

## X Std

Topic	Content	Expected Learning Outcomes	Mode of Transaction	No. of Periods
I. Theory of Sets	i. Introduction ii. Properties of operations on sets iii. De Morgan's laws- verification using example Venn diagram iv. Formula for $n(A \cup B \cup C)$ v. Functions	<ul style="list-style-type: none"> <li>To revise the basic concepts on Set operations</li> <li>To understand the properties of operations of sets - commutative, associative, and distributive restricted to three sets.</li> <li>To understand the laws of complementation of sets.</li> <li>To understand De Morgan's laws and demonstrating them by Venn diagram as well.</li> <li>To solve word problems using the formula as well as Venn diagram.</li> <li>To understand the definition, types and representation of functions.</li> <li>To understand the types of functions with simple examples.</li> </ul>	Use Venn diagrams for all illustrations  Give examples of functions from economics, medicine, science etc.	26 Periods
II. Sequences and Series of Real Numbers	i. Introduction ii. Sequences iii. Arithmetic Progression (A.P) iv. Geometric Progression (G.P) v. Series	<ul style="list-style-type: none"> <li>To understand to identify an Arithmetic Progression and a Geometric Progression.</li> <li>Able to apply to find the nth term of an Arithmetic Progression and a Geometric Progression.</li> <li>To determine the sum of n terms of an Arithmetic Progression and a Geometric Progression.</li> <li>To determine the sum of some finite series such as <math>\sum n, \sum n^2, \sum n^3</math></li> </ul>	Use pattern approach  Use dot pattern as teaching aid  Use patterns to derive formulae  Examples to be give from real life situations	27 Periods

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III. Algebra	i. Solving linear equations ii. Polynomials iii. Synthetic division iv. Greatest common divisor (GCD) and Least common multiple (LCM) v. Rational expressions vi. Square root vii. Quadratic Equations	<ul style="list-style-type: none"> <li>• To understand the idea about pair of linear equations in two unknowns. Solving a pair of linear equations in two variables by elimination method and cross multiplication method.</li> <li>• To understand the relationship between zeros and coefficients of a polynomial with particular reference to quadratic polynomials.</li> <li>• To determine the remainder and the quotient of the given polynomial using Synthetic Division Method.</li> <li>• To determine the factors of the given polynomial using Synthetic Division Method.</li> <li>• Able to understand the difference between GCD and LCM, of rational expression.</li> <li>• Able to simplify rational expressions (Simple Problems),</li> <li>• To understand square roots.</li> <li>• To understand the standard form of a quadratic equation <math>ax^2 + bx + c = 0</math>, (<math>a \neq 0</math>).</li> <li>• To solve quadratic equations (only real root) - by factorization, by completing the square and by using quadratic formula.</li> <li>• Able to solve word problems based on quadratic equations.</li> <li>• Able to correlate relationship between discriminant and nature of roots.</li> <li>• Able to Form quadratic equation when the roots are given.</li> </ul>	Illustrative examples – Use charts as teaching aids Recall GCD and LCM of numbers initially Compare with operations on fractions Compare with the square root operation on numerals. Help students visualize the nature of roots algebraically and graphically.	40 Periods

Topic	Content	Expected Learning Outcomes	Mode of Transaction	No. of Periods
IV. Matrices	i. Introduction ii. Types of matrices iii. Addition and subtraction iv. Multiplication v. Matrix equation	<ul style="list-style-type: none"> <li>• Able to identify the order and formation of matrices</li> <li>• Able to recognize the types of matrices</li> <li>• Able to add and subtract the given matrices.</li> <li>• To multiply a matrix by a scalar, and the transpose of a matrix.</li> <li>• To multiply the given matrices (2x2; 2x3; 3x2 Matrices).</li> <li>• Using matrix method solve the equations of two variables.</li> </ul>	Using of rectangular array of numbers.  Using real life situations.  Arithmetic operations to be used	16 Periods
V. Coordinate Geometry	i. Introduction ii. Revision :Distance between two points iii. Section formula, Mid point formula, Centroid formula iv. Area of a triangle and quadrilateral v. Straight line	<ul style="list-style-type: none"> <li>• To recall the distance between two points, and locate the mid point of two given points.</li> <li>• To determine the point of division using section formula (internal).</li> <li>• To calculate the area of a triangle.</li> <li>• To determine the slope of a line when two points are given, equation is given.</li> <li>• To find an equation of line with the given information.</li> <li>• Able to find equation of a line in: slope-intercept form, point -slope form, two -point form, intercept form.</li> <li>• To find the equation of a straight line passing through a point which is (i) parallel (ii) perpendicular to a given straight line.</li> </ul>	Simple geometrical result related to triangle and quadrilaterals to be verified as applications.  the form $y = mx + c$ to be taken as the starting point	25 Periods

Topic	Content	Expected Learning Outcomes	Mode of Transaction	No. of Periods
VI. Trigonometry	i. Introduction ii. Identities iii. Heights and distances	<ul style="list-style-type: none"> <li>• Able to identify the Trigonometric identities and apply them in simple problems.</li> <li>• To understand trigonometric ratios and applies them to calculate heights and distances. (not more than two right triangles)</li> </ul>	By using Algebraic formulae  Using trigonometric identities.  The approximate nature of values to be explained	21 Periods
VII. Geometry	i. Basic proportionality theorem (with proof) ii. Converse of Basic proportionality theorem (with proof) iii. Angle bisector theorem (with proof) iv. Converse of Angle bisector theorem (with proof) v. Similar triangles (theorems without proof)	<ul style="list-style-type: none"> <li>• To understand the theorems and apply them to solve numerical problems only.</li> </ul>	Paper folding symmetry and transformation techniques to be adopted.  Formal proof to be given  Drawing of figures  Step by step logical proof with diagrams to be explained and discussed	20 Periods
VIII. Measurements	i. Introduction ii. Surface Area and Volume of Cylinder, Cone, Sphere, Hemisphere, Frustum iii. Surface area and volume of combined figures iv. Invariant volume	<ul style="list-style-type: none"> <li>• To determine volume and surface area of cylinder, cone, sphere, hemisphere, frustum</li> <li>• Volume and surface area of combined figures (only two).</li> <li>• Some problems restricted to constant Volume.</li> </ul>	Use 3D models to create combined shapes  Use models and pictures ad teaching aids.  Choose examples from real life situations.	24 Periods

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IX. Practical Geometry	i. Introduction ii. Construction of tangents to circles iii. Construction of Triangles iv. Construction of cyclic quadrilateral	<ul style="list-style-type: none"> <li>Able to construct tangents to circles.</li> <li>Able to construct triangles, given its base, vertical angle at the opposite vertex and (a) median (b) altitude (c) bisector.</li> <li>Able to construct a cyclic quadrilateral</li> </ul>	To introduce algebraic verification of length of tangent segments.  Recall related properties of angles in a circle before construction.  Recall relevant theorems in theoretical geometry	15 Periods
X. Graphs	i. Introduction ii. Quadratic graphs iii. Some special graphs	<ul style="list-style-type: none"> <li>Able to solve quadratic equations through graphs</li> <li>To solve graphically the equations  <math>y \propto x</math>, <math>y \propto \frac{1}{x}</math>, <math>xy = k</math>, <math>\forall x, y &gt; 0</math>.</li> <li>Able to apply graphs to solve word problems</li> </ul>	Interpreting skills also to be taken care of graphs of quadratics to precede algebraic treatment.  Real life situations to be introduced.	10 Periods
XI. Statistics	i. Recall Measures of central tendency ii. Measures of dispersion iii. Coefficient of variation	<ul style="list-style-type: none"> <li>To recall Mean for grouped and ungrouped data situation to be avoided).</li> <li>To understand the concept of Dispersion and able to find Range, Standard Deviation and Variance.</li> <li>Able to calculate the coefficient of variation.</li> </ul>	Use real life situations like performance in examination, sports, etc.	16 Periods
XII. Probability	i. Introduction ii. Probability-theoretical approach	<ul style="list-style-type: none"> <li>To understand Random experiments, Sample space and Events – Mutually Exclusive, Complementary, certain and impossible events.</li> <li>To understand addition Theorem on probability and apply it in solving some simple problems.</li> </ul>	Three diagrams and investigations on coin tossing, die throwing, picking the cards to be used.	15 Periods