

Maharashtra State Board

Syllabus for class 10 Maths

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. X Algebra

1. Arithmetic Progression :

- Introduction to Sequence
- Arithmetic Progression (A.P.) and Geometric Progression (G.P.)
- General term of an A.P. and G.P.
- Sum of the first 'n' terms of an A.P. and G.P.
- Arithmetic Mean and Geometric Mean.

2. Quadratic Equations

- Introduction to quadratic equations
- Solutions of quadratic equations
- Nature of roots based on discriminant
- Relation between roots of the equation and coefficient of the terms in the equation Equations reducible to quadratic form

3. Linear equations in two variables

- System of linear equations in two variables
- Algebraic methods of solving linear equations in two variables
- Graphical representation of different possibilities of solutions/Inconsistency
- Graphical method of solving a system of linear equations
- Determinant of order two

- Cramer's rule

- Consistency of pair of linear equations

4. Probability :

- Introduction to probability and related terms
- Classical definition of probability
- Types of events
- Equally likely outcomes
- Probability of an event
- Properties of Probability
- Addition theorem (without proof)

5. Statistics :

- Brief revision of Tabulation of data, inclusive and exclusive type of tables
 - Mean, median and mode of grouped data
 - Histograms, frequency polygon, frequency curve, pie diagram
 - Ogives (Cumulative frequency graphs)
 - Applications of ogives in determination of median
 - Relation between measures of central tendency
 - Introduction to normal distribution
 - Properties of normal distribution
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Geometry

1. Similarity :

- Properties of ratios of areas of two triangles
- Basic proportionality theorem
- Introduction to similarity
- Similar triangles
- Areas of two similar triangles
- Similarity in right angled triangles
- Pythagoras theorem and its converse
- 30o-60o-90o theorem and 45 o-45 o-90 o theorem
- Application of Pythagoras theorem in acute and obtuse angle.
- Appolonius theorem

2. Circle :

- Tangents and its properties
- Theorem - Tangent at any point to the circle is perpendicular to the radius and its converse
- Number of tangents from a point to a circle
- Theorem- The length of two tangent segments drawn from a point outside the circle are equal
- Touching circles
- Introduction to an arc
- Angle subtended by the arc to the centre and to the point on the circle
- Cyclic quadrilateral
- Tangent - Secant theorem

3. Co-ordinate Geometry :

- Slope of a line
- Intercepts made by a line
- Standard forms of equation of a line
- General equation of a line.

4. Geometric Constructions :

- Division of line segment in a given ratio
- Basic geometric constructions

- Construction of tangent to the circle from the point on the circle and out side the circle.
- Construction of tangent without using centre
- Construction of triangle If the base, angle apposite to it and either median altitude is given
- Construction of a triangle similar to a given triangle

5. Trigonometry :

- Angles in standard position.
- Trigonometric ratios in terms of coordinates of point
- Trigonometric Identities (with proof)
- Use of basic identities and their applications
- Problems on height and distance

6. Menstruation :

- Length of an arc
- Area of the sector
- Area of a Circular Segment
- Euler's formula
- Surface area and volume of cuboids Spheres, hemispheres, right circular cylinders cones, frustum of a cone.
- Problems based on areas and perimeter/circumference of circle, sector and segment of a circle.
- Problems on finding surface areas and volumes of combinations of any two of the following : cuboids, spheres, hemispheres and right circular cylinders/ cones
- Problems involving converting one type of metallic solid into another.





General Mathematics

Introduction :

Mathematics is the language of all sciences. It is important to note that the subject itself has a separate identity in the life of human beings. The study of Mathematics has to be graded at different levels viz. primary, secondary and higher secondary. At the primary level the focus is on understanding the various concepts and fundamentals and on developing basic skills of calculation. At the secondary level the emphasis is on developing the capacity of the student to apply mathematics in solving problems.

As curriculum renewal is a continuous process, the curriculum of Mathematics has also undergone several changes from time to time in accordance with the changing needs of the society. In response to the demand of the society after deliberation of Government and Maharashtra State Board of Secondary and Higher Secondary Education, the Board has taken decision to implement Mathematics at two levels from the year 2008 viz. Mathematics (Algebra and Geometry) and General Mathematics.

The Board has restructured the syllabus of Mathematics for std. IX and X on the directives of NCF 2005 and SCF 2010 with a new perspective. The syllabus has been designed to foster a sense of personal achievement and to encourage the continuing creative interaction so as to overcome Mathophobia among students.

The logical proofs of the problems are

avoided while restructuring the syllabus of General Mathematics. The topics selected are useful to develop knowledge, understanding skill and application which will enable the students to cope confidently with the developments in the modern world.

OBJECTIVES

- Consolidate the knowledge and skills acquired in Mathematics at primary stage.
- Acquire the knowledge and skills required for various competitive examinations.
- Acquire the skills required for various professions where minimum qualification is Standard X.
- Acquire the skills in Mathematics required for self employment.
- Expertise in basic Mathematical skills.
- Build the confidence and develop creative interest in Mathematics.
- Use the available modern technology to understand the concepts in Mathematics
- Understand and use the terms, symbols, principles in Mathematics.
- Apply mathematical knowledge to solve problem in real life situations.
- Develop the skill of drawing through geometric constructions.
- Think logically, analytically and use



Std. X
Part-I

Unit I - Arithmetic

1 Variation -

- Introduction
- Types of variation
- Time, work and speed

2 Sequences -

- Introduction
- Patterns of numbers
- Progressions
- Arithmetic Progressions

Unit II - Commercial Mathematics

3 Modern marketing techniques -

- Discount
- Rebate
- Commission
- Brokerage
- Instalments

4 Taxes and Investments -

- Introduction
- Sales tax
- VAT
- Income Tax
- Investments
 - Bank investment
 - Post investment
 - Life insurance
 - Shares and Mutual funds

Unit III - Algebra

5 Linear equations in two variables

- Introduction
- Solution of equations in two variables
- Methods of solving linear equations in two variables

6 Quadratic equations -

- Introduction
- Solution of quadratic equations
- Methods of solving quadratic equations

Part-II

Unit IV - Geometry

1. Similarity

- Introduction
- Test of similarity
- Properties of similar triangles
- Basic proportionality theorem
- Similarity in right angled triangle. Pythagoras theorem statement
- Pythagorean Triplets
- Application of Pythagoras theorem
- Appolloneous theorem

2. Circle -

- Introduction
- Terms related to circle
- Properties of chords
- Properties of tangents
- Arc of circle

3. Trigonometry

- Basic concepts in Trigonometry
- Problems related to height and



distance

Unit V - Constructions

4. Geometric Constructions -
- Construction of incircle of triangle
 - Construction of circumcircle of triangle
 - Tangents to the circle
 - Construction related to design

Unit VI- Mensuration

5. Surface area and volume -

- Parallelopiped
- Rectangular parallelopiped
- Cube
- Cylinder

- Cone
- Sphere and hemisphere

Unit - Statistics

6. Statistics

- Representation of data
- Histogram
- Frequency polygon
- Pie Diagram
- Measures of central tendency for grouped data
- Probability

