Rajasthan Board Class 9 Maths Syllabus

Details of the Syllabus
गणित (Mathematics)
UNIT I : NUMBER SYSTEMS संख्या पद्धति

1. **REAL NUMBERS**

   Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring /terminating decimals.

   Examples of nonrecurring / non terminating decimals such as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ etc. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}$, $\sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by unique point on the number line and conversely, every point on the number line represent a unique real number.

   Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized). Definition of nth root of a real number.

   Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws).

   Rationalization (with precise meaning) of real numbers of the type (& their combinations)

   $$\frac{1}{a + b\sqrt{x}} \quad \& \quad \frac{1}{\sqrt{x} + \sqrt{y}}$$ where x and y are natural number and a, b are integers.

UNIT II : ALGEBRA बीजगणित

1. **POLYNOMIALS बहुपद**

   Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros/roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorization of $ax^2+bx+c, a \# 0$ where a, b, c are real numbers, and of cubic polynomials using the Factor Theorem. Recall of algebraic expressions and identities. Further identities of the type $(x+y+z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$, $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy (x \pm y)$.

   $x^3 + y^3 + z^3 - 3xyz = (x + y + z) (x^2 + y^2 + z^2 - xy - yz - zx)$ and their use in factorization of polynomials. Simple expressions reducible to these polynomials..

2. **LINEAR EQUATIONS IN TWO VARIBALES**
   दो चरों वाले रैखिक समीकरण

   Recall of linear equations in one variable. Introduction to the equation in two variables.

Prove that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.

UNIT III : GEOMETRY ज्यामिति

1. INTRODUCTION TO EUCLID'S GEOMETRY
यूक्लिड   की ज्यामिति   का परिचय

History – Geometry in India and Eulid's geometry. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common / obvious notions, axioms/postulates and theorems. The five postulates of Euclid, Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem.

1. (Axiom) Given two distinct points, there exists one and only one line through them.
2. (Theorem) (Prove) two distinct lines cannot have more than one point in common.

2. LINES AND ANGLES रेखाएँ एवं कोण

1. (Motivate) if a ray stand on a line, then the sum of the two adjacent angles so formed is $180°$ and the converse.
2. (Prove) If two lines intersect, the vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal interests two parallel lines.
4. (Motivate) Lines, which are parallel to a given line, are parallel.
5. (Prove) The sum of the angles of a triangle is $180°$.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.

3. TRIANGLES त्रिभुज

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one tringle is equal to any two angels and the included side of the other triangle (ASA Congruence).
3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruence).
4. (Motivate) Two right triangle congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.
5. (Prove) The angles opposite to equal side of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between 'angle and facing side' inequalities in triangles.

4. QUADRILATERALS चतुर्भुज

1. (Prove) The diagonal divides a parallelogram into two congruent triangles.
2. (Motivate) In a parallelogram opposite sides are equal, and conversely.
3. (Motivate) In a parallelogram opposite angels are equal, and conversely.
4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.
5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely.
6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse.

5. AREA क्षेत्रफल

Review concept of area, recall area of a rectangle.

1. (Prove) Parallelograms on the same base and between the same parallels have the same area.
2. (Motivate) Triangles on the same base and between the same parallels are equal in area and its converse.

6. CIRCLES वृत

Through examples, arrive at definitions of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle.

1. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.
2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.
3. (Motivate) There is one and only one circle passing through three given non-collinear points.
4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center(s) and conversely.
5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.
6. (Motivate) Angles in the same segment of a circle are equal.
7. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.
8. (Motivate) The sum of the either pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.

7. CONSTRUCTIONS रचनाऐं

1. Constructions of bisectors of line segments & angles, 60°, 90°, 45° angles etc., equilateral triangles.

2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.

3. Construction of a triangle of given perimeter and base angels.

UNIT IV : COORDINATE GEOMETRY   निर्देशांक ज्यामिति

1. COORDINATE GEOMETRY   निर्देशांक ज्यामिति

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations. Plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $ax + by + c = 0$ by writing it as $y = mx+c$.

UNIT V : MENSURATION   मेन्सूरेशन

1. AREAS   क्षेत्रफल

Area of a triangle using Hero's formula (without proof) and its application in finding the area of a quadrilateral.

2. SURFACE AREAS AND VOLUMES   पृष्ठीय क्षेत्रफल एवं आयतन

Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.

UNIT VI : STATISTICS AND PROBABLILTY
सांख्यिकी एवं प्रायिकता

1. STATISTICS   सांख्यिकी

Introduction to Statistics : Collection of data, presentation of data – tabular form, ungrouped / grouped, bar graphs, histograms (with varying base length), frequency polygons, qualitative analysis of data to choose the correct from of presentation for the collected data. Mean, median, mode of ungrouped data.

2. PROBABILITY   प्रायिकता

History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real – life situations, and from examples used in the chapter on statistics.

Prescribed Books :

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