

Mathematics

Navigation pack

**SENIOR PHASE
GRADE 8**

Platinum



X-kit
Achieve!



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Mathematics Grade 8 Navigation Pack

Print ISBN: 9781485720355

Print GUID: DA65702C-E0A2-493F-8918-BD0862379DC0

EPDF ISBN: 9781485720362

EPDF GUID: CE36C4CD-3A0B-4779-B947-FD35DF12F274

Acknowledgements

MyPedia Assessments Maths Grade 8, Preetha Sooknanan, (Ed) 2019. Reprinted by permission of Pearson South Africa Pty (Ltd)

Cover design by Pearson Media Hub

Typesetting by Laura Brecher

Contents

Find us online	4
Dear Teacher	5
Covid-19 safety guidelines	6
How to use this Navigation Pack	9
Navigation Guide	11
Term 1	14
Term 2	16
Term 3	18
Term 4	21
Targeted Worksheets	23
Worksheet 1	24
Worksheet 2	27
Worksheet 3	30
Targeted Worksheets Memoranda	33
Exemplar Assessments	37
Task: Mid-year Test	38
Task: Term 3 Test	41
Task: Final Year Test	44
Exemplar Assessments Memoranda	48

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Dear Teacher

The National State of Disaster due to the COVID-19 pandemic has resulted in the disruption of Education in South Africa and the loss of valuable teaching time and disruption of the school calendar.

As a result of this, the DBE has created and released revised Annual Teaching Plans (ATPs) to assist schools and teachers in ensuring the 2021 school year is completed. The 2021 ATPs are based on the revised ATPs that were developed in 2020. It is important to note that fundamental and core topics are retained in the 2021 ATPs. Some of the strategies that have been used in the process of developing the 2021 DBE ATPs are:

- reduction of content covered in certain topics
- merging of topics
- deleting topics
- revising the assessment guidelines
- reduction in teaching time for certain topics
- resequencing of topics/concepts

At Pearson South Africa, we believe that education is the key to every individuals' success. To ensure that despite the challenges, teachers and learners can meet all the necessary learning outcomes for the year, we have created the Navigation Guide, a free resource to support teachers and learners during this challenging time.

The Navigation Pack aims to summarise and highlight the changes in the 2021 DBE ATP and provide teachers and learners with worksheets that focus on impacted topics in the curriculum.

Due to resequencing of topics, the order of topics in the textbook that is currently used in the classroom may not be aligned to the new sequence of topics in the ATP. The Navigation Pack has a set of assessments based on the Section 4 changes and the revised assessment guidelines.

COVID-19 safety guidelines for teachers and learners

Gatherings at school

Where schools are open for learning, it is up to management to take decisive action to ensure sites are not simultaneously used for other functions such as shelters or treatment units in order to reduce the risk.

Implement social distancing practices that may include:



- A staggered timetable, where teachers and learners do not arrive/leave at the same time for the beginning and end of the school day.
- Cancelling any community meetings/events such as assemblies, cake sales, market day, tuckshop, after-care classes, matric dance, Eisteddfod and other events.
- Cancelling any extra-mural activities such as ballet classes, swimming lessons, sport games, music class and other events that create a crowd gathering.
- Teaching and modeling creating space and avoiding unnecessary touching.
- Limiting movement and interaction between classes.
- Schools with an established feeding scheme plan are to ensure that hygiene and social distancing is always implemented. Teachers and staff members assisting with food distribution are to wear masks, sanitise prior to issuing food items and learners are to stand 1,5m apart in the queue.

Wear a mask at all times.



1. Restrooms/toilets

Hand washing

Washing hands with soap and water  or using alcohol-based hand sanitisers  is one of the most important ways to help everybody stay healthy at school. Critical to this is preparing and maintaining handwashing stations with soap and water at the toilet and in each classroom.



Teachers and learners should always wash their hands after:

- eating
- entering the classroom
- using the toilet
- blowing your nose or coughing
- touching tears, mucous, saliva, blood or sweat.

2. Premises and classroom setting

When schools open, classroom settings should be altered in order to promote hygiene, safety and social distancing.

Changed classroom settings may include:

- Cleaning and disinfecting school buildings, classrooms and especially sanitation of facilities at least once a day, particularly surfaces that are touched by many people (railings, lunch tables, sports equipment, door and window handles, toys, teaching and learning tools etc.).
- Ensure the proper ventilation and fresh flow of air through classrooms.
- Providing learners with vital information about how to protect themselves by incorporating the importance of hygiene, handwashing and other measures of protecting themselves, into the lessons.
- Promoting best handwashing and hygiene practices and providing hygiene supplies.

- Prepare and maintain handwashing stations with soap and water, and if possible, place alcohol-based hand sanitisers in each classroom, at entrances and exits, and near lunchrooms and toilets.



- Ensure teachers and learners wear a mask at all times.



Social distancing

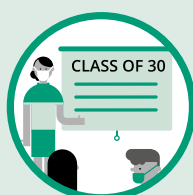
- Space the learners out in the classroom (or outdoors) – try to keep learners separated by a minimum of 1,5m.



- Create space for learner's desks to be at least 1,5m apart

- Learners should not share cups, eating utensils, or food
- Do not let learners eat items that fall on the floor or chew on pencils or other objects

- Learners are not to exceed 30 per class or 50% of original class size



- Avoid close contact, like shaking hands, hugging or kissing



3. Social behaviour

It is extremely vital during a pandemic that focus is not only directed towards optimal physical health and hygiene but finding ways to facilitate mental health support.

- Treat everybody with respect and empathy – no teasing about COVID-19.
- Encourage kindness towards each other and avoid any stereotyping when talking about the virus.
- Stay home if you have a temperature or are ill.
- Do not touch people who are ill, but be empathetic.

Wear a mask at all times.




How to use this Navigation Pack

Revised DBE Teaching Plan:

Comprehensive summary of the CAPS topics according to the revised ATPs.

Navigation Plan: Link to the Platinum series, as well as additional resources in the Navigation Pack.

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
NUMERIC AND GEOMETRIC PATTERNS (continued)		<ul style="list-style-type: none"> Extend, investigate and extend numeric and geometric patterns looking for relationships between numbers, including patterns represented algebraically Describe and justify the general rules for observed relationships between numbers in own words or in algebraic language 			
FUNCTIONS AND RELATIONSHIPS	Input and output values	Revise, determine input values, output values or rules for patterns and relationships using: <ul style="list-style-type: none"> flow diagrams tables formulae Extend determine input values, output values or rules for patterns and relationships using equations	7 hours		
	Equivalent forms	Revise, determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented: <ul style="list-style-type: none"> verbally in flow diagrams in tables by formulae by number sentences Extend determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented by equations		Navigation Pack: Targeted Worksheet 1	Page 24
ALGEBRAIC EXPRESSIONS	Algebraic language	<ul style="list-style-type: none"> Recognise and identify conventions for writing algebraic expressions Identify and classify like and unlike terms in algebraic expressions Recognise and identify coefficients and exponents in algebraic expressions 	4.5 hours		
	Expand and simplify algebraic expressions	Use commutative, associative and distributive laws for rational numbers and laws of exponents to: <ul style="list-style-type: none"> Add and subtract like terms in algebraic expressions 			
ASSESSMENTS	Investigation				
	Term 2 Test ^{*5}			Navigation Pack: Mid-year test	Pages 38–40
 TOTAL HOURS = 42					

^{*5} June Exam P1 and P2 is now a test with all topics for Term 1 and Term 2.

Assessments for the Term as per the revised ATPs and the Section 4 amendments.

Link to a targeted worksheet in the Navigation Pack, that focus on impacted or challenging topics in the curriculum.

Footnotes provide any additional information.

Link to an exemplar assessment in the Navigation Pack, that was created with Section 4 and curriculum changes in mind.

Navigation Guide

Mathematics Phase overview

GRADE	NO OF WEEKS	TOTAL TIME (HOURS)
7	42	174
8	33	132
9	42	175

TOPIC	GRADE 7	GRADE 8	GRADE 9
WHOLE NUMBERS	Revision; calculation techniques; multiples and factors; solve problems	Revision; calculation techniques; multiples and factors; solve problems	Revision; properties of numbers; calculations using whole numbers; multiples and factors; solve problems
EXPONENTS	Mental calculations; comparing and representing numbers in exponential form; calculations using numbers in exponential form	Comparing and representing numbers in exponential form; calculations using numbers in exponential form; solve problems	Calculations using numbers in exponential form: Revise and extend to include integer exponents
INTEGERS	Counting; ordering and comparing integers; calculations with integers	Revise calculations with integers; properties of integers	Revise calculations with integers; revise properties of integers
COMMON FRACTIONS	Ordering; comparing and simplifying common fractions; calculations with fractions; calculation techniques; percentages; solve problems	Calculations with fractions; calculation techniques; percentage; solve problems	Removed as a stand-alone topic but to be incorporated into Expressions (Page 122 & 123 of CAPS)
DECIMAL FRACTIONS	Ordering and comparing decimal fractions	Calculations with decimal fractions; calculation techniques	Removed as a stand-alone topic but to be incorporated into Expressions (Page 122 & 123 of CAPS)
PATTERNS	Investigate and extend patterns	Revise, investigate and extend numeric and geometric patterns; investigate and extend numeric and geometric patterns; describe and justify the general rules for observed relationships between numbers in own words or in algebraic language	Investigate and extend numeric and geometric patterns; describe and justify the general rules for observed relationships between numbers in own words or in algebraic language
FUNCTIONS AND RELATIONSHIPS	Input and output values; equivalent forms	Input and output values; equivalent forms	Input and output values; equivalent forms
ALGEBRAIC EXPRESSIONS	Recognise and interpret rules or relationships represented in symbolic form; identify variables and constants in given formulae and equations	Algebraic language; expand and simplify algebraic expressions	Algebraic language; expand and simplify algebraic expressions; factorise algebraic expressions

TOPIC	GRADE 7	GRADE 8	GRADE 9
ALGEBRAIC EQUATIONS	Number sentences	Equations	Revision, extend solving equations to include factorisation and equations of the form: a product of factors = 0
GRAPHS	Removed	Interpreting graphs; drawing graphs	Interpreting graphs; drawing graphs
CONSTRUCTION OF GEOMETRIC FIGURES	Measuring angles; constructions (Provide learners with accurately constructed figures); geometry of straight lines	Removed as a stand-alone topic and part of it has been incorporated into Geometry of 2D shapes	Removed as a stand-alone topic and part of it has been incorporated into Geometry of 2D shapes
GEOMETRY OF 2D SHAPES	Classifying 2D shapes (triangles; quadrilaterals); similar and congruent 2D shapes; solving problems	Classifying 2D shapes (Triangles; Quadrilaterals); constructions; investigating properties of geometric figures; solve problems; similar and congruent 2D shapes	Revise classifying 2D shapes (triangles; quadrilaterals); constructions
GEOMETRY OF 3D OBJECTS	Removed	Removed	Removed
GEOMETRY OF STRAIGHT LINES	Part of Construction of geometric figures	Angle relationships; Solving problems	Revise angle relationships; Solving problems
TRANSFORMATION GEOMETRY	Transformations; enlargements and reductions	Transformations	Transformations
THEOREM OF PYTHAGORAS	N/A	Develop and use the Theorem of Pythagoras	Use the Theorem of Pythagoras to solve problems involving unknown lengths in geometric figures that contain right-angled triangles
AREA AND PERIMETER OF 2D SHAPES	Area and perimeter; calculations and solving problems	Area and perimeter; calculations and solving problems	Use appropriate formulae and conversions between SI units to solve problems and calculate perimeter and area of polygons and circles
SURFACE AREA AND VOLUME OF 3D OBJECTS	Surface area and volume; calculations and solving problems	Removed	Use appropriate formulae and conversions between SI units to solve problems and calculate the surface area, volume and capacity of rectangular prisms; triangular prisms and cylinders
DATA HANDLING	Collect data (provide learners with data to save time); Organise and summarise data; Represent data; Interpret data; Analyse data; Report data	Removed	Removed
PROBABILITY	Removed	Removed	


Term 1

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
REVISION WHOLE NUMBERS			2,5 hours		
	Calculations using whole numbers	Revise: Calculations using all four operations on whole numbers; estimating and using calculators where appropriate	9 hours		
	Calculation techniques	Use a range of strategies to perform and check written and mental calculations with whole numbers including: <ul style="list-style-type: none">• estimation• adding, subtracting and multiplying in columns• long division• rounding off and compensating using a calculator			
	Multiples and factors* ¹	Revise: <ul style="list-style-type: none">• Prime factors of numbers to at least 3-digit whole numbers• LCM and HCF of whole numbers, by inspection or factorisation			
	Solving problems* ²	Revise: Solve problems involving whole numbers, including: <ul style="list-style-type: none">• comparing two or more quantities of the same kind (ratio)• comparing two quantities of different kinds (rate)• sharing in a given ratio where the whole is given• Extend to increasing or decreasing of a number in a given ratio• Solve problems that involve whole numbers, percentages and decimal fractions in financial contexts			
INTEGERS	Calculations with integers	Revise: <ul style="list-style-type: none">• addition and subtraction with integers• Multiply and divide with integers• Perform calculations involving all four operations with integers• Perform calculations involving all four operations with numbers that involve squares, cubes, square roots and cube roots of integers	9 hours		
	Properties of integers	Recognise and use commutative, associative and distributive properties of addition and multiplication for integers Recognise and use additive and multiplicative inverses for integers			

*¹ Concept of LCM and HCF has been modified.

*² Financial Maths removed.

Term 1

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
COMMON FRACTIONS	Calculations with fractions	<ul style="list-style-type: none"> Divide whole numbers and common fractions by common fractions Calculate the squares, cubes, square roots and cube roots of common fractions Calculate amounts if given percentage increase or decrease Calculations and solving problems 	9 hours		
	Calculation techniques	Use knowledge of reciprocal relationships to divide common fractions			
	Percentage	Calculate amounts if given percentage increase or decrease			
	Solving problems	<ul style="list-style-type: none"> Solve problems in contexts involving common fractions and mixed numbers, including grouping, sharing and finding fractions of whole numbers Solve problems in contexts involving percentages 			
DECIMAL FRACTIONS*3	Calculations with decimal fractions	<ul style="list-style-type: none"> Multiplication of decimal fractions by decimal fractions not limited to one decimal place Division of decimal fractions by decimal fractions Calculate the squares, cubes, square roots and cube roots of decimal fractions 	4 hours		
	Calculation techniques	<ul style="list-style-type: none"> Use knowledge of place value to estimate the number of decimal places in the result before performing calculations Use rounding off and a calculator to check results where appropriate 			
ASSESSMENTS	Assignment Term Test 1		3 hours		
 TOTAL HOURS = 38.5					

*3 Moved decimal fractions from Term 3 to Term 1 and overlapped to Term 2 due to time increased from 6 hours to 9 hours.

Term 2

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
DECIMAL FRACTIONS* ⁴	Calculations with decimal fractions	Revise: <ul style="list-style-type: none"> • Multiplication of decimal fractions by decimal fractions not limited to one decimal place • Division of decimal fractions by decimal fractions • Calculate the squares, cubes, square roots and cube roots of decimal fractions 	5 hours		
	Solving problems	Solve problems in context involving decimals			
EXPONENTS	Comparing and representing numbers in exponential form	<ul style="list-style-type: none"> • Revise, compare and represent whole numbers in exponential form • Compare and represent integers in exponential form • Compare and represent numbers in scientific notation, limited to positive exponents 	10 hours	Navigation Pack: Targeted Worksheet 1	Page 20
	Calculations using numbers in exponential form	Establish general laws of exponents, limited to: $a^m \times a^n = a^{m+n}$ $a^m \div a^n = a^{m-n}$ if $m > n$ $(a^m)^n = a^{m \times n}$ $(a \times b)^n = a^n \times b^n$ $a^0 = 1$ <ul style="list-style-type: none"> • Recognise and use the appropriate laws of operations using numbers involving exponents and square and cube roots • Perform calculations involving all four operations with numbers that involve squares, cubes, square and cube roots of integers • Calculate the squares, cubes, square and cube roots of rational numbers 		Navigation Pack: Targeted Worksheet 1	Pages 24–26
	Solving problems	Solve problems in contexts involving numbers in exponential form		Navigation Pack: Targeted Worksheet 1	Pages 24–26
NUMERIC AND GEOMETRIC PATTERNS	Investigate and extend patterns	Revise, investigate and extend numeric and geometric patterns looking for relationships between numbers, including patterns: <ul style="list-style-type: none"> • represented in physical or diagram form • not limited to sequences involving a constant difference or ratio • of learner's own creation • represented in tables 	9 hours		

*⁴ Moved decimal fractions from Term 3 to Term 1 and overlapped to Term 2 due to time increased from 6 hours to 9 hours.

Term 2

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
NUMERIC AND GEOMETRIC PATTERNS (continued)		<ul style="list-style-type: none"> Extend, investigate and extend numeric and geometric patterns looking for relationships between numbers, including patterns represented algebraically Describe and justify the general rules for observed relationships between numbers in own words or in algebraic language 			
FUNCTIONS AND RELATIONSHIPS	Input and output values	Revise, determine input values, output values or rules for patterns and relationships using: <ul style="list-style-type: none"> flow diagrams tables formulae Extend determine input values, output values or rules for patterns and relationships using equations	7 hours		
	Equivalent forms	Revise, determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented: <ul style="list-style-type: none"> verbally in flow diagrams in tables by formulae by number sentences Extend determine, interpret and justify equivalence of different descriptions of the same relationship or rule presented by equations			
ALGEBRAIC EXPRESSIONS	Algebraic language	<ul style="list-style-type: none"> Recognise and identify conventions for writing algebraic expressions Identify and classify like and unlike terms in algebraic expressions Recognise and identify coefficients and exponents in algebraic expressions 	4.5 hours		
	Expand and simplify algebraic expressions	Use commutative, associative and distributive laws for rational numbers and laws of exponents to: <ul style="list-style-type: none"> Add and subtract like terms in algebraic expressions 			
ASSESSMENTS	Investigation				
	Term 2 Test ^{*5}			Navigation Pack: Mid-year test	Pages 38–40
<div> TOTAL HOURS = 42 </div>					

^{*5} June Exam P1 and P2 is now a test with all topics for Term 1 and Term 2.

Term 3

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
ALGEBRAIC EXPRESSIONS ^{*6}	Expand and simplify algebraic expressions	<p>Use commutative, associative and distributive laws for rational numbers and laws of exponents to:</p> <ul style="list-style-type: none"> Add and subtract like terms in algebraic expressions <p>Multiply integers and monomials by:</p> <ul style="list-style-type: none"> monomials binomials trinomials <p>Divide the following by integers or monomials:</p> <ul style="list-style-type: none"> monomials binomials trinomials <p>Simplify algebraic expressions involving the above operations</p> <p>Determine the squares, cubes, square roots and cube roots of single algebraic terms or like algebraic terms</p> <p>Determine the numerical value of algebraic expressions by substitution</p>	8 hours		
ALGEBRAIC EQUATIONS ^{*7}	Equations	<p>Use substitution in equations to generate tables of ordered pairs</p> <p>Extend solving equations to include:</p> <ul style="list-style-type: none"> using additive and multiplicative inverses using laws of exponents 	9 hours		
GEOMETRY OF STRAIGHT LINES	Angle relationships	<p>Recognise and describe pairs of angles formed by:</p> <ul style="list-style-type: none"> perpendicular lines intersecting lines parallel lines cut by a transversal 	8 hours		
	Solving problems	Solve geometric problems using the relationships between pairs of angles described above			
GEOMETRY OF 2D SHAPES ^{*8}	Classifying 2D shapes	<p>Identify and write clear definitions of triangles in terms of their sides and angles, distinguishing between:</p> <ul style="list-style-type: none"> equilateral triangles isosceles triangles right-angled triangles 	12.5 hours ^{*9}	Navigation Pack: Targeted Worksheet 2	Pages 27–29

^{*6} Algebraic expressions (Term 2 and 3), merged, however part of the expressions has been moved to Term 3 due to time reduced from 13.5 hours. to 12.5 hours.


^{*7} Algebraic equations (Term 2 and 3) merged and moved to Term 3.

^{*8} Moved from Term 2 to Term 3.

^{*9} Topic time increased from 8 hours to 12.5 hours since it incorporates part of constructions, with modification.

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
GEOMETRY OF 2D SHAPES*8 (continued)	Constructions	Provide learners with accurately constructed figures to investigate the properties of triangles		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Investigating properties of geometric figures	Investigate the angles in a triangle, focusing on: <ul style="list-style-type: none"> the sum of the interior angles of triangles the size of angles in an equilateral triangle the sides and base angles of an isosceles triangle 		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Classifying 2D shapes	Identify and write clear definitions of quadrilaterals in terms of their sides and angles, distinguishing between: <ul style="list-style-type: none"> parallelogram square trapezium rectangle rhombus kite 		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Constructions	Provide learners with accurately constructed figures to investigate the properties of quadrilaterals		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Investigating properties of geometric figures	Investigate sides and angles in quadrilaterals, focusing on: <ul style="list-style-type: none"> the sum of the interior angles of quadrilaterals the sides and opposite angles of parallelograms 		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Solving problems	Solve geometric problems involving unknown sides and angles in triangles and quadrilaterals, using known properties and definitions		Navigation Pack: Targeted Worksheet 2	Pages 27–29
	Similar and congruent 2D shapes	<ul style="list-style-type: none"> Identify and describe the properties of congruent shapes Identify and describe the properties of similar shapes 		Navigation Pack: Targeted Worksheet 2	Pages 27–29

Term 3


REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
	Solving problems	Solve geometric problems involving unknown sides and angles in triangles and quadrilaterals, using known properties and definitions		Navigation Pack: Targeted Worksheet 2	Pages 27–29
REVISION			4.5 hours		
ASSESSMENTS	Project Term Test			Navigation Pack: Term 3 Test exemplar	Pages 41–43
<div> TOTAL HOURS = 47</div>					

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
GRAPHS	Interpreting graphs	Revise: Analyse and interpret global graphs of problem situations, with special focus on the following trends and features: <ul style="list-style-type: none"> • linear or non-linear • constant, increasing or decreasing Analyse and interpret global graphs of problem situations, with a special focus on the following trends and features: <ul style="list-style-type: none"> • maximum or minimum • discrete or continuous 	8 hours		
	Drawing graphs	Draw global graphs from given descriptions of a problem situation, identifying features listed above Use tables or ordered pairs to plot points and draw graphs on the Cartesian plane			
TRANSFORMATION GEOMETRY ^{*10}	Transformations	Recognise, describe and perform transformations with points on a coordinate plane, focusing on: <ul style="list-style-type: none"> • reflecting a point in the x-axis or y-axis • translating a point within and across quadrants • Recognise, describe and perform transformations with triangles on a coordinate plane, focusing on the coordinates of the vertices when: <ul style="list-style-type: none"> • reflecting a triangle in the x-axis or y-axis • translating a triangle within and across quadrants 	4.5 hours ^{*11}	Navigation Pack: Targeted worksheet 3	Pages 30–32
THEOREM OF PYTHAGORAS	Develop and use the Theorem of Pythagoras	<ul style="list-style-type: none"> • Investigate the relationship between the lengths of the sides of a right-angled triangle to develop the Theorem of Pythagoras • Determine whether a triangle is right-angled triangle or not if the lengths of the three sides of the triangle is known • Use the Theorem of Pythagoras to calculate the missing length in a right-angled triangle, leaving irrational answers in surd form 	4,5 hours		

^{*10} Teach point plotting, translation and reflection (enlargements and reductions, and rotating a triangle around the origin have been removed).

^{*11} Reduced from 6 hours to 4,5 hours.

Term 4

REVISED DBE ANNUAL TEACHING PLAN				NAVIGATION PLAN	
TOPIC	UNITS	CONTENT SPECIFIC CONCEPTS	TIME	LINKS TO PEARSON NAVIGATION PACK	PAGE REFERENCE
AREA AND PERIMETER OF 2D SHAPES ^{*12}	Area and perimeter	<ul style="list-style-type: none"> Use appropriate formulae to calculate perimeter and area of: circles Calculate the areas of polygons, to at least 2 decimal places, by decomposing them into rectangles and/or triangles Use and describe the relationship between the radius, diameter and circumference of a circle in calculations Use and describe the relationship between the radius and area of a circle in calculations 	9 hours		
AREA AND PERIMETER OF 2D SHAPES ^{*12} (continued)	Calculations and solving problems	<ul style="list-style-type: none"> Solve problems, with or without a calculator, involving perimeter and area of polygons and circles to at least 2 decimal places Use and describe the meaning of the irrational number pi (π) in calculations involving circles Use and convert between appropriate SI units, including: $\text{mm}^2 \leftrightarrow \text{cm}^2 \leftrightarrow \text{m}^2 \leftrightarrow \text{km}^2$ 			
REVISION		Revision of Term 3 and Term 4 work	4.5 hours		
	^{*13}				
ALL TOPICS	Term 4 Test ^{*14}			Navigation Pack: Final Year Test Exemplar	Pages 44–47
 TOTAL HOURS = 38					

^{*12} 3D Geometry is removed.

^{*13} Data handling is removed.

^{*14} The final examination is replaced by a term test.

Targeted Worksheets

TARGETED WORKSHEET	TOPIC IN CAPS
1	Exponents
2	Geometry of 2D shapes
3	Transformation geometry

Targeted Worksheet 1

Topic: Exponents

Content summary

Learners should know the following content.

1. Compare and represent whole numbers in exponential form: $a^b = a \times a \times a \times \dots$ for b number of factors.
2. Recognise and use the appropriate laws of operations with numbers involving exponents and square and cube roots.
3. Perform calculations involving all four operations using numbers in exponential form, limited to exponents up to 5, and square and cube roots.

Work with the content in the following order:

Comparing and representing numbers in exponential form

- Revise, compare and represent whole numbers in exponential form.
- Compare and represent integers in exponential form.
- Compare and represent numbers in scientific notation, limited to positive exponents.

Calculations using numbers in exponential form

- Establish general laws of exponents, limited to:

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n} \text{ if } m > n$$

$$(a^m)^n = a^{m \times n}$$

$$(a \times t)^n = a^n \times t^n$$

$$a^0 = 1$$
- Recognise and use the appropriate laws of operations using numbers involving exponents and square and cube roots.
- Perform calculations involving all four operations with numbers that involve squares, cubes, square and cube roots of integers.
- Calculate the squares, cubes, square and cube roots of rational numbers.

Solving problems

- Solve problems in contexts involving numbers in exponential form.

Targeted Worksheet 1

Topic: Exponents

Name:

Surname:

Marks: 35

Time: 60 minutes

Instructions

Read the following instructions carefully before answering the questions.

1. This paper consists of 10 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

1. Write these numbers as powers.

- | | | |
|-----|-----------|-----|
| 1.1 | 100 | (1) |
| 1.2 | 16 | (1) |
| 1.3 | 8 | (1) |
| 1.4 | 81 | (1) |
| 1.5 | 121 | (1) |
| 1.6 | 1 000 000 | (1) |

[6]

2. Write these square and cube numbers as natural numbers.

- | | | |
|-----|--------|-----|
| 2.1 | 3^4 | (1) |
| 2.2 | 12^2 | (1) |
| 2.3 | 10^3 | (1) |
| 2.4 | 8^2 | (1) |
| 2.5 | 2^3 | (1) |
| 2.6 | 4^3 | (1) |

[6]

3. Determine the square roots.

- | | | |
|-----|--------------|-----|
| 3.1 | $\sqrt{144}$ | (1) |
| 3.2 | $\sqrt{36}$ | (1) |
| 3.2 | $\sqrt{81}$ | (1) |
| 3.4 | $\sqrt{100}$ | (1) |

[4]

4. Determine the cube roots.

4.1 $\sqrt[3]{8}$ (1)

4.2 $\sqrt[3]{1000}$ (1)

4.3 $\sqrt[3]{27}$ (1)

4.4 $\sqrt[3]{125}$ (1)

[4]

5. Lungile says that $3^2 = 6$. Is this correct? Explain your answer.

(2)

[2]

6. Calculate the values of these powers.

6.1 5×2^4 (1)

6.2 $2^5 \times 3$ (1)

6.3 3×3^3 (1)

[3]

7. Simplify $10^3 - 10^2$.

(2)

[2]

8. Between which two whole numbers does $\sqrt{60}$ lie?

(2)

[2]

9. Determine the value of $2^1 + 2^3 + 2^5$.

(2)

[2]

10. Copy and complete this table.

(4)

Decimal notation	345,708			34 089
Scientific notation		$2,3 \times 10^5$	$1,5 \times 10^3$	

[4]

Total: 35

Targeted Worksheet 2

Topic: Geometry of 2D shapes

Content summary

Please note that **Constructions** has been integrated into this section given time constraints thus:

The learners should be able to:

- describe, sort, name and compare triangles according to their sides and angles, focusing on equilateral, isosceles and right-angled triangles.
- describe, sort, name and compare quadrilaterals in terms of the length of sides, parallel and perpendicular sides, size of angles (right angles or not)
- describe and name parts of a circle
- recognise and describe similar and congruent figures by comparing their shapes and sizes.

The topic is divided into two parts, viz. triangles and quadrilaterals. For each subtopic learners should be able to classify and investigate their properties. Provide learners with accurately constructed figures so that they can investigate the properties of triangles and quadrilaterals.

The learners should then be able to solve geometric problems involving unknown sides and angles in triangles and quadrilaterals, using known properties and definitions.

Work with the content in the following order:

Classifying 2D shapes

- Allow learners to identify and write clear definitions of triangles in terms of their sides and angles, distinguishing between equilateral, isosceles and right-angled triangles.

Investigating properties of geometric figures

- Investigate the angles in a triangle, focus on the sum of the interior angles of triangles, the size of angles in an equilateral triangle and the sides and base angles of an isosceles triangle.

Classifying 2D shapes

- Identify and write clear definitions of quadrilaterals in terms of their sides and angles, distinguishing between a parallelogram, rectangle, square, rhombus, trapezium and kite.

Investigating the properties of geometric figures

- Investigate sides and angles in quadrilaterals, focus on the sum of the interior angles of quadrilaterals and the sides and opposite angles of parallelograms.

Similar and congruent 2D shapes

- Identify and describe the properties of congruent shapes.
- Identify and describe the properties of similar shapes.

Solving problems

- Solve geometric problems involving unknown sides and angles in triangles and quadrilaterals, using known properties and definitions.
- Describe, sort, name and compare triangles according to their sides and angles.
- Describe, sort, name and compare quadrilaterals in terms of length of sides parallel and perpendicular sides AND size of angles (right-angles or not).
- Describe and name parts of a circle.
- Recognise and describe similar and congruent figures by comparing shape and size.

Targeted Worksheet 2

Topic: Geometry of 2D shapes

Name: _____

Surname: _____

Marks: 40

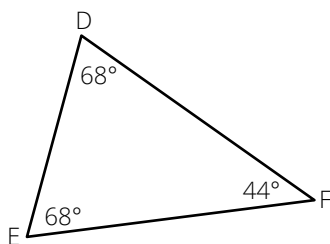
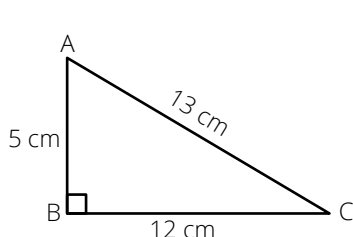
Time: 60 minutes

Instructions

Read the following instructions carefully before answering the questions.

1. This paper consists of 4 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

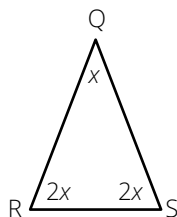
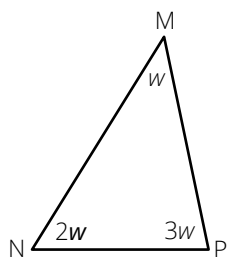
1. Classify each of these triangles, giving reasons for your answers.



(4)

[4]

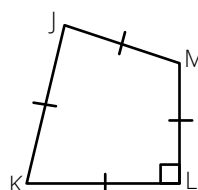
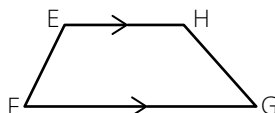
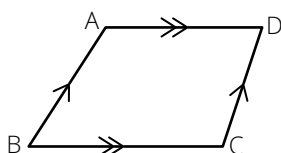
2. Calculate the values of w and x , then classify the triangle. Give reasons for your answers.



(10)

[10]

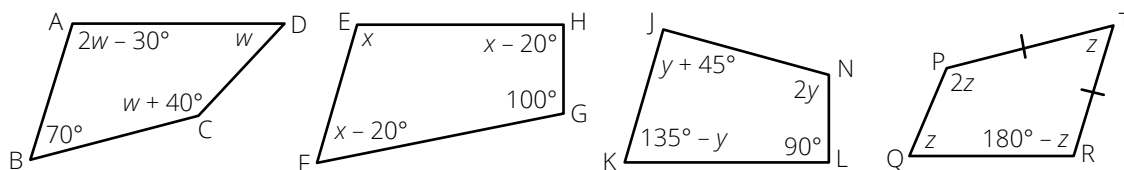
3. Classify each of these quadrilaterals, giving reasons for your answers. The sketches are not drawn to scale.



(6)

[6]

4. Calculate the values of w , x , y and z in each of these diagrams and classify the quadrilaterals. Give reasons for your answers. The diagrams have not been drawn to scale.



(6)

[20]

Total: 40

Targeted Worksheet 3

Topic: Transformation geometry

This topic is the baseline knowledge that learners require at every stage of FET, so educators should teach it bearing in mind that it will assist with Co-ordinate or Analytical Geometry at a later stage.

Reference can also be made to the future grades when teaching.

Concentrate on teaching the learners how to:

- recognise, describe and perform translations, reflections and rotations with geometric figures and shapes on squared paper
- identify and draw lines of symmetry in geometric figures.

Work with the content in the following order:

Recognise, describe and perform transformations with points on a co-ordinate plane, focusing on:

- reflecting a point in the x-axis or y-axis
- translating a point within and across quadrants.

Recognise, describe and perform transformations with triangles on a co-ordinate plane, focusing on the co-ordinates of the vertices when:

- reflecting a triangle in the x-axis or y-axis
- translating a triangle within and across quadrants using the shapes of a rectangle and a square specifically.

Targeted Worksheet 3

Topic: Transformation geometry

Name:

Surname:

Marks: 40

Time: 60 minutes

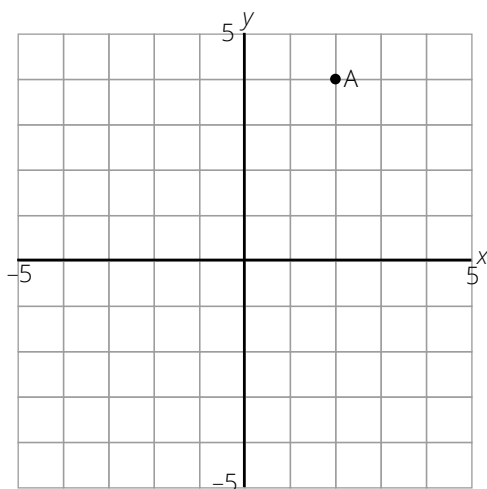
Instructions

Read the following instructions carefully before answering the questions.

1. This paper consists of 2 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

1.

1.1 Copy this grid into your class workbook.



1.2 Reflect A:

- a) in the x-axis and label its reflection A'. (2)
- b) in the y- axis and label its reflection A''. (2)

1.3 Copy and complete these statements:

- a) $A(\underline{\quad}; \underline{\quad}) \rightarrow A'(\underline{\quad}; \underline{\quad})$ (4)
- b) $(x; y) \rightarrow (\underline{\quad}; \underline{\quad})$ (2)

1.4 Copy and complete these statements.

a) $A(\underline{\quad}; \underline{\quad}) \rightarrow A''(\underline{\quad}; \underline{\quad})$ (4)

b) $(x; y) \rightarrow (\underline{\quad}; \underline{\quad})$ (2)

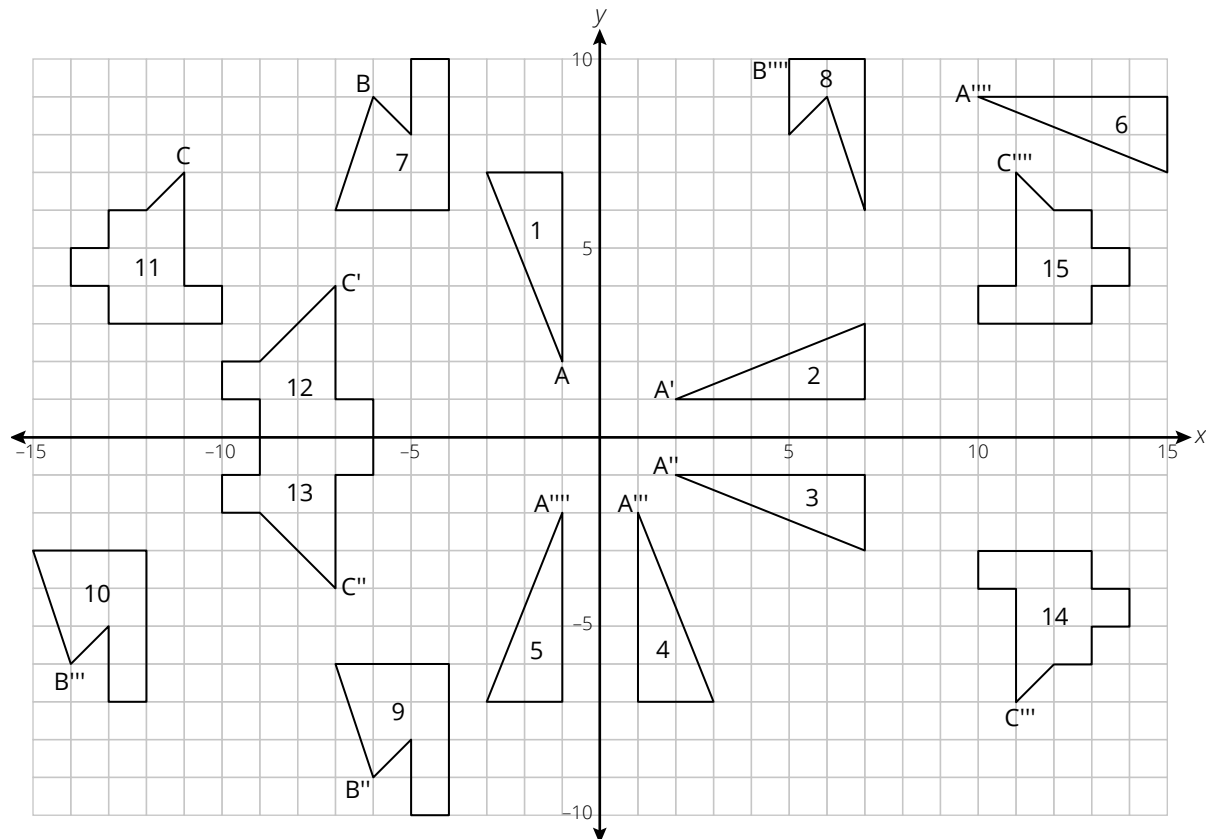
1.5 Translate A 6 units down and 5 units to the left and label the translated point A'''. (2)

1.6 Copy and complete this statement:

$A(\underline{\quad}; \underline{\quad}) \rightarrow A'''(\underline{\quad}; \underline{\quad})$ and $(x; y) \rightarrow (\underline{\quad}; \underline{\quad})$. (2)

[20]

2.



2.1 Name five pairs of figures that are reflections in the x-axis. (5)

2.2 Name three pairs of figures that are reflections in the y-axis. In each case, state the coordinates of the points that are labelled. (9)

2.3 Which figure is a translation of figure 10? Describe the translation in words and state the coordinates of the labelled points. (6)

[20]

Total: 40

Targeted Worksheet 1 Memorandum

Marks: 35

1.

1.1 10^2 ✓ (1)

1.2 4^2 or 2^4 ✓ (1)

1.3 2^3 ✓ (1)

1.4 3^4 (or 9^2) ✓ (1)

1.5 11^2 ✓ (1)

1.6 10^6 or 56×2^6 ✓ (1)

[6]

2.

2.1 81 ✓ (1)

2.2 144 ✓ (1)

2.3 1 000 ✓ (1)

2.4 64 ✓ (1)

2.5 8 ✓ (1)

2.6 64 ✓ (1)

[6]

3.

3.1 12 ✓ (1)

3.2 6 ✓ (1)

3.3 9 ✓ (1)

3.4 10 ✓ (1)

[4]

4.

4.1 2 ✓ (1)

4.2 10 ✓ (1)

4.3 3 ✓ (1)

4.4 5 ✓ (1)

[4]

5. No ✓; $3^2 = 3 \times 3 = 9$ and $3 \times 2 = 6$ ✓ (2)

[2]

6.

6.1 80 ✓ (1)

6.2 96 ✓ (1)

6.3 81 ✓ (1)

[3]

7. 900 ✓✓ (2)
[2]
8. 7 and 8 ✓✓ (2)
[2]
9. 42 ✓✓ (2)
[2]
10.

Decimal notation	345,708	230 000 ✓	1 500 ✓	34 089
Scientific notation	$3,45708 \times 10^2$ ✓	$2,3 \times 10^5$	$1,5 \times 10^3$	$3,4089 \times 10^4$ ✓

(4)
[4]

Targeted Worksheet 2 Memorandum

Marks: 40

1. $\triangle ABC$ is a right-angled scalene triangle ✓ because $\hat{B} = 90^\circ$ ✓ and it has 3 unequal sides.
 $\triangle DEF$ is an acute-angled isosceles triangle with $\hat{D} = \hat{E} = 68^\circ$ 3 and $\hat{F} = 44^\circ$. ✓

[4]

2. $6w = 180^\circ$ (∠ sum $\triangle MNP$) ✓
 $\hat{M} = 30^\circ$, ✓ $\hat{N} = 60^\circ$ ✓ and $\hat{P} = 90^\circ$ ✓
 So, $\triangle MNP$ is a right-angled scalene triangle. ✓
 $5x = 180^\circ$ (∠ sum $\triangle QRS$) ✓
 $x = 36^\circ$ ✓
 $\hat{Q} = 30^\circ$, ✓ $\hat{R} = \hat{S} = 72^\circ$ ✓
 So, $\triangle QRS$ is an acute-angled isosceles triangle. ✓

[10]

3. ABCD is a parallelogram because both pairs of opposite sides are parallel. ✓✓
 EFGH is a trapezium because one pair of opposite sides is parallel. ✓✓
 JKLM is a square because it is a rhombus with a right angle. ✓✓

[6]

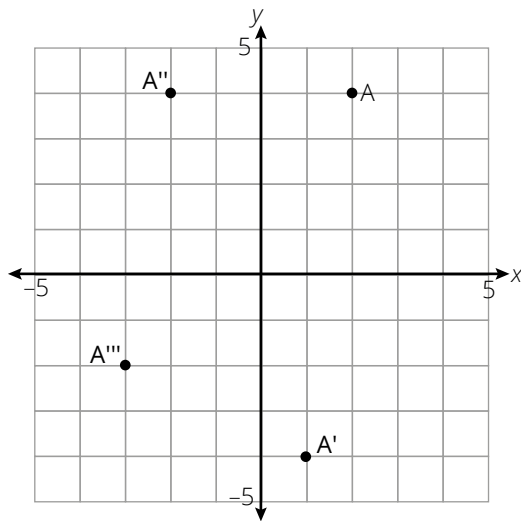
4. $4w + 80^\circ = 360^\circ$ (∠ sum quad ABCD) ✓
 $4w = 280^\circ \Rightarrow w = 70^\circ$ ✓
 $\hat{A} = \hat{C} = 100^\circ$ and $\hat{B} = \hat{D} = 70^\circ$
 ABCD is a parallelogram because it is a quadrilateral with both pairs of opposite angles equal. ✓✓
 $3x + 60^\circ = 360^\circ$ (∠ sum quad EFGH) ✓
 $3x = 300^\circ \Rightarrow x = 100^\circ$ ✓
 \hat{E} and $\hat{G} = 100^\circ$ and $\hat{F} = \hat{H} = 80^\circ$ ✓
 EFGH is a parallelogram because it is a quadrilateral with both pairs of opposite angles equal. ✓✓
 $2y + 270^\circ = 360^\circ$ (∠ sum quad JKLN) ✓
 $2y = 90^\circ \Rightarrow y = 45^\circ$ ✓
 $\hat{J} = \hat{K} = \hat{L} = \hat{N} = 90^\circ$ ✓
 JKLN is a rectangle because it is a quadrilateral with four right angles. ✓✓
 $3z + 180^\circ = 360^\circ$ 3 (∠ sum quad PQRT) ✓
 $3z = 180^\circ \Rightarrow z = 60^\circ$ ✓
 \hat{P} and $\hat{R} = 120^\circ$ and $\hat{Q} = \hat{T} = 60^\circ$ ✓
 PQRT is a parallelogram because it is a quadrilateral with both pairs of opposite angles equal. ✓✓

[20]
Total: 40

Targeted Worksheet 3 Memorandum

Marks: 40

1.1



1.2 Plotted on grid. (4)

1.3 a) $A(2; 4) \Rightarrow A'(2; -4)$ ✓✓ each coordinate (4)

b) $(x; y) \Rightarrow (x; -y)$ ✓✓ each coordinate (2)

1.4 a) $A(2; 4) \Rightarrow A''(-2; 4)$ ✓✓ each coordinate (4)

b) $(x; y) \Rightarrow (-x; y)$ ✓✓ each coordinate (2)

1.5 Plotted on grid. ✓✓ (2)

1.6 $A(2; 4) \Rightarrow A'''(-3; -2)$ and $(x; y) \Rightarrow (x - 5; y - 6)$ ✓✓ each coordinate (2)

[20]

2.

2.1 1 and 5 ✓ each figure (1)

2 and 3 ✓ each figure (1)

7 and 9 ✓ each figure (1)

12 and 13 ✓ each figure (1)

14 and 15 ✓ each figure (1)

2.2 4 and 5 $A'''(1; -2) \rightarrow A''''(-1; -2)$ ✓ each pair, each coordinate and translated coordinate (3)

7 and 8 $B(-6; 9) \rightarrow B'(6; -9)$ ✓ each pair, coordinate and translated coordinate (3)

11 and 15 $C(-11; 7) \rightarrow C'''(11; 7)$ ✓ each pair, coordinate and translated coordinate (3)

2.3 Figure 9. The translation is 8 units to the right and 3 down.

$B'''(-14; -6) \rightarrow B''(-6; -9)$ ✓✓ Description, each coordinate and translated coordinate (6)

[20]

Total: 40

Exemplar Assessments

Exemplar Assessments

Mid-year Test

Name: _____

Surname: _____

Time: 60 minutes

Marks: 60

Instructions and information

Read the following instructions carefully before answering the questions.

1. This paper consists of 9 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

Question 1

From the numbers 1, 3, 8, 15, 18, 23, 28 and 33 identify:

- | | | |
|-----|-------------------------------------|-----|
| 1.1 | two prime numbers | (2) |
| 1.2 | two numbers that are divisible by 4 | (1) |
| 1.3 | two odd composite numbers | (2) |
| 1.4 | multiples of 9. | (2) |

[7]

Question 2

Simplify the following.

- | | | |
|-----|---|-----|
| 2.1 | $x^2 \times x^2 \times x^4$ | (1) |
| 2.2 | $x^2 \div x^2$ | (1) |
| 2.3 | $(3y^3)^2$ | (1) |
| 2.4 | $4(27cd)^0$ | (1) |
| 2.5 | Write 1 504 000 000 in scientific notation. | (1) |

[5]

Question 3

Simplify.

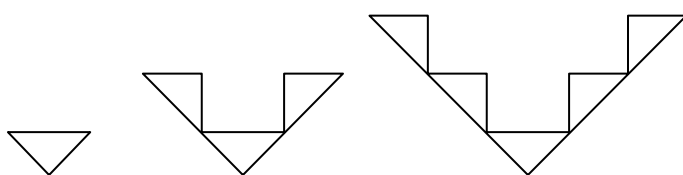
- | | | |
|-----|-----------------|-----|
| 3.1 | $3x^2y + 2x^2y$ | (2) |
|-----|-----------------|-----|

- 3.2 $2ac - 3cd + 4ac + 10cd$ (2)
- 3.3 Write down all the terms that are in the expression: $2x - 2 + 3x \div 2x$. (3)
- 3.4 Solve for x .
- 3.4.1 $3x - 1 = 8$ (2)
- 3.4.2 $2(x + 2) = 22$ (2)
- 3.4.3 $5^x = 125$ (2)

[13]

Question 4

Study the pattern and answer the questions.

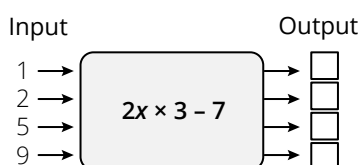


- 4.1 Draw shape 4. (2)
- 4.2 What is the constant difference of the pattern in terms of the number of triangles? (3)
- 4.3 Write down the general rule. (2)
- 4.4 If each triangle is made up of three sticks, how many sticks will you need to draw the 12th shape? (2)

[9]

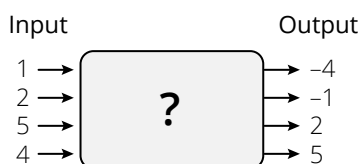
Question 5

- 5.1 Write the missing output values in the flow diagram.



(4)

- 5.2 Given the flow diagram, determine the general rule used to find the output values.



(3)

[7]

Question 6

Calculate the following. Show all working.

6.1 $-11 \times (-3) - 50 \div (-5) + 43$ (3)

6.2 $(-14 - 4) \div (5 - 8) \times (-2) + 20$ (3)

[6]**Question 7**

Is the statement true or false?

7.1 $8 - (5 \times 2) = (8 - 5) \times (8 - 2)$ (2)

7.2 $3 - 5(3 + 9) = 3 \div (-5 \times 3) + (-5 \times 9)$ (2)

[4]**Question 8**

On a cold winter night, the temperature in Bloemfontein is -7°C while the temperature in Johannesburg is -3°C . What is the difference between the temperatures in the cities? (3)

[3]**Question 9**

Mercury is $5,79 \times 10^7$ km from the Sun. Mars is $1,08 \times 10^8$ km from the Sun and Earth is $1,5 \times 10^8$ km from the Sun.

9.1 How far is Mars from Mercury when both planets and the Sun are in a straight line? (3)

9.2 If Saturn is $1,28 \times 10^8$ km from Earth, how far from the Sun is Saturn when these planets are in a straight line? (3)

[6]**Total: 60**

Exemplar Assessments

Term 3 Test

Name:

Surname:

Time: 60 minutes

Marks: 50

Instructions and information

Read the following instructions carefully before answering the questions.

1. This paper consists of 7 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

Question 1

Determine if the following statements are true or false. Give reasons for your answers.

- 1.1 A square is a rectangle. (2)
- 1.2 A rectangle is a square. (2)
- 1.3 A parallelogram is a rhombus. (2)

[6]

Question 2

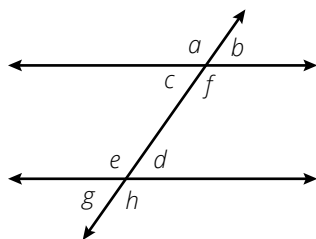
Calculate, without using a calculator.

- 2.1 $4(x - 2) = 8$ (2)
- 2.2 $x + 5 = 11$ (2)
- 2.3 $3x + 3 = 2x + 8$ (3)
- 2.4 $\frac{x}{4} = 25$ (2)
- 2.5 $\frac{x+1}{3} = 6$ (3)
- 2.6 $-(4x - 3) + 9 = -(5x + 6)$ (3)

[15]

Question 3

Identify the relationship between the angles.

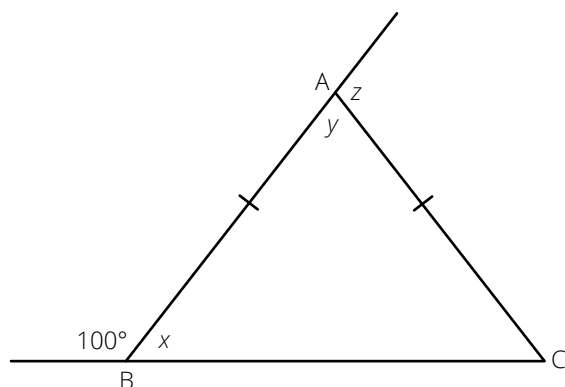


- 3.1 a, b, e, f (1)
 3.2 a and f (1)
 3.3 b and f (1)
 3.4 f and c (1)
 3.5 a and c (1)

[5]

Question 4

Find the values of x, y and z .



(6)

[6]

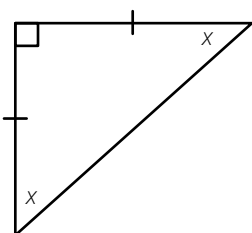
Question 5

x and y are complementary angles and $2x = 180^\circ$. Determine the sizes of x and y respectively. (5)

[5]

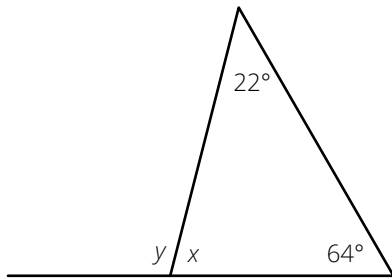
Question 6

6.1 Determine the value of x .



(4)

6.2 Determine the values of x and y in the diagram.

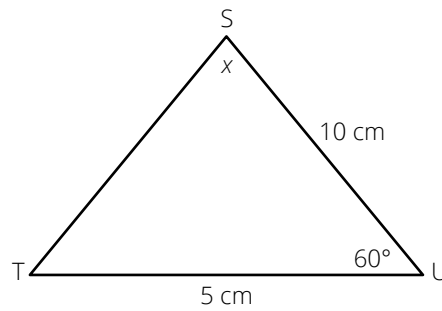
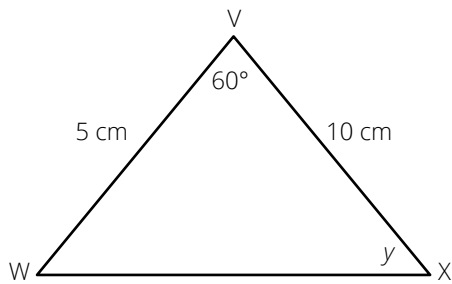


(5)

[9]

Question 7

Prove that the following triangles are congruent.



(4)

[4]

Total: 50

Exemplar Assessments

Final Year Test

Name: _____

Surname: _____

Time: 60 minutes

Marks: 50

Instructions and information

Read the following instructions carefully before answering the questions.

1. This paper consists of 6 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations in the spaces provided.
4. You may use a non-programmable scientific calculator.
5. Write neatly and legibly.

Question 1

Calculate the numerical value of the numbers in simplest form.

- 1.1 $14 + 3 - 6 - (2 \times 3)$ (1)
- 1.2 $4^5 \div 4^3$ (2)
- 1.3 $21 + 22 + 23 + 24$ (1)
- 1.4 Calculate the value of $\sqrt[3]{64} - \sqrt[3]{27}$. (2)
- 1.5 Write six hundred and fifty-two million in scientific notation. (1)
- 1.6 Calculate $8\frac{2}{3} \div 1\frac{4}{9}$. (2)
- 1.7 Which of the following numbers are rational?
 $-\sqrt{64}$; $\sqrt{\frac{16}{9}}$; $\sqrt{-4}$; π ; $9\frac{3}{5}$; $\sqrt{3}$; $0,3$ (2)
- 1.8 Write these decimals in ascending order:
 $0,969$; $0,099$; $0,96$; $0,09069$; $0,961$; $0,9639$; $0,996$ (2)
- 1.9 Increase 320 kg in the ratio 9 : 4. (1)
- 1.10 Decrease by R4 500 by 20%. (1)

[15]

Question 2

Simplify the expression.

- 2.1.1 $3x^2 - 2x + x^2 + 4 + 8x - 20$ (2)

2.2 Solve for x in the equations.

2.2.1 $2x + 5 = 9$ (1)

2.2.2 $x - 8 = -2$ (1)

2.2.3 $2(x + 3) = 3(x - 1)$ (3)

2.3 Find the value of $3x^2 - 6x + 4$ if $x = 2$. (2)

[9]

Question 3

The n th term of a sequence of numbers is $n^2 - 3$.

3.1 Write down the sixth term of the sequence. (1)

3.2 Calculate the sum of the first three terms. (3)

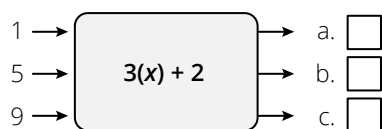
3.3 Consider the following sequence:



3.3.1 How many small triangles will there be in patterns 5 and 6? (2)

3.3.2 Describe the rule for this sequence. (1)

3.4 Write down the values of the missing numbers.

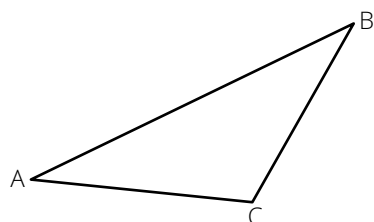


(3)

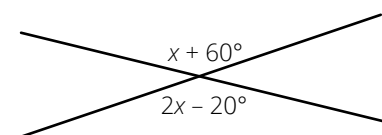
[10]

Question 4

4.1 Name the obtuse angle in $\triangle ABC$. (1)

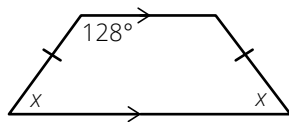


4.2 Calculate the size of in the given figure, with reasons.



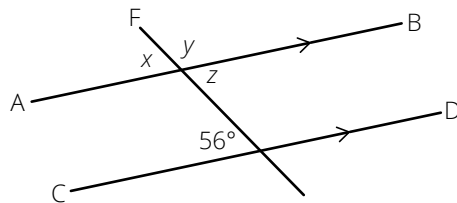
(3)

- 4.3 Calculate the size of x in the given figure, with reasons.



(2)

- 4.4 In the diagram, $AB \parallel CD$ and EF is a transversal that cuts AB and CD . Write down the size of the angles labelled x , y and z . (Give reasons.)

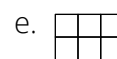
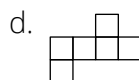
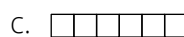
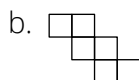
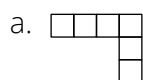


(6)

[12]

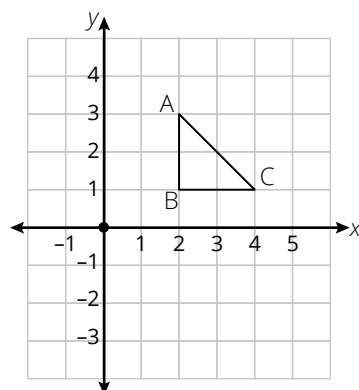
Question 5

- 5.1 Which of the nets can be folded to form a cube?



(1)

- 5.2 Write down the coordinates of the image of the shape in the diagram after it is translated 3 units left and 1 unit down.



(3)

[4]

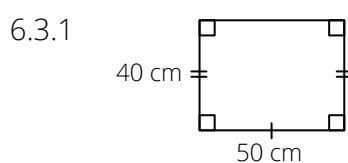
Question 6

Convert the units:

- 6.1 4,75 cm into mm (1)

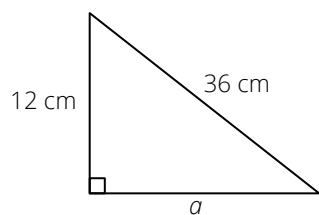
- 6.2 0,56 kg into grams. (1)

- 6.3 Find the perimeters of the shapes.



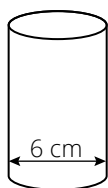
(1)

6.3.2



(4)

- 6.4 A cooldrink can holds 340 ml of juice. The diameter of the can is 6 cm.
Determine the height of the can, rounded off to the nearest centimetre
(use $\pi = 3,14$).



(3)

[10]

Total: 60

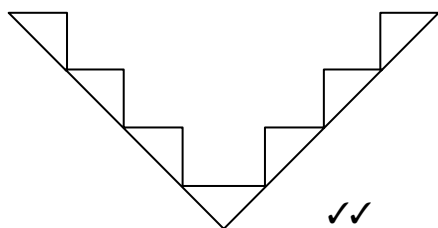
Exemplar Assessments

Mid-year Test Memorandum

Marks: 60

1.1	$3 \checkmark$ and $23 \checkmark$	(2)
1.2	8 and $28 \checkmark$	(1)
1.3	15 and $33 \checkmark \checkmark$	(2)
1.4	$18 \checkmark \checkmark$	(2)
		[7]
2.1	$x^2 \times x^2 \times x^4$ $= x^{2+2+4}$ $= x^8 \checkmark$	(1)
2.2	$x^2 \div x^2$ $= x^{2-2}$ $= x^0$ $= 1 \checkmark$	(1)
2.3	$(3y^3)^2$ $= 3^2 y^{3 \times 2}$ $= 9y^6 \checkmark$	(1)
2.4	$4 \times 1 = 4 \checkmark$	(1)
2.5	$1,504 \times 10^9 \checkmark$	(1)
		[5]
3.1	$3x^2y + 2x^2y$ $= 5x^2y \checkmark \checkmark$	(2)
3.2	$2ac - 3cd + 4ac + 10cd$ $= 6ac + 7cd \checkmark \checkmark$	(2)
3.3	The terms are $2x$; -2 and $(3x \div 2x)$. \checkmark	(3)
3.4.1	$3x = 8 + 1 \checkmark$ $x = 3 \checkmark$	(2)
3.4.2	$2x = 22 - 4 \checkmark$ $x = 9 \checkmark$	(2)
3.4.3	$5^x = 5^3 \checkmark$ $x = 3 \checkmark$	(2)
		[13]

4.1



(2)

4.2

Shape	1	2	3	4
Total triangles	1	3	5	7

✓✓

The constant difference is 2. ✓

(3)

4.3

$$y = 2x - 1 \quad \checkmark\checkmark$$

(2)

4.4

$$y = 2x - 1$$

$$= 2(12) - 1$$

$$= 23 \quad \checkmark$$

$$\text{Total sticks} = 23 \times 3 = 69 \quad \checkmark$$

(2)

[9]

5.1

$$2(1) \times 3 - 7 = -1 \quad \checkmark$$

$$2(2) \times 3 - 7 = 5 \quad \checkmark$$

$$2(5) \times 3 - 7 = 23 \quad \checkmark$$

$$2(9) \times 3 - 7 = 47 \quad \checkmark$$

(4)

5.2

The common difference is 3. ✓

Therefore, the general rule is $3x - 7$. ✓✓

(3)

[7]

6.1

$$-11 \times (-3) - 50 \div (-5) + 43$$

$$= -33 + 10 + 43 \quad \checkmark\checkmark$$

$$= 86 \quad \checkmark$$

(3)

6.2

$$(-14 - 4) \div (5 - 8) \times (-2) + 20$$

$$= -18 \div (-3) \times (-2) + 20 \quad \checkmark$$

$$= 6 \times (-2) + 20 \quad \checkmark$$

$$= 8 \quad \checkmark$$

(3)

[6]

7.1

$$8 - (5 \times 2) = (8 - 5) \times (8 - 2)$$

$$8 - 10 \neq 3 \times 6$$

False ✓✓

(2)

7.2 $3 - 5(3 + 9) = 3 \div (-5 \times 3) + (-5 \times 9)$

$-57 = -57$

True ✓✓

(2)

[4]

8. Difference in temperature is: $-3\text{ }^{\circ}\text{C} - (-7)\text{ }^{\circ}\text{C}$ ✓✓

$= 4\text{ }^{\circ}\text{C}$. ✓

(3)

[3]

9.1 Distance apart would be:

$(1,08 \times 10^8 \text{ km}) - (5,79 \times 10^7 \text{ km})$ ✓✓

$= 5,01 \times 10^7$ ✓

(3)

9.2 Distance from the Sun = $(1,28 \times 10^9 \text{ km}) - (1,5 \times 10^8 \text{ km})$ ✓✓

$= 2,78 \times 10^8 \text{ km}$ ✓

(3)

[6]

Total: 60

Exemplar Assessments

Term 3 Test Memorandum

Marks: 50

1.1 True. ✓ A square is a special type of rectangle because it has all the properties of a rectangle. ✓ (2)

1.2 False. ✓ A rectangle has two unequal pairs of parallel sides, unlike a square. ✓ (2)

1.3 False. ✓ A parallelogram has two unequal pairs of parallel sides, unlike a rhombus. ✓ (2)

[6]

2.1 $4(x - 2) = 8$
 $4x - 8 = 8$ ✓
 $4x = 8 + 8$
 $\frac{4x}{4} = \frac{16}{4}$
 $x = 4$ ✓ (2)

2.2 $x + 5 = 11$
 $x = 11 - 5$
 $x = 6$ ✓✓ (2)

2.3 $3x + 3 = 2x + 8$
 $3x - 2x = 8 - 3$
 $x = 5$ ✓✓✓ (3)

2.4 $\frac{x}{4} = 25$
 $x \times 1 = 25 \times 4$
 $x = 100$ ✓✓ (2)

2.5 $\frac{x+1}{3} = 6$
 $\frac{3}{1} \times \left(\frac{x+1}{3}\right) = 6 \times 3$
 $x + 1 = 18$
 $x = 18 - 1$
 $x = 17$ ✓✓✓ (3)

2.6 $-(4x - 3) + 9 = -(5x + 6)$
 $-4x + 3 + 9 = -5x - 6$
 $5x - 4x = -3 - 9 - 6$
 $x = -18$ ✓✓✓ (3)

[15]

- 3.1 Angles around a point (revolution) ✓ (1)
- 3.2 Vertically opposite angles ✓ (1)
- 3.3 Angles on a straight line ✓ (1)
- 3.4 Alternate angles ✓ (1)
- 3.5 Corresponding angles ✓ (1)
- [5]**
4. $x = 180^\circ - 100^\circ$
 $x = 80^\circ$ (angles on a straight line) ✓✓
 $y = 180^\circ - (80^\circ + 80^\circ)$ (angles of a triangle) ✓
 $y = 20^\circ$ ✓
 $z = 180^\circ - 20^\circ$ (angles on a straight line) ✓
 $z = 160^\circ$ ✓ (6)
- [6]**
5. $2x = 180^\circ$ ✓
 $x = 90^\circ$ ✓
 $x + y = 90^\circ$ ✓ (complementary \angle s) ✓
 $90^\circ + y = 90^\circ$
 $y = 0^\circ$ ✓ (5)
- [5]**
- 6.1 $x + x + 90^\circ = 180^\circ$ ✓ (\angle sum of Δ) ✓
 $2x = 180^\circ - 90^\circ$ ✓
 $2x = 90^\circ$
 $x = 45^\circ$ ✓ (4)
- 6.2 $x + 22^\circ + 64^\circ = 180^\circ$ (\angle sum of Δ) ✓
 $x = 180^\circ - 86^\circ$
 $x = 94^\circ$ ✓
 $y = 22 + 64^\circ$ ✓ (ext. \angle of Δ = sum of interior opposite angles) ✓
 $y = 86^\circ$ ✓ (\angle sum of Δ) (5)
- [9]**
7. $\hat{V} = \hat{U} = 60^\circ$ ✓
 $VW = UT = 5 \text{ cm}$
 $VX = US = 10 \text{ cm}$ ✓
 $\therefore \Delta VWX \equiv \Delta UTS$ ✓ (SAS) ✓ (4)
- [4]**
- Total: 50**

Exemplar Assessments

Final Year Test Memorandum

Marks: 60

1.1 $14 + 3 - 6 - (2 \times 3)$
 $= 14 + 3 - 6 - 6$
 $= 5 \checkmark$ (1)

1.2 $4^5 \div 4^3$
 $= 4^{5-3} \checkmark$
 $= 4^2 = 16 \checkmark$ (2)

1.3 $21 + 22 + 23 + 24$
 $= 90 \checkmark$ (1)

1.4 $\sqrt[3]{64} - \sqrt[3]{27}$
 $= 4 - 3 \checkmark$
 $= 1 \checkmark$ (2)

1.5 $6,52 \times 10^8 \checkmark$ (1)

1.6 $8\frac{2}{3} \div 1\frac{4}{9}$
 $= \frac{26}{30} \times \frac{9}{13} \checkmark$
 $= 4 \checkmark$ (2)

1.7 $\sqrt{\frac{16}{9}} \checkmark \checkmark$ (2)

1.8 0,09069; 0,9639; 0,099; 0,961; 0,969; 0,996; 0,96 $\checkmark \checkmark$ (2)

1.9 $320 \times \frac{9}{4} = 720 \checkmark$ (1)

1.10 R3 600 \checkmark (1)

[15]

2.1.1 $3x^2 - 2x + x^2 + 4 + 8x - 20$
 $= 4x^2 + 6x - 16 \checkmark \checkmark$ (2)

2.2.1 $2x + 5 = 9$
 $2x = 4$
 $x = 2 \checkmark$ (1)

2.2.2 $x - 8 = -2$
 $x = 6 \checkmark$ (1)

2.2.3 $2(x + 3) = 3(x - 1)$
 $2x + 6 = 3x - 3 \checkmark$
 $-x = -9 \checkmark$
 $x = 9 \checkmark$ (3)

2.3	$3(2)^2 - 6(2) + 4$ ✓ $= 4$ ✓	(2)	
			[9]
3.1	$n^2 - 3$ $(6)^2 - 3 = 33$ ✓	(1)	
3.2	$(1)^2 - 3 = -2$ ✓ $(2)^2 - 3 = 1$ $(3)^2 - 3 = 6$ Sum $- 2 + 1 + 6 = 5$ ✓✓	(3)	
3.3.1	15 and 21 ✓✓	(2)	
3.3.2	$n^2 - 1$ ✓	(1)	
3.4	8 ✓; 17 ✓; 26 ✓	(3)	
			[10]
4.1	$\hat{A}CB$ ✓	(1)	
4.2	$x + 60^\circ = 2x + 20^\circ$ (vertically opposite angles) ✓ $x - 2x = 20^\circ - 60^\circ$ $-x = -40^\circ$ ✓ $x = 40^\circ$ ✓	(3)	
4.3	$x = 180^\circ - 128^\circ$ (co-interior angles, parallel lines) ✓ $x = 52^\circ$ ✓	(2)	
4.4	$x = 56^\circ$ ✓ (corresponding angles; $AB \parallel CD$) ✓ $y = 180^\circ - 56^\circ = 124^\circ$ ✓ (\angle s on a straight line) ✓ $z = 56^\circ$ ✓ (vertically opposite angles)	(6)	
			[12]
5.1	d ✓	(1)	
5.2	$A(2; 3) \rightarrow A'(-1; 2)$ ✓ $B(2; 1) \rightarrow B'(-1; 0)$ ✓ $C(4; 1) \rightarrow C'(1; 0)$ ✓	(3)	
			[4]
6.1	475 mm ✓	(1)	
6.2	0,0056 g ✓	(1)	
6.3.1	$40 + 40 + 50 + 50 = 180$ cm ✓	(1)	

6.3.2 $a^2 = 36^2 - 12^2$ ✓ (Theorem of Pythagoras) 2

$$a^2 = 1\,152$$
 ✓

$$a = 33,94$$
 ✓

$$\text{Perimeter} = 33,94 + 12 + 36 = 81,94 \text{ cm}$$
 ✓ (4)

6.4 $V = \pi r^2 h$

$$340 = (3,14)(6)^2(h)$$
 ✓

$$h = \frac{340}{(3,14)(6)^2}$$
 ✓

$$= 3 \text{ cm}$$
 ✓ (3)

[10]

Total: 60

Notes

Dotted lines for writing notes.

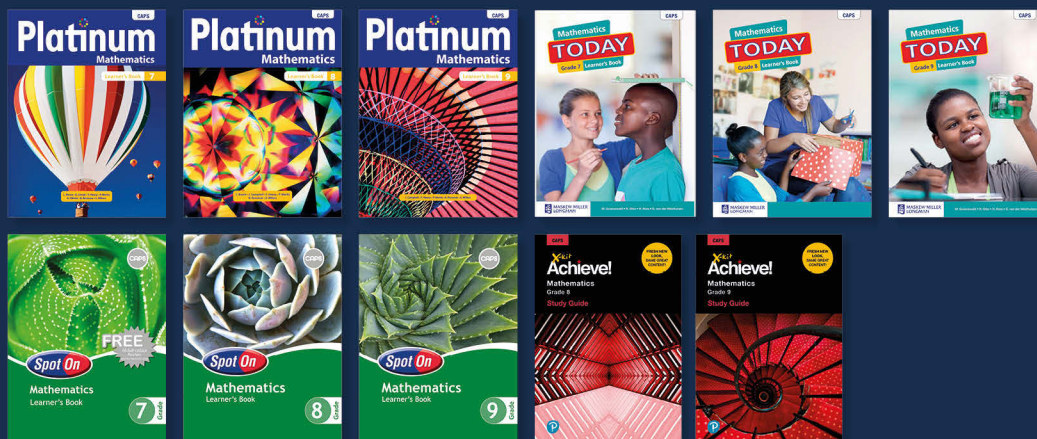
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CE36C4CD-3A0B-4779-B947-FD35DF12F274

ISBN 978-1-4857-2036-2