

SYLLABUS

Teaching Points

Teaching Notes

1. SETS

Revision of work done in Classes VI and VII

Idea of a set Notation

Finite/Infinite set

Well defined collection of distinct objects.

Roster method (listing elements) and set builder method.

Denoting sets by capital letters and elements by small letters.

Universal set

Revision of work done in Classes VI and VII

The empty set

Equivalent sets, Equal sets

Cardinal number of a set

Candidates will be expected to be familiar with the terms and symbols connected with sets, namely,

Sets of numbers : N, W, I or Z, Q and R

General : \in , \notin , ξ , \emptyset or $\{ \}$, $n(A)$

Subsets

Complement of a set, Union of sets, Intersection of sets

Operational : A' , \cup , \cap .

Relation : $=$, \neq , \leftrightarrow , \Leftrightarrow , \subset , \supset , \subseteq , \supseteq .

Venn diagrams

Venn diagrams as illustrations to bring out relationship in sets and their use in simple logical problems.

2. NUMBERS

Numbers

Natural numbers, whole numbers, integers, rational and irrational numbers, real numbers.

The real number line

Prime and composite numbers, odd and even numbers.

Factors, H.C.F., Multiples, L.C.M.

Four fundamental operations. Simplification of expressions involving fractions and decimals (Use of principle of BODMAS).

Symbols : $=$, $>$, $<$, \leq , \geq , $+$, $-$, \times , \div , of, brackets.

Directed numbers

Four fundamental operations involving directed numbers.

Ratio, fractions, decimals and percentage

Conversion of one to the other.

Squares and Square roots

Square root by factors and division method.

3. ARITHMETICAL PROBLEMS

Simple Interest

Calculation of Interest and Amount only.

Compound Interest by Simple Interest method

Calculation of Interest and Amount only.

Percentage, Profit and Loss

Elementary (simple and direct questions) only.

Time and work

Pupils must be fully conversant with the measures of money, length, area, volume, weight and time.

Time and Distance

Proportional parts

4. ALGEBRA

Fundamental concepts

Pupils will be expected to be familiar with algebraic terms such as term, monomial, binomial, trinomial, polynomial, degree of a polynomial, coefficient, variable, constant, linear, algebraic fractions.

Fundamental operations

Addition, subtraction and multiplication.

Division of a polynomial by a monomial or a binomial of first degree.

Simplification by removal of brackets (Use of principle of BODMAS).

Substitution

Substitution in polynomials (degree 2 or 1) involving at most 3 unknowns.

Exponents

Positive, integral and zero indices only.

Laws of exponents : $x^m \cdot x^n = x^{m+n}$; $x^m/x^n = x^{m-n}$; ($m > n$ only)

$(x^m)^n = x^{mn}$ and $x^0 = 1$ Proofs of the laws will not be required.

Formulae

Framing of formulae (simple cases). Change of subject of formula.

Products and
Expansions
Factorisation

$$(x \pm a)(x \pm b)$$

$$(x \pm a)^2$$

Taking common; $ax + bx, a(x + y) \pm b(x + y)$

Grouping and taking common : $ac + bd + ad + bc$

Difference of squares $x^2 - y^2$

Trinomials $ax^2 + bx + c$ ($a, b, c \in \mathbb{N}$).

Linear equations

Solution of :

(i) simple linear equations and problems leading to them.

(ii) pairs of simultaneous linear equations in two variables.

Simple problems leading to them.

Candidates will be expected to find a solution set in a given replacement set for the variable.

Graphs

Graphical representation of a linear equation in two variables, Solution of a pair of simultaneous linear equations in two variables graphically.

5. MENSURATION

Area and perimeter of
a triangle, rectangle,
trapezium and circle

Problems on paths inside or outside a rectangle or a circle may be included.

Volume and surface of cuboids

Pupils should be familiar with the abbreviations; cm, m, km; cm^2 , m^2 , cm^3 , m^3 .

6. GEOMETRY

Note : In the Geometry section of the syllabus, pupils will not be expected to prove theorems.

Questions should be set to test simple logical deductions from geometrical properties.

Fundamental concepts

Candidates will be expected to be familiar with line, plane, space, line segment, polygons as a set of points.

Lines

Parallel, intersecting, perpendicular, bisectors of angles, bisectors of line segments.

Angles

Acute, right, obtuse, straight and reflex. Adjacent angles, vertically opposite angles. Complementary and supplementary angles. Alternate, corresponding and interior opposite angles (with reference to parallel line).

Properties

- (a) If two straight lines intersect, the adjacent angles are supplementary and vertically opposite angles are equal.
- (b) If two angles having a common arm are supplementary the other two arms lie in a straight line.
- (c) If two parallel lines are cut by a transversal line,
 - (1) the alternate angles are equal,
 - (2) the corresponding angles are equal,
 - (3) the interior angles on the same side of the cutting line are supplementary.
- (d) The converse of (c).

Polygons

The angle sum property - interior : $(2n - 4)\text{rt. angles}$, exterior : (4 rt. angles) .

Triangles : Kinds

Scalene, isosceles, equilateral

Properties

- (a) Congruency : SAS, ASA, SSS, RHS.
- (b) The angle sum property.
- (c) If one side of a triangle is produced, the exterior angle formed is equal to the sum of the interior opposite angles.
- (d) If two sides of a triangle are equal, the angles opposite to them are equal; and the converse.
- (e) If two sides of a triangle are unequal, the greater side has the greater angle opposite to it; and the converse.
- (f) Pythagoras' theorem.

Quadrilaterals,	(a) If a pair of opposite sides of a quadrilateral are equal and Parallel, it is a parallelogram.
	(b) The opposite angles of a parallelogram are equal and adjacent angles are supplementary.
	(c) The diagonals of a parallelogram bisect each other, and each diagonal bisects the parallelogram.
Area propositions	(d) Parallelograms on the same base and between the same parallels are equal in area.
	(e) The area of a triangle is half that of a parallelogram on the same base and between the same parallels.
Rectangle	(f) The diagonals of a rectangle are equal and bisect each other.
Square	(g) The diagonals of a square bisect each other at right angles and are equal.
Rhombus	(h) The diagonals of a rhombus bisect each other at right angles.
Constructions	Using ruler and compasses only :
Angles	An angle equal to a given angle. Bisection of an angle.
	Construction of angles of 60° , 30° , 90° , 45° .
Lines	Bisector of a line segment. Perpendicular bisector of a line segment.
	Construction of a perpendicular to a line (i) at a given point in the line and (ii) from an external point.
Triangles	Simple data corresponding to congruency conditions (Questions on constructions of triangles given sum/difference of sides/angles not to be asked).
Rectangles, Squares and Rhombus	From simple data.
Circle	From simple data. Circumcircle and incircle of a triangle.

PART II

1. ARITHMETIC/ALGEBRA

Approximation

Significant figures, rounding off to a specified unit (e.g. to the nearest mm, nearest g, nearest paisa, etc.) and decimal places.

Power and roots (tables and approximation)

Use of tables in computing squares, cubes, square roots and cube roots of natural numbers. Using the division method to find the square roots of a non-perfect square natural number to a specified number of decimal places e.g. find $\sqrt{27}$ correct to 2 decimal places.

H.C.F. and L.C.M.

Using factors only.

Inequations

Simplification of algebraic fractions (cancelling the H.C.F. in Nr. and Dr.) Addition and subtraction of simple algebraic fractions by finding the L.C.M. of the denominators.

Quadratic equations

Solution of quadratic equations in one variable, using factors only. **Problems leading to quadratic equations excluded.**

Relations and Mappings

Review of Class VII work; roster form and equation form of functions. Classification of functions not included.

2. MENSURATION

Area and perimeter of a trapezium

Use of the formula for area; direct problems only.

3. GEOMETRY

Circles

Terms : radius, diameter, circumference, chords, arcs, semicircle, major arc, minor arc, sectors, segments, central angle, tangents, \angle in a semicircle = 90°

Symmetry, Reflection, Rotation

Figures having symmetry, line symmetry, rotation through 90° .

4. STATISTICS

Tabulation of raw-data. Frequency tally. Frequency distribution and column graphs based on frequency distribution and not frequency density. Introduction to grouped data – tabulating data and finding mean. Introducing median and mode, revising earlier concepts.