KENDRIYA VIDYALAYA SANGATHAN (KOLKATA REGION)

SPLIT UP SYLLABUS.SESSION 2019-20.CLASS XI –MATHEMATICS

Month	Chapter/Topic	Periods Required	**Suggested Activities And Projects To Be Conducted (Any Ten) (Please Refer NCERT Site)**	**Periodical Tests, Annual Examination And Syllabus**
JUNE & JULY	1. **Sets** : Sets and their representations. Empty set.Finite and Infinite sets.Equalsets.Subsets.Subsets of a set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets.Difference of sets. Complement of a set. Properties of Complement Sets.	15	1. To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n . 2. To represent set theoretic operations using Venn diagrams. 3. To identify a relation and a function 4. To plot the graphs of sin x, sin 2x,2sinx and sin $\frac{x}{2}$, using same coordinate axes.	
	2. **Relations & Functions:** Ordered pairs, Cartesian product of sets.Number of elements in the cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto R x R x R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs. Sum, difference, product and quotient of functions.	15		
	3. **Trigonometric Functions:** Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another.Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x+\cos^2 x=1$, for all x. Signs of trigonometric functions. Domain and range of trignometric functions and their graphs. 4. Expressing sin (x±y) and cos (x±y) in terms of sinx, siny, cosx&cosy and their simple applications. Deducing the identities like the following: .tan(x ± y) , cot(x ± y)	15		
AUGUST	1. **Trigonometric Functions(conti…)** : sinα ± sinβ , cosα + cosβ, cosα – cosβ etc. Identities related to sin 2x, cos2x, tan 2x, sin3x, cos3x and tan3x. General solution of trigonometric equations of the type sin*y*= sin*a*, *cosy*= *cosa*and tan*y*= tan*a.*	10		

	2. **Principle of Mathematical Induction:** Process of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.	10		Periodic Test 1 (26th August - 31 St August) Max Marks 50 Syllabus Upto August
	3. **Complex Numbers and Quadratic Equations** Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system. Square root of a complex number.	10	1. To interpret geometrically the meaning of $i = \sqrt{-1}$ and its integral powers. 2.To obtain a quadratic function with the help of linear functions graphically.	
SEPTEMBER	2. **Linear Inequalities** Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.Graphical solutions of linear inequalities in two variables.Graphical method of finding a solution of system of linear inequalities in two variables	10	1. To find the number of ways in which three cards can be selected from given five cards. 2. To construct a Pascal's Triangle and to write binomial expansion for a given positive integral exponent.	
	3. **Permutations and Combinations** Fundamental principle of counting. Factorial *n*. (n!) Permutations and combinations, derivation of formulae for nPr and nCr and their connections, simple applications.	10		
	Binomial Theorem: 1. History, statement and proof of the binomial theorem for positive integral indices.Pascal's triangle, General and middle term in binomial expansion, simple applications.	10		
OCTOBER	**1.Sequence and Series:** Sequence and Series. Arithmetic Progression (A. P.). Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of first *n* terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M. Formulae for the sum of special sequences and problems based on it.	15	1. To obtain formula for the sum of squares of first n-natural numbers. 2. To demonstrate that the Arithmetic mean of two different positive numbers is always greater than the Geometric mean. **Projects suggested for Autumn Break(any one)** but teachers can take more innovative projects 1. Project on history of Mathematicians: It may include history of Indian mathematicians such as Aryabhata, Brahmgupta, Varahamihir, Sridhara,	

			Bhaskaracharya, Ramanujan etc. 2. history of foreign athematicians such as Cantor, Pythagoras, Thales, Euclid, Appollonius, Descartes, Fermat, Leibnitz, Euler, Fibonac, Gauss, Newton.	
NOVEMBER	**1. Straight Lines** Brief recall of two dimensional geometry from earlier classes. Shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point-slope form, slope-intercept form, two-point form, intercept form and normal form. General equation of a line.Equation of family of lines passing through the point of intersection of two lines.Distance of a point from a line.	10	1. To verify that the equation of a line passing through the point of intersection of two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is of the form $a_1x + b_1y + c_1) +$ K$(a_2x + b_2y + c_2) = 0$.	Half Yearly Examination (Periodic Test 2) 04th -09 Nov Syllabus Upto October 2019 Max Marks : 80
	2. Conic Sections: Sections of a cone: circle, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola.Standard equation of a circle.	10	1. To construct different types of conic sections. 2. To construct an ellipse using a rectangle.	
DECEMBER	**1. Introduction to Three-dimensional Geometry:** Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.	10	1. To explain the concept of octants by three mutually perpendicular planes in space.	
	2. Limits and Derivatives: Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, Derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.	18	1.Verification of the geometrical significance of derivative. PROJECT (WINTER BREAK) 1. Application of conic sections in Mathematics and physics 2. Fibonacci sequence , their properties and similar patterns in nature 3. Pascal triangle	

			4. collection of statistical data and analyzing standard deviation and mean deviation.	
JANUARY	**1.Mathematical Reasoning:** Mathematically acceptable statements. Connecting words/ phrases - consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words, Difference between contradiction, converse and contrapositive.	05		Periodic test 3 (16-22 Jan'2020) Max marks 50 Syllabus upto December
	2. Statistics: Measures of dispersion: Range, mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.	10		
	3.Probability: Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories studied in earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.	10	1. To write the sample space, when a die is rolled once, twice --------	
FEBRUARY	REVISION	28		