



MATHEMATICS

1st Term Course

Marks:100

Time : 3 hours

Unit	Name of the Chapter	Marks
1	Number system	17
2	Polynomials	18
3	Lines and Angles	10
4	Triangles	20
5	Quadrilaterals	15
6	Areas of Parallelograms and Triangles	10
7	Construction	10
	Total	100

Unit I: Number System

Marks : 17

Real Numbers: Review of representation of natural number, integers, rational numbers on the numbers line. Representation of terminating/ non terminating recurring decimals on the number line through successive magnification. Rational number as recurring numbers as recurring/ terminating decimals. Examples of non recurring/non terminating decimal, such as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$,

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 number line and conversely, every point on number line represents a unique real number. Existence of \sqrt{x} for a given positive real number x (visual proof to be emphasized). Definition of n^{th} root of a real number. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learners to arrive at the general laws).

Rationalization (with precise meaning) of real numbers of the type (and their combinations)

$\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x} + \sqrt{y}}$ and where 'x' and 'y' are natural numbers and a and b are integers. Logarithm ___ concepts



Unit II: Polynomials

Marks: 18

Definition of a polynomials in one variable. Its coefficients, with examples and counter examples, its terms, Zero polynomial. Degree of a polynomial, constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiplies. Zeros/roots of a polynomial/ equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statements and proof of the Factor Theorem. Factorization of $ax^2 + bx + c$, $a \neq 0$ where a, b, c , are real numbers and of cubic polynomials using the Factor Theorem. Recall of algebraic expressions and identities

Further identities of the type

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

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

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

and their use in factorization of polynomials. Simple expression reducible to these polynomials.

Unit III: Lines and Angles

Marks: 10

Introduction to Euclids Geometry, the five postulates of Euclid, version of the fifth postulate, Relationship between Axiom and theorem.

1. Given two distinct point, there exists one and only one line through them.
2. (Prove) T wo distinct line can not have more than one point in common.
3. (Motivate) If a ray stands on a line, then the sum of two adjacent angles so formed is 180° degree and the converse.
4. (Prove) If two line interest, the vertically opposite angles are equal.
5. (Motivate) Results on corresponding angles, alternative angles, interior angles when a transversal interest two parallel lines.
6. Lines which are parallel to a given line are parallel.
7. (Prove) The sum of the angles of a triangle is 180° .
8. (Motivatei) If one side of a triangle is produced, the exterior angles so formed is equal to the sum of the two interior opposite angles.



Unit IV Triangles

Marks: 20

1. Two triangles are congruent if any two sides and the included angles of one triangle is equal to any two sides and their included angle of the other triangle (S.A.S 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 corresponding sides of the other triangle (SSS Congruence).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal respectively to the hypotenuse and the side of the other triangle .
5. (Prove) 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 a triangle.

Unit V Quadrilaterals

Marks : 15

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 its converse.

Unit VI Areas of Parallelograms and Triangles

Marks : 10

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 base and between the same parallels are equal in area and its converse.

Unit VII Constructions

Marks: 10

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



2nd Term Course

Marks : 100

Time : 3 hours

Unit	Name of the Chapter	Marks
8	Linear Equation in Two Variables	10
9	Coordinate Geometry	10
10	Circles	25
11	Heron's Formula	10
12	Surface Area and Volumes	20
13	Statistics	15
14	Probability	10
	Total	100

Unit VIII Linear Equation in Two Variables Marks: 10

Recall of linear equations in one variable. Introduction to the equation in two variables. 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 solution being done simultaneously.

Unit IX Coordinate Geometry Marks 10

The Cartesian plane. Coordinates of a point, names and terms associated with co-ordinate plane notations plotting points in the plane, graph of a linear equation as examples: focus on linear equations of the type $ax + by + c = 0$ by writing it as $y = mx + c$ and linking it with chapter on linear equations in two variables.

Unit X Circles Marks :25

Definition of circles, related concepts, radius, circumference, diameter, chord, arc, subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the centre and its converse.
2. (Motivate) The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre 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 centre (s) and conversely.



5. (Prove) The angle subtended by an arc at the centre 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 angles 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 the either pair of the opposite angles of a cyclic quadrilateral is 180° degree and its converse.

Unit XI Heron's Formula

Marks: 10

Area of triangle using Heron's formula (without proof) and its application in finding the area of a Quadrilateral.

Unit XII Surface Area and Volumes

Marks: 20

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

Unit XIII Statistics

Marks: 15

Introduction to Statistics, Collection of data, Presentation of data-tabular form, ungrouped grouped, bar graphs, histogram (with varying base lengths) frequency polygons, qualitative analysis of data to choose the correct form of presentation for the collected data. Mean (arithmetic mean), Median, Mode of ungrouped data.

Unit XIV Probability

Marks: 10

History, Repeated experiments and observed frequency approach to Probability. Focus is on empirical Probability

Book Prescribed:

Mathematics: A Text Book for Class IX published by Jammu and Kashmir State Board of School Education.



COURSE WORK (Assessment Project Work)

The course work components has been designed to provide schools with an alternative means of assessment of those objectives as lend themselves to testing by means other than timed written paper. The course work is intended to provide a framework for developing and ability to solve problems for encouraging investigation activities. The course work component allows particular emphasis on objectives, which are difficult to test in times written papers.

Suggested Topic

- (i) Finding area of classroom, school campus and making a project indicating cost of fencing/ walling etc.
- (ii) Representing statistical data graphically.
- (iii) Scale drawing maps/ model making, etc.
- (iv) Working of a Computer.

Note:

1. The students can use simple electronic calculators. Electronic calculators having exponential and trigonometric functions shall not be allowed.
2. Trigometrical/ Log tables, if required, be provided to the students. No other Mathematical or Statistical table will be allowed to be used.