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CLASS 6
YEARLY LEARNING OUTCOMES FOR MATHS
YEAR 20 2022-23

By the end of the year, students should be able to-

Number System:

M1. Apply and extend previous understandings of numbers to the system of rational numbers.

Revisit:

M1.1 Create and write smallest and greatest numbers using a set of given digits

M1.2 State the place value and face value of a digit from (10 – 100000000) by expanding and converting expanded form to 9 digit numeral

M1.3 Identify, compare and arrange 7, 8, 9 digit numbers from (1000000 to 100000000) in ascending and/or descending order

M1.4 Round off a number to the nearest 1000, 10000, 100000, 1000000, 10000000 (thousand, ten thousand, lakh, ten lakhs, crore)

Integers

M1.5 Demonstrate the understanding of integers through

   a. concrete situations

   b. through movement of the number line

M1.6 Understand integers as directed numbers

M1.7 Demonstrate the understanding of the term 'opposite' as applied to integers and of the term 'absolute value'

M1.8 Compare the value of integers on a number line and order them

M1.9 Understand addition, subtraction, and properties of integers through movement on the number line

M1.10 Solve sums on the learned properties of integers using addition and subtraction

Sets

M 1.11 Understand and define set - idea of set notation

M 1.12 Know the roster-listing and set builder methods of representing sets

M 1.13 Understand the terms: equal set, empty set or null or void set, finite set, infinite set, singleton set, cardinal number,

Factors and Multiples:

M2. Compute fluently with multi-digit numbers and find common factors and multiples. (Recap of class-5)

M2.1 Define and demonstrate understanding of natural numbers, composite numbers and prime numbers

M2.2 Identify the divisibility of any number using the divisibility rules of 2,3,4,5,6,8,10,11 and 25

M2.3 Factorize one or more numbers (upto 999) using the prime factorization and long division methods to find the HCF and LCM

M2.4 Understand the relation between HCF and LCM

M2.5 Solve problems using the skills learnt related to HCF and LCM

Fractions, Decimals and Percentage:

M3. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

Fractions

M3.1 Identify, define and classify various types of fractions (recap)

M3.2 Reduce a fraction to its lowest or simplest form (using different methods) (recap)

M3.3 Compute, compare and apply all the operations (BODMAS, addition, subtraction, multiplication, division) with fractions to solve sums /problems

Decimals

M3.4 Demonstrate the understanding of and use of decimals upto 4 decimal places concretely, through money and the metric units of measure, using place value and expanded form

M3.5 Compare decimals upto 4 decimal places (tenths, hundredths, thousandths, ten thousandths) and arrange decimals in ascending and descending order

M3.6 Convert decimals to fractions and vice versa (terminating decimals only) using different methods

M3.7 Solve problems involving addition, subtraction, multiplication and division skills learnt for decimals

M3.8 Round off the numbers with one or two decimals to the nearest whole number

Percentage

M4.5 Understand percent as a fraction with 100 as denominator and its application in various situations

M4.6 Compute (through unitary method) and apply percentage to solve sums and problems

Ratio and Proportion:

M4. Understand ratio concepts and use ratio reasoning to solve problems.

Ratio and Proportion
M4.1 Understand terms like antecedent and consequent in a ratio
M4.2 Understand the term ratio and represent it using concrete objects, drawings, etc.
M4.3 Understand that when 2 ratios are equal to one another they are said to be in proportion
M4.4 Solve simple and direct word problems (related to unitary method) / sums on ratio
  (i) simplify a ratio ii) compare two ratios iii) divide a given quantity in a given ratio)
M 4.5 Solve simple and direct word problems / sums on proportion

Algebra:

M5. Apply and extend previous understanding of arithmetic to patterns and algebraic expressions.

M 5.1 Generate patterns from a given sample
M 5.2 Understand unknowns through examples in simple contexts (single operations)

M6. Represent and analyze quantitative relationships between dependent and independent variables in algebraic expressions.

M6.1 Frame algebraic expressions
M6.2 Evaluate value of algebraic expressions by substituting a number for the variable

M7. Reason about and solve one-variable equations and inequalities

M7.1 Find the unknown variable in a linear equation using addition, subtraction, multiplication or division operations

Geometry:

M8. Understand and apply basic and advanced properties of the concepts of geometry

Basic Geometrical Concepts, Lines, Angles
M8.1 Know and draw different kinds of lines – parallel lines, intersecting lines, perpendicular lines, bisector and perpendicular bisector of a line segment.
M8.2 Understand terms like vertex, arm/sides of an angle, interior and exterior of an angle
M8.3 Identify and define different types of angles- acute, right, obtuse, straight, reflex, adjacent, vertically opposite, supplementary and complementary angles, alternate, corresponding, interior, exterior angles with reference to parallel lines
M8.4 Construct using ruler and compass i.) an angle of given measures ii) an angle equal to a given angle, iii) bisection of an angle, iv) perpendicular bisector of line segment
        v) perpendicular to a line from a point not on the line vi) at a point on the line

Triangles
M8.5 Know and define the terms vertex, sides and angles of a triangle, interior and exterior of triangles

M8.6 Define, classify and construct different kinds of triangles (scalene, isosceles, equilateral, acute angled , obtuse angled, and right angled triangles)

M8.7 Classify quadrilaterals as trapezium, parallelogram, rectangle, square, rhombus

M8.8 Draw different types of triangles and quadrilaterals

M8.9 Recognize and name solid figures, the faces, edges, vertices (corners) of prism, pyramid, cone, cube, cuboid

M8.10 Attempt to prepare solids using their nets

Circle
M8.11 Understand the terms - centre, radius, diameter, circumference, chord, secant, tangent, arc, sector, segment, interior and exterior of a circle, quadrant, concentric circles

Linear Symmetry
M8.12 Recognize reflection symmetry

M8.13 Observe and identify 2-D symmetrical objects for reflection symmetry

M8.14 Reflect the given shape in the line of symmetry using graph paper

Mensuration:

M9. Solve real-world and mathematical problems involving area, surface area and volume.

Perimeter and Area
M9.1 Measure perimeter of a rectangle, square, triangle

M9.2 Find area of rectangular or square region using units like mm^2, cm^2, m^2 and km^2

M9.3 Calculate the area of shapes formed from rectangles and squares, cube and cuboid in cm^2, m^2 and km^2

Volume
M9.4 Demonstrate the idea of volume of shapes.

M9.5 Use the conversion $1\ m^3 = 1000000 cm^3$

Data Handling:

M10. Develop understanding of statistical variability.
M10.1 Read and create simple bar graphs for the given data

M11. Summarize and describe distributions.
M11.1 Appreciate the need for finding a representative value for given data

M11.2 Find mean and median of data having not more than ten observations

Mathematical Reasoning:

M 13. Make decisions about how to approach problems
M 13.1 Analyse problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information and observing patterns

M13.2 Determine when and how to break a problem into simpler parts.

M 14. Use strategies, skills and concepts in finding solution
M14.1 Apply strategies and results from simpler problems to more complex problems.

M14.2 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to ex[lain mathematical reasoning.

M14.3 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language, support solutions with evidence in both verbal and symbolic work.

M 15. Move beyond a particular problem by generalizing to other solutions
M15.1 Develop generalisations of the results obtained and apply them in other circumstances.