Class 6, Maths (1) **Patterns in Mathematics**

Mathematics, pattern, explanation, creativity, discovery, sequence, number theory, counting numbers, odd numbers, even numbers, triangular numbers, square numbers, cube numbers, powers of 2, powers of 3, Virahanka numbers, visualize, pictorial representation, dot pattern, grid, square grid, triangle formation, cube formation, hexagonal numbers, relation, up and down pattern, visual explanation, shape pattern, geometry, regular polygons, triangle, square, pentagon, hexagon, heptagon, octagon, nonagon, decagon, angle, side, corner, symmetry, complete graph, K2, K3, K4, line segments, stacked shapes, stacked triangles, stacked squares, Koch snowflake, iterative process, fractal, transformation, recursive geometry, dimension, discovery, observation, connecting lines, segment count, visual insight, hidden pattern, structured arrangement, mathematical reasoning, and real-world application,

Class 6, Maths (1)	Patterns in Mathematics
Pattern Type	Sequence / Formula
All 1's	1, 1, 1, 1, 1, 1, 1, ...
Counting numbers	1, 2, 3, 4, 5, 6, 7, ...
Odd numbers	1, 3, 5, 7, 9, 11, 13, ...
Even numbers	2, 4, 6, 8, 10, 12, 14, ...
Triangular numbers	1, 3, 6, 10, 15, 21, 28, ...
Square numbers	1, 4, 9, 16, 25, 36, 49, ...
Cube numbers	1, 8, 27, 64, 125, 216, ...
Virahanka numbers	1, 2, 3, 5, 8, 13, 21, ...
Powers of 2	1, 2, 4, 8, 16, 32, 64, ...
Powers of 3	1, 3, 9, 27, 81, 243, 729, ...
Hexagonal numbers	1, 7, 19, 37, ...
Sum of first n odd numbers	1 + 3 + 5 + ... + (2n-1) = n^2
Sum of counting numbers up and down	1 + 2 + 3 + ... + n + ... + 3 + 2 + 1 = n^2
Shape Pattern - Regular Polygons	Triangle, Quadrilateral, Pentagon, ..., each has increasing sides
Shape Pattern - Complete Graphs	K2, K3, K4, K5, K6
Shape Pattern - Stacked Squares	1, 4, 9, 16, ...
Shape Pattern - Stacked Triangles	1, 3, 6, 10, ...
Shape Pattern - Koch Snowflake	3, 12, 48, ... (3 × Powers of 4)

Class 6, Maths (2) — Lines and Angles

Point, Line, Line Segment, Ray, Angle, Vertex, Arms of an angle, Right Angle, Straight Angle, Acute Angle, Obtuse Angle, Reflex Angle, Degree, Protractor, Fold, Crease, Superimposition, Angle Bisector, Measuring Angles, Rotation, Turn, Full Turn, Half Turn, Quarter Turn, Angle Estimation, Clock Angles, Real-life Angles, Compass, Divider, Scissors, Spectacles, Swing, Door Angle, Toy Slope Angle, Insect Rotation, Inner Scale, Outer Scale, Protractor Center, Base Line, Angle Marking, Transparent Circle, Rotating Arms, Slit Comparison,

Angle Guessing Game, Classroom Angle Activity, Sum of Angles in a Triangle, Naming Angles, Direction of Naming, Drawing Angles, Making Angles with Protractor, DIY Protractor, Paper Folding for Angles, Ashoka Chakra Spokes, 360 Degrees, 180 Degrees, 90 Degrees, 0 Degree Angle, Equal Angles, Comparing Angles, Labeling Points, Joining Points, Intersecting Lines, Perpendicular Lines, Direction of Ray, Endpoints, Angle Formation, Real-life Observation, Geometry Tools, Angle Classification, Estimation Practice

Class 6, Maths (2) — Lines and Angles

Concept / Formula	Explanation
Point	Represents a precise location; has no length, breadth, or height
Line Segment	Shortest path between two points A and B; denoted as AB or BA
Line	Extends indefinitely in both directions; denoted as AB or a small letter like l or m
Ray	Starts from one point and extends infinitely in one direction; denoted as AB (A is starting point)
Angle	Formed by two rays with a common starting point (vertex); denoted as ∠ABC (vertex in middle)
Straight Angle	180°; forms a straight line
Right Angle	90°; exactly half of a straight angle
Acute Angle	More than 0° and less than 90°
Obtuse Angle	More than 90° and less than 180°
Reflex Angle	More than 180° and less than 360°
Full Angle	360°; complete rotation
Angle Measurement	Measured using a protractor in degrees (°)
Angle Bisector	A ray dividing an angle into two equal parts
Clock Angle Formula	Angle = |30*hour - (11/2)*minutes|
Sum of Angles in Triangle	Always 180°

Class 6, Maths (3) **Number Play**

Supercell, Palindrome, Digit Sum, Kaprekar Constant, Estimation, Collatz Conjecture, Computational Thinking, Number Line, Reverse-and-Add, Odd and Even Numbers, Mental Math, Pattern, Game Strategy, Palindrome Time, Place Value, Even Number, Odd Number, Neighbouring Cells, Estimation Questions, Reverse Number, Line Arrangement,

1-digit number, 2-digit number, 3-digit number, 4-digit number, 5-digit number, Winning Number, Consecutive Digits, Digit Reordering, Estimation Strategy, Grid, Repetition, Strategy, Palindrome Date, Conjecture, Neighbour, Odd-Digit Number, Line-up Puzzle, Reverse Process, Clock Pattern, Calendar Reuse

Class 6, Maths (3)	Number Play	
Concept	Formula / Rule	Explanation / Notes
Number of Digits	1-digit: 1–9	Total = 9 numbers
Number of Digits	2-digit: 10–99	Total = 90 numbers
Number of Digits	3-digit: 100–999	Total = 900 numbers
Number of Digits	4-digit: 1000–9999	Total = 9000 numbers
Number of Digits	5-digit: 10000–99999	Total = 90000 numbers
Supercell Rule	Cell > All Neighbouring Cells	Left, Right, Top, Bottom
Digit Sum	Sum of all digits of number	E.g., 68 → 6+8=14
Palindrome	Reads same forward and backward	e.g., 121, 797, 1111
Reverse & Add	Num + Reverse(Num)	Repeat till palindrome (e.g., 52 + 25 = 77)
Kaprekar Constant	C = A - B	A = digits descending, B = digits ascending; repeat → 6174
Even Rule (Collatz)	n → n/2	If n is even
Odd Rule (Collatz)	n → 3n + 1	If n is odd
Estimation Example	32+29+35 ≈ 100	Estimating class strength
Addition Format	5-digit + 5-digit = 5-digit/6-digit	e.g., 12350 + 24545 = 36895
Subtraction Format	5-digit – 5-digit = 3/4/5-digit	e.g., 48952 – 24547 = 24405
Mental Math Pattern	Use middle numbers repeatedly	e.g., 1500 + 1500 + 400 = 3400
Game Strategy	Say numbers to reach 21 first	Add 1–3 each turn
Game Strategy	Start at 1–10, reach 99	Add 1–10 each turn

Data, Tally Marks, Frequency, Pictograph, Bar Graph, Scale, Ascending Order, Infographic, Visual Presentation, Tabular Form, Observation, Interpretation, Popular, Survey, Category, Representation, Comparison, Distribution, Criteria, Hypothesis, Inference, Analysis, Symbol, Key (Scale), Height, Width, News Item, Column Graph, Rectangle, Misleading

Class 6, Maths (4) — Data Handling and Presentation

Concept	Formula / Description	Example / Notes
Frequency	Number of times a data point occurs	E.g., 7 students chose gulab jamun
Tally Marks	Groups of lines used to count data points	|||| = 4, ||||/ = 5
Pictograph	Uses pictures to represent data	= 10 children
Bar Graph	Uses bars to show frequencies	Bar height corresponds to frequency
Scale in Pictograph	Unit picture represents multiple units	e.g., 1 icon = 5 students
Scale in Bar Graph	Unit length = fixed value	e.g., 1 unit = ₹200
Organising Data	Arranged in a table or ascending order	Helps in analysis
Ascending Order	Sorting from smallest to largest	3, 4, 5, 6...
Column Graph	Bar graph with vertical bars	Used to compare heights
Infographic	Visually appealing data representation	Can include colors, icons, shapes
Misleading Visuals	Exaggerated visuals can mislead	e.g., wider triangles for taller mountains

Factor, Prime Number, Composite Number, Common Factor, Common Multiple, Co-prime, Prime Factorisation, Multiple, Divisible, Idli-Vada Game, Divisibility, Even Number, Odd Number, Perfect Number, Twin Primes, Sieve of Eratosthenes,

Product of Primes, Multiplication Property, Jump Size, Thread Art, Divisibility Rule, Digit Pattern, Palindrome, Remainder, Prime Puzzle, Co-prime Pair, Common Divisor, Prime Product, Safe Pair

Class 6, Maths (5)	Prime Time
Concept	Formula / Explanation
Prime Factorisation	Every number greater than 1 can be written as a product of prime numbers. E.g., 84 = 2 × 2 × 3 × 7
Divisibility Rule for 2	Number ends in 0, 2, 4, 6, 8
Divisibility Rule for 5	Number ends in 0 or 5
Divisibility Rule for 10	Number ends in 0
Divisibility Rule for 4	Last two digits divisible by 4
Divisibility Rule for 8	Last three digits divisible by 8
Co-prime Check	Two numbers are co-prime if they have no common prime factor
Divisibility Check	If prime factorisation of divisor is included in dividend, then divisible
Perfect Number	Sum of all factors equals twice the number. E.g., 28 = 1+2+4+7+14+28 = 56 = 2×28
Product of Primes	If number is divisible by another, its prime factors must be in the dividend
Multiples of Number	n, 2n, 3n, ... are multiples of n
Common Multiples	Multiples shared by two numbers. First one is called LCM
Factors	Numbers that divide a number completely without remainder
Common Factors	Numbers that divide two or more numbers exactly

Perimeter and Area

Perimeter, Area, Rectangle, Square, Triangle, Equilateral Triangle, Regular Polygon, Length, Breadth / Width, Diagonal, Unit Square, Estimate, Grid Paper, Rejoin, Tangram, Side, Figure, Straight Line, Diagonal Line, Rope Fencing, Lace, Track, Common Finishing Line, Carpet, Flower Bed, Shape, Connected Figure, Unit, Maze Puzzle, Perimeter Formula, Area Formula, Half, Round, Region, Split, Shape Comparison, Measurement Unit, Square Unit, Same Area, Different Perimeter, Estimate and Verify, Tangram Shapes, Connected Squares.

Class 6, Maths (6)	Perimeter and Area
Topic	**Formula**
Perimeter of a Rectangle	Perimeter = 2 × (length + breadth)
Perimeter of a Square	Perimeter = 4 × side
Perimeter of a Triangle	Perimeter = sum of the lengths of its three sides
Perimeter of an Equilateral Triangle	Perimeter = 3 × side
Perimeter of a Regular Polygon	Perimeter = number of sides × length of one side
Area of a Rectangle	Area = length × width
Area of a Square	Area = side × side
Area of a Triangle	Area = 1/2 × base × height
Area from Grid Estimation	Area ≈ number of full squares + 0.5 × number of half squares
Area of Composite Shapes	Area = Sum of areas of individual rectangles/triangles
Area using Tangram (Example)	Area of shape = Sum of equivalent square units from tangram pieces

fractions, fractional unit, equal shares, numerator, denominator, unit fraction, mixed fraction, equivalent fractions, simplest form, lowest terms, number line, compare, addition, subtraction, rectangular strip, visualisation, paper strip, whole number, general rule, share, multiplication fact, addition fact, division fact, Brahmagupta's method, fractional unit, same denominator, different denominators, ancient Indian mathematics, Bakshali manuscript, Sulba-sutras, bhinna, ansha, bhaga, codified, Egyptian fractions, arithmetic operations, convert, visualise, solution, justify, ascending order, descending order, figure it out, fractional length, systematic way, historical context, notation, puzzles, Vedic times.

Class 6, Maths (7)	Fractions
Concept	Formula/Definition
Fractional Unit	If 1 whole is divided into n equal parts, each part = 1/n
Comparing Fractions	If denominators are the same, compare numerators directly
Mixed Fraction to Improper	a b/c = (a×c + b)/c
Improper to Mixed	p/q = a b/q where a = p//q, b = p%q
Equivalent Fractions	a/b = (a×n)/(b×n) for any non-zero n
Lowest Terms	Divide numerator and denominator by their HCF
Addition (Same Denominator)	a/b + c/b = (a + c)/b
Addition (Different Denominator)	Find LCM of denominators, convert fractions, then add
Subtraction (Same Denominator)	a/b - c/b = (a - c)/b
Subtraction (Different Denominator)	Find LCM of denominators, convert fractions, then subtract
Division Fact	1 ÷ n = 1/n
Addition Fact	1 = n × (1/n)
Multiplication Fact	1 = (1/n) + (1/n) + ... n times
Brahmagupta's Method	Make denominators same using LCM, then operate on numerators

Compass, Radius, Centre, Rectangle, Square, Perpendicular, Diagonal, Opposite Sides, Angle, Construction, Dot Grid, Ruler, Arc, Curves, Estimate, Identical, Measure, Rotated Figure, Side Length, Symmetrical, Freehand, Straight Line, Half Circle, Dot Paper, Equal Sides, Corner, Label, Support Line, Intersect, Grid, Measure Distance, Arc Intersection, Midpoint, Sidelength, Overlapping, Planning, Trial and Error, Angle Division, Shorthand, Right Angle, Construction Step, Figure, Intersection, Side, Rotate, Travel Order, Supporting Curve, Line Segment, Measure Tool, Estimation, Base, Arbitrary, Duplicate, Recording, Naming, Diagonals Divide Angles, Equal Angles, Shaded Region, Visualise, Arc Drawing

Class 6, Maths (8) — Playing with Constructions

Topic	Formula / Concept	Description / Use
Circle	Radius = Distance from center to any point on the circle	Used to define a circle with a compass
Square	All sides equal & all angles = 90°	Defines a square
Rectangle	Opposite sides equal & all angles = 90°	Defines a rectangle
Naming Squares/Rectangles	Names must follow path around shape	Incorrect: ABDC, Correct: ABCD
Construction	Use compass & ruler to draw accurate shapes	Basic construction technique
Diagonals of Rectangle	Diagonals are equal in length	Each diagonal divides opposite angles
Equidistant Point	Point at equal distance from two points lies on intersection of arcs	Used in constructing symmetric shapes
Perpendicular Line	Constructed using right angle or compass	Essential for making squares/ rectangles
Identical Squares in Rectangles	Length of longer side = multiple of square side	For dividing into 2 or 3 identical squares
Diagonal & Side	If side = a, diagonal = d, use compass to locate intersection	Rectangle from side and diagonal
Symmetry	Used to ensure balanced figures	Important in figures like 'Eyes'

Symmetry, Line of Symmetry, Mirror Halves, Reflection Symmetry, Rotational Symmetry, Centre of Rotation, Angle of Symmetry, Multiple Symmetries, Asymmetrical, Ink Blot, Paper Folding, Radial Arms, Koch Snowflake, Ashoka Chakra, Regular Polygon, Punching Game, Fold, Overlap, Diagonal, Horizontal Line, Vertical Line, Square, Rectangle, Triangle, Hexagon, Dot Grid, Squared Paper, Puzzle Pieces, Curved Boundary, Figure, Rotation Order, Centre of Circle, Sector (of Circle), Diameter, Snowflake, Identical Parts, Repetition Pattern, Pinwheel, Gopuram, Fold Line, Overlapping, Paper Cut-Outs, Festive Decorations, Punch Hole, Predict Shape, Strategy Game, Turn, Clockwise, Counterclockwise, Degree, Full Turn, Partial Turn, Equal Angles, Sector Colouring, Natural Figures,

Class 6, Maths (9) — Symmetry

Concept / Formula	Explanation
Line of Symmetry	A line that divides a figure into two identical parts such that one part is the mirror image of the other.
Vertical Fold (Symmetry)	Folding a figure vertically to check if both halves match. If yes, it has vertical symmetry.
Horizontal Fold (Symmetry)	Folding a figure horizontally to check if both halves match. If yes, it has horizontal symmetry.
Diagonal Fold (Symmetry in square)	Folding a square along its diagonal; both parts overlap, indicating symmetry.
Reflection Symmetry	The image on one side of the line of symmetry is a reflection of the other side.
Rotational Symmetry	A figure has rotational symmetry if it looks the same after a rotation (less than 360°) around a central point.
Centre of Rotation	The fixed point around which a figure is rotated to check for rotational symmetry.
Angles of Rotational Symmetry	The specific angles (e.g., 90°, 120°, 180°, etc.) at which a figure looks identical after rotation.
Order of Rotational Symmetry	The number of times a figure matches itself during a full 360° rotation.
Symmetries of a Circle	A circle has infinite lines of symmetry and infinite angles of symmetry as it can be rotated by any angle about its center.
Formula: Smallest Angle of Rotational Symmetry	0
True Statement	Every figure with rotational symmetry has 360° as one angle of symmetry.

Integer, Positive Number, Negative Number, Zero, Additive Inverse, Lift Movement, Number Line, Token Model, Credit, Debit, Sea Level, Temperature, Subtraction, Addition, Inverse, Floor Number, Ground Floor, Lift Button, Movement, Comparison, Expression, Token, Zero Pair, Border Sum, Inverse Operation, Missing Addend,

Sea Level Reference, Thermometer, Brahmagupta's Rule, Infinite Number Line, Target Floor, Starting Floor, Bank Balance, Altitude, Freezing Point, Heat Wave, Expression Evaluation, History of Integers, Jiuzhang Suanshu, Arthashastra, Brahmasphutasiddhanta, Integer Grid, Game of Integers

Class 6, Maths (10) — The Other Side of Zero

Concept	Formula/Rule
Addition	Starting Number + Movement = Target Number
Subtraction	Target Number – Starting Number = Movement
Addition Example	(+1) + (+2) = +3
Addition Example	(+2) + (–3) = –1
Subtraction Example	(+5) – (+2) = +3
Subtraction Example	(–1) – (–2) = +1
Subtraction Example	(–1) – (+3) = –4
Subtraction Example	(+2) – (–2) = +4
Brahmagupta Addition	Positive + Positive = Positive
Brahmagupta Addition	Negative + Negative = Negative
Brahmagupta Addition	Positive + Negative = Sign of Greater (after subtraction)
Brahmagupta Addition	Any number + its inverse = 0
Brahmagupta Addition	Any number + 0 = Same number
Brahmagupta Subtraction	Smaller Positive – Larger Positive = Negative
Brahmagupta Subtraction	Larger Positive – Smaller Positive = Positive
Brahmagupta Subtraction	Subtracting a Negative = Adding a Positive
Brahmagupta Subtraction	Number – Itself = 0
Brahmagupta Subtraction	Number – 0 = Same Number
Brahmagupta Subtraction	0 – Number = Inverse of Number
Inverse Rule	a + (–a) = 0
Inverse Rule	–a + a = 0
Movement Rule	Movement1 + Movement2 = Total Movement
Temperature	Above Freezing: Positive °C
Temperature	Below Freezing: Negative °C
Banking	Credits = Positive, Debits = Negative
Dice Game	Roll two dice (–1 to –6 and +1 to +6), result = addition or subtraction