K	M	6
15.		Hexagon ✓		1	K	E	4
16.		1 km ✓		1	K	E	4
17.		2°C ✓		1	K	E	5
18.	18.1	12 cm✓		1	R	E	5
	18.2	8 squares✓		1	R	E	5
19.		4680 ✓	60 x 78	1	P	M	7
20.		22:10 ✓		1	K	M	6
21.	21.1	5 hours✓		1	R	M	6
	21.2	22:45 ✓	9h later	1	R	M	6
22.		Laetitia ✓		1	R	M	6
23.		4 out of 52 or ✓ 1 out of 13		1	C	D	6
24.		45 ✓		1	R	M	6
25.		4✓	50 – 30 – 11 – 5	1	P	D	6

SECTION C

Keys for marking	
A	Accuracy
CA	Consistent Accuracy
M	Method

- This is a marking guideline. In instances where learners have used different but mathematically sound strategies to solve the problems they (learners) should be credited.
- Unless stated otherwise, learners who give a correct answer only, should be awarded fullmarks.
- Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

No.		Expected answer	Clarification	Mark	Cognitive level	Level of difficulty	Grade
1.		6254 +3874 10128 ✓✓	Correct answer :2 marks 128 :1mark 10 :1mark Mark each one as a unit Any method may be used	2	R	M	4
2.		69157 −17239 51918 ✓✓	Correct answer :2 marks 918 :1mark 51 :1mark Mark each one as a unit Any method may be used	2	R	M	5
3.		$5\frac{1}{8} + 3\frac{3}{8} = 8\frac{4}{8}$ ✓✓ or $8\frac{1}{2}$	Correct answer: 2 marks 8: 1mark $\frac{4}{8}$: 1mark	2	R	E	5

No.		Expected answer	Clarification	Mark	Cognitive level	Level of difficult	Grade
4.		6907 × 28 55 256✓ +138 140✓ 193 396✓ or 6 907 × 28 = 6 907× 7 x 4✓ = 48 349 × 4✓ = 193 396✓ or 6 907 × 28 = 6 907 × 4x 7✓ = 27 628 × 7✓ = 193 396✓	Example of CA: 6907 × 28 55 256✓ +138 140✓ 193 396✓ 6907 × 28 55 256✓ +138 145x 193 401✓ 6907 × 28 55156x +138140✓ 193296✓ 6907 × 28 55256✓ +138140✓ 194296 x	3	R	M	6
5.		✓✓✓ 3 3 7 rem13 26 ⟌ 8 7 7 5 - 7 8 9 7 - 7 8 1 9 5 - 1 8 2 1 3	Correct answer: 3 marks 337: 1 mark rem13: 1 mark Method : 1 mark	3	R	D	6
6.		$5\frac{11}{12} - 3\frac{5}{6}$ $= 2\frac{11}{12} - \frac{10}{12}$ ✓✓ $= 2\frac{1}{12}$ ✓	Correct answer: 3 marks 2: 1mark $\frac{10}{12}$: 1mark $2\frac{1}{12}$	3	R	D	6
7.		Profit = $\frac{30}{100}$ ✓× R120 000 = 30 x R1200 ✓or 3 x R12 000 = R36 000✓	1 hundredth of R120000 = R1 200; 30hundredths (or 30%) is R36 000	3	R	M	7

PART FOUR
SCHOOL BASED ACTIVITIES
TERM ONE

Please note the following keys:

	Content Area	Cognitive levels	Levels of difficulty
NOR	Numbers, Operations and Relationships	**K:** knowledge	**E:** easy
PFA	Patterns, Functions and Algebra	**R:** routine procedure	**M:** moderate
SS	Space and Shape (Geometry)	**C:** complex procedure	**D:** difficult
M	Measurement	**P:** problem solving	
DH	Data Handling		
G (6)	Grade 6		

Please note that the tag above each question, as shown below, provides the following information in this order: content area, topic, grade level of the question, cognitive level and difficulty level e.g.:

Content area	Topic	Level of Difficulty	Cognitive Level
NOR	Common fractions	E	R

It is thereafter written in the format: **NOR/common fractions/R/E** above each question.

SECTION A

Circle the letter next to the correct answer from question 1 to question 20.

NOR/ Rounding Off/K/E

1. Complete: 24 937 rounded off to the nearest 1 000 is ….

   A 24 000
   B 25 000
   C 4 000
   D 5 000

(1)

NOR/Place Value/K/E

2. What is the place value of the 9 in 259 032?

   A hundred thousand
   B ten thousand
   C thousands
   D hundreds

(1)

NOR/Place Value/K/E

3. What is the value of the digit 5 in 754 628?

   A 754 000
   B 750 000
   C 54 000
   D 50 000

(1)

NOR/Place Value/R/M

4. Complete: 10 000 subtracted from 500 005 is equal to …

   A 490 005
   B 510 005
   C 499 005
   D 400 005

(1)

NOR/Place Value/K/M

5. Which number below contains 2 ten thousands?

   A 152 347
   B 25 500
   C 40 000
   D 2 000

(1)

NOR/Place Value/R/E

6. Write the number that is equal to
9 thousand + 3 hundred thousand + 8 tens + 70 thousand.

A 316 080
B 379 008
C 379 080
D 82 080

(1)

NOR/Number Patterns/R/M

7. Which number in this number sequence below is incorrect?
9; 14; 18; 23; 27; 31

A 31
B 27
C 23
D 18

(1)

NOR/Whole Numbers/K/M

8. Which one of the following numbers is bigger than 640 000?

A 650 000
B 640 000
C 460 000
D 630 000

(1)

NOR/ Multiples/K/M

9. Which one of the number sequences below contains multiples of 9 ?

A 1; 2; 3; 4; 5; 6; 7; 8; 9
B 9; 18; 27; 36
C 9; 19; 29; 39
D 3; 6; 9; 12

(1)

NOR/ Factors/K/M

10. Which one of the lists of numbers below contains factors of 48?

A 1 , 2 , 4 , 12 , 24 , 48
B 18 , 28 , 3 , 48 , 58
C 48 , 96 , 144 , 192
D 12 , 2 , 36 , 48

(1)

PFA/ Number Sentence/P/M

11. The All Blacks rugby team, scored 20 points before half time against the Springboks rugby team. After half time, the Springboks scored double the number of points that the All Blacks scored during the first half, and then scored another 3 points. Choose the number sentence that illustrates how many points the Springboks scored.

A 20 +20 + 3 = ☐
B 20 +20 - 3 = ☐
C 20 + 3 = ☐
D 20 - 3 = ☐

(1)

NOR/ Common Fractions/K/E

12. Which fraction below does not have the same value as ?

A $\frac{1}{3}$
B $\frac{2}{3}$
C $\frac{2}{6}$
D $\frac{3}{9}$

(1)

PFA/Number Sentences/R/M

13. Complete: 25 × 26 is equivalent to …

A 20(20 + 6) + (20 + 6)
B (20 + 5) × (20 × 6)
C 25 × (20 × 6)
D 25(20 + 6)

(1)

PFA/Number sentences/R/M

14. 10 + 40 ÷ 4 - 2 =

A 18
B 30
C 25
D 20

(1)

M/Time/R/M

15. How many years are there in 3 1/2 centuries?

A 300
B 350
C 80
D 3

(1)

M/Time/R/M

16. Which statement below does not represent 2.45 p.m.?

A forty-five minutes past two in the afternoon
B quarter to three in the afternoon
C quarter to three in the morning
D 14:45

(1)

SS/Angles/K/M

17. What kind of angle is represented between the two hands on the clock face below?

A A straight angle
B An obtuse angle
C A reflex angle
D An acute angle

(1)

Space & shape/2-D Shapes /K/M

18. Assume the figure below is a parallelogram. Which description below matches the quadrilateral below?

A The quadrilateral has two acute angles and two obtuse angles.
B The quadrilateral has four acute angles.
C The quadrilateral has four right angles.
D The quadrilateral has four obtuse angles.

DH/Mode/K/E

19. What is the mode of the following data set collected for different shoe sizes?
4 5 2 6 3 5 6 3 5 5 4 7 8

A 20
B 6
C 4
D 5

DH/Median/K/M

20. What is the median of the following set of data?
2 2 4 5 6 8

A $4\frac{1}{2}$

B 2

C 9

D 8

(1)

SECTION B

NOR/Rounding Off/R/E

1. Complete: 1 147 rounded off to the nearest 5 is... (1)

NOR/Operations/K/E

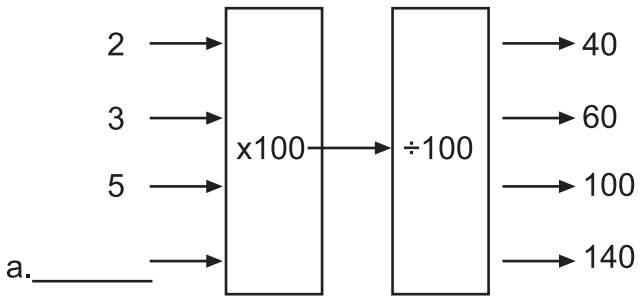
2. Fill in the missing number:
135+250 = 135 = 385 (1)

NOR/Operations/C/M

3. What is the value of 25 x (8 ÷ 4) ÷ 5 x 25 (1)

NOR/Flow Diagrams/R/M

4. Complete flow diagram by filling in the missing number. (1)



NOR/Prime numbers/K/M

5. List all the prime numbers between 20 and 40 (1)

NOR/Value/K/E

6. What is the value of the digit 9 in 239 042 (1)

M/Time/R/M

7. 03:55 is displayed on a digital clock.
What will the time be 120 minutes later? (1)

PFA/Number Patterns/R/M

8. Write the two missing numbers in the sequence below.
124 250; 124 750; 125 250; _____; _____. (1)

SS/2-D shapes/K/E

9. State wether the following statement is true or false.
The angles of a parallelogram are all right angels. (1)

PFA/frequency table/R/E

10. Susan recorded the answers to her classmates' favourite activities during weekends. Complete the frequency table.

Favourite activities during weekends		
Activity	Tally marks	Frequency
1. Reading	𝍸 𝍸 𝍸 ///	18
2. Watching television	𝍸 𝍸 𝍸 𝍸 𝍸 //	_____
3. Playing games	𝍸 𝍸 𝍸	15

SECTION C

Calculate each of the following. Show all the calculation steps.

NOR/Addition/R/M

1. 56 423 + 8 851 + 21 479

NOR/Subtraction/R/M

2. 98 743 - 45 694

(2)

NOR/Common Fractions/R/M

3. $4\frac{4}{7} - 2\frac{2}{7}$

(2)

NOR/Common Fractions/R/M

4. $\frac{2}{3} + \frac{1}{12}$

(3)

NOR/Common Fractions/R/M

5. $\frac{4}{10}$ of R250 (2)

M/Time/P/M

6. Dix had an appointment at the dentist's office at 11:50 a.m. The dentist arrived 20 minutes late and Dix left his office 30 minutes thereafter. What time did she leave the dentist's office? (3)

NOR/Common Fractions/P/M

7. Faiza uses a $\frac{1}{4}$ of a 2kg bag of flour to bake a chocolate cake. How many cakes can she bake with 3 bags of the flour? (3)

NOR/Whole numbers/P/M

8. A second hand car costs R38 750 less than a new one. If the new car costs R99 999, what does the second hand car cost?

(3)

MARKING GUIDELINE

Sections	Cognitive levels	Levels of difficulty
A: multiple-choice questions	**K:** knowledge	**E:** easy
B: short answer questions	**R:** routine procedure	**M:** moderate
C: multiple step questions	**C:** complex procedure	**D:** difficult
	P: problem solving	

Levels of understanding
1: There areunrelated strategies or excessive dependence on the information that is provided in the question and is incorrectly used/is duplicated.
2: There issome computational ability that **may** not relate to the question/topic.
3: There issome conceptual knowledge and ability to analyse but is inconsistent in computational and/reasoning skills.
4: correct response. The learner is able to consistently apply/demonstrate correct computational and reasoning skills required in the question.

SECTION A

1 mark per answer

No.		Expected answer	Level of understanding			
1.	A	24 000	1	lacks knowledge of rounding off	K	E
	B	25 000✓	4	correct response		
	C	4 000	1	lacks knowledge of rounding off		
	D	5 000	4	lacks knowledge of rounding off		
2.	A	hundred thousand	2	lacks knowledge of place value	K	E
	B	ten thousand	2	lacks knowledge of place value		
	C	thousands✓	4	correct response		
	D	Hundreds	1	lacks knowledge of place value		
3.	A	754 000	1	lacks knowledge of place value	K	E
	B	750 000	1	lacks knowledge of place value		
	C	54 000	2	lacks knowledge of place value		
	D	50 000✓	4	correct response of		
4.	A	490 005✓	4	correct response	R	M
	B	510 005	1	Added 10 000		
	C	499 005	2	Subtracted 1 000		
	D	400 005	2	Subtracted 100 000		
5.	A	152 347	1	identified a 2 in the thousands column	R	M
	B	25 500✓	4	correct response		
	C	40 000	1	multiplied 2 by 2 ten thousands		
	D	2 000	1	identified a 2 in the thousands column		
6.	A	316 080	1	Added 7 000 instead of 70 000	R	E
	B	379 008	2	Added 8 instead of 80		
	C	379 080✓	4	correct response		
	D	82 080	1	Added 3 000 instead of 300 000		
7.	A	31✓	4	correct response	R	M

No.		Expected answer	Level of understanding			
	B	27	2	forms part of the number pattern after 4 has been added to 23		
	C	23	2	forms part of the number pattern after 5 is added to 18		
	D	18	2	Forms part of the number pattern after 4 is added to 14		
8.	A	650 000✓	4	correct response	K	M
	B	640 000	2	lacks knowledge of comparing numbers		
	C	460 000	1	lacks knowledge of comparing numbers		
	D	630 000	2	lacks knowledge of comparing numbers		
9.	A	1; 2; 3; 4; 5; 6; 7; 8; 9	1	numbers from 1 to 9	K	M
	B	9; 18; 27; 36✓	4	correct response		
	C	9; 19; 29; 39	1	9 is the units digit		
	D	3; 6; 9; 12	1	multiples of 3		
10.	A	1; 2; 4; 12; 24; 48✓	4	correct response	K	M
	B	18; 28; 38; 48; 58	1	8 is the units digit		
	C	48; 96; 144; 192	2	multiples of 48		
	D	12; 24; 36; 48	1	multiples of 12		
11.	A	20 +20 + 3 = ☐	4	correct response	P	M
	B	20 +20 - 3 = ☐	2	mixed the 2 operations		
	C	20 + 3 = ☐	1	just added the numbers		
	D	20 – 3 = ☐	1	just subtracted the numbers		
12.	A	$\frac{1}{3}$	3	The fraction is equivalent to $\frac{4}{12}$	K	M
	B	$\frac{2}{3}$✓	4	correct response		
	C	$\frac{2}{6}$	3	The fraction is equivalent to $\frac{4}{12}$		
	D	$\frac{3}{9}$	3	The fraction is equivalent to $\frac{4}{12}$		
13.	A	20(20+6)+(20+6)	1	incorrect use of brackets and numbers	R	M
	B	(20 + 5) × (20 × 6)	2	incorrect response 20 is multiplied by 6		
	C	25 (26 × 6)	1	incorrect number within brackets		
	D	25 (20 +6)✓	4	correct response to		
14.	A	18✓	4	correct response	R	M
	B	30	2	incorrect order of operation		
	C	25	2	incorrect order of operation		
	D	20	1	incorrect order of operation		

No.		Expected answer	Level of understanding			
	D	20	1	incorrect order of operation		
15.	A	300	3	added 3 centuries only	R	M
	B	350✓	4	correct response		
	C	80	2	added 3 decades to 50 years		
	D	3	2	did not calculate the number years		
16.	A	forty-five minutes past two in the afternoon	3	represents 2.45 p.m.	R	M
	B	quarter to three in the afternoon	3	represents 2.45 p.m.		
	C	quarter to three in the morning✓	4	correct response		
	D	14:45	3	represents 2.45 p.m. on the 24 hour clock		
17.	A	A straight angle	1	not a straight line	K	M
	B	An obtuse angle	1	the angle is not greater than a right angle		
	C	A reflex angle	1	the angle is not greater than a straight angle.		
	D	An acute angle✓	4	angle is less than a right angle.		
18.	A	The quadrilateral has two acute angles and two obtuse angles.✓	4	correct response	K	M
	B	The quadrilateral has four acute angles.	2	Lacks knowledge of the properties of quadrilaterals		
	C	The quadrilateral has four right angles.	1	Lacks knowledge of the properties of quadrilaterals		
	D	The quadrilateral has four obtuse angles.	1	Lacks knowledge of the properties of quadrilaterals		
19.	A	20	1	added the 5s	K	E
	B	13	1	counted the numbers		
	C	4	1	chose the first number		
	D	5✓	4	correct response		
20.	A	$4\frac{1}{2}$✓	4	correct response	K	M
	B	2	1	confused with the mode		
	C	9	2	added the 4and 5		
	D	8	1	chose the last digit		

SECTION B

one mark per answer

- **Accept any alternative correct solution that may not be included in the memorandum unless otherwise stated.**
- **Penalise only once for the same error where applicable.**
- **Ignore minor spelling errors.**
- **Accept answers that may be in any official language i.e. if it is a word.**

No.	Expected answer	Clarification	Mark	Cognitive level	Level of difficulty
1.	1 150✓		1	R	E
2.	250 ✓		1	K	E
3.	250✓		1	C	M
4.	7✓		1	R	M
5.	23, 29, 31, 37✓		1	K	M
6.	9 000✓		1	K	E
7.	05:55 ✓		1	K	M
8.	125 750; 126 250 ✓		1	K	D
9.	False ✓		1	R	M
10.	27 ✓		1	R	M

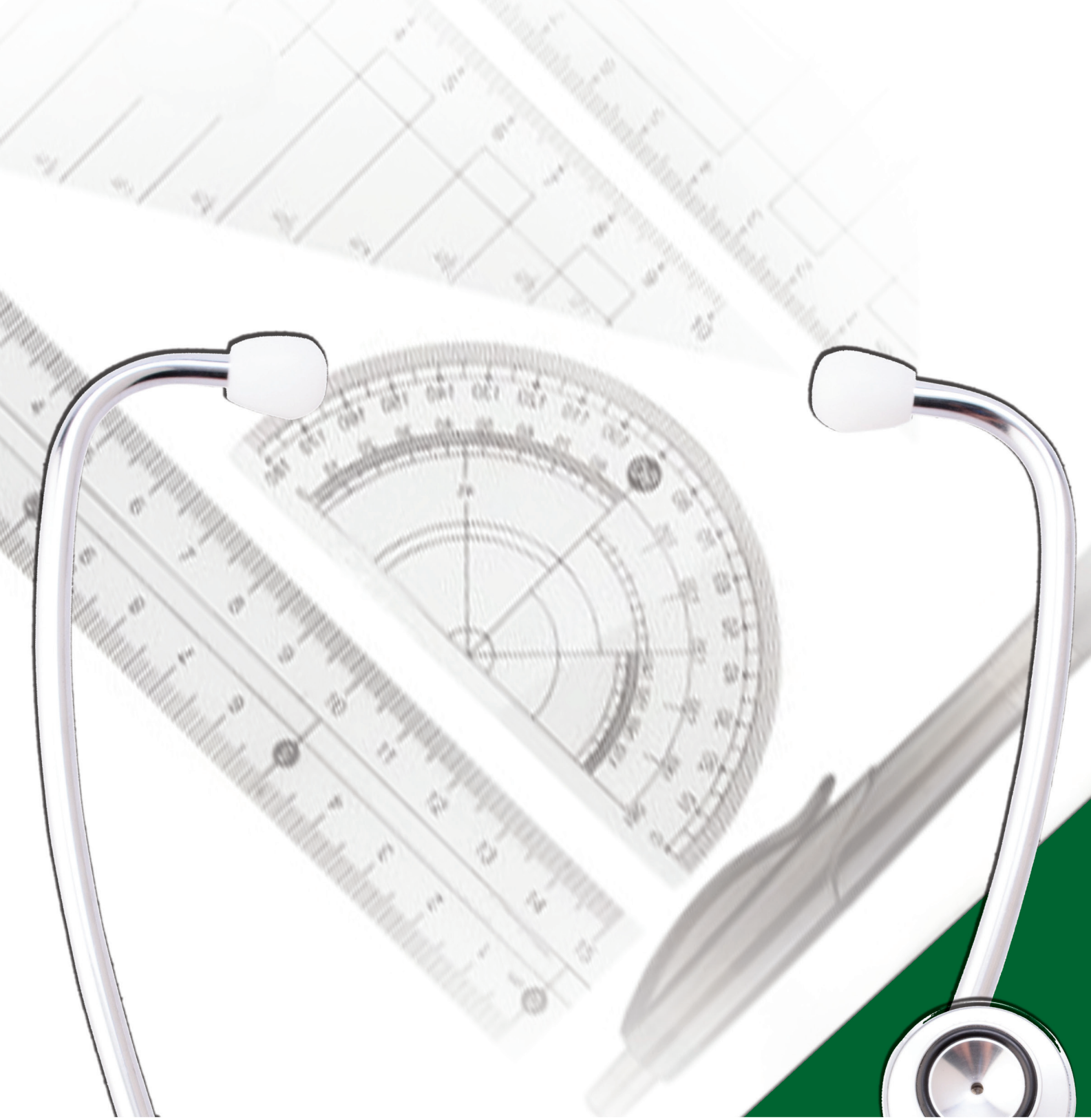
SECTION C

Keys for marking	
A	Accuracy
CA	Consistent Accuracy
M	Method

- **This is a marking guideline. In instances where learners have used different but mathematically sound strategies to solve the problems they (learners) should be credited.**
- **Unless stated otherwise, learners who give a correct answer only, should be awarded full marks.**
- **Underline errors committed by learners and apply Consistent Accuracy (CA) marking.**

No.	Expected answer	Clarification	Mark	Cognitive level	Level of difficulty
1.	56 423 8 851 + 21 479 86 753 ✓✓	Correct answer:2 marks 753 :1 mark 86 :1 mark Mark each one as a unit. Any method may be used.	2	R	M
2.	98 743 – 45 694 53 049 ✓✓	Correct answer:2 marks 049 :1 mark 53 :1 mark Mark each one as a unit. Any method may be used.	2	R	M
3.	$4\frac{4}{7} - 2\frac{2}{7}$ $=2\frac{2}{7}$ ✓✓	Correct answer: 2 marks 2: 1 mark $\frac{2}{7}$: 1 mark	2	R	E
4.	$\frac{2}{3} + \frac{1}{12}$ $= \frac{2}{3} \times \frac{4}{4} + \frac{1}{12}$ $= \frac{8}{12}$✓ + $\frac{1}{12}$ $= \frac{9}{12}$✓ $= \frac{3}{4}$✓	Correct answer: 3 marks $\frac{8}{12}$: 1 mark $\frac{9}{12}$: 1 mark $\frac{3}{4}$: 1 mark	3	R	M
5.	$\frac{4}{10}$ of R250 = (R250÷ 10) × 4✓ = R25✓× 4 =R100✓	Correct answer: 3 marks R25: 1 mark R100:1 mark Method : 1 mark	3	R	M
6.	11:50 a.m.+ 20 minutes = 12:10 p.m. ✓ 12:10 p.m.+ 30 minutes = 12:40 p.m. ✓✓	Correct answer: 3 marks 12:10 p.m.: 1 mark 12:40 p.m.: 1 mark Method : 1 mark	3	P	M

No.	Expected answer	Clarification	Mark	Cognitive level	Level of difficulty
7.	No. of g for 1 cake = 2 000 ÷ 4 = 500 g ✓ 3 bags = 6 kg No. of cakes with 6 000 g = 6 000 ÷ 500 = 12✓	Correct answer: 3 marks 500 g.: 1 mark 12 cakes.: 1 mark Method : 1 mark	3	P	M
8.	Cost = R99 999 – R38 750✓ R 99 999 –R 38 750 R 61 249 ✓✓	Correct answer: 3 marks Method: 1 mark 249: 1 mark 61 : 1 mark Mark each one as a unit .	3	P	M



DIAGNOSTIC ASSESMENT TOOL GRADE 6 PHASE BASED AND TERM ONE ASSESSMENTS

MATHEMATICS

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