KENDRIYA VIDYALAYA SANGATHAN (KOLKATA REGION)

SPLIT UP SYLLABUS(2019-20)

CLASS XII –MATHEMATICS

MONTHS	CHAPTERS/TOPICS	NO.OF PERIODS	Suggested Activities and Projects to be conducted (ANY TEN) (Please refer NCERT Site)	Monthly test/PERIODICAL TESTS,PRE BOARDS AND SYLLABUS
APRIL	1. **Relations and Functions**: Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. **2. Inverse Trigonometric Functions** : Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions. **3.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.	15 15 7	**1.** To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l $\perp$ m} is symmetric but neither reflexive nor transitive. **2.** To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l || m} is an equivalence relation **3.** To demonstrate a function which is one-one but not onto and vice versa **4.** To draw the graph of $\sin^{-1} x$ using the graph of sin x and demonstrate the concept of mirror reflection (about the line y = x) and related activities	Monthly test 1 (June 24-28) syllabus upto May
MAY & JUNE	1. **Matrices (contd)** 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). **2. 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.	25	**Projects suggested for summer vacation(any one)** but teachers can take more innovative projects 1. Study the nature of Mathematics and make a project where three aspect of nature of Mathematics – formalism, logic, intuition is applied for the development of mathematics. 2. History of foreign Mathematicians such as Cantor, Pythagoras, Thales, Euclid, Appollonius, Descartes, Fermat, Leibnitz, Euler, Fibonac, Gauss, Newton. 3. Mathematics and Chemistry: Study structure of organic compounds.	

			4. Mathematics and Biology: Study of science of heredity etc. 5. Mathematics and Music 6. Mathematics and Environment	
JULY	**1. Continuity and Differentiability**: Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. 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. **2. Applications of Derivatives**: Applications of derivatives: rate of change of bodies, increasing/decreasing functions. Tangents and normals, 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).	15 15	1. To find analytically the limit of a function f (x) at x = c and also to check the continuity of the function at that point. 2. To verify Rolle's Theorem and Lagrange's Mean Value Theorem. 3. To understand the concepts of decreasing and increasing functions. 4. To understand the concepts of local maxima, local minima absolute maximum and minimum values of a function and point of inflection. 5. Different application based problem on Maxima And Minima.	Monthly Test 2 (May be treated as PERIODICAL TEST 1(PT 1): EXP. DATE : 26TH JULY TO 31st JULY,2019 Syllabus: Relation and function, Inverse trigonometric function, Matrices and Determinant, Continuity, Differentiability and Application of Derivative
AUGUST	**1. Integrals**: Integration as inverse process of differentiation.Integration of a variety of functions by substitution, Integration of standard forms $\int \frac{dx}{x^2 \pm a^2}, \quad \int \frac{dx}{a^2 - x^2}, \quad \int \frac{dx}{\sqrt{x^2 \pm a^2}},$ $\int \frac{dx}{\sqrt{a^2 - x^2}},$ and its application on the following special types $\int \frac{dx}{ax^2 + bx + c}, \quad \int \frac{dx}{\sqrt{ax^2 + bx + c}}$ $, \int \frac{px+q}{\sqrt{ax^2+bx+c}}\, dx$ Integration by parts. Integration of standard forms $\int \sqrt{x^2 \pm a^2}\, dx$, $\int \sqrt{a^2 - x^2}\, dx$ and evaluation of simple integrals of special types and problems based on them.	20	1. To evaluate the definite integral as the limit of a sum and verify it by actual integration.	

	$\int \sqrt{ax^2+bx+c}$ dx , $\int (px+q)\sqrt{ax^2+bx+c}$ dx etc. Integration of rational function by partial fractions **2.** Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof).Basic properties of definite integrals and evaluation of definite integrals. **3. Applications of the Integrals** : 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).	15		Monthly test 3: 27-31st August (syllabus upto August)
SEPTEMBER	**1. Differential Equations** : 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. **2. Vectors** : 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 vectors, vector (cross) product of vectors, scalar triple product of vectors	15 15	1. To verify geometrically $\vec{a}\times(\vec{b}+\vec{c})=\vec{a}\times\vec{b}+\vec{a}\times\vec{c}$ 2. To verify that angle in a semi-circle is a right angle, using vector method.	Monthly test 4 (May be treated as PERIODICAL TEST 2) EXP. DATE : 27 SEPTEMBER TO 03 OCTOBER 2019 Syllabus: Topics Included In PT 1 and Integrals , Application Of Integrals and Differential Equation.
OCTOBER	**1. 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.	15	1. To demonstrate the equation of a plane in normal form. 2. To verify that the angle between two planes is the same as the angle between their normals. 3. To measure the shortest distance between two skew lines and verify it analytically.	
NOVEMBER	**Linear Programming** : Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical	07	Project To minimise the cost of the food, meeting the dietary requirements of the staple	

	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). **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. **REVISION should start preferably from 15th November , 2019**	10	food of the adolescent students of your school. 1. To explain the computation of conditional probability of a given event A, when event B has already occurred, through an example of throwing a pair of dice.	
DECEMBER	REVISION		**FIRST PRE BOARD**: ON WHOLE SYLLABUS EXP. DATE OF COMMENCEMENT: 02-10 December, 2019	
JANUUARY	REVISION		**SECOND PRE BOARD:** **(May be treated as PERIODICAL TEST 3**) ON WHOLE SYLLABUS EXP. DATE OF COMMENCEMENT: 16th - 23rd JANUARY, 2020	
FEBRUARY	REVISION		**THIRD PRE BOARD**: ON WHOLE SYLLABUS for Under Achievers.	