Common Understanding & Proficiency Assessment-Mathematics – 2018-19
Class- VIII (based on class-VII syllabus)

1. **Number System**

(i) Knowing Our Numbers: Integers

- Multiplication and division of integers (through patterns).
- Division by zero is meaningless
- Properties of integers (including identities for addition & multiplication, commutative, associative, distributive) (through patterns).

These would include examples from whole numbers as well. Involve expressing commutative and associative properties in a general form. Construction of counterexamples, including some by children. Counter examples like subtraction is not commutative.

- Word problems including integers (all operations)

(ii) Fractions And Rational Numbers:

- Multiplication of fractions
- Fraction as an operator
- Reciprocal of a fraction
- Division of fractions
- Word problems involving mixed fractions
- Introduction to rational numbers (with representation on number line)
- Operations on rational numbers (all operations)
- Representation of rational number as a decimal
- Word problems on rational numbers (all operations)
- Multiplication and division of decimal fractions
- Conversion of units (length & mass)
- Word problems (including all operations)

(iii) Powers:

- Exponents only natural numbers
- Laws of exponents (through observing patterns to arrive at generalisation.)

(i) $a^m\ a^n\ a^{m+n}$
(ii) (ii) $(a^m)^n = a^{mn}$
(iii) (iii) $a^m/a^n = a^{m-n}$, where $m - n \in N$

2. Algebra

(i) Algebraic Expressions

- Generate algebraic expressions (simple) involving one or two variables
- Identifying constants, coefficient, powers
- Like and unlike terms, degree of expressions e.g., x^2y etc. (exponent ≤ 3, number of variables)

- Addition, subtraction of algebraic expressions (coefficients should be integers).
- Simple linear equations in one variable (in contextual problems) with two operations (avoid complicated coefficients)

(ii) Ratio And Proportion

- Ratio and proportion (revision)
- Unitary method continued, consolidation, general expression.
- Percentage- an introduction.
- Understanding percentage as a fraction with denominator 100
- Converting fractions and decimals into percentage and vice-versa.
- Application to profit and loss (single transaction only)
- Application to simple interest (time period in complete years).

3. Geometry

(i) Understanding Shapes:

- Pairs of angles (linear, supplementary, complementary, adjacent, vertically opposite) (verification and simple proof of vertically opposite angles)
- Properties of parallel lines with transversal (alternate,corresponding, interior, exterior angles)

(ii) Properties Of Triangles:

- Angle sum property (with notions of proof & verification through paper folding, proofs using property of parallel lines, difference between proof and verification.)
- Exterior angle property
- Sum of two sides of atriangle is always greater than it's third side
- Pythagoras Theorem (Verification only)

(iii) Symmetry

- Recalling reflection symmetry
- Idea of rotational symmetry, observations of rotational symmetry of 2-D objects. (90°, 120°, 180°)
- Operation of rotation through 90° and 180° of simple figures.
- Examples of figures with both rotation and reflection symmetry (both operations)
- Examples of figures that have reflection and rotation symmetry and vice-versa

(iv) Representing 3-D In 2-D:

- Drawing 3-D figures in 2-D showing hidden faces
- Identification and counting of vertices, edges, faces, nets (for cubes cuboids, and cylinders, cones).
- Matching pictures with objects (Identifying names)
- Mapping the space around approximately through visual estimation.

(v) Congruence

- Congruence through superposition (examples-blades, stamps, etc.)
- Extend congruence to simple geometrical shapes e.g. triangles, circles.
- Criteria of congruence (by verification) SSS, SAS, ASA, RHS

(vi) Construction (Using Scale, Protractor, Compass)

• Construction of a line parallel to a given line from a point outside it.(Simple proof as remark with the reasoning of alternate angles)□• Construction of simple triangles. Like given three sides, given a side and two angles on it, given two sides and the angle between them.

4. Mensuration

• Revision of perimeter, Idea of circumference of Circle

Area

Concept of measurement using a basic unit area of a square, rectangle, triangle, parallelogram and circle, area between two rectangles and two concentric circles.

5. Data handling

(i) Collection and organisation of data – choosing the data to collect for a hypothesis testing.

(ii) Mean, median and mode of ungrouped data – understanding what they represent.

(iii) Constructing bargraphs

(iv) Feel of probability using data through experiments. Notion of chance in events like tossing coins, dice etc. Tabulating and counting occurrences of 1 through 6 in a number of throws. Comparing the observation with that for a coin. Observing strings of throws, notion of randomness.