



**FURTHER MATHS SCHEME**  
**CLASS: SS2**

SN	TOPICS	BREAKDOWN/ ANALYSIS	REMARK
1	QUADRATIC FUNCTIONS AND EQUATIONS	<ul style="list-style-type: none"> <li>- Analysis of quadratic roots</li> <li>-Sum and products of roots</li> <li>-Symmetric functions of roots</li> <li>- Use of discriminant and analysis of the nature of roots.</li> </ul>	Use of discriminant
2	MINIMUM AND MAXIMUM VALUES OF QUAD. FUNCTIONS	<ul style="list-style-type: none"> <li>- Minimum values</li> <li>-Maximum values</li> <li>- Turning points</li> <li>- Line of symmetry</li> <li>- Equating of line of symmetry</li> <li>-Graphing.</li> </ul>	Equating of line symmetry
3	POLYNOMIALS	<ul style="list-style-type: none"> <li>- Definition of polynomials</li> <li>-Addition and subtraction of polynomials</li> <li>-Multiplication of polynomials</li> <li>- Division of polynomials</li> </ul>	
		<ul style="list-style-type: none"> <li>-Remainders theorem</li> <li>- Factors theorem</li> <li>-Related problems in polynomials</li> <li>- Sketching polynomial curve</li> <li>- Identities of polynomials</li> <li>- Odd and even functions</li> </ul>	Curve sketching and identities of polynomials
4	BINOMIAL EXPANSION	<ul style="list-style-type: none"> <li>Expansions in general basic notations and ideas</li> <li>- Pascal's triangle and its uses in expansion</li> <li>- Binomial theorem and combinatorial or a reduced formula for expansion.</li> <li>- The use of binomial expansion in numerical approximations.</li> </ul>	
5	PERMUTATION AND COMBINATION	<ul style="list-style-type: none"> <li>- Basic definitions and rules of operation.</li> <li>- Factorials</li> <li>-Permutation as an arrangement of elements</li> <li>-The reduced formula for</li> </ul>	<ul style="list-style-type: none"> <li>- The use of reduced formula</li> <li>- conditional permutations.</li> </ul>

		<p>permutation</p> <ul style="list-style-type: none"> <li>- Arrangement of identical objects</li> <li>- Conditional permutation</li> </ul>	
6	CONSTRUCTION	<p>Permutation as a ring</p> <ul style="list-style-type: none"> <li>- Combination as a selection of an object</li> <li>- Simple problems involving permutations and combinations</li> </ul>	
7	TRIGONOMETRY	<ul style="list-style-type: none"> <li>- Rotation and radian measures</li> <li>- Trigonometrical identities (revisit)</li> <li>- compound angles</li> <li>- Identities of compound angles</li> <li>- Sums and differences of angles</li> <li>- double and half angles</li> <li>- Sums and difference of ratios, products of ratios.</li> </ul>	Emphasizes on compound angles, double and half angles

8	SEQUENCE AND SERIES	<ul style="list-style-type: none"> <li>- Definitions and basic concepts</li> <li>Linear sequence</li> <li>*First term</li> <li>* common difference</li> <li>-Nth term of linear sequence</li> <li>- the sum of the first nth term of a linear sequence</li> <li>- Simple problems leading to linear sequence.</li> </ul>	
		<p>Exponential sequence or Geometric sequence</p> <ul style="list-style-type: none"> <li>* first term</li> <li>* common ratio</li> <li>Nth term of an exponential sequence</li> <li>Sum of the first nth term of an exponential sequence</li> <li>- Combined linear and exponential sequence</li> <li>- Some problems leading to exponential sequence</li> </ul>	Emphasis laid upon combined linear and exponential sequence
9	SERIES	<ul style="list-style-type: none"> <li>- Definition of series a summation of sequence</li> <li>-Infinite and finite series</li> <li>-Convergence and divergence series(not deeply)</li> <li>-Limiting value of a series</li> </ul>	

		- Sum to infinite of a series.	
10	PARTIAL FRACTIONS	Introduction - addition of Algebraic fractions as well as subtraction (fusing) - Basic concept of partial fractions - Partial fraction with denominator of distinct factors * Use of cover- up rule and method of comparison of co-efficient.	
		- Partial fraction with repeated factors in the denominator. - partial fraction with unfactorised quadratic factor - Partial fraction with degree of the numerator greater than that of the denominator (the use of long division)	Emphasis on the use of long division
11	VECTORS 1	- Introduction and basic concepts. - Scalars and vectors - Addition and subtraction of vectors - Multiplication of vectors (position vectors) - Vectors in two dimension - vectors in three dimension	Emphasis on addition, subtraction and division by a scalar.
12	VECTORS 2	Making a vector a unit vector - Scalar products of two vectors - basic properties of Dot product of vectors -Projections of vectors - Some trigonometric applications of Dot product of vectors * the prove of sine-rule * The prove of Pythagoras theorem * The prove of cosine rule	Emphasis on Dot. Product and projections of vectors
13	CO-ORDINATE GEOMETRY 1	-Cartesian co-ordinate systems - Distance between two points - Division of a line segment - Mid-point of a line segment * Internal division * External division * Ratios of division	

14	CO-ORDINATE GEOMETRY 2	<ul style="list-style-type: none"> <li>- Gradients</li> <li>- Equation of a straight line</li> <li>- Intersecting lines (parallel and perpendicular lines)</li> <li>- Locus of a point</li> <li>- determination law</li> </ul>	
15	CO-ORDINATE GEOMETRY 3	<ul style="list-style-type: none"> <li>- Circles, definitions and common terms associated with circles.</li> <li>- Equation of a circle                             <ul style="list-style-type: none"> <li>*Standard equation</li> <li>* General equation</li> </ul> </li> <li>- Centre and a given point on a circle</li> <li>- Parametric equations of a circle.</li> </ul>	
16	CIRCLES	<ul style="list-style-type: none"> <li>- Method of defining a circle</li> <li>- Points outside a circle</li> <li>- Touching circles</li> <li>-Tangent to a circle</li> </ul>	Method of defining a circle
17	LIMITS	<ul style="list-style-type: none"> <li>-Definition of a limits, basic concepts</li> <li>- Limit to a particular point</li> <li>- Limit to infinity (<math>\infty</math>)</li> <li>- Limit of trigonometrical function</li> </ul>	Limits of trigonometrical function should be emphasized
18	DIFFERENTIATION	<ul style="list-style-type: none"> <li>- Basic concepts and definition</li> <li>- Differentiation from 1<sup>st</sup> principle</li> <li>- Differentiation by definition</li> <li>- The derivation of differentiation formular and its usefulness</li> </ul>	Emphasis on chain rule as well as quotient rule
19	TECHNIQUES IN DIFFERENCIATION	<ul style="list-style-type: none"> <li>- Product rule i.e. a function of the form <math>f(x).g(x)</math></li> <li>- Quotient rule of differentiation i.e. function of the form <math>F(x)</math></li> </ul>	

		$\overline{g(x)}$ - Chain rule of differentiation of function.	
20	IMPLICIT DIFFERENTIATION	Differentiation of function of the form $f(x,y)=0$	
21	DIFFERENTIATION OF TRIG FUNCTIONS	- Recap of trig identities - Derivative of Sin x - Derivative of Cos x - Derivative of Tan x - Derivative of Sec x	
22	APPLICATIONS OF DIFFERENTIATION	- Gradient of a curve at a point - Tangents and normal to a curve - Application of differentiation in motions	