MATHEMATICS

CLASS - 9

BOARD OF SECONDARY EDUCATION, RAJASTHAN
AJMER

Text Book Translation Committee

MATHEMATICS

Class - IX

Convener

Dr. Arun Kumar Arora
Retd. Associate Professor
Samrat Prithviraj Chouhan Govt. College,
Ajmer

Translators

Dr. Sushil Kumar Bissu
Associate Professor
Samrat Prithviraj Chouhan Govt. College,
Ajmer

Dr. Kamal Mishra
Associate Professor
Commissionerate College Education,
Jaipur

Shambhoo Singh Lamba
Principal
Govt. Higher Secondary School,
Topdara, Ajmer

Mrs. Ruchi Dave
Sr. Teacher
Govt. Girls Secondary School
Naveen Vidyadhar Nagar, Jaipur

Mohammed Zakir Khan
Retd. Principal
Merta City

Dr. Devendra Bhatnagar
Retd. Principal
Jaipur

Syllabus Committee

MATHEMATICS

Class - IX

Convener

Dr. Sushil Kumar Bissu
Associate Professor
Samrat Prithviraj Chouhan Govt. College,
Ajmer

Members

Rajnarayan Sharma
Retd. Principal
Jaipur

Shambhoo Singh Lamba
Principal
Govt. Higher Secondary School,
Topdara, Ajmer

Nagarjun Sharma
Principal
Govt. Higher Secondary School,
Niwai, Tonk

Ramlal Jat
Principal
Govt. Higher Secondary School,
Khadbamniya, Rajsamand

Chandra Prakash Kurmi
Lecturer
Govt. Higher Secondary School,
Todaraisingh, Tonk

Bhagwan Singh Shekhawat
Sr. Teacher
Govt. Varishtha Upadhya Sanskrit School
Puskar, Ajmer

PREFACE

This book has been written in accordance with the new syllabus for class IX prescribed by the Board of Secondary Education, Rajasthan, Ajmer. In presenting the book the basic object of the syllabus has been fully kept in mind and an attempt has been made to acquaint the students with the contribution of Indian Mathematician towards the development of scientific traditions. The contribution of Indian Mathematicians have been mentioned at appropriate places. Every effort has been made to present the subject in simple and lucid manner Important principal have been explained in detail.

In the interest of the students sufficient number the illustrative examples have been given. At the end of each chapter a summary of the chapter is given in the form of important points, which will help the students in revision. In each chapter objective, short and essay type questions have been given in sufficient number in the miscellaneous exercise.

We hope the book will be useful to students. Students, teachers and reviewers are requested to send their comments, suggestions and to point out any shortcoming in the book, so that the desired improvement in the book can be made in the subsequent edition.

Authors

SYLLABUS

MATHEMATICS

Class-IX

Time- 3.15 hours **Subject code- 09**

Max. Marks-100

S.N.	Name of Unit	Name of Chapter	Marks	Total Marks
1.	Vedic Mathematics	1. Vedic Mathematics	08	08
2.	Number System	1. Number System	06	06
3.	Algebra	1. Polynomials	10	20
		2. Linear Equations in Two Variable	10	
4.	Geometry	1. Introduction with geometry and Angle	02	26
		Plane Geometry line and angle		
		2. Rectilinear Figures	06	
		3. Congruence and Inequalities of Triangles	04	
		4. Construction of Triangle	04	
		5. Quadrilateral	06	
		6. Area of triangle and quadrilateral	04	
5.	Mensuration	1. Area of plane figures	07	15
		2. Surface area and volume of cube and cuboid	08	
6.	Trigonometry	1. Angle and their measurement	03	10
		2. Trigonometric ratios of acute angle	07	
7.	Statistics	1. Statistics	10	10
8.	Road Safety Education	1. Road Safety Education	05	05

Details of the Syllabus

Marks

Unit 1 Vedic Mathematics 8

1. Fundamental concept of Vedic Mathematics (Part-I)

The meaning and applications of the sutras Ekadhikena Purvena, Ekanyunena Purvena, Vinculum (Negative) number, base, sub-base, deviation, The meaning & application of Sutra Nikhilam. Navtah Charamam dastah, Navanka and Ekadashanka methods of checking the results for addition, subtraction and multiplication operations.

Unit 2 Number system 6

Review of Rational numbers on Number line, Irrational number, Real number and their Decimal expansions, representation of irrational number on the number line, successive magnification, Geometrical representation of a real number, operation on real numbers, laws of exponent for real numbers

Unit 3 Algebra 20

1. Polynomials 10

Definition of a polynomial with one variable, its coefficient, constant polynomials, zero polynomial, linear polynomial, zeros of a polynomial, remainder, theorem, factorization of polynomials, Algebraic identities :

$(x+y)^2 = x^2 + 2xy + y^2, (x-y)^2 = x^2 - 2xy + y^2$

$x^2 - y^2 = (x+y)(x-y), (x+a)(x+b) = x^2 + (a+b)x + ab$

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$

$(x \pm y)^3 = x^3 \pm y^3 \pm 3xy(x \pm y)$

$x^3 + y^3 + z^3 - 3xyz = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$

2. Linear Equation in two variables 10

Introduction, linear equation in two variables, Rectangular co-ordinate system, graph of linear equation of two variable. Algebraic methods of solving simultaneous linear equations :- (i) Method of Elimination (by substitution, by equating the co efficients) (ii) cross-multiplication method, condition for solvability, applications of linear equations in two variables.

Unit 4 Geometry 26

1. Introduction of Plane Geometry, Line and Angle 02

Fundamental concepts, theorems and geometric construction, geometric symbols, Angle and its measurements, transversal line and parallel line, basic

constructions. Construction draw a bisector of a given line segment, draw a bisector of a given angle, construction of various angle 60°, 120°, 30°, 90°, 45°, 135° with the help of ruler and compass, draw an equivalent angle of an angle on a point of a line, draw the various angles of any measurement with the help of ruler and compass. Draw a perpendicular from a point which is out side the line on any line. Draw a perpendicular at any point of the line.

2. Rectilinear Figures 6

Triangle and its angle, classification of triangle, rectilinear figures.

3. Congruence and Inequalities of Triangle 4

Theorem- Angle-Side-Angle some properties of triangle, some other concepts for the congruence of triangle, Side-Side-Side-rule, RHS-rule, inequalities of triangle perpendicular distance of a line from a external point.

4. Construction of Triangles 4

Construction of triangles when three sides are given, two sides and angle between them is given, two angles and one side is given. Construction a right-angled triangles when two sides and an angle opposite to one side is given, some difficult constructions of triangles.

5. Quadrilateral 6

Types of quadrilateral, properties of parallelogram, mid point theorem, construction of quadrilaterals when four sides and a diagonal are given, three sides and two angles between them are given, two consecutive side and angle between them and other two angles are given, construction of parallelogram and trapezium.

6. Area of triangles and Quadrilaterals 4

Introduction, area, figures made on same base and between pair of same parallel lines.

- Parallelograms made on same base and between same parallel lines are equal.
- Area of triangle between same base and same parallel lines are equal.
- If the area of two triangle are equal and one side of a triangle is equal to one side of other triangle, then their corresponding altitudes are equal.
- Baudhayan theorem - In a right angled triangle, square made on hypotenuse, is equal to the sum of the squares made on other two sides.

Converse of Baudhayan theorem- In a triangle, if square of a longest side is equal to the sum of the squares of other two sides, angle opposite to this side is a right angle.

Unit 5 Mensuration 15

1. Area of plane figures 7

Introduction, area of triangle, Heron's formula, area of an isosceles triangle, area of a equilateral triangle, area of right angled triangle, area of quadrilateral, area of parallelogram, to find the area of different quadrilateral (cyclic quadrilateral, rhombus, trapezium) and their uses.

2. Surface area and Volume of cube and cuboid 8

Introduction, cube, cuboid, diagonal of cube and cuboid. Surface area and volume of cube and cuboid.

Unit 6 Trigonometry 10

1. Angle and their measurement 3

Trigonometry, positive and negative distance, angle, positive and negative angles, angles of any magnitude and their measurement, sexagesimal system, centesimal system, circular system . Value of π, value of 1 radian.

2. Trigonometric ratios of Acute Angles 7

Right-angled triangle, trigonometric ratios of acute angle, relation between trigonometric ratios, trigonometric identities.

Unit 7 Statistics 10

1. Statistics 10

Introduction, Primary data, Secondary data, presentation of data, graphical representation of data, bargraph, histograms (According to change in base and height), frequency polygon, measures of central tendency. Mean, mode, median.

Unit 8 Road Safety Education 5

Percentage (objective, content, activity) circle (objective, content, activity), statistics (objective, content, activity) quadrilaterals (objective, content, activity), road signs, probability (objective), data.

Prescribed book :

Mathematics, Board of Secondary Education Rajasthan, Ajmer

INDEX