

SING YIN SECONDARY SCHOOL
Syllabus for F.4 Mathematics (2016-2017)

Textbook : New Horizon Senior Mathematics Compulsory Part – 4A, 4B & 5A

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Students are expected to develop the following attitudes:

- to love logical thinking
- to accept careful work as important
- to accept challenging work.

Chapter	Topics	Approx. No. of Period	Objectives
1	Real Numbers and Complex Numbers	8	<ul style="list-style-type: none"> • To appreciate the development of various types of numbers • To learn some basic concepts of complex numbers • To learn the four basic operations of complex numbers • To prove the irrationality of $\sqrt{2}$ by contradiction.
2	Functions and Graphs	7	<ul style="list-style-type: none"> • To recognize the intuitive concepts of functions, independent and dependent variables, domains and co-domains • To recognize the notation of functions and use algebraic, tabular and graphical methods to represent functions • To understand the features of the graphs of constant functions, linear functions and quadratic functions
3	Quadratic Equations in One Unknown	8	<ul style="list-style-type: none"> • To recognize the general form of a quadratic equation • To understand the factor method for solving quadratic equations • To use the quadratic formula to solve quadratic equations • To use the graphical method to solve quadratic equations • To apply different methods to solve practical problems involving quadratic equations
4	Roots and Coefficients of Quadratic Equations	8	<ul style="list-style-type: none"> • To understand and apply the concept of discriminant in order to determine the nature of roots of quadratic equations • To understand the relations between the roots and coefficients • To form a quadratic equation with given roots • To form a quadratic equation by the sum of roots and the product of roots
5	Equations of Straight Lines	9	<ul style="list-style-type: none"> • To find the equations of straight lines under different conditions • To understand the general form of equations of straight lines • To understand the features of straight lines • To understand the possible intersections of two straight lines

6	More about Polynomials	22	<ul style="list-style-type: none"> To manipulate the addition, subtraction, multiplication and division of polynomials and to understand the division algorithm To learn and to apply the remainder theorem To understand the factor theorem and to apply it in factorization of polynomials up to degree 3 To understand the concepts of the greatest common divisor and the least common multiple of polynomials To perform addition, subtraction, multiplication and division of rational functions
7	Exponential and Logarithmic Functions	19	<ul style="list-style-type: none"> To understand the definition and the laws of rational indices To solve exponential equations and logarithmic equations To understand the definition and the properties of logarithms To appreciate the applications of logarithms To understand the properties of exponential functions and logarithmic functions and recognize the features of their graphs
8	Quadratic Functions and Graphs	6	<ul style="list-style-type: none"> To find the optimum values of quadratic functions graphically To understand the method of completing square To find the optimum values of quadratic functions by the algebraic method To solve practical problems involving the optimum values of quadratic functions
9	Trigonometry	10	<ul style="list-style-type: none"> To understand the concepts of angles and quadrants To learn the definition of trigonometric ratios and arbitrary angles To understand the concepts of reference angles and find trigonometric ratios by using reference angles To use the trigonometric identities to simplify expressions To understand the functions sine, cosine and tangent, and their graphs and properties To solve trigonometric equations To find the graphical solutions of trigonometric equations by reading graphs or adding a suitable straight line on a trigonometric graph
10	Important Formulas in Trigonometry	6	<ul style="list-style-type: none"> To study and use the formula $\frac{1}{2}ab \sin C$ for calculating the areas of triangles To study and use the sine formula to solve oblique triangles To study and use the cosine formula to solve oblique triangles To study and apply Heron's formula

11	Variations	12	<ul style="list-style-type: none"> To understand direct and inverse variations and their applications to real-life problems To understand the graphs of direct and inverse variations To understand joint and partial variations and their applications to real-life problems
14	Basic Properties of Circles	16	<ul style="list-style-type: none"> To understand and apply the properties of chords, angles and arcs of a circle To understand and apply the properties of a cyclic quadrilateral To understand the tests for concyclic points and cyclic quadrilaterals
			<ul style="list-style-type: none"> Learn to use Intersection Chord Theorem to solve problems.
15	Tangents to Circles	6	<ul style="list-style-type: none"> To understand the properties of tangents to a circle To understand the properties of angles in the alternate segment

Note: Contents in the shaded boxes are not included in the syllabus.

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Signature of Teacher In Charge : _____

Checked by : _____