

ANNUAL NATIONAL ASSESSMENT 2014 ASSESSMENT GUIDELINES MATHEMATICS

GRADE 8

INTRODUCTION

The 2014 cycle of Annual National Assessment (ANA 2014) will be administered in all public and designated¹ independent schools from 16 to 19 September 2014. During this period all learners in Grade 1-9 will write nationally set tests in Language and Mathematics and the results will be used to report progress related to achieving the goals set in the *Action Plan 2014, Towards Schooling 2025*.

The ANA tests during the third school term. The Department of Basic Education (DBE) has developed Assessment Guideline documents provided for each grade and subject (Language and Mathematics) that outline the minimum curriculum content that must be covered by all learners prior to the writing of the test. The Assessment Guidelines defines the scope of work that will be covered in the test for each grade and subject.

SENIOR PHASE

In Grades 7-9, the tests will cover work that is prescribed for the first three quarters of the school year. For these grades the Assessment Guidelines are arranged in columns: Content Area, Topics, Content and Skills and Descriptive Statements of what will be assessed.

It is important to note that the ANA 2013 Assessment Guidelines do not imply that the delimited scope is all that must be taught and learnt during the school year. Instead, Assessment the Guidelines provide the basic minimum curriculum that must have been covered by the end of the third school quarter.

Teachers are expected to use these Assessment Guidelines together with the other resources for their teaching and assessment programs.

¹ "Designated" independent schools are those that will apply and register either their Grade 3 or Grade 6 learners to participate in ANA for purposes of securing State subsidy.

CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
Numbers, Operations and Relationships	Whole numbers	Calculations with whole numbers	 Calculation with whole numbers involving the: commutative and associative property of addition and multiplication distributive property of multiplication over addition and subtraction inverse operation additive property of 0 multiplicative property of 1 division property of 0.
		Multiples and factors	Determine the LCM and/ or HCF of numbers to at least 3-digit whole numbers by inspection or factorisation.
		Calculation techniques	Calculate using addition, subtraction, multiplication and division and various techniques.
		Problem solving	 Solve problems involving whole numbers including: ratio, rate, speed, distance and/or time sharing in a given ratio where the whole is given increasing or decreasing a number in a given ratio.
	Integers	Recognising, ordering, comparing and counting integers	 Recognise order and/or compare integers. Count backwards and forwards in integers for any interval.
		Calculations	Add and/or subtract and multiply and/or divide integers.
			Determine squares, cubes, square roots and/or cube roots of integers.
		Problem solving	Solve problems in context involving multiple operations with integers.
	Exponents	Representing and comparing	Represent and compare numbers in exponential form.

CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
		Recognise and use laws	Recognise and use appropriate laws of operations using numbers involving
			exponents, square roots and cube roots.
		Calculations	Perform calculations involving all four operations with numbers that involve
			squares, cubes, square roots and/or cube roots of integers.
			Calculate the squares, cubes, square roots and/or cube roots of rational
			numbers.
		Scientific notation	Write very large numbers in scientific notation.
	Common fractions	Calculation techniques	Use knowledge of multiples and factors to write fractions in the simplest
			form before or after calculations.
			Use knowledge of equivalent fractions to add and subtract common
			fractions including mixed numbers.
			Multiply common fractions including mixed numbers.
			Use knowledge of reciprocal relationships to divide common fractions.
			Solve problems in context involving common fractions and/or mixed
			numbers, including grouping, sharing and determining fractions of whole
			numbers.
	Decimal fractions	Percentages	Calculate percentages:
			of whole numbers
			of part of a whole
			 increase or decrease of whole numbers.
			Solve problems in context involving percentage including profit and loss,
			discount, simple interest and/or loans.
		Ordering and comparing	Order and compare decimal fractions of at least 3 decimal places and
		decimal fractions	round off to at least 2 decimal places.

CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
		Addition, subtraction,	Add, subtract and multiply decimal fractions of at least 3 decimal places.
		multiplication and division	Division of decimal fractions by:
			whole numbersdecimal fractions.
			Calculate the squares, cubes, square roots and cube roots of decimal fractions.
			Recognise equivalence between common fraction, decimal fraction and/or percentage forms of the same number.
		Problem solving	Solve problems in context involving decimal fractions rounding off where appropriate.
Patterns, Functions and	Numeric and geometric	Investigate and extend	Investigate and extend numeric and/or geometric patterns looking for
Лусыа	patterns		 represented in diagram form
			 not limited to sequences involving a constant difference or ratio represented in tables
			represented algebraically.
			Describe and justify the general rules for relationships between numbers in own words or in algebraic language.
	Algebraic expressions	Algebraic language	Identify variables, constants, coefficients and exponents in given algebraic expressions.
			Add and subtract like terms in algebraic expressions.

CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
			Multiply the following by integers and monomials:
			monomials
			binomials
			• trinomials.
			Divide the following by integers and monomials:
			monomials
			• binomials
			• trinomials.
			Simplify algebraic expressions involving addition, subtraction, multiplication
			and division.
			Determine the squares, cubes, square roots and cube roots of single
			algebraic terms or like algebraic terms.
			Determine the numerical value of an algebraic expression by substitution.
	Algebraic equations	Equations	Solve equations by
			inspection
			 using additive and/or multiplicative inverses
			 using the laws of exponents.
			Set up and solve equations to describe problem situations.
	Functions and	Input and output values	Determine input and output values or rules using:
	relationships	or rules	• flow diagram
			• tables
			• formulae
			 and/or equations
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CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
Space and shape (geometry)	Geometry of straight lines	Angle relationship	 Recognise and describe pairs of angles formed by: perpendicular lines intersecting lines and/or parallel lines cut by a transversal.
		Problem solving	Solve geometric problems using relationships between pairs of angles.
	Geometry of 2-D shapes	Definitions	Identify and define triangles in terms of their sides and/ or angles distinguishing between equilateral, isosceles and/ or right-angled triangles.
			Identify and define quadrilaterals in terms of their sides and/ or angles distinguishing between a parallelogram, rectangle, square, rhombus, trapezium and/ or kite.
		Similar and congruent 2- D shapes	Identify and describe the properties of congruent and/ or similar shapes.
		Problem solving	Solve geometric problems involving unknown sides and/ or angles in triangles and/ or quadrilaterals, using known properties and definitions.
	Transformation Geometry	Transformations	Recognize, describe and perform translations, reflections and rotations with geometric figures and shapes on squared paper.
		Enlargements and reductions	Draw enlargements and/or reductions of geometric figures on squared paper and compare them in terms of shape and size.

CONTENT AREA	TOPICS	CONTENT AND SKILLS	DESCRIPTIVE STATEMENTS
			The learner must be able to (i.e. do or know):-
	Geometry of 3D - objects	Classifying 3D- objects	Describe, sort and compare cubes, rectangular prisms, triangular prisms, pyramids and cylinders in terms of shape and number of faces, vertices and edges.
Measurement	Theorem of Pythagoras	Use the Theorem of Pythagoras	Use the Theorem of Pythagoras to calculate a missing length in a right- angled triangle leaving irrational answers in surd form.
			Determine whether a triangle is a right – angled triangle or not if the lengths of three sides of the triangle are known.
	Perimeter and area of 2- D shapes	Perimeter of polygons and area of squares, rectangles, triangles and/or circles.	Use appropriate formulae to calculate the perimeter and/or area of squares rectangles triangles circles.
			Calculate the area of polygons by decomposing them into rectangles and/or triangles.
			Use and convert between appropriate SI units including: $mm^2 \leftrightarrow cm^2 \leftrightarrow m^2 \leftrightarrow km^2$
			Solve problems with or without using a calculator involving perimeter and area of polygons and circles.
	Surface area and volume of 3-D objects	Surface area, volume and/or capacity of cubes and/or rectangular prisms	Use appropriate formulae to calculate the surface area, volume and/or capacity of cubes, rectangular prisms and/or triangular prisms.

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			The learner must be able to (i.e. do or know):-
		SI units	Use and convert between appropriate SI units, including:
			$mm^2 \leftrightarrow cm^2$
			$cm^2 \leftrightarrow m^2$
			$mm^3 \leftrightarrow cm^3$
			$cm^3 \leftrightarrow m^3$
			$1 \ cm^3 \leftrightarrow 1 \ ml$
			$1 m^3 \leftrightarrow 1 kl$
			Solve problems with or without using a calculator involving surface area,
			volume and/or capacity.
	Organize and	Organize and summarize	Organize and record data using tallies, tables and stem-and-leaf
	summarize data	data	displays including grouped data.
Data Handling			Summarize data using measures of central tendency including the
			mean, median, mode and measures of dispersion including range
			and the extremes.
	Interpret, analyse and	Interpret data	Read and interpret data represented in words, bar graphs, double bar
	report data		graphs, histograms, pie charts and broken-line graphs.
	Probability	Probability	Consider a simple situation (with equal likely outcomes) to list all possible
			outcomes and determine the probability of each possible outcome using the
			definition of probability.