Subject: Mathematics Class – 9

Unit	Omitted Topics
Unit-I: Number System	
Real Numbers	- Representation of terminating/non-terminating recurring decimals on the number line through successive magnification - Explaining that every real number is represented by a unique point on the number line and conversely, viz every point on the number line represents a unique real numbers.
Sets	No Omission
Unit-II: Commercial Mathematics	
Compound Interest	No Omission
Ratio and Proportion	- Direct variation - simple and direct word problem
Cost of Living Index	Full Chapter Omitted
Sales tax	Full Chapter Omitted
Unit-III: Algebra	
Polynomials	- Statement and proof of the Factor theorem. - Recall of algebraic expression and identities. Further identities of the type: - $x^3 + y^3 + z^3 - 3xyz$
GCD and LCM	No Omission
Linear Equations in Two Variables	No Omission
Unit-IV: Geometry	
Lines and angles	No Omission
Triangles	No Omission
Concurrent Lines in a Triangle	Full Chapter Omitted
Quadrilaterals and Parallelograms	No Omission
Area	Full Chapter Omitted
Constructions	- Construction of a triangle of a given perimeter and base angles
Circles	Omit except definition of circle related concepts, radius, circumference, diameter, chord, arc and simple numerical problems.
Unit-V: Coordinate Geometry	No Omission
Unit-VI: Trigonometry	
Trigonometric ratios	No Omission
Trigonometric Identities	No Omission

Unit-VII: Mensuration	
Areas	Application of Hero's formula in finding the area of a quadrilateral
Surface Areas and volumes	No Omission
Unit-VIII: Statistics and Probability	
Statistics	- Histogram(with varying base lengths) - Frequency polygons - Mean, median and mode of ungrouped data
Probability	No Omission

MATHEMATICS (Selected)
CLASS – 9

UNIT-I: NUMBER SYSTEM

Real numbers:

- Irrational number as non-terminating and non-repeating decimals
- Real numbers and the real number line. Surds and Rationalization of surds. Problems of proving a number to be irrational number should be avoided. Representing an irrational number on the number line should be avoided for numbers other than $\sqrt{2}, \sqrt{3}$ and $\sqrt{5}$

Sets:

- Revision
- Representation of sets, equal sets, subsets, power set, universal set.

UNIT-II: COMMERCIAL MATHEMATICS

Compound Interest:

- Compound interest when the interest is compounded yearly and half-yearly.
- Rate of growth and depreciation. Conversion period not more than four (Rate should be 4%, 5% or 10%).

Ratio and Proportion:

- Ratio and proportion.

UNIT-III: ALGEBRA

Polynomials:

- Definition of a polynomial 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 multiples.
- Zeros / roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers.
- Factorisation 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:
  $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$; $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy(x \pm y)$;
  $x^3 \pm y^3 = (x \pm y)(x^2 \mp xy + y^2)$;
  and their use in factorization of polynomials.

G.C.D. and L.C.M.

- G.C.D. and L.C.M. of polynomials by factorisation**.**

Linear Equations in Two Variables:

- 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.
- System of linear equation in two variables.
- Solution of the system of linear equations by substitution method.
- Simple word problems.

UNIT-IV: GEOMETRY

Lines and Angles:

1. If two parallel lines are intersected by a transversal, then the pair of corresponding angles are equal.
2. If two parallel lines are intersected by a transversal, then the pair of alternate angles are equal.
3. Vertically opposite angles are equal.
4. If a transversal intersects two lines in such a way that a pair of alternate angles is equal, then the two lines are parallel.
5. If a transversal intersects two parallel lines, then the interior angles on the same side of the transversal are supplementary.
6. If a transversal intersects two lines in such a way that a pair of interior angles on the same side of the transversal are supplementary, then the two lines are parallel.
7. Lines which are parallel to a given line are parallel to each other.
8. If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.

Triangles:

1. Two triangles are congruent if any two sides and the included angle of one triangle are equal to any two sides and the included angle of the other triangle.
2. 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.
3. Two triangles are congruent if the three sides of one triangle are equal to the three sides of the other triangle.
4. Two right triangles are congruent if the hypotenuse and a side of one triangle are respectively equal to the hypotenuse and a side of the other triangle.
5. The angles opposite to equal sides of a triangle are equal.
6. The sides opposite to equal angles of a triangle are equal.

Quadrilaterals and Parallelograms:

1. A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and of equal length.
2. Diagonals of a rectangle are equal and bisect each other.
3. Diagonals of a rhombus bisect each other at right angles.
4. Diagonals of a square are equal and bisect each other at right angles.
5. In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and is half of it.
6. The line drawn through the mid point of one side of a triangle parallel to another side bisects the third side.
7. Triangle inequalities and relation between ‘angle and facing side’; inequalities in a triangle.

Constructions:

1. Construction of a triangle given its base, sum of the other two sides and one base angle.
2. Construction of a triangle given its base, difference of the other two sides and one base angle.
3. Construction of a triangle given its two sides and a median corresponding to one of these sides.
4. Construction of a triangle equal in area to a given quadrilateral.
   (i) Proofs of constructions not required.
   (ii) Constructions using ruler and compasses only.

Circles:

Definitions of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle and simple numericals.

UNIT-V: COORDINATE GEOMETRY

- The Cartesian plane.
- Co-ordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples.
- Focus on linear equations of the type ax+by+c=0 by writing it as y=mx+c and linking with the chapter on linear equations in two variables.

UNIT-VI: TRIGONOMETRY

Trigonometric ratios:

- Formation of angles through rotation of a ray.
- Idea of positive and negative angles.
- Trigonometric ratios of an acute angle of a right angled triangle. Trigonometric ratio of 0,30,45,60,90.
- Given a trigonometric ratio, to find all other trigonometric ratios.
- Given a side and an angle of a right triangle, to find other sides and angles.

Trigonometric Identities:

- Very simple identity proof of trigonometric ratios.

UNIT-VII: MENSURATION

Areas:

- Area of a triangle using Hero's formula (without proof)

Surface Areas and Volumes:

- Concept of surface area.
- Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.

UNIT-VIII: STATISTICS AND PROBABILITY

Statistics:

- Introduction to statistics.
- Collection of data, presentation of data – tabular form, ungrouped/ grouped, bar graphs.

Probability:

- History, repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real-life situations, and from example used in the chapter on statistics).

Weightage to Form of Questions :

Sl/no.	*Form of Questions*	*No. of Questions*	*Marks for each question*	*Total Marks*
2.1	Objective type	24	1	24
2.2	Short Answer I	10	2	20
2.3	Short Answer II	07	3	21
2.4	Long Answer	03	5	15
	TOTAL	**44**		**80**

Weightage to Content Area :

Sl/no.	*Topic*	*Marks*
3.1	Number System and Sets	08
3.2	Commercial Mathematics	10
3.3	Algebra	16
3.4	Geometry	14
3.5	Coordinate Geometry	04
3.6	Trigonometry	10
3.7	Mensuration	10
3.8	Statistics and Probability	08
	TOTAL	**80**

Scheme of Options :

All questions shall be compulsory i.e. there shall not be any overall choice in the questions paper. However, internal choices have been provided in 2 questions of 3 marks each and 1 question of 5 marks. These choices may be given from within the same topic.

(a) Blue Print Sample 1 : Mathematics Class 9

Forms of Question/ Topic	Knowledge				Understanding				Application				HOTS				Total
	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	
Number System & Sets	1(1)		3(1)		1(1)	2(1)			1(1)								**8(5)**
Commercial Maths	1(1)	2(1)			1(1)		3(1)		1(1)	2(1)							**10(6)**
Algebra	1(1)			5(1)	1(1)	2(1)			1(1)		3(1)				3(1)		**16(7)**
Geometry	1(1)	2(1)			1(1)			5(1)	2(2)		3(1)						**14(7)**
Coordinate Geometry	1(1)	2(1)							1(1)								**4(3)**
Trigonometry	1(1)				1(1)		3(1)		1(1)	2(1)				2(1)			**10(6)**
Mensuration	1(1)	2(1)			1(1)				1(1)			5(1)					**10(5)**
Statistics & Probability	1(1)				1(1)	2(1)			1(1)						3(1)		**8(5)**
Sub- Total	**8(8)**	**8(4)**	**3(1)**	**5(1)**	7(7)	**6(3)**	**6(2)**	**5(1)**	**9(9)**	**4(2)**	**6(2)**	**5(1)**		**2(1)**	**6(2)**		**80(44)**
Total	**24(14)**				**24(13)**				**24(14)**				**8(3)**				

(b) Blue Print Sample 2

Forms of Question/ Topic	Knowledge				Understanding				Application				HOTS				Total
	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	Obj	SA I	SA II	LA	
Number System & Sets	1(1)				1(1)		3(1)				3(1)						**8(4)**
Commercial Maths	3(3)	4(2)			1(1)	2(1)											**10(7)**
Algebra	4(4)	2(1)			1(1)		3(1)				3(1)				3(1)		**16(9)**
Geometry	1(1)	2(1)			2(2)	2(1)				2(1)		5(1)					**14(7)**
Coordinate Geometry					1(1)						3(1)						**4(2)**
Trigonometry	2(2)	2(1)			1(1)	2(1)					3(1)						**10(6)**
Mensuration	3(3)				2(2)											5(1)	**10(6)**
Statistics & Probability					1(1)	2(1)						5(1)					**8(3)**
Sub- Total	**14(14)**	**10(5)**			**10(10)**	**8(4)**	**6(2)**			**2(1)**	**12(4)**	**10(2)**			**3(1)**	**5(1)**	**80(44)**
Total	**24(19)**				**24(16)**				**24(7)**				**8(2)**				

Note : 1) The figures in the bracket denote the number of questions.

2) This is only a sample Blue Print. The question setter may develop his/her own Blue Print as pser the question design.