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Basic Education
REPUBLIC OF SOUTH AFRICA

2021 National ATP: Grade – Term 1: MATHEMATICS GRADE 12

TERM 1	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Number patterns, sequences and series				Euclidean Geometry			Trigonometry		
	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. Number patterns, including arithmetic and geometric sequences and series 2. Sigma notation 3. Derivation and application of the formulae for the sum of arithmetic and geometric series: 3.1 $S_n = \frac{n}{2}[2a+(n-1)d]$; $S_n = \frac{n}{2}(a+l)$ 3.2 $S_n = \frac{a(r^n-1)}{r-1}$; $(r \neq 1)$; and 3.3 $S_n = \frac{a}{1-r}$; $(-1<r<1), (r \neq 1)$				1. Revise earlier work on the necessary and sufficient conditions for polygons to be similar. 2. Prove (accepting results established in earlier grades): • that a line drawn parallel to one side of a triangle divides the other two sides proportionally (and the Mid-point Theorem as a special case of this theorem) ; • that equiangular triangles are similar; • that triangles with sides in proportion are similar; and • the Pythagorean Theorem by similar triangles.			Compound angle identities: $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \sin\beta\cos\alpha$ $\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \pm \sin\alpha\sin\beta$ $\sin 2\alpha = 2\sin\alpha\cos\beta$ $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$ $= 2\cos^2\alpha - 1$ $= 1 - 2\sin^2\alpha$ Solve Problems in two and three dimensions 1. Prove and apply the sine, cosine and area rules. 2. Solve problems in two dimensions using the sine, cosine and area rules.		
SBA	Assignment				Investigation or project			Test		

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2021 National ATP: Grade – Term 2: MATHEMATICS GRADE 12

TERM 2	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Analytical Geometry		Functions: Formal definition; inverses, exponential and logarithmic		Differential Calculus including Polynomials				Finance, growth and decay	
	Derive and apply: 1. the equation of a line through two given points; 2.the equation of a line through one point and parallel or perpendicular to a given line; and 3.The inclination (θ) of a line, where $m = tan\theta$ is the gradient of the line $(0^\circ \leq \theta \leq 180^\circ)$ 1. The equation that defines a circle with radius *r* and centre (*a*;*b*) . 2. Determination of the equation of a tangent to a given circle.		1. Definition of a *function*. 2. General concept of the *inverse of a function* and how the domain of the function may need to be restricted (in order to obtain a one-to-one function) to ensure that the inverse is a function. 3. Determine and sketch graphs of the inverses of the functions defined by 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. 4. Revision of the exponential function and the exponential laws and graph of the function defined by $y = a^x$ where $b > o$ and $b \neq 0$ 5. Understand the definition of a logarithm: $y = \log_b x \Leftrightarrow x = b^y \; ; \; b > 0 \; and \; b \neq 1$ 6. The graph of the function define $y = \log_b x$ for both the cases $0 < b < 1$ and $b > 1$.		Factorise third-degree polynomials. Apply the Remainder and Factor Theorems to polynomials of degree at most 3 (no proofs required). 1. An intuitive understanding of the limit concept, in the context of approximating the rate of change or gradient of a function at a point. 2. 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*. 3. Using the definition (first principle), find the derivative, *f* '(*x*) for *a*, *b* and *c* constants: 3.1 $f(x) = ax^2 + bx + c$; 3.2 $f(x) = ax^3$; 3.3 $f(x) = \frac{a}{x}$ and 3.4 *f* (*x*) = *c*. 4. Use the formula (for any real number *n*) together with the rules 4.1 $\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$ and 4.2 $\frac{d}{dx}[kf(x)] = k\frac{d}{dx}[f(x)]$, ($k$ a constant) 5. Find equations of tangents to graphs of functions. 6. Introduce the second derivative of *f* (*x*) and how it determines the concavity of a function. 7. 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. 8. Solve practical problems concerning optimisation and rate of change, including calculus of motion.			1.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). 2. Solve problems involving present value and future value annuities. 3. Make use of logarithms to calculate the value of *n* , the time period, in the equations $A = P(1+i)^n \quad or \quad A = P(1-i)^n.$	
SBA	**Test**									

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2021 National ATP: Grade – Term 3: MATHEMATICS GRADE 12

TERM 3	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Finance, growth and decay (continuation)	Statistics			Counting and Probability					
	4. Critically analyse investment and loan options and make informed decisions as to best option(s) (including pyramid).	1.Histograms 2.Frequency polygons 3.Ogives (cumulative frequency curves) 4.Variance and standard deviation of ungrouped data 5.Symmetric and skewed data 6.Identification of outliers. 7. Revise symmetric and skewed data. 8. 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.			1.Revised the addition rule for mutually exclusive events: $P(A\ or\ B) = PA + P(B)$ The complementary rule: $P(not\ A) = 1 - P(A)$ and the identity $P(A\ or\ B) = P(A) + P(B) - P(A\ and\ B)$ 2.Identify dependents and independents events and the product rule for independent events: $P(A\ and\ B) = P(A) \times P(B)$ 3.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. 4. Use tree diagrams for the probability of consecutive or simultaneous events which are not necessarily independent. 5.Probability problems using Venn diagrams, tree diagrams, two-way contingency tables and other techniques to solve probability problems (where events are not necessarily independent). 6.Apply the fundamental counting principle to solve probability problems.				
SBA	**Test**							**TRIAL EXAMINATION**		

2021 National ATP: Grade – Term 4: MATHEMATICS GRADE 12

TERM 4	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	EXAM
Topics	**Revision**				**Final Examination**						
											PAPER 1 150 marks 3 hours **Algebraic expressions, equations and inequalities 25** **Number patterns 25** **Functions and graphs 35** **Finance, growth and decay 15** **Differential Calculus 35** **Counting Principle and Probability 15**
SBA											
TOTAL NUMBER OF SBA TASKS 6 **Term 1 Assignment (15%), Investigation / Project 15%) and Test (10%)** **Term 2 Test (10%)** **Term 3 Test (10 %) and Test (10 %)** **Term 4 Final Examination**											**PAPER 2 150 marks 3 hours** **Euclidean Geometry 40** **Analytical Geometry 40** **Trigonometry 50** **Statistics 20**