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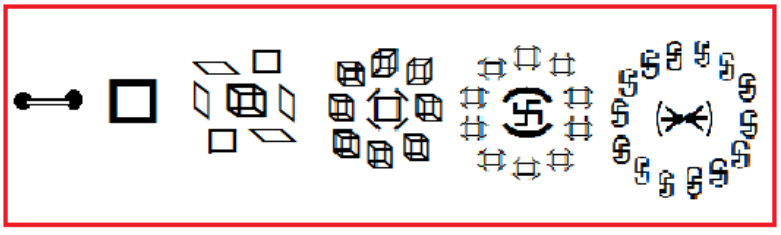
(MATHEMATICS VALUES CHASE YEAR 01-10-2015 to 30-09-2016)

VEDIC MATHEMATICS

&

MODERN MATHEMATICS

SATHAPATYA MEASURING ROD



(HYPER CUBES 1 TO 6)

Sixth Week : Day 1

Present day Main stream school Mathematics

Part – 1 Background material
Part – 2 Lessons Steps and Exercises

Part – 1
Background material

1. Idea of values of present day main stream school Mathematics can be had from NCERT syllabli of school Mathematics.
2. NCERT school Mathematics syllabi is of 12 years schooling phased as primary level, middle level, high and higher secondary level.
3. NCERT Syllabi of high and higher secondary school Mathematics aims to cover following values of Mathematics:

Class - VIII

Chapter 1	Rational Numbers
Chapter 2	Linear Equations in One Variable
Chapter 3	Understanding Quadrilaterals
Chapter 4	Practical Geometry
Chapter 5	Data Handling
Chapter 6	Squares and Square Roots
Chapter 7	Cubes and Cube Roots
Chapter 8	Comparing Quantities
Chapter 9	Algebraic Expressions and Identities
Chapter 10	Visualising Solid Shapes
Chapter 11	Mensuration
Chapter 12	Exponents and Powers
Chapter 13	Direct and Inverse Proportions
Chapter 14	Factorisation
Chapter 15	Introduction to Graphs
Chapter 16	Playing with Numbers

Class - IX

First Term Syllabus

UNIT I: NUMBER SYSTEMS

1. REAL NUMBERS

1. Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring/terminating decimals.
2. Examples of non-recurring / non-terminating decimals. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}$, $\sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, every point on the number line represents a unique real number.
3. Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized).
4. Definition of nth root of a real number.
5. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)
6. Rationalization (with preci meaning) of real numbers of the type (a their combinations)

UNIT II: ALGEBRA

1. POLYNOMIALS

Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear, quadratic and cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros of a polynomial. State and motivate the Remainder Theorem with examples. Statement and proof of the Factor Theorem. Factorization of $(ax^2 + bx + c, a + 0$ where a, b and c are real numbers, and of cubic polynomials using the Factor Theorem) dt quadratic & cubic polynomial.
Recall of algebraic expressions and identities. Further verification of identities of the type $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$, $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy\ (x \pm y)$, $x^3 \pm y^3 = (x \pm y)\ (x^2 \pm xy + y^2)$, $x^3 + y^3 + z^3 - 3xyz = (x + y + z)\ (x^2 + y^2 + z^2 - xy - yz - zx)$ and their use in factorization of polymonials. Simple expressions reducible to these polynomials.

UNIT III: GEOMETRY

1. INTRODUCTION TO EUCLID'S GEOMETRY

History - Geometry in India and Euclid's geometry. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem, for example:

(Axiom) 1. Given two distinct points, there exists one and only one line through them.

(Theorem) 2. (Prove) Two distinct lines cannot have more than one point in common.

2. LINES AND ANGLES

1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180° and the converse.
2. (Prove) If two lines intersect, vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.
4. (Motivate) Lines which are parallel to a given line are parallel.
5. (Prove) The sum of the angles of a triangle is 180°.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.

3. TRIANGLES

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).
3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruene).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.
5. (Prove) The angles opposite to equal sides of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between 'angle and facing side' inequalities in triangles.

UNIT IV: COORDINATE GEOMETRY

1. COORDINATE GEOMETRY

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $Ax + By + C = 0$ by writing it as $y = mx + c$.

UNIT V: MENSURATION

1. AREAS

Area of a triangle using Heron's formula (without proof) and its application in finding the area of a quadrilateral. Area of cyclic quadrilateral (with proof) - Brahmagupta's formula.

Second Term Syllabus

The text of OTBA for SA-II will be from Unit - 2 Linear Euqations in two variables.

UNIT II: ALGEBRA (Contd.)

2. LINEAR EQUATIONS IN TWO VARIABLES

Recall of linear equations in one variable. Introduction to the equation in two variables. Focus on linear equations of the type $ax+by+c=0$. Prove that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III: GEOMETRY (Contd.)

4. QUADRILATERALS

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sides are equal, and conversely.
3. (Motivate) In a parallelogram opposite angles are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse.

5. AREA

Review concept of area, recall area of a rectangle.

1. (Prove) Parallelograms on the same base and between the same parallels have the same area.
2. (Motivate) Triangles on the same (or equal base) base and between the same parallels are equal in area.

6. CIRCLES

Through examples, arrive at definitions of circle related concepts, radius, circumference, diameter, chord, arc, secant, sector, segment subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
3. (Motivate) There is one and only one circle passing through three given non-collinear points.
4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center (or their repective centers) and conversely.
5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
6. (Motivate) Angles in the same segment of a circle are equal.
7. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
8. (Motivate) The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.

7. CONSTRUCTIONS

1. Construction of bisectors of line segments and angles of measure 60°, 90°, 45° etc., equilateral triangles.
2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.
3. Construction of a triangle of given perimeter and base angles.

UNIT V: MENSURATION (Contd.)

2. SURFACE AREAS AND VOLUMES

Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.

UNIT VI: STATISTICS

Introduction to Statistics: Collection of data, presentation of data - tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons, qualitative analysis of data to choose the correct form of presentation for the collected data. Mean, median, mode of ungrouped data.

UNIT VII: PROBABILITY

History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real - life situations, and from examples used in the chapter on statistics).

Class – X

First Term Syllabus

UNIT I: NUMBER SYSTEMS

1. REAL NUMBERS

Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples, Proofs of results - irrationality of $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, decimal expansions of rational numbers in terms of terminating/non-terminating recurring decimals.

UNIT II: ALGEBRA

1. POLYNOMIALS

Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.

2. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Pair of linear equations in two variables and their graphical solution. Geometric representation of different possibilities of solutions/inconsistency.

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 must be included. Simple problems on equations reducible to linear equations may be included.

UNIT III: GEOMETRY

1. TRIANGLES

Definitions, examples, counter examples of similar triangles.

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.
2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.
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.

5. (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.
6. (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.
7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.
8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.
9. (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 traingle.

UNIT IV: TRIGONOMETRY

1 . INTRODUCTION TO TRIGONOMETRY

Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined); motivate the ratios, whichever are defined at 0° and 90°. Values (with proofs) of the trigonometric ratios of 30°, 45° and 60°. Relationships between the ratios.

2. 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.

UNIT V: STATISTICS AND PROBABILITY

1. STATISTICS

Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph.

Second Term Syllabus

UNIT II: ALGEBRA (Contd.)

3. QUADRATIC EQUATIONS

Standard form of a quadratic equation $ax^2+bx+c=0$, $(a \neq 0)$. Solution of the quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship between discriminant and nature of roots.

Situational problems based on quadratic equations related to day to day activities to be incoporated.

4. ARITHMETIC PROGRESSIONS

Motivation for studying Arithmetic Progression Derivation of standard results of finding the nth term and sum of first n terms and their application in solving daily life problems.

UNIT III: GEOMETRY (Contd.)

2. CIRCLES

Tangents to a circle motivated by chords drawn from points coming closer and closer to the point.

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 circle are equal.

3. CONSTRUCTIONS

1. Division of a line segment in a given ratio (internally).
2. Tangent to a circle from a point outside it.
3. Construction of a triangle similar to a given triangle.

UNIT IV: TRIGONOMETRY

3. HEIGHTS AND DISTANCES

Simple and believable problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only 30°, 45°, 60°.

UNIT V: STATISTICS AND PROBABILITY

2. PROBABILITY

Classical definition of probability. Connection with probability as given in Class IX. Simple problems on single events, not using set notation.

UNIT VI: COORDINATE GEOMETRY

1. LINES (In two-dimensions)

Review the concepts of coordinate geometry done earlier including graphs of linear equations. Awareness of geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). Area of a triangle.

UNIT VII: MENSURATION

1. AREAS RELATED TO CIRCLES

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 60°, 90° and 120° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

2. SURFACE AREAS AND VOLUMES

(i) Problems on finding 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.

(ii) 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.)

Class – XI

Unit-I: Sets and Functions

1. Sets

Sets and their representations. Empty set. Finite and Infinite sets. Equal sets. 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. Practical Problems based on sets.

2. Relations & Functions

Ordered pairs, Cartesian product of sets. Number of elements in the cartesian product of two finite sets. Cartesian product of the

sets of real (upto R x R). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. 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 quotients of functions.

3. Trigonometric Functions

Positive and negative angles. Measuring angles in radians and in degrees and conversion of one into other. Definition of trigonometric functions with the help of unit circle. Truth of the $\sin^2 x+\cos^2 x=1$, for all x. Signs of trigonometric functions. Domain and range of trignometric functions and their graphs. Expressing sin (x±y) and cos (x±y) in terms of sinx, siny, cosx & cosy and their simple application. Deducing identities like the following:

Identities related to sin 2x, cos2x, tan 2x, sin3x, cos3x and tan3x. General solution of trigonometric equations of the type sin y = sin a, cos y = cos a and tan y = tan a.

Unit-II: Algebra

1. 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.

2. Complex Numbers and Quadratic Equations

Need for complex numbers, especially $\sqrt{1}$, to be motivated by inability to solve some of the quardratic equations. Algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system. Square root of a complex number.

3. Linear Inequalities

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Graphical solution of system of linear inequalities in two variables.

4. Permutations and Combinations

Fundamental principle of counting. Factorial n. (n!)Permutations and combinations, derivation of formulae and their connections, simple applications.

5. Binomial Theorem

History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications.

6. 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 n terms of a G.P., Arithmetic and Geometric series infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M. Formula for the following special sum:

Unit-III: Coordinate Geometry

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.

2. Conic Sections

Sections of a cone: circles, 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.

3. Introduction to Three–dimensional Geometry

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

Unit-IV: Calculus

1. Limits and Derivatives

Derivative introduced as rate of change both as that of distance function and geometrically.

Intutive idea of limit. Limits of polynomials and rational functions, trignometric, exponential and logarithmic functions. Definition of derivative, relate it to slope of tangent of a curve, derivative of sum, difference, product and quotient of functions. The derivative of polynomial and trignometric functions.

Unit-V: Mathematical Reasoning

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.

Unit-VI: Statistics and Probability

1. 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.

2. 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 the theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

Class – XII

Unit I: Relations and Functions

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. Binary operations.

2. Inverse Trigonometric Functions

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

Unit II: Algebra

1. 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. Noncommutativity 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.

Unit III: Calculus

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).

3. Integrals

Integration as inverse process of differentiation.Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \frac{px+q}{ax^2+bx+c}\,dx, \int \frac{px+q}{\sqrt{ax^2+bx+c}}\,dx, \int \sqrt{a^2 \pm x^2}\,dx, \int \sqrt{x^2 - a^2}$$

$$\int \sqrt{ax^2 + bx + c}\,dx, \int (px + q)\sqrt{ax^2 + bx + c}\,dx$$

Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic propertiesof definite integrals and evaluation of definite integrals.

4. 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).

5. 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 of the type:

dy/dx + py = q, where p and q are functions of x or constants.

dx/dy + px = q, where p and q are functions of y or constants.

Unit IV: Vectors and Three-Dimensional Geometry

1. 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.

2. 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.

Unit V: Linear Programming

1. 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 and unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit VI: Probability

1. Probability

Conditional probability, multiplication theorem on probability. independent events, total probability, Baye's theorem, Random variable and its probability distribution, mean and variance of random variable. Repeated independent (Bernoulli) trials and Binomial distribution.

4. The teaching lessons arrangement are in the NCERT text books of Mathematics for classes 9, 10, 11, 12 as under :

Mathematics of Class – 09

Chapter – 01 Number systems
Chapter – 02 Polynomials
Chapter – 03 Coordinate Geometry
Chapter – 04 Linear equation
Chapter – 05 Introduction to Euclid's geometry

Chapter – 06 Lines and angles
Chapter – 07 Coordinate Geometry
Chapter – 08 quadrilaterals
Chapter – 09 areas of parellograms and triangles
Chapter – 10 circles
Chapter – 11 Constructions
Chapter – 12 Heron's Formula
Chapter – 13 Surface areas and volumes
Chapter – 14 Statistics
Chapter – 15 Probability

Mathematics of Class – 10

Chapter – 01 Real Number
Chapter – 02 Polynomials
Chapter – 03 pair of linear equations in two variables
Chapter – 08 Introduction to Trigonometry
Chapter – 09 some applications of Trigonometry
Chapter – 10 circles
Chapter – 11 Constructions
Chapter – 12 Areas related to circles
Chapter – 13 Surface areas and volumes
Chapter – 14 Statistics
Chapter – 15 Probability

Class -9

Appendix – 1 Proofs in mathematics
Appendix – 2 mathematical modeling

Class – 10

Appendix – 1 Proofs in mathematics
Appendix – 2 mathematical modeling

Class -11

Chapter-1 Sets
Chapter-2 Relations and functions
Chapter- 3 Trigonometric functions
Chapter -4 Principle of mathematical induction
Chapter -5 Complex numbers and Quadratic equations
Chapter -6 Linear inequalities
Chapter -7 Permutations and Combinations
Chapter -8 Binomial Theorem
Chapter -9 Sequences and Series
Chapter -10 Straight Lines
Chapter -11 Conic Sections
Chapter-12 Introduction to three dimensional geometry
Chapter -13 Limits and Derivatives
Chapter -14 Mathematical reasoning
Chapter -15 Statistics
Chapter -16 Probability

Appendix-1 Infinite Series
Appendix-2 Mathematical Modeling

Class -12
Part – I
Chapter-1 Relations and functions
Chapter-2 Inverse Trigonometric functions
Chapter- 3 Matrices

Chapter -4 Determinants
Chapter -5 Continuity and differentiability
Chapter -6 Applications of Derivatives
Appendix-1 Proofs in Mathematics
Appendix-2 Mathematical Modeling

Class -12
Part – II
Chapter-7 Integrals
Chapter-8 Applications of Integrals
Chapter- 9 Differential equations
Chapter -10 Vector Algebra
Chapter -11 Three dimensional geometry
Chapter -12 Linear programming
Chapter -13 Probability

5. These text books also, at the end of the chapter enlist: 'What has been discussed' and also is made a summary of learning during the lesson.
6. The illustratively, here below is produced in respect one of the lesson:

WHAT HAVE WE DISCUSSED?

0. For a and b integers (and b not equal to zero), a / b is defined as a rational number.
1. Addition of two rational numbers is a rational number.
2. Subtraction of one rational number from another rational number gives a rational number.
3. Multiplication of two rational number is a rational number.
4. Operation of addition of two rational numbers is commutative.
5. Operation of addition of rational numbers is associative
6. The additive identity of rational numbers is the rational number zero.
7. The multiplicative identity of rational numbers is the rational number 1.
8. Additive inverse of a / b is defined as (-a) / b
9. Multiplicative inverse of rational number a/b would be c /d when (a c) = (b d)
10. Rational numbers obey law of distributivity. As per it, x= a / b, y = c / d and z = e / f
    rational numbers shall be under distributivity law shall be leading to
    x (y+z) = xy + xz and x (y-z) = xy - xz
11. For $x \leq y$, $x \leq x / 2 + y / 2 \leq y$, and as such between two given rational numbers x, y there shall be a countless rational number.
12. Rational number a / b and c / d would be comparable as
    a / b = c / d if a d = b c and
    a / b > c / d if a d > c b and
    a / b < c / d if a d < c b
13. As such Rational numbers can be set along a line to be designated as the rational
    numbers line.

7. From the above it may have been inferred as that for having an idea of the values of main stream school Mathematics, we shall visit and revisit the text books of School Mathematics.
8. Once one is fully aware of these values, one can go for compilation of these values to reach at the attainments of these values and the expected state of mathematical mind of the student passing out 10 + 2 class with Mathematics as one of the subjects.
9. Then, further projection can be had as to what precisely is the mathematical model of the universe in which we are living being taught to our student.

Part – 2 Lessons Steps and Exercises pages

Lessons Steps

1. Aim of present lesson is to be conscious about the values of present day main stream school Mathematics.
2. Challenge of present lesson is to be clear about the specifics of the topics of school Mathematics at present.
3. Evaluation expected is as to the (a) existing conceptual format of school Mathematics
   (i) As to numbers systems
   (ii) Algebraic equations
   (iii) Geometric bodies
   (iv) Mathematical tools for applied values of Mathematics and
   (v) The ultimate attainments expected from the pass outs of (10+2) level.
4. Also, one is to visualize and to conceptualize as to the format of mathematical mind with which the pass out of 10 + 2 level shall be viewing the universe in which we live in.
5. Poser emerging here would be as to whether thereafter any extended / alternative or of different features mathematical model can be there which can be introduced and perused as school Mathematics model.
6. This as such shall be bringing us face to face with the Vedic Mathematics model. And with it would follow a chain of posers as to whether this VM model is authenticated? Whether the same is an extraction of 3D model of existing mathematics? Or the same (VM model) is an alternative and absolutely different model than that of existing model?
7. With it, that way, the first learning urge would be, to have an glimpse of VM model and to have a feel and idea of the VM approach steps as to the existing Mathematics values.
8. For it, we may visit Ganita Sutras text which is just a composition of 16 + 13 aphorsms / Sutras avail just 520 letters in all.
9. Ganita Sutras text is being introduced in lesson 2.
10. In addition, VM Mathematics feel is to be had in terms of the features of Sathapatya measuring rod which extends geometric formats range from interval, square and cube to the bodies of 4, 5 & 6 real spaces.
11. One may have a pause here and take note that VM model extends existing mathematical model of interval, square and cube range to that of interval, square, cube, hyper cube-4, hyper cube-5 and hyper cube-6
12. Sathapatya measuring rod is to be formally of introduced in lesson 3 of this course.
13. With these introductory number, and the background material listed at the outset, we may now formally take up the broad classification of the topes of existing scheme Mathematics being 1 Numbers 2 Equations & 3. Bodies.
14. One shall re-visit the above school syllabi and to reach at, as first stage, the number domain being covered here and then as second & third steps as to algebraic equation & geometric bodies set ups.
15. As for as the approach features and mathematical tools aspects of existing mathematics are covered, the same as well would require specific enlisting before their values attainment features may be comprehended and imbibed.
16. Lessons 4, 5, 6 are being specifically devoted to focus upon these aspects.
17. This way, the set of first six lessons, starting with the present one shall be helping us to have a preliminary view of the existing model and the way same may augmented with VM values.

Exercises

18. First exercise which one shall undertake would be revisit the 10 + 2 level school Mathematics of existing model and to tabulate the specific values which are to be expected to be attained by the pass outs of 10 + 2 level.
19. Second exercise which need be undertaken is to reach at all mathematical mind with which the 10 + 2 pass outs shall be approaching the universe in which we are living.
20. Third exercise which one shall undertake is to reach at the intuitive intellectual view as to whether the existing mathematical model is the universe we live in as that the same requires extension or replacement with any other model?
21. Fourth exercise which may be undertaken would be to reach at the intuitive intellectual model with which the universe we live in deserve to be approached?

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