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Mathematics
Std IX and X

Introduction

Mathematics is the language of all sciences. Mathematics as a subject at the secondary level has great importance in a progressive country like India as it develops various life skills. The challenges caused by tremendous growth in the population, globalization, pollution, competitions between countries, natural disasters emphasise the need to develop the curriculum in Mathematics at the secondary level. Knowledge of the subject and skills acquired while learning-Mathematics helps in developing the ability to execute, manage, plan with precision. This could be effectively inculcated at the secondary level and hence Mathematics has got the pivotal place in the scheme of studies of secondary education.

Mathematics helps to develop decision making which is applicable to real life situations. In addition, it helps enormously in the development of the other disciplines which involves analysis, reasoning and adoption of innovative ideas. A study of the different applications of Mathematics at secondary level in various fields like science, geography, economics, social sciences etc. gives the student a comprehensive and global perspective.

The curriculum in the subject of Mathematics has undergone changes from time to time in accordance with the growth of the subject to address the emerging needs of the society. The proposed syllabus for the state of Maharashtra has been designed by adopting all units and subunits from the respective syllabus of NCF 2005. The proposed curriculum includes the . study of Number system, Algebra, Geometry, Trigonometry, Mensuration, Statistics, Graphs and Co-ordinate geometry.

The teaching of Mathematics should be imparted through various activities which may involve the use of concrete materials, models, patterns, charts, pictures, posters, games, puzzles, experiments and through field visits and projects.

Objectives

To enable the students

1. to consolidate the mathematical knowledge and skills acquired at the upper primary stage.
2. to acquire knowledge and understanding of mathematical terms, symbols, concepts principles and processes and proofs.
3. to develop the ability to apply mathematical knowledge to solve problems in real life situations.
4. to develop analytical, logical thinking and problem solving abilities of students.
5. to develop skills in drawing geometrical figures, diagrams, graphs, charts etc.
6. to identify the inter relationship between different parts of problems and draw logical conclusions.
7. to develop an interest in students to study mathematics as a discipline.
8. to develop awareness of the need for national integration, protection of environment, by nuclear family removal of social barriers, elimination of sex bias.
9. to develop reverence and respect towards great mathematicians particularly towards Indian Mathematicians.

Std. IX
Algebra

1. Sets :
- Introduction
- Methods of writing sets
- Types of sets
- Subset - Proper, Improper subset
- Super set
- Universal set
- Venn diagrams
- Operations on sets
- Relations between various operations
- Number of elements in the set and related results.

2. Real Numbers :
- Revision of natural numbers, integers, rational numbers and irrational numbers
- Existence of irrational numbers and their representations on the number line
- 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
- Properties of real numbers
- Definition of nth root of a real number
- Surds - Definition
- Forms of surds
- Operations and Laws of surds
- Rationalization of Surds
- Absolute value of real numbers
- Euclid's division Lemma
- Fundamental theorem of Arithmetic

3. Algebraic Expressions :
- Introduction to algebraic expression ?
- Operations on algebraic expressions
- Methods of factorization of algebraic expression ?
- Introduction to polynomials
- Operations on polynomials
- Value of polynomials
- Zeros/roots of polynomial
- Relation between zeros and coefficient of polynomials?
- Remainder theorem
- Factor theorem

4. Graphs :
- Cartesian coordinate system
- Understanding of graphs of lines parallel to axes
- Graph of line ax + by + c = o

5. Linear equations in two variables
- System of linear equations
- Solution of system of linear equations in two variables(Algebraic methods)

6. Ratio, proportion and variation
- Introduction to ratio
- Properties of ratio
- Properties of equal ratios
- Theorem on equal ratios
- Percentage as a ratio
- Introduction to proportion
- Introduction to variation
- Revision of concepts based on Direct variation, Inverse variation
- Mixed variation
- Real life problems based on ratio, proportion and variation

7. Statistics :
- Collection of data
- Classification and tabulation of data
- Diagramatic representation of data
- Graphical representation of data
- Mean, median, mode of ungrouped data

Geometry

1. Lines and Angles :

- Introductions to line
- Basic terms and definitions related to line
- Introduction to Euclid's Geometry
- Plane seperation axiom
- Introduction to angles in terms of rotation
- Directed angles, Sexagesimal system
- Types of angles
- zero angle, straight angle,coterminal angle
- Relation between angles
- Introduction to mathematical proofs
- Parallel lines
- Results on parallel lines and transversal
- Tests of parallel lines
- Results on perpendicular lines
- Distance of a point from a line

2. Triangles :

- Types of triangles
- Terms related to triangle
- Properties of triangle
- Exterior angles and corresponding interior opposite angles
- Results involving exterior angle and corresponding interior opposite angles
- Similar triangles

3. Congruence of triangles :

- Criteria of congruent triangles
- Theorem of an isosceles triangle and its converse
- Perpendicular bisector theorem
- Angle bisector theorem
- Properties of triangles based on inequalities
- Property of perpendicular drawn from a point outside the line.

4. Circle :

- Introduction to circle and related terms
- Circle passing through the given points
- One and only one circle passes through the three non collinear points.
- Congruence of circles
- Properties of chords of the circle

5. Quadrilateral :

- Properties of quadrilateral
- Properties of parallelogram
- Properties of rectangle
- Properties of a trapezium
- Properties of a rhombus
- Properties of a square
- Kite
- Tests for particular quadrilateral
- Theorem on midpoints of two sides of a triangle and its converse

6. Coordinate Geometry :

- Distance formula
- Section formula
- Area of a triangle

7. Geometric constructions :

- Basic construction - perpendicular bisector of given segment.
- Construction of a triangle

  - Sum/difference of two sides and base angles is given

  - Perimeter and base angles are given

8. Trigonometry :

- Introduction to trigonometric ratios
- Trigonometric Ratios of angles 0o, 30 o, 45 o, 60 o, 90 o
- Trigonometric identities for complementary angles

9. Mensuration :

- Area of triangle
- Area of regular hexagon, polygon
- Area of quadrilaterals
- If two parallelograms lie between two parallel lines and have the same base then they have thesame area.
- If a triangle and a parallelogram have the same base and lie between the same parallel lines, then the area of the triangle is half the area of the parallelogram.
- Perimeter of triangle and quadrilateral
- Area of circle