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Basic Education
REPUBLIC OF SOUTH AFRICA

2021 National ATP: Grade – Term 1: MATHEMATICS GRADE 11

TERM 1	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Exponents and surds		Equations and inequalities			Euclidean Geometry			Trigonometry (reduction formulae, graphs, equations)	
	1. Simplify expressions and solve equations using the laws of exponents for rational exponents where $x^{\frac{p}{q}} = \sqrt[q]{x^p}; x > 0; q > 0$ 2. Add, subtract, multiply and divide simple surds. 3. Solve simple equations involving surds.		1. Complete the square 2. Solve Quadratic equations (by factorization and by using the quadratic formula) 3. Solve Quadratic inequalities in one unknown (Interpret solutions graphically.) **NB**: It is recommended that the solving of equations in two unknowns is important to be used in other equations like hyperbola-straight line as this is normal in the case of graphs 4. Equations in two unknowns, one of which is linear and the other quadratic 5. Nature of roots			Accept results established in earlier grades as axioms and also that a tangent to a circle is perpendicular to the radius, drawn to the point of contact. Then investigate and prove the theorems of the geometry of circles: • The line drawn from the centre of a circle perpendicular to a chord bisects the chord; • The perpendicular bisector of a chord passes through the centre of the circle; • The angle subtended by an arc at the centre of a circle is double the size of the angle subtended by the same arc at the circle (on the same side of the chord as the centre); • Angles subtended by a chord of the circle, on the same side of the chord, are equal; • The opposite angles of a cyclic quadrilateral are supplementary; • Two tangents drawn to a circle from the same point outside the circle are equal in length; • The angle between the tangent to a circle and the chord drawn from the point of contact is equal to the angle in the alternate segment. Use the above theorems and their converses, where they exist, to solve riders.		1. Derive and use the identities: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\theta \neq k.90^\circ, k$ an odd integer; and $sin^2\theta + cos^2\theta = 1$. 2. Derive and use reduction formulae to simplify the following expressions: 2.1. $\sin(90^\circ \pm \theta); \cos(90^\circ \pm \theta)$; 2.2. $\sin(180^\circ \pm \theta); \cos(180^\circ \pm \theta)$ and $\tan(180^\circ \pm \theta)$; 2.3. $\sin(360^\circ \pm \theta); \cos(360^\circ \pm \theta)$ and $\tan(360^\circ \pm \theta)$; 2.4. $\sin(-\theta); \cos(-\theta)$ and $\tan(-\theta)$; 3.Determine for which values of a variable an identity holds.	
SBA	**Investigation or project**						**Test**			

2021 National ATP: Grade – Term 2: MATHEMATICS GRADE 11

TERM 2	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Trig – equations	Analytical Geometry			Number patterns		Functions			
	4. Determine the general solutions of trigonometric equations. Also, determine solutions in specific intervals	Revise 1. distance between the two points; 2. gradient of the line segment connecting the two points (and from that identify parallel and perpendicular lines); and 3. Coordinates of the mid-point of the line segment joining the two points. 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 $(0^\circ \leq \theta \leq 180^\circ)$			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.Revise the effect of the parameters a and q and investigate the effect of p on the graphs of the functions defined by: 1.1. $y = f(x) = a(x+p)^2 + q$ 1.2. $y = f(x) = \frac{a}{x+p} + q$ 1.3. $y = f(x) = a.b^{x+p} + q$ where $b > 0$, $b \neq 1$ 2.Investigate numerically the average gradient between two points on a curve and develop an intuitive understanding of the concept of the gradient of a curve at a point. 3.Point by point plotting of basic graphs defined by $y = sin\theta$, $y = cos\theta$ and $y = tan\theta$ for $\theta \in [-360^\circ; 360^\circ]$ 4.Investigate the effect of the parameter *k* on the graphs of the functions defined by $y = \sin(kx)$, $y = \cos(kx)$ and $y = tan(kx)$ 5. Investigate the effect of the parameter *p* on the graphs of the functions defined by $y = \sin(x+p)$, $y = \cos(x+p)$ and $y = tan(x+p)$ 6. Draw sketch graphs defined by: $y = a\sin k(x+p)$, $y = a\cos k(x+p)$ and $y = a\,tan\,k(x+p)$ at most two parameters at a time.		
SBA	**Assignment**						**Test**			

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2021 National ATP: Grade – Term 3: MATHEMATICS GRADE 11

TERM 3	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Topics	Trigonometry (sine, cosine and area rules)			Measurement		Statistics			Probability	
	1. Prove and apply the sine, cosine and area rules. 2. Solve problems in two dimensions using the sine, cosine and area rules.			• Revise the volume and surface areas of right-prisms and cylinders. • Study the effect on volume and surface areas when multiplying any dimension by a constant factor k. Calculate volume and surface areas of spheres, right prisms, right cones and combination of those objects (figures).		1. Revise measures of central tendency in ungrouped data. 2. Measures of central tendency in grouped data: calculation of mean estimate of grouped and ungrouped data and identification of modal interval and interval in which the median lies. 3. Revision of range as a measure of dispersion and extension to include percentiles, quartiles, inter-quartile and semi-inter-quartile range. 4. Five number summary (maximum, minimum and quartiles) and box and whisker diagram. 5. Use the statistical summaries (measures of central tendency and dispersion), and graphs to analyse and make meaningful comments on the context associated with the given data. 6.Histograms 7.Frequency polygons 8.Ogives (cumulative frequency curves) 9.Variance and standard deviation of ungrouped data 10.Symmetric and skewed data 11. Identification of outliers.			1. The use of probability models to compare the relative frequency of events with the theoretical probability. 2. The use of Venn diagrams to solve probability problems, deriving and applying the following for any two events 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 $P(A \text{ and } B) = 0$; A and B are complementary if they are mutually exclusive; and $P(A) + P(B) = 1.$ Then $P(B) = P(not(A)) = 1 - P(A)$ 3.Revised the addition rule for mutually exclusive events: $P(A \text{ or } B) = PA + P(B)$ The complementary rule: $P(not\ A) = 1 - P(A)$ and the identity $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ 4.Identify dependents and independents events and the product rule for independent events: $P(A \text{ and } B) = P(A) \times P(B)$ 5.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. 6.Use tree diagrams for the probability of consecutive or simultaneous events which are not necessarily independent .	
SBA	**Test**								**Test**	

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2021 National ATP: Grade – Term 4: MATHEMATICS GRADE 11

TERM 3	Week 1	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	EXAM
Topics	**Euclidean Geometry**	Finance, growth and decay			**Revision**	**Examination**			**Admin**	
	6.Use tree diagrams for the probability of consecutive or simultaneous events which are not necessarily independent .	1.Use the simple and compound growth formulae to solve problems, including interest, hire purchase, inflation, population growth and other real-life problems. 2.Understand the implication of fluctuating foreign exchange rates (e.g. on the petrol price, imports, exports, overseas travel). 3.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). 4.The effect of different periods of compound growth and decay, including nominal and effective interest rates								**PAPER 1 150 marks 3 hours** **Algebraic expressions, equations and inequalities 45** **Number patterns 25** **Functions and graphs 45** **Finance, growth and decay 15** **Probability 20**
SBA	**Test**									
TOTAL NUMBER OF SBA TASKS 7 **Term 1 Investigation / Project 15%) and Test (10%)** **Term 2 Assignment (15%) and Test (10%)** **Term 3 Test (10 %) and Test (10 %)** **Term 4 Test (10 %)**										**PAPER 2 150 marks 3 hours** **Euclidean Geometry 40** **Analytical Geometry 30** **Trigonometry 60** **Statistics 20**