

**D.A.V. Public School**  
**Affiliated to CBSE(10+2)**  
**Sector – 3 Dhurwa Ranchi-4**

**Class X Mathematics Syllabus(2020-2021)**

**Prescribed Books:**

➤ NCERT

Months	No. of Working Days	Unit / Chapters	Sub Topics	Exam / Tests Portion
April		AREAS RELATED TO CIRCLES	<ul style="list-style-type: none"> <li>❖ Motivate the area of a circle; area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of <math>60^\circ</math>, <math>90^\circ</math> and <math>120^\circ</math> only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)</li> </ul>	
May		POLYNOMIALS	<ul style="list-style-type: none"> <li>❖ Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.</li> </ul>	
		PAIR OF LINEAR EQUATIONS IN TWO VARIABLES	<ul style="list-style-type: none"> <li>❖ Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency.</li> <li>❖ Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution, by elimination and by cross multiplication method. Simple situational problems. Simple problems on equations reducible to linear equations.</li> </ul>	
		QUADRATIC EQUATIONS	<ul style="list-style-type: none"> <li>❖ Standard form of a quadratic equation <math>ax^2 + bx + c = 0</math>, (<math>a \neq 0</math>). Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula. Relationship between discriminant and nature of roots.</li> <li>❖ Situational problems based on quadratic equations related to day to day activities to be incorporated.</li> </ul>	

June		ARITHMETIC PROGRESSIONS	<ul style="list-style-type: none"> <li>❖ Motivation for studying Arithmetic Progression Derivation of the <math>n</math>th term and sum of the first <math>n</math> terms of A.P. and their application in solving daily life problems</li> </ul>	<u><b>PT I Portion</b></u> <ul style="list-style-type: none"> <li>• Areas related to circles</li> <li>• Polynomials</li> <li>• Pair of linear equations in two variables</li> <li>• Quadratic equations</li> <li>• Arithmetic progressions</li> <li>• Triangles</li> </ul>
July		TRIANGLES	<ul style="list-style-type: none"> <li>❖ Definitions, examples, counter examples of similar triangles.</li> <li>1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.</li> <li>2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.</li> <li>3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar. 4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.</li> <li>4. (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.</li> <li>5. (Motivate) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other.</li> <li>6. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.</li> <li>7. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.</li> <li>8. (Prove) In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angles opposite to the first side is a right angle.</li> </ul>	<u><b>Half Yearly Exam Portion</b></u>  PT1 Portion + Lines (In two-dimensions)
August		LINES (In two-dimensions)	<ul style="list-style-type: none"> <li>❖ Review: Concepts of coordinate geometry, graphs of linear equations. Distance formula. Section formula (internal division). Area of a triangle.</li> </ul>	
September		INTRODUCTION TO TRIGONOMETRY	<ul style="list-style-type: none"> <li>❖ Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios whichever are defined at <math>0^\circ</math> and <math>90^\circ</math>. Values of the trigonometric ratios of <math>30^\circ</math>, <math>45^\circ</math> and <math>60^\circ</math>. Relationships between the ratios.</li> </ul>	

		TRIGONOMETRIC IDENTITIES	❖ Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$ . Only simple identities to be given. Trigonometric ratios of complementary angles.	
		HEIGHTS AND DISTANCES: Angle of elevation, Angle of Depression	❖ Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only $30^\circ, 45^\circ, 60^\circ$ .	
October		REAL NUMBER	❖ Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples, Proofs of irrationality of $\sqrt{2}, \sqrt{3}, \sqrt{5}$ Decimal representation of rational numbers in terms of terminating/non-terminating recurring decimals.	
		CIRCLES	❖ Tangent to a circle at, point of contact 1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact. 2. (Prove) The lengths of tangents drawn from an external point to a circle are equal.	
		CONSTRUCTIONS	1. Division of a line segment in a given ratio (internally). 2. Tangents to a circle from a point outside it. 3. Construction of a triangle similar to a given triangle.	
		SURFACE AREAS AND VOLUMES	1. Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones. Frustum of a cone. 2. Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken).	
November		STATISTICS	❖ Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph	<b>PT II Portion</b> <ul style="list-style-type: none"> <li>• Introduction to trigonometry</li> <li>• Trigonometric identities</li> <li>• Heights and distances</li> <li>• Real number</li> <li>• Circles</li> <li>• Constructions</li> <li>• Surface areas and volumes</li> </ul>
		PROBABILITY	❖ Classical definition of probability. Simple problems on finding the probability of an event	
December		<b>Revision for Board Exam</b>		<b>Pre Board / Mock I / II Portion</b>  Whole Syllabus

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**Class XII Mathematics Syllabus(2020-2021)**

**Prescribed Books:**

➤ NCERT

Months	No. of Working Days	Unit / Chapters	Sub Topics	Exam / Tests Portion
April		Relations and Functions	❖ Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function	
May		Inverse Trigonometric Functions	❖ Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions Elementary properties of inverse trigonometric functions	
		Matrices	❖ Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries)	
		Determinants	❖ Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.	
June		Continuity and Differentiability	❖ Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions.	

			<ul style="list-style-type: none"> <li>❖ Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretation.</li> </ul>	
		Applications of Derivatives	<ul style="list-style-type: none"> <li>❖ Applications of derivatives: rate of change of bodies, increasing/decreasing functions, tangents and normal's, use of derivatives in approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).</li> </ul>	
July		Integrals	<ul style="list-style-type: none"> <li>❖ Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals</li> <li>❖ Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.</li> </ul>	<p><b><u>Half Yearly Exam Portion</u></b></p> <ul style="list-style-type: none"> <li>• Relations and Functions</li> <li>• Inverse Trigonometric Functions</li> <li>• Matrices</li> <li>• Determinants</li> <li>• Continuity and Differentiability</li> <li>• Applications of Derivatives</li> <li>• Integrals</li> <li>• Applications of the Integrals</li> </ul>
August		Applications of the Integrals	<ul style="list-style-type: none"> <li>❖ Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only), Area between any of the two above said curves (the region should be clearly identifiable).</li> </ul>	
September		Differential Equations	<ul style="list-style-type: none"> <li>❖ Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation</li> </ul>	
		Vectors	<ul style="list-style-type: none"> <li>❖ Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of</li> </ul>	

			vectors, vector (cross) product of vectors, scalar triple product of vectors.	
October		Three - dimensional Geometry	❖ Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.	
		Linear Programming	❖ Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).	
November		Probability	❖ Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean and variance of random variable.	
December		<b>Revision for Board Exam</b>		<b><u>Pre Board / Mock I / II Portion</u></b>  Whole Syllabus