integers, addition, subtraction, closure property, commutative property, associative property, additive identity, multiplication, product, negative integers, positive integers, repeated addition, number line, distributive property, multiplicative identity, zero, identity element, inverse, grouping, order, rules, sign, quotient, division, division by zero, commutativity, associativity, profit, loss, temperature, elevation, pattern, sum, difference, whole numbers, result, table, observation, expression, simplification, verify, exercise, question, answer, correct, incorrect, score, marks, quiz, team, round, example, practice, general rule, verify, calculation, expression, evaluate, simplify, property, statement, result, difference, equation, table, pattern, simplify, rule, identity, example, check, total, earned, incurred, pencil, pen, month, selling, value, temperature, increase, decrease, ground level, shaft, elevator, rate, movement, game, player, counter, dice, move, board, integers from -104 to 104, score, marks, incorrect answers, correct answers, reasoning, verification, learning, concept, understanding.

Class 7, Maths (1)

Property	Formula
Closure Property of Addition	a + b is an integer
Closure Property of Subtraction	a - b is an integer
Commutative Property of Addition	a + b = b + a
Associative Property of Addition	a + (b + c) = (a + b) + c
Additive Identity	a + 0 = 0 + a = a
Closure Property of Multiplication	a × b is an integer
Commutative Property of Multiplication	a × b = b × a
Associative Property of Multiplication	(a × b) × c = a × (b × c)
Multiplicative Identity	a × 1 = 1 × a = a
Multiplication with Zero	a × 0 = 0 × a = 0
Distributive Property over Addition	a × (b + c) = a × b + a × c
Distributive Property over Subtraction	a × (b - c) = a × b - a × c
Product of Positive and Negative Integer	a × (-b) = - (a × b)
Product of Two Negative Integers	(-a) × (-b) = a × b
Division of Negative by Positive	(-a) ÷ b = - (a ÷ b), b ≠ 0
Division of Positive by Negative	a ÷ (-b) = - (a ÷ b), b ≠ 0
Division of Negative by Negative	(-a) ÷ (-b) = a ÷ b, b ≠ 0
Division Identity	a ÷ 1 = a
Division by Negative One	a ÷ (-1) = -a
Zero Division Rule 1	a ÷ 0 is not defined
Zero Division Rule 2	0 ÷ a = 0, a ≠ 0
Non-Associativity of Division	(a ÷ b) ÷ c ≠ a ÷ (b ÷ c)
Non-Commutativity of Division	a ÷ b ≠ b ÷ a

multiplication, improper fractions, pictorially, denominator, numerator, rectangle, represent, operator, remaining, mixed fraction, equal parts, observation, product, whole number, simplified, reciprocal, conversion, decimal point, decimal number, equilateral triangle, perimeter, area, breadth, hundredths, shifting, quotient, divisible, remainder, average, polygon, classroom, strips, pictorial representation, place value, multiplied, divided, digits, constructing, example, comparison, distance, vehicle, required, accurately, directly, observe, classify, simplified form.

Class 7, Maths (2)	Fractions and Decimals
Concept	**Formula**
Multiplication of a Fraction by a Whole Number	$a \times (p/q) = (a \times p)/q$
Multiplication of Two Fractions	$(a/b) \times (c/d) = (a \times c)/(b \times d)$
Fraction as 'of'	a of b = a × b
Division of Whole Number by Fraction	$a \div (b/c) = a \times (c/b)$
Division of Fraction by Whole Number	$(a/b) \div c = (a/b) \times (1/c)$
Division of a Fraction by Another Fraction	$(a/b) \div (c/d) = (a/b) \times (d/c)$
Multiplication of Decimal Numbers	Multiply as whole numbers, then place decimal point by adding decimal digits
Multiplication by 10, 100, 1000	Shift decimal point to the right by number of zeros
Division by 10, 100, 1000	Shift decimal point to the left by number of zeros
Division of Decimal by Whole Number	Divide as whole numbers, then place decimal accordingly
Division of Decimal by Decimal	Shift decimal in both numbers to make divisor whole, then divide

Class 7, Maths (3)

Data Handling

Average, Arithmetic Mean, Mean, Range, Mode, Median, Central Tendency, Bar Graph, Double Bar Graph, Frequency, Representative Value, Tally Marks, Scale (in Graph), Ascending Order, Descending Order, Observations, Spread of Data, Data, Group of Observations, Visualization, Sum of Observations, Number of Observations, Tallest Bar, Shortest Bar, Unit Length (Graph), Data Handling, Most Frequent, Least Frequent, Central Value, Spread, Tabulation, Tally Bars, Margins of Victory, Graph, Double Bar Graph Use, Favourite Colour, Rainfall Measurement, Sales Comparison, Weakest Students, Improvement Analysis, Scale Selection, Representation, Suitable Scale, Score Analysis, Heights Measurement, Reading Bar Graph, Ratio, Least Difference, Maximum Temperature, Minimum Temperature, Median Value, Ascending Arrangement, Descending Arrangement, Equal Division, Popular Size, Least Popular Size, Most Preferred Option, Least Preferred Option, Survey, Tally Chart, Margins of Football Matches, Students' Enrolment, Weekly Rainfall, Weekly Study Hours, Weekly Demand, Data Table, Incorrect Representative, Number of Colours, Book Sale, Popular Sport, Participation vs Watching, Largest Difference, Tallest Student, Shortest Student, Midpoint, Score Improvement, Demand Analysis, Survey Result, Data Representation, Graphical Scale, Sale Comparison, Weak Students.

Class 7, Maths (3)	Data Handling
Concept	**Formula**
Arithmetic Mean (Mean)	Mean = (Sum of all observations) / (Number of observations)
Range	Range = Highest observation - Lowest observation
Mode	Mode = Observation that occurs most frequently
Median (Odd number of observations)	Median = Middle observation when arranged in ascending or descending order
Bar Graph Scale Selection	Choose scale so all values fit comfortably; 1 unit = suitable number of observations
Double Bar Graph	Two bars side by side for each category to compare two sets of data

mind-reading, multiply, subtract, equation, expression, condition, variable, numerical, operations, multiplication, division, satisfied, equality, statement, subtracting, transposing, statement, solution, statement, situation, equation, statement, subtracted, multiplied, divided, mathematical, operation, transposing, expression, simplified, applications, practical, corresponding, problem, unknown, required, isosceles, vertex, balance, disturbed, undisturbed, systematic, transposition, technique, appropriate.

Class 7, Maths (4)	Simple Equations
Formula	Description
4x + 5 = 65	Ameena's game equation to find the number Sara thought of
10y - 20 = 50	Appu's game equation to find Balu's number
3x + 11 = 32	Sum of three times a number and 11 is 32
6z - 5 = 7	Six times a number minus 5 equals 7
m/4 - 7 = 3	One fourth of m is 3 more than 7
n/3 + 5 = 8	One third of a number plus 5 is 8
3y + 5 = 44	Father's age is 5 years more than three times Raju's age
8m + 4 = 100	Mangoes in large box is 8 small boxes plus 4 mangoes
x + 3 = 0	Example equation
x - 7 = 1	Example equation
5x = 25	Example equation
m/3 = 2	Example equation
n + 5 = 19	Checking value for solution
7n + 5 = 19	Checking value for solution
4p - 3 = 13	Checking value for solution
5p + 2 = 17	Trial and error method
3m - 14 = 4	Trial and error method
x + 4 = 9	Word problem - sum of x and 4 is 9
y - 2 = 8	Word problem - 2 subtracted from y is 8
10a = 70	Word problem - ten times a is 70

line segment, ray, angle, intersect, acute, obtuse, complementary, supplementary, adjacent, linear pair, interior angles, exterior angles, corresponding angles, alternate interior angles, alternate exterior angles, transversal, parallel

vertices, equilateral, rectangle, vertically opposite angles, initial point, distinct points, tracing, carpenter's square, draftsman, ruler, geometry, measurement, equally, property, verify, label, notation, representation

Class 7, Maths (5)	Lines and Angles
Topic	**Formula**
Complementary Angles	$\angle A + \angle B = 90°$
Supplementary Angles	$\angle A + \angle B = 180°$
Vertically Opposite Angles	Vertically opposite angles are equal
Corresponding Angles (Parallel Lines)	If lines are parallel, then $\angle 1 = \angle 5$
Alternate Interior Angles	If lines are parallel, then $\angle 3 = \angle 6$ and $\angle 4 = \angle 5$
Alternate Exterior Angles	If lines are parallel, then $\angle 1 = \angle 8$ and $\angle 2 = \angle 7$
Interior Angles on Same Side of Transversal	If lines are parallel, then $\angle 3 + \angle 5 = 180°$ and $\angle 4 + \angle 6 = 180°$
Linear Pair	$\angle A + \angle B = 180°$ (if they form a linear pair)
Condition for Parallel Lines (Corresponding Angles)	If $\angle 1 = \angle 5$, then lines are parallel
Condition for Parallel Lines (Alternate Interior Angles)	If $\angle 4 = \angle 6$, then lines are parallel
Condition for Parallel Lines (Same Side Interior Angles)	If $\angle 4 + \angle 5 = 180°$, then lines are parallel

Class 7, Maths (6)

The Triangle and its Properties

Triangle, Vertices, Median, Altitude, Exterior Angle, Interior Opposite Angles, Angle Sum Property, Equilateral Triangle, Isosceles Triangle, Scalene Triangle, Acute-angled Triangle, Obtuse-angled Triangle, Right-angled Triangle, Hypotenuse, Legs, Pythagoras Property, Sum of Two Sides, Difference of Two Sides, Sides, Angles, Base, Base Angles, Linear Pair, Adjacent Angles, Remote Interior Angles, Hypotenuse Square, Leg Squares, Sum of Angles, Right Angle, Acute Angle, Obtuse Angle, Triangle Inequality, Converse of Pythagoras Theorem, Symmetry Axis, Perfect Square, Midpoint, Perpendicular Bisector, Folded Crease, Paper Folding Method, Parallel Lines, Transversal, Alternate Angles, Corresponding Angles, Linear Pair Property, Identical Triangles, Symmetry, Dissection Method, Converse Problems, Perfect Precision, Base Length, Side Inequality Property, Lime Powder Method.

Class 7, Maths (6)

The Triangle and its Properties

Property	Description	Formula
Exterior Angle Property	Exterior angle = Sum of interior opposite angles	$\angle ACD = \angle A + \angle B$
Angle Sum Property	Sum of angles in a triangle is 180°	$\angle A + \angle B + \angle C = 180°$
Pythagoras Theorem	In right-angled triangle, hypotenuse² = base² + height²	$AC^2 = AB^2 + BC^2$
Triangle Inequality Property	Sum of any two sides > third side	AB + BC > AC, etc.
Isosceles Triangle Property	Angles opposite equal sides are equal	If AB = AC, then $\angle B = \angle C$
Equilateral Triangle Property	All angles and sides are equal	Each angle = 60°, All sides equal
Third Side Range in Triangle	Third side lies between sum and difference of other two sides	If AB = a, AC = b, then $\lvert a - b \rvert < BC < a + b$

Class 7, Maths (7)

Comparing Quantities

Percentage, Per cent, Fraction, Decimal, Ratio, Profit, Loss, Cost Price (CP), Selling Price (SP), Simple Interest, Principal (P), Rate of Interest (R), Amount, Increase, Decrease, Discount, Profit Percentage, Loss Percentage, Estimation, Borrowed Money, Per annum (p.a.), Equivalent Fraction, Unitary Method, Improper Fraction, Proper Fraction, Conversion, Hundredths, Base (in % change), Total, Comparative Statement, Multiply by 100, Natural Number (context), Saving, Estimation of Area, Ratio to Percentage, Borrowed Sum, Interest (I), Time Period (T), Total Amount (A), Rate Formula (I = P × R × T/ 100), Increase/Decrease Formula, Profit/ Loss Calculation, Tangram, Numerator, Denominator, Out of 100, Simplest Form (Fractions), 100 as Common Denominator, Conversion of Ratios, Reverse Conversion, Fractional Numbers, Comparative Analysis, Net Amount, Whole Quantity, Tabular Representation, Price Rise/Increase, Parts of a Whole, Time Units Conversion, Selling at a Loss, Borrowed Period, Tangram Puzzle, Fill in the Blanks (Practice), Comparison by Fraction, Common Base, Borrowing Loan, Total Parts in Ratio, Simple Interest Formula, Shaded Region, Estimation by Approximation, Comparative Method.

Class 7, Maths (7) — Comparing Quantities

Concept	Formula
Percentage Definition	x% = (x / 100)
Fraction to Percentage	(Fraction) × 100 = Percentage
Decimal to Percentage	(Decimal) × 100 = Percentage
Percentage to Decimal	Percentage ÷ 100 = Decimal
Percentage to Fraction	Percentage ÷ 100 = Fraction
Part to Whole (Unitary Method)	(Percentage × Whole) / 100 = Part
Finding Whole from Part	(Part × 100) / Percentage = Whole
Ratio to Percentage	(Part / Total Parts) × 100
Percentage Increase	(Increase / Original) × 100
Percentage Decrease	(Decrease / Original) × 100
Profit	Profit = SP - CP
Loss	Loss = CP - SP
Profit Percentage	(Profit / CP) × 100
Loss Percentage	(Loss / CP) × 100
Simple Interest (1 year)	SI = (P × R) / 100
Simple Interest (Multiple years)	SI = (P × R × T) / 100
Total Amount with Interest	A = P + SI
Finding Principal from Interest	P = (SI × 100) / (R × T)
Finding Rate of Interest	R = (SI × 100) / (P × T)
Finding Time	T = (SI × 100) / (P × R)

Class 7, Maths (8) Rational Numbers

Natural Numbers, Whole Numbers, Integers, Fractions, Rational Numbers, Numerator, Denominator, Positive Rational Numbers, Negative Rational Numbers, Equivalent Rational Numbers, Standard Form, Reciprocal, Number Line, Additive Inverse, Multiplication of Rational Numbers, Division of Rational Numbers, Comparison of Rational Numbers, Rational Numbers between Two Rational Numbers, LCM (Least Common Multiple), HCF (Highest Common Factor), Counting Numbers, Decimal Numbers, Negative Integers, Zero (0), Fractional Numbers, Ratio, Standard Form Reduction, Negative Sign Adjustment, Equivalent Fractions, Jump on Number Line, Opposite Rational Numbers, Reciprocal Property, Product of Rational Numbers, Division by Reciprocal, Insertion of Rational Numbers, Decreasing Order, Increasing Order, Multiplicative Inverse, Subtraction of Rational Numbers, Sum of Rational Numbers, LCM Method for Addition/Subtraction, Positive Integer, Negative Rational Numbers Example,

Rational Numbers Examples, Finite Integers Between Integers, Infinite Rational Numbers, Standard Form Property, Negative Sign Handling, Simplification, Cross Multiplication (for Comparison), Interval on Number Line, Halfway Point, Left Side of Zero, Right Side of Zero, Equidistant Points, Sign Convention, Successive Jumps, Positive Integer Denominator Rule, Rational Number Form, No Common Factor Condition, Rational Numbers as Fractions, Decimal to Rational Conversion, Opposite Situations, Fractional Distance Representation, Rational Number Generation, Repeated Multiplication, Dealing with Negative Denominators, Non-Terminating Rational Numbers, Additive Identity, Zero as Rational Number, Non-Repeating Rational Numbers, Standard Form HCF Method, Numerator Denominator Interchange, Pairing Rational Numbers,

Class 7, Maths (8) — Rational Numbers

Concept	Formula
Definition of Rational Number	A number of the form p/q where p, q are integers and q ≠ 0
Equivalent Rational Numbers	p/q = (p×n)/(q×n), n ≠ 0
Standard Form	Divide numerator and denominator by their HCF; denominator must be positive
Addition (Same Denominator)	a/b + c/b = (a + c)/b
Addition (Different Denominator)	a/b + c/d = (ad + bc)/bd
Additive Inverse	a/b + (–a/b) = 0
Subtraction	a/b – c/d = a/b + (–c/d)
Multiplication	(a/b) × (c/d) = (a×c)/(b×d)
Multiplication by Integer	(a/b) × n = (a×n)/b
Division	(a/b) ÷ (c/d) = (a/b) × (d/c)
Reciprocal	Reciprocal of (a/b) is (b/a), a ≠ 0, b ≠ 0
Comparing Rational Numbers	Use common denominators or number line
Negative Rational Comparison	If a/b < c/d then –a/b > –c/d

Parallelogram, Base, Height, Area, Triangle, Rectangle, Perimeter, Circumference, Circle, Radius, Diameter, π (Pi), Sector, Semicircle, Shaded region, Altitude, Scalene Triangle, Congruent, Oblique Height, Sector Division, Shaded Area, String Method, Perimeter Comparison, Revolution, Polishing Cost, Fencing, Conversion, Diagonal, Graph Paper Method, Rectangle Formation, Graphical Estimation, Base-Height Relation, Same Area ≠ Congruent, Constant Ratio, Circle Folding, Multiple Shapes Comparison, Real-life Application, Formula Derivation, Equivalent Transformations

Class 7, Maths (9) **Perimeter and Area**

Concept	Formula	Notes
Area of Parallelogram	Area = base × height	Used for any parallelogram
Area of Triangle	Area = 1/2 × base × height	Derived from parallelogram
Circumference of Circle (diameter form)	Circumference = π × diameter	π ≈ 3.14 or 22/7
Circumference of Circle (radius form)	Circumference = 2 × π × radius	π ≈ 3.14 or 22/7
Circumference of Semicircle	Circumference = 1/2 × π × diameter	Only curved part
Perimeter of Semicircle	Perimeter = π × radius + diameter	Curved + straight edge
Area of Circle	Area = π × radius^2	π ≈ 3.14 or 22/7
Shaded Area Between Circles	Area = $\pi R^2 - \pi r^2$	R is larger radius, r is smaller

Variable, Constant, Algebraic Expression, Term, Factor, Coefficient, Monomial, Binomial, Trinomial, Polynomial, Like Terms, Unlike Terms, Expression Value, x^2 (x squared), x^3 (x cubed), Expression Tree,

Algebraic Factor, Numerical Coefficient, Addition/Subtraction of Expressions, Evaluate Expression, Power, Substitution, Simplification, Power Notation, Product, Expression, Evaluate

Class 7, Maths (10) — Algebraic Expressions

Expression	Formula / Description
x^2	x × x (x squared)
x^3	x × x × x (x cubed)
$2y^2$	2 × y × y
$3x^2 - 5$	3 × x^2 − 5
xy	x × y
4xy + 7	4 × x × y + 7
Coefficient	Numerical factor of a term (e.g. in 5xy, 5 is the coefficient)
Monomial	Expression with 1 term (e.g. 7xy)
Binomial	Expression with 2 unlike terms (e.g. x + y)
Trinomial	Expression with 3 terms (e.g. $3x^2 - 5x + 2$)
Polynomial	Expression with 1 or more terms (includes monomial, binomial, trinomial)
x + 4	Addition of constant 4 to variable x
4x – 3	4 × x – 3
$19 - 5x^2$	$19 - (5 \times x^2)$
$100 - 10x^3$	$100 - (10 \times x^3)$
5n – 2	5 × n – 2
$5n^2 + 5n - 2$	$5 \times n^2 + 5 \times n - 2$
$n^3 + 5n^2 + 5n - 2$	$n^3 + 5 \times n^2 + 5 \times n - 2$
$a^2 + 2ab + b^2$	a × a + 2 × a × b + b × b
$a^3 - b^3$	a × a × a – b × b × b

Exponent, Base, Exponential Form, Squared, Cubed, Standard Form, Product of Powers, Power of a Power, Negative Base, Zero Exponent, Expanded Form, Comparing Powers, Multiplying with Same Exponents, Dividing with Same Base, Law of Exponents, Decimal Number System, Standard Notation, Prime Factor, Product of Prime Factors, Comparing Exponents, Multiplication Rule, Division Rule, Power Rule, Negative Exponent Base, Positive and Negative Results, Scientific Notation, Expression, Simplify, Power, Factor, Variable, Order of Factors, Multiplicative Identity, Laws of Indices, Standard Form Rule

Class 7, Maths (11) **Exponents and Powers**

Expression	Formula	Description
am × an	am+n	Multiplying powers with same base
am ÷ an	am–n	Dividing powers with same base (m > n)
(am)n	amn	Power of a power
am × bm	(ab)m	Multiplying powers with same exponent
am ÷ bm	(a/b)m	Dividing powers with same exponent
a0	1	Any non-zero number raised to power 0
(–1)even	1	–1 raised to an even power
(–1)odd	–1	–1 raised to an odd power
10^n	Standard form: a × 10^n	Used to express large numbers

Symmetry, Line of Symmetry, Regular Polygon, Equilateral Triangle, Square, Pentagon, Hexagon, Mirror Line, Clockwise, Anticlockwise, Centre of Rotation, Angle of Rotation, Rotational Symmetry, Order of Rotational Symmetry, Reflectional Symmetry, Polygon, Triangle, Right Angle, Perpendicular Bisector, Coincide, Paper Folding, Ink-dot Devil, Axes of Symmetry, Diagonal, Punching Game,

Reflection, Fold, Transparent Sheet, Symmetric Fold, Windmill, Clockwise Rotation, Anticlockwise Rotation, Fixed Point, Paper Windmill, Full Turn, Half-turn, Quarter-turn, Transparent Overlay, Identical Parallelograms, Centre of the Square, Alphabet Symmetry, Rotational Order, Circle Symmetry, Diameter, Figure Completion.

Class 7, Maths (12)

Symmetry

Concept	Formula / Rule
Line Symmetry of Regular Polygon	A regular polygon has as many lines of symmetry as its number of sides.
Lines of Symmetry - Equilateral Triangle	3 lines of symmetry
Lines of Symmetry - Square	4 lines of symmetry
Lines of Symmetry - Regular Pentagon	5 lines of symmetry
Lines of Symmetry - Regular Hexagon	6 lines of symmetry
Rotation - Quarter Turn	90° rotation
Rotation - Half Turn	180° rotation
Rotation - Full Turn	360° rotation
Rotational Symmetry - Order of Symmetry	Order of Rotational Symmetry = Number of times object looks same in a full turn

Class 7, Maths (13)

Visualising Solid Shapes

Solid Shape, Plane Figure, 3-Dimensional (3D), 2-Dimensional (2D), Face, Edge, Vertex (Vertices), Net, Oblique Sketch, Isometric Sketch, Cross-section, Shadow, Top View, Front View, Side View, Cube, Cuboid, Cylinder, Cone, Pyramid, Sphere, Tetrahedron, Dimension, Sketch, Visualisation, Die (Dice), Fold, Slant Surface, Base, Slicing, Shadow Play, Projector, Arrow View, Rough Sketch, Strip Model, Hidden Edge, View Direction, Equilateral Triangle, Isometric Dot Paper, Stacking, Hidden Part, Cross-Sectional View, Building View, Manipulation, Match (Shape Matching), Parallel Line Segment, Opposite Face, Skeleton, Foldable Net, Total Dots on Die, Vertical Cut, Horizontal Cut, Clay Model, Time of Observation, Illumination Angle, Circular Plate, Rough Estimate, Dot Grid, Fastening, Square Base, Visual Illusion

Class 7, Maths (13) **Visualising Solid Shapes**

Shape	Faces (F)	Edges (E)	Vertices (V)
Cube	6	12	8
Cuboid	6	12	8
Triangular Prism	5	9	6
Square Pyramid	5	8	5
Triangular Pyramid (Tetrahedron)	4	6	4
Cylinder	3	2	0
Cone	2	1	1
Sphere	1	0	0