GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG PROVINCE
MATHEMATICS – ANNUAL TEACHING PLAN –
FINAL GRADE 12 12 JANUARY 2022

DATE	TOPIC	CONTENT	F	ASSESSMENT	DATE Completed	% Completed
TERM 1				**3 TASKS TERM 1**		
Week 1 **12/1 – 14/1** **(3 days)**	Number patterns	• Patterns: Investigate number patterns leading to those where there is a constant second difference between consecutive terms, and the general term is therefore quadratic.(1 day) • Number patterns (Arithmetic sequences and series).				**3%**
	Sequences & Series	• Number patterns (Arithmetic sequences and series). • Number patterns (Geometric sequences and series).				
Week 2 **17/1 – 21/1**	Sequences & Series	• Sigma notation. • Sum of series. • Derivation and application of the formulae for the sum of arithmetic series: $S_n = \frac{n}{2}[2a + (n-1)d]$ $S_n = \frac{n}{2}[a + L]$				**7%**
Week 3 **24/1 – 28/1**	Sequences & Series	• Derivation and application of the formulae for the sum of geometric series: $S_n = \frac{a(r^n - 1)}{r - 1}; (r \neq 1)$ and • Sum to infinity $S_n = \frac{a}{1 - r}; (-1 < r < 1), (r \neq 1)$ $S_\infty = \frac{a}{1 - r}$		**ASSIGNMENT** **SBA marks:15%**		**10%**
Week 4 **31/1 – 04/2**	Euclidean Geometry	• Revise earlier work on the necessary and sufficient Conditions for polygons to be similar. • Revise grade 10 Midpoint theorems. • Revise Gr 11 Circle geometry All Theorems. • **PROVE (accepting results established in earlier grades)A line drawn parallel to one side of a triangle divides the other two sides proportional(and the midpoint theorem as a special case of this theorem):** Proportionality • **USE:** Proportionality and Midpoint Theorems. **NB: Converses to be taught for application purposes**				**14%**
Week 5 **07/2 – 11/2**	Euclidean Geometry	• **PROVE:** Equiangular triangles are similar and • **That triangles with sides in proportion are similar ; and The Pythagorean theorem by similar triangles** • **USE:** Equiangular triangles are similar. • **NB: Converses to be taught for application purposes** •				**17%**
Week 6 **14/2 –18/2**	Euclidean Geometry	**USE: COMBINED** • Proportionality and Midpoint Theorems. • Equiangular triangles are similar. • Triangles with sides in proportion are similar. Pythagorean Theorem by similar triangles	**F**	**INVESTIGATION/ PROJECT** **SBA marks: 15%**		**21%**

Week 7 **21/2 – 25/2**	Trigonometry	• Revise and use the identities: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\theta \neq k.90^{\circ}, k$ an odd integer; and $\sin^2\theta + \cos^2\theta = 1$. • Revise and use reduction formulae to simplify the following expressions: $\sin(90^{\circ} \pm \theta)$; $\cos(90^{\circ} \pm \theta)$; $\sin(180^{\circ} \pm \theta)$; $\cos(180^{\circ} \pm \theta)$ and $\tan(180^{\circ} \pm \theta)$; $\sin(360^{\circ} \pm \theta)$; $\cos(360^{\circ} \pm \theta)$ and $\tan(360^{\circ} \pm \theta)$; . $\sin(-\theta)$; $\cos(-\theta)$ and $\tan(-\theta)$;				**24%**
Week 8 **28/2 – 04/3**	Trigonometry	• Compound angle identities: **Accepting** $\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$ • Prove $\sin(\alpha \pm b) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$ $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$ • Double angle identities: $\sin 2\alpha = 2\sin\alpha\cos\alpha$ $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$ $= 2\cos^2\alpha - 1$ $= 1 - 2\sin^2\alpha$	**F**			**28%**
Week 9 **07/3 – 11/3**	Trigonometry	• Determine the general solutions of trigonometric equations. Also, determine solutions in specific intervals involving Compound and double angles		**TEST** **SBA MARKS:** **15%**		**31%**
Week 10 **14/3 – 17/3** **(4 days)**	Trigonometry	• Prove and apply the sine, cosine and area rules. • Solve problems in two and three dimensions involving compound angels •				**34%**
END OF TERM 1 SCHOOLS CLOSES ON THE 17/03/2022						

DATE	TOPIC	CONTENT	F	ASSESSMENT	Date Completed	% Completed
TERM 2				**2 TASKS TERM 2**		
Week 1 05/4 – 08/4 (4 days)	Analytical Geometry	Derive and apply: the equation of a line through two given points; • The equation of a line through one point and parallel or perpendicular to a given line , and • The inclination (θ) of a line, where $m = tan\theta$ is the gradient of the line $(0^\circ \leq \theta \leq 180^\circ)$				**38%**
Week 2 11/4 –15/4 (4 days)	Analytical Geometry	The equation of a circle [with radius ***r*** and centre (***a; b***)] • $(x-a)^2 + (y-b)^2 = r^2$ • The equation of a tangent to a given circle				**41%**
Week 3 18/4 – 22/4 (4 days)	Functions: Formal Definition Inverses Restrictions of domain	• Definition of a function. • Determine and sketch graphs of the inverses of the functions defined by $y = ax + q;\ y = ax^2$. Focus on the following characteristics: • domain and range, • intercepts with the axes, • turning points, • minima, maxima, • asymptotes (horizontal and vertical) • shape and symmetry, • average gradient (average rate of change), • intervals on which the function increases /decreases. • General concept of the *inverse of a function* and restriction of the domain to ensure that the inverse is a function(in order to obtain a one- to – one function)				**45%**
Week 4 25/4 – 29/4 (4 days)	Functions: Inverses Exponential and Logarithmic	• Revision of the exponential function and the exponential laws and Graph of the function defined by $y = b^x, b > 0$ and $b \neq 1$. • Understand the definition of a logarithm(**LAWS NOT EXAMINABLE)** The graph defined $y = \log_b x \Leftrightarrow x = b^y, b > 0; b \neq 1$ The graph of the function defined by $y = \log_b x$ for both the cases $0 < b < 1$ and $b > 1$..				**48%**
Week 5 02/5 – 06/5 (4 days)	Functions: Polynomials Differential Calculus	• Factorise third degree polynomial .Apply the Remainder and Factor Theorem to polynomial of degree at most 3**(NO PROOFS REQUIRED)** • Intuitive understanding of limit concept in the context of approximating the rate of change or the gradient of a function at a point.				**52%**

Week 6 09/5 – 13/5	Differential Calculus	• Use Limits to define the derivative of a function f at any x $$f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$$ Generalise to find the derivative of f at any point x in the domain of f , i.e., define the derivative function $f'(x)$ of the function $f(x)$. Understand intuitively that $f'(a)$ is the gradient of the tangent to the graph of f at the point with x -coordinate a. • Using the definition (first principle), find the derivative, $f'(x)$ for a, b and c constants: $f(x) = ax^2 + bx + c$; $f(x) = ax^3$; $f(x) = \frac{a}{x}$ and $f(x) = c$.		**TEST**		**55%**
Week 7 16/5 – 20/5	Differential Calculus	• Use the formula (for any real number n) together with the rules $\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$ and $\frac{d}{dx}[kf(x)] = k\frac{d}{dx}[f(x)], \quad (k$ a constant				**59%**
Week 8 23/5 – 27/5	**Differential Calculus**	• Find equations of tangents to graphs of functions. • Introduce the second derivative of $f(x)$ and how it determines the concavity of a function. • Sketch graphs of cubic polynomial functions using differentiation to determine the Coordinate of stationary points, and points of inflection (where concavity changes). Also, determine the x -intercepts of the graph using the factor theorem and other techniques.				**62%**
Week 9 30/5 – 03/06	**Differential Calculus**	• **Measurement (REVISION) -Surface Area and Volume formulas** • Solve practical problems concerning optimisation and rate of change, including calculus of motion.	**F**	**TEST** **SBA marks: 15%**		**66%**
Week 10 06/6 – 10/6	**Financial Mathematics**	• Use the simple and compound growth formulae [$A = P(1+in)$ and $A = P(1+i)^n$] to solve problems, including interest, hire purchase, inflation, population growth and other real-life problems. • Understand the implication of fluctuating foreign exchange rates (e.g. on the petrol price, imports, exports, overseas travel).				**69%**
Week 11 13/6 – 17/6 (3 days)	**Financial Mathematics**	• Use simple and compound decay formulae: $A = (1 - in)$ and $A = (1 - i)^n$ to solve problems (including straight line depreciation and depreciation on a reducing balance). • The effect of different periods of compound growth and decay ,including nominal and effective interest rate.				**72%**
Week 12 **20/6 – 24/6**	**Financial Mathematics**	• Solve problems involving present value and future value annuities			6%	**76%**
END OF TERM 2 SCHOOLS CLOSES ON THE 24/06/2022						

DATE	TOPIC	CONTENT	F	ASSESSMENT	Date Completed	% Completed
TERM 3				**2 TASKS TERM 3**		
Week 1 19/7 –22/7 (4days)	**Financial Mathematics**	• Make use of logarithms to calculate the value of *n* , the time period, in the equations • Critically analyse investment and loan options and make informed decisions as to best option(s) (including pyramid).				**79%**
Week 2 25/7 – 29/7	**Statistics**	• Histograms • Frequency polygons • Ogives (cumulative frequency curves) • Variance and standard deviation of ungrouped data				**83%**
Week 3 01/8 –05/8	**Statistics**	• Symmetric and skewed data • Identification of outliers • Revise symmetric and skewed data.				**86%**
Week 4 08/8 – 12/8 (3 days)	**Statistics**	• Use statistical summaries, scatterplots, regression (in particular the least squares regression line) and correlation to analyse and make meaningful comments on the context associated with given bivariate data, including interpolation, extrapolation and discussions on skewness.		**TEST** **SBA marks:15%**		**90%**
Week 5 15/8 - 19/8	**Counting and Probability**	• The use of Venn Diagram to solve probability problems , deriving and applying the following for any two events A and B in a Sample Space S. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ A and B are mutually exclusive if $P(A \text{ and } B) = 0;$ $P(A \text{ or } B) = P(A) + P(B)$ • A and B are complementary if they are mutually exclusive; and $P(A) + P(B) = 1.$ Then $P(B) = P(not(A)) = 1 - P(A)$				**93%**
Week 6 22/8 – 26/8	**Counting and Probability**	• Identify dependents and independents events and the product rule for independent events: $P(A \text{ and } B) = P(A) \times P(B)$ • The use of Venn diagrams to solve probability problems, deriving and applying formulae for any three events A, B and C in a sample space S. • Use tree diagrams for the probability of consecutive or simultaneous events which are not necessarily independent. • Probability problems using Venn diagrams, tree diagrams, two-way contingency tables and other techniques to solve probability problems (where events are not necessarily independent).				**97%**
Week 7 29/8 – 02/9	**Counting and Probability**	• Apply the fundamental counting principle to solve probability problems.				100%
Week 8 05/9 – 09/9	**Prelim exam**			PRELIMINARY EXAMINATIONS **SBA marks:25%%**		
Week 9 12/9 – 16/9	**Prelim exam**					
Week 10 19/9 – 23/9	**Prelim exam**					
Week 11 26/9 – 30/9	**Prelim exam**					
END OF TERM 3 SCHOOLS CLOSES ON THE 30/09/2022						

DATE	TOPIC	CONTENT	F	ASSESSMENT	Date Completed	% Completed
TERM 4						
Week 1 11/10 – 14/10 (4days)	Revision					
Week 2 17/10 – 21/10	Revision					
Week 3 24/10 – 28/10	Revision					
Week 4 31/10 – 04/11	**FINAL EXAMINATIONS**		**F**	**SBA: 25%** **Final Exam: 75%**		
Week 5 07/11 – 11/11	**FINAL EXAMINATIONS**					
Week 6 14/11 – 18/11	**FINAL EXAMINATIONS**					
Week 7 21/11 – 25/11	**FINAL EXAMINATIONS**					
Week 8 28/11 – 02/12	**FINAL EXAMINATIONS**					
Week 9 05/12 – 09/12	**FINAL EXAMINATIONS**					
Week 10 12/12 – 16/12 (3 Days0	**FINAL EXAMINATIONS**					
END OF TERM 4 SCHOOLS CLOSES ON THE 14/12/2022						

Mark distribution for Mathematics NCS end – of – year papers: Grade 10 - 12			
PAPER 1: Grade 12: bookwork: maximum 6 marks			
Description	**Grade 10**	**Grade 11**	**Grade 12**
Algebra and equations (and inequalities)	30 ± 3	45 ± 3	25 ± 3
Patterns and Sequence	15 ± 3	25 ± 3	25 ± 3
Finance and Growth	10 ± 3		
Finance, growth and decay		15 ± 3	15 ± 3
Functions and graphs	30 ± 3	45 ± 3	35 ± 3
Differential Calculus			35 ± 3
Probability	15 ± 3	20 ± 3	15 ± 3
TOTAL	**100**	**150**	**150**
PAPER 2: Grade 11 and 12: theorems and / or trigonometric proofs: maximum 12 marks			
Description	**Grade 10**	**Grade 11**	**Grade 12**
Statistics	15 ± 3	20 ± 3	20 ± 3
Analytical Geometry	15 ± 3	30 ± 3	40 ± 3
Trigonometry	40 ± 3	50 ± 3	50 ± 3
Euclidean Geometry	30 ± 3	50 ± 3	40 ± 3
TOTAL	**100**	**150**	**150**

Note:

- Modelling as a process should be included in all papers, the contextual questions can be set on any topic.
- Questions will not necessarily be compartmentalised in sections, as the table indicates. Various topics can be integrated in the same question.
- **Formula sheet must be provided for the final examinations in Grade 10 and 11**

NB:

- 6 SBA TASKS TO BE COMPLETED IN 2022

THE TASKS ARE AS FOLLOWS

TERM	SBA TASKS	WEIGNTING
1	Investigation/Project	15%
	Assignment	15%
	Test	15%
2	Test	15%
3	Test	15%
	Preparatory Examination	25%
	WEIGHTING	**100%**