PROVINCE OF THE

EASTERN CAPE

EDUCATION

DIRECTORATE:

CURRICULUM FET PROGRAMMES

LESSON PLANS

TERM 4

MATHEMATICS GRADE 12

FOREWORD

The following Grade 10, 11 and 12 Lesson Plans were developed by Subject Advisors during May 2009. Teachers are requested to look at them, modify them where necessary to suit their contexts and resources. It must be remembered that Lesson Plans are working documents, and any comments to improve the lesson plans in this document will be appreciated. Teachers are urged to use this document with the following departmental policy documents: Subject Statement; LPG 2008; SAG 2008; Examination Guidelines 2009 and Provincial CASS Policy / Guidelines.

Lesson planning is the duty of each and every individual teacher but it helps when teachers sometimes plan together as a group. This interaction not only helps teachers to understand how to apply the Learning Outcomes (LOs) and Assessment Standards (ASs) but also builds up the confidence of the teachers in handling the content using new teaching strategies.

It must please be noted that in order to help teachers who teach across grades and subjects, an attempt has been made to **standardise lesson plan templates** and thus the new template might not resemble the templates used in each subject during the NCS training. However, all the essential elements of a lesson plan have been retained. This change has been made to assist teachers and lighten their administrative load.

Please note that these lesson plans are to be used only as a guide to complete the requirements of the Curriculum Statements and the work schedules and teachers are encouraged to develop their own learner activities to supplement and /or substitute some of the activities given here (depending on the school environment, number and type of learners in your class, the resources available to your learners, etc).

Do not forget to build in the tasks for the Programme of Assessment into your Lesson Plans.

Strengthen your efforts by supporting each other in clusters and share ideas. Good Luck with your endeavours to improve Teaching, Learning and Assessment.

SUBJECT: MATHEMATICS **GRADE 12** **LESSON PLAN 1** **TIME : 4 ½ HOURS**

REMEDIAL WORK ON TRIAL PAPER 1 AND PAPER 2

Learning Outcome 1: Number and Number Relationships *When solving problems, the learner is able to recognise, describe, represent and work confidently with numbers and their relationships to estimate, calculate and check solutions.*		Learning Outcome 2: Functions and Algebra *The learner is able to investigate, analyse, describe and represent a wide range of functions and solve related problems.*		Learning Outcome 3: Space, Shape and Measurement *The learner is able to describe, represent, analyse and explain properties of shapes in 2-dimensional and 3-dimensional space with justification.*		Learning Outcome 4: Data Handling and Probability *The learner is able to collect, organise, analyse and interpret data to establish statistical and probability models to solve related problems.*	
12.1.2Demonstrate an understanding of the definition of a logarithm and any laws needed to solve real-life problems	√	12.2.1(a)Demonstrate the ability to work with various types of functions and relations including the inverses listed in the following Assessment Standard.(b)Demonstrate knowledge of the formal definition of a function	√	12.3.3Use a two dimensional Cartesian co-ordinate system to derive and apply: the equation of a circle (any centre);the equation of a tangent to a circle given a point on the circle	√	11.4.1 Calculate and represent measures of central tendency and dispersion	√
12.1.3a) Identify and solve problems involving number patterns, including but not limited to arithmetic and geometric sequences and series. (b)Correctly interpret sigma notation.(c)Prove and correctly select the formula for and calculate the sum of series,	√	12.2.2a)Investigate and generate graphs of the inverse relations of functions, in particular the inverses of: $y = ax + q$ $y = ax^2$ $y = a^x$; $a > 0$(b) Determine which inverses are functions and how the domain of the original function needs to be restricted so that the inverse is also a function.	√	12.3.4(a)Use the compound angle identities to generalise the effect on the co-ordinates of a point (x ; y) after rotation about the origin through an angle θ.\(b)Demonstrate the knowledge that rigid transformations	√	Represent bivariant numerical data as a scatter plot and suggest intuitively whether a linear, quadratic or exponential function would best fit the data (problems should include issues related to health	√
12.1.4(a)Calculate the value of n in the formula $A = P(1 \pm i)^n$ b)Apply knowledge of geometric series to solving annuity, bond and sinking fund problems, with or without the use of the formulae:	√	12.2.3 Identify characteristics as listed below and hence use applicable characteristics to sketch graphs of the inverses of the functions listed above:(a)domain and range;(b)intercepts with the axes;(c)turning points, minima and maxima; (d)asymptotes;(e)shape and symmetry;(f)average gradient (average rate of change); intervals on which the function increases/decreases	√	12.3.5Derive and use the following compound angle identities: sin (α±β) ; cos (α±β) ; sin 2α ; cos2α	√		
12.1.5Critically analyse investment and loan options and make informed decisions as to the best option(s) (including pyramid and micro-lenders' schemes).	√	12.2.4 Factorise third degree polynomials (including examples which require the factor theorem)	√	12.3.6 Solve problems in two and three dimensions by constructing and interpreting geometric and trigonometric models	√		
12.1.6Solve non-routine, unseen problems	√	(12.2.7 a)Investigate and use instantaneous rate of change of a variable when interpreting models of situations: demonstrating an intuitive understanding of	√				

		the limit concept in the context of approximating the rate of change or gradient at a point; establishing the derivatives of the following functions from first principles: (c)Determine the equations of tangents to graphs.(d)Generate sketch graphs of cubic functions using differentiation to determine the stationary points (maxima, minima and points of inflection) and the factor theorem and other techniques to determine the intercepts with the *x*-axis.(e) Solve practical problems involving optimisation and rates of change.					
		12.2.8 Solve linear programming problems by optimising a function in two variables, subject to one or more linear constraints, by establishing optima by means of a search line and further comparing the gradients of the objective function and linear constraint boundary lines.	√				

TEACHING ACTIVITIES	**LEARNERS ACTIVITIES**	**RESOURCES**	**ASSESSMENT**	**DATE COMPLETED**
ACTIVITY 1 (One week) Educators give feedback ,and do remedial work and revision of all papers of trial examinations . Memoranda is discussed with learners TEACHING METHODS	Learners do corrections of the whole trial exams so that they rectify their mistakes.	Trial exam papers, calculators,	Tutorials , home work Memo Peer, self, educator.	

Discussion, question and answer, group work				
Homework: extra work given each day as home work				
Enrichment/Expanded Opportunities: challenging questions from past papers, and text books				
Teacher Reflections:				

SIGNATURES:

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TEACHER DATE HOD / SMT DATE

SUBJECT: MATHEMATICS	**GRADE 12**	**LESSON PLAN 2**	**TIME : 4 ½ HOURS**

REVISION FOR FINAL EXAMINATIONS(Paper 1)

Learning Outcome 1: Number and Number Relationships *When solving problems, the learner is able to recognise, describe, represent and work confidently with numbers and their relationships to estimate, calculate and check solutions.*		Learning Outcome 2: Functions and Algebra *The learner is able to investigate, analyse, describe and represent a wide range of functions and solve related problems.*		Learning Outcome 3: Space, Shape and Measurement *The learner is able to describe, represent, analyse and explain properties of shapes in 2-dimensional and 3-dimensional space with justification.*		Learning Outcome 4: Data Handling and Probability *The learner is able to collect, organise, analyse and interpret data to establish statistical and probability models to solve related problems.*	
12.1.2Demonstrate an understanding of the definition of a logarithm and any laws needed to solve real-life problems	√	12.2.1(a)Demonstrate the ability to work with various types of functions and relations including the inverses listed in the following Assessment Standard.(b)Demonstrate knowledge of the formal definition of a function	√	12.3.3Use a two dimensional Cartesian co-ordinate system to derive and apply: the equation of a circle (any centre);the equation of a tangent to a circle given a point on the circle		11.4.1 Calculate and represent measures of central tendency and dispersion	
12.1.3a) Identify and solve problems involving number patterns, including but not limited to arithmetic and geometric sequences and series. (b)Correctly interpret sigma notation.(c)Prove and correctly select the formula for and calculate the sum of series,	√	12.2.2a)Investigate and generate graphs of the inverse relations of functions, in particular the inverses of: $y = ax + q$ $y = ax^2$ $y = a^x$; $a > 0$(b) Determine which inverses are functions and how the domain of the original function needs to be restricted so that the inverse is also a function.	√	12.3.4(a)Use the compound angle identities to generalise the effect on the co-ordinates of a point $(x\ ;\ y)$ after rotation about the origin through an angle θ.\(b)Demonstrate the knowledge that rigid transformations		Represent bivariant numerical data as a scatter plot and suggest intuitively whether a linear, quadratic or exponential function would best fit the data (problems should include issues related to health	
12.1.4(a)Calculate the value of n in the formula $A = P(1 \pm i)^n$ b)Apply knowledge of geometric series to solving annuity, bond and sinking fund problems, with or without the use of the formulae:	√	12.2.3 Identify characteristics as listed below and hence use applicable characteristics to sketch graphs of the inverses of the functions listed above:(a)domain and range;(b)intercepts with the axes;(c)turning points, minima and maxima; (d)asymptotes;(e)shape and symmetry;(f)average gradient (average rate of change); intervals on which the function increases/decreases	√	12.3.5Derive and use the following compound angle identities: sin (α±β) ; cos (α±β) ; sin 2α ; cos2α			
12.1.5Critically analyse investment and loan options and make informed decisions as to the best option(s) (including pyramid and micro-lenders' schemes).	√	12.2.4 Factorise third degree polynomials (including examples which require the factor theorem)	√	12.3.6 Solve problems in two and three dimensions by constructing and interpreting geometric and trigonometric models			

12.1.6Solve non-routine, unseen problems	√	(12.2.7 a)Investigate and use instantaneous rate of change of a variable when interpreting models of situations: demonstrating an intuitive understanding of the limit concept in the context of approximating the rate of change or gradient at a point; establishing the derivatives of the following functions from first principles: (c)Determine the equations of tangents to graphs.(d)Generate sketch graphs of cubic functions using differentiation to determine the stationary points (maxima, minima and points of inflection) and the factor theorem and other techniques to determine the intercepts with the *x*-axis.(e) Solve practical problems involving optimisation and rates of change.	√				
		12.2.8 Solve linear programming problems by optimising a function in two variables, subject to one or more linear constraints, by establishing optima by means of a search line and further comparing the gradients of the objective function and linear constraint boundary lines.	√				

TEACHING ACTIVITIES	**LEARNERS ACTIVITIES**	**RESOURCES**	**ASSESSMENT**	**DATE COMPLETED**
ACTIVITY 1 (one week) Teacher revises paper 1 with the learners (including all the examinable assessment standards of grade 11 as stated in the grade 12 examination guide lines)	Learners work out as many paper 1 questions as possible	Paper 1 question papers (exemplar, past papers, June, trial, and others from study guides) memoranda	Tutorials, home work, class work Memoranda Peer, self, and educator.	

TEACHING METHODS Discussion, question and answer, group work				
Homework: extra work given each day as home work				
Enrichment/Expanded Opportunities: challenging questions from past papers, and text books				
Teacher Reflections:				

SIGNATURES:

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TEACHER DATE HOD / SMT DATE

SUBJECT: MATHEMATICS	**GRADE 12**	**LESSON PLAN 3**	**TIME : 4 ½ HOURS**

REVISION FOR FINAL EXAMINATIONS(Paper 2)

Learning Outcome 1: Number and Number Relationships *When solving problems, the learner is able to recognise, describe, represent and work confidently with numbers and their relationships to estimate, calculate and check solutions.*		Learning Outcome 2: Functions and Algebra *The learner is able to investigate, analyse, describe and represent a wide range of functions and solve related problems.*		Learning Outcome 3: Space, Shape and Measurement *The learner is able to describe, represent, analyse and explain properties of shapes in 2-dimensional and 3-dimensional space with justification.*		Learning Outcome 4: Data Handling and Probability *The learner is able to collect, organise, analyse and interpret data to establish statistical and probability models to solve related problems.*	
12.1.2Demonstrate an understanding of the definition of a logarithm and any laws needed to solve real-life problems		12.2.1(a)Demonstrate the ability to work with various types of functions and relations including the inverses listed in the following Assessment Standard.(b)Demonstrate knowledge of the formal definition of a function		11.3.1 Use the formulae for surface area and volume of right pyramids, right cones, spheres and combinations of these geometric objects.	√	11.4.1 Calculate and represent measures of central tendency and dispersion	√
12.1.3a) Identify and solve problems involving number patterns, including but not limited to arithmetic and geometric sequences and series. (b)Correctly interpret sigma notation.(c)Prove and correctly select the formula for and calculate the sum of series,		12.2.2a)Investigate and generate graphs of the inverse relations of functions, in particular the inverses of: $y = ax + q$ $y = ax^2$ $y = a^x$; $a > 0$(b) Determine which inverses are functions and how the domain of the original function needs to be restricted so that the inverse is also a function.		11.3.3 Use a Cartesian co-ordinate system to derive and apply: 12.3.3Use a two dimensional Cartesian co-ordinate system to derive and apply: the equation of a circle (any centre);the equation of a tangent to a circle given a point on the circle	√	Represent bivariate numerical data as a scatter plot and suggest intuitively whether a linear, quadratic or exponential function would best fit the data (problems should include issues related to health	√
12.1.4(a)Calculate the value of n in the formula $A = P(1 \pm i)^n$ b)Apply knowledge of geometric series to solving annuity, bond and sinking fund problems, with or without the use of the formulae:		12.2.3 Identify characteristics as listed below and hence use applicable characteristics to sketch graphs of the inverses of the functions listed above:(a)domain and range;(b)intercepts with the axes;(c)turning points, minima and maxima; (d)asymptotes;(e)shape and symmetry;(f)average gradient (average rate of change); intervals on which the function increases/decreases		11.3.4 Investigate, generalise and apply the effect on the co-ordinates of the point (x;y) after rotation around the origin through an angle of 90^0 or 180^0 The vertices $(x_1: y_1)$, $(x_2:y_2)$, … $(x_n:y_n)$ of a polygon after enlargement through the origin,by a constant factor k. 12.3.4(a)Use the compound angle identities to generalise the effect on the co-ordinates of a point $(x ; y)$ after rotation about the origin through an angle θ.\(b)Demonstrate the knowledge that rigid transformations preserve shape and size and that enlargement preserves shape and size.	√		

12.1.5Critically analyse investment and loan options and make informed decisions as to the best option(s) (including pyramid and micro-lenders' schemes).		12.2.4 Factorise third degree polynomials (including examples which require the factor theorem)		11.3.5 Derive and use the values of the trigonometric functions of 30^0,45^0,60^0. Derive and use the following identities: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\sin^2\theta+\cos^2\theta = 1$ 12.3.5 Compound angle identities Sin (A±B) = sinA cos B ± cos A sin B	√		
12.1.6Solve non-routine, unseen problems		(12.2.7 a)Investigate and use instantaneous rate of change of a variable when interpreting models of situations: demonstrating an intuitive understanding of the limit concept in the context of approximating the rate of change or gradient at a point; establishing the derivatives of the following functions from first principles: (c)Determine the equations of tangents to graphs.(d)Generate sketch graphs of cubic functions using differentiation to determine the stationary points (maxima, minima and points of inflection) and the factor theorem and other techniques to determine the intercepts with the *x*-axis.(e) Solve practical problems involving optimisation and rates of change.		11.3.6 Solve problems in two dimensions 12.3.6 Solve problems in 2-D and 3-D by constructing and interpreting geometric and trigonometric models	√		
		12.2.8 Solve linear programming problems by optimising a function in two variables, subject to one or more linear constraints, by establishing optima by means of a search line and further comparing the gradients of the objective function and linear constraint boundary lines.					

TEACHING ACTIVITIES	LEARNERS ACTIVITIES	RESOURCES	ASSESSMENT	DATE COMPLETED

Teacher makes use of exemplars and previous question papers to reinforce different topics that are examinable: Mensuration:, Coordinate Geometry, Transformation Geometry Trigonometry and Data Handling:	Learners work out as many paper 2 questions as possible	Study Guides, Maths 911,Study mates, Exemplars, previous exam question papers, calculators.	Method: Tutorials Tool: Memo Form: Peer, Self , Educator	
Homework: Extra activities are given from the resources				
Enrichment/Expanded Opportunities: Learners work on their paces in answering the questions.				
Teacher Reflections:				

SIGNATURES:

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TEACHER DATE HOD / SMT DATE