CBSE Class 9 Maths Updated Syllabus

CBSE Maths 9th Class Syllabus: Course Structure

UNIT No.	UNIT NAME	MARKS
I	Number Systems	10
II	Algebra	20
III	Coordinate Geometry	4
IV	Geometry	27
V	Mensuration	13
VI	Statistics & Probability	6
	TOTAL	**80**

Unit I - Number Systems

1. REAL NUMBERS

1. Review of representation of natural numbers, integers, and rational numbers on the number line. Rational numbers as recurring/ terminating decimals. Operations on real numbers.

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. This explains 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. Definition of the nth root of a real number.

4. Rationalization (with precise meaning) of real numbers of the type $\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ and their combinations) where x and y are natural numbers and a and b are integers.

5. Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by cases, allowing the learner to arrive at the general laws.)

Unit II - Algebra

1. POLYNOMIALS

Definition of a polynomial in one variable, with examples and counter examples. Coefficients of a polynomial, terms of a polynomial and zero polynomial. Degree of a polynomial. Constant, linear, quadratic and cubic polynomials. Monomials, binomials, trinomials. Factors and multiples. Zeros of a polynomial. Motivate and State the Remainder Theorem with examples. Statement and proof of the Factor Theorem. Factorisation of $ax^2+bx+c, a\neq 0$ where a, b and c are real numbers, and of cubic polynomials using the Factor Theorem.

Recall of algebraic expressions and identities. Verification of identities:

$$(x+y+z)^2 = x^2+y^2+z^2+2xy+2yz+2zx$$
$$(x\pm y)^3 = x^3\pm y^3\pm 3xy(x\pm y)$$
$$x^3\pm y^3 = (x\pm y)(x^2\mp xy+y^2)$$

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$ and their use in the factorisation of polynomials.

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 of ax+by+c=0. Explain 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 lie on a line.

Unit III -Coordinate Geometry

COORDINATE GEOMETRY

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane.

Unit IV- Geometry

1. INTRODUCTION TO EUCLID'S GEOMETRY

History - Geometry in India and Euclid's geometry. Euclid's method of formalising observed phenomena into rigorous mathematics includes definitions, common/obvious notions, axioms/postulates, and theorems. The five postulates of Euclid. Showing the relationship between axiom and theorem, for example:

(Axiom) 1. Given two distinct points, one and only one line exists 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. (Motivate) Two triangles are congruent if any two angles and the included side of one triangle are 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 the three sides of the other triangle (SSS Congruence).

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 midpoints of any two sides is parallel to the third side and in half of it and (motivate) its converse.

5. CIRCLES

1. (Prove) Equal chords of a circle subtend equal angles at the centre and (motivate) 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) Equal chords of a circle (or of congruent circles) are equidistant from the centre (or their respective centres) and conversely.

4. (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.

5. (Motivate) Angles in the same segment of a circle are equal.

6. (Motivate) If a line segment joining two points subtends an equal angle at two other points on the same side of the line containing the segment, the four points lie on a circle.

7. (Motivate) The sum of either pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.

Unit V - Mensuration

1. AREAS
Area of a triangle using Heron's formula (without proof)

2. SURFACE AREAS AND VOLUMES
Surface areas and volumes of spheres (including hemispheres) and right circular cones.

Unit VI - Statistics & Probability

STATISTICS
Bar graphs, histograms (with varying base lengths), and frequency polygons.

Mathematics Question Paper Design Class – IX

S. No.	Typology of Questions	Total Marks	% Weightage (approx.)
1.	**Remembering:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	43	54
2.	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules differently.	19	24
3.	**Analysing:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalisations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions	18	22
	Total	**80**	**100**

Marking Scheme for Internal Assessment

INTERNAL ASSESSMENT	Marks
Pen Paper Test and Multiple Assessment (5+5)	10 Marks
Portfolio	05 Marks
Lab Practical (Lab activities to be done from the prescribed books)	05 Marks
Total	20 Marks

Prescribed Books:
Mathematics Textbook for Class IX, Published by NCERT