# BHARTIYA VIDYA MANDIR SENIOR SECONDARY SCHOOL
# SECTOR-39, CHANDIGARH ROAD, LUDHIANA
# SYLLABUS OF CLASS IX

**BOOK: NCERT** **SUBJECT – MATHEMATICS** **SESSION - 2024-2025**

| Month | Unit/Chapter/Topic | Learning Objectives | Resources/Art-integarted pedagogy tools used E-Resources | | Learning Outcomes/ Skills learnt by students |
|---|---|---|---|---|---|
| **APRIL** | NUMBER SYSTEM: REAL NUMBERS<br>1.Review of representation of natural numbers, integers, and rational numbers on the number line. Rational numbers as recurring/ terminating decimals. Operations on real numbers. 2. Examples of non-recurring/non-terminating decimals. Existence of non-rational numbers (irrational numbers) such as , and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, viz. every point on the number line represents a unique real number.<br>3.Definition of nth root of a real number<br>4.Rationalization and 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.) | Students will be able to<br>1) understand Irrational numbers, Real numbers and their decimal expansion<br>2) locate Irrational numbers, Real numbers on number line<br>3) perform operations on real numbers and use laws of exponents of real numbers<br>4) learn the concept of rationalizing the denominator | Lecture and Inductive method | http://epathshala.nic.in/QR/?id=0962CH01 | Students will attain the following behavioral objectives :<br>*They will appreciate the 'density property' of real numbers.<br>*They can apply this thinking process in the real life situation that any particular solution may not be the final/only solution but there is a scope of improvement.<br>*They can imagine any real number with accuracy |
| **APRIL** | COORDINATE GEOMETRY<br>The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations. | Students will be able to learn :<br>1. The coordinate axis divides the plane into four parts called quadrants.<br>2. The distance of a point from Yaxis is called its X-coordinate, or abscissa and the distance of the point from X-axis is called its Ycoordinate, or ordinate.<br>3. To locate the quadrant of a given point on the Cartesian plane.<br>4. To write the coordinates of the points marked on the Cartesian plane.<br>5. To plot a point on the Cartesian plane if its coordinates are given | Synthetic and Problem solving Method | http://epathshala.nic.in/QR/?id=0962CH03 | *Appraise the use of Cartesian system in real life scenarios like designing 2 – d blue prints of home, offices etc.<br>2. *Will develop the skills like precision and accuracy |
| **MAY** | LINEAR EQUATIONS IN TWO VARIABLES:<br>Recall of linear equations in one variable. Introduction to the equation in two variables. Focus on linear equations of the type ax + by + c=0.Explain 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 lie on a line. | Students will be able to :<br>1.Learn the concept of linear equation in two variables.<br>2. Identify the variables (dependent and independent), their coefficients and the constant terms in the equation.<br>3. Finding possible values of the variables that satisfy the equation.<br>4. Learn graphical interpretation of linear equation.<br>5. Write equation of x axis and y axis.<br>6. Frame equation of line parallel to x axis and y axis. | Lecture and Project Method | http://epathshala.nic.in/QR/?id=0962CH04 | 1. Analyze the different aspects of life as any problem has n number of solution.<br>2. Concept of linear equation in dealing day to day activities like comparing the cost, budgeting a party, making prediction for future and so on.<br>3. Problem solving ability |
| **MAY** | HERON'S FORMULA<br>(Area of a triangle using Heron's formula (without proof) | Students will be able to<br>1.Recall the term triangles and area of triangles.<br>2.Understand and apply the concept of Heron's formula<br>3.Calculate the area of a triangle using Heron's formula | Lecture and Heuristic Method | http://epathshala.nic.in/QR/?id=0962CH12 | Heron's formula can be used to measure the area of triangle whose sides are given, it can be used in our daily life in the following ways:-<br>□ To find the area of triangular park<br>□ To find area of scalene triangle in which the height doesn't definitely exists.<br>□ To find area of flyover.<br>It gives scope to student to think for alternative method.<br>□ It gives practical approach and motivational spirit to students that nothing is impossible in this world. |

| | | | | | |
|---|---|---|---|---|---|
| **JUNE** | **SUMMER VACATIONS** | | | | |
| **JULY** | POLYNOMIALS Definition of a polynomial in one variable, with examples and counter examples. Coefficients of a polynomial, terms of a polynomial and zero polynomial. Degree of a polynomial. Constant, linear, quadratic and cubic polynomials. Monomials, binomials, trinomials. Factors and multiples. Zeros of a polynomial. Motivate and State the Remainder Theorem with examples. Statement and proof of the Factor Theorem. Factorization of ax2 + bx + c, a ≠ 0 where a, b and c are real numbers, and of cubic polynomials using the Factor Theorem. | Students will be able to :<br>1) Understand the term polynomials, terms related to polynomials, zeroes of apolynomial.<br>2) Understand and apply Remainder theorem and factor theorem.<br>3) Do factorization of polynomials.<br>4) Understand and apply algebraic identities | Analytic and Lecture Method | http://epathshala.nic.in/QR/?id=0962CH02 | Students will apply regrouping/ rearrangement method of factorization into real life situation to rearrange/manipulate the available resources to obtain the desirable result/outcome. They will also learn the method 'divide and conquer' of problem solving in the real life by factorization of a polynomial as they may apply any of the available methods or say that it cannot be factorized. |
| **JULY** | INTRODUCTION TO EUCLID'S GEOMETRY (7) Periods History - Geometry in India and Euclid'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. Showing the relationship between axiom and theorem, for example:<br>(Axiom) 1. Given two distinct points, there exists one and only one line through them.<br>(Theorem) 2. (Prove) Two distinct lines cannot have more than one point in common. | Students will be able to: 1)understand Euclid's definitions. 2) Distinguish between axioms and postulates. 3) understand Equivalent version of Euclid's fifth postulates | Analytic and Problem solving Method | http://epathshala.nic.in/QR/?id=0962CH05 | Students will be able to define a term and design an algorithm to solve/ prove a problem from real life. |
| **AUGUST** | LINES AND ANGLES (15) Periods<br>1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180O<br>and the converse.<br>2. (Prove) If two lines intersect, vertically opposite angles are equal.<br>3. (Motivate) Lines which are parallel to a given line are parallel. | Students will be able to:<br>1. Explain the terms 'line', 'ray', 'line segment', 'collinear points', 'intersecting lines' and 'parallel lines'<br>2. Describe the different types of angles<br>3. Explain the terms 'adjacent angles', 'linear pair of angles', 'complementary angles', supplementary angles' and 'vertically opposite angles'<br>4. Prove that vertically opposite angles are equal<br>5. Describe the angles formed by a transversal<br>6. Explain the corresponding angles axiom<br>7. Prove that if a transversal intersects two parallel lines, then each pair of alternate interior angles is equal<br>8. Prove that if a transversal intersects two parallel lines, then each pair of interior angles on the same side of the transversal is supplementary<br>9. Prove that the lines which are parallel to the same line are parallel to each other.<br>10. Prove that the sum of three angles of a triangle is 1800 | Analytic and Problem solving Method | http://epathshala.nic.in/QR/?id=0962CH06 | Students apply the concept of lines and angle in various<br>sports like basketball, javelin throw etc.<br>2. Students also use the concept in various designs for their activities<br>3. Engineers and architects apply the properties of lines and angles while making designs or blueprints for buildings' |
| **AUGUST** | STATISTICS (15) Periods Bar graphs, histograms (with varying base lengths), and frequency polygons. | Students will be able to:<br>1. Define different types of data with example<br>2. Create a frequency distribution table with suitable class interval .<br>3. Define and differentiate between terms like range, class interval, class size, class width, class mark and so on<br>3. Draw a bar graph to represent the given data<br>4. Interpret data from the given bar graph<br>5. Draw a histogram to represent the given data<br>6. Interpret the data represented in a histogram.<br>7. Differentiate between bar graph, double bar graph and histogram<br>8. Draw a frequency polygon with the help of a histogram | Inductive and Deductive Method | http://epathshala.nic.in/QR/?id=0962CH14 | 1.Student can find average of anything from real life situation like his/her Result, average of monthly household expenses, run rate of any cricket match 2. Students become more arranged and systematic |
| **SEPTEMBER** | **TERM I EXAMINATION** | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **OCTOBER** | TRIANGLE 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 triangle is equal to any two angles and the included side of the other triangle (ASA Congruence) | Students will be able to: 1. Describe congruent triangles 2. List the four criteria for the congruence of triangles 3. Understand and apply the Side-Angle-Side (SAS) congruence rule 4. Understand and apply the Angle-Side-Angle (ASA) congruence rule 5. Understand and apply the Side-Side-Side (SSS) congruence rule 6. Understand and apply the Right Angle-Hypotenuse Side (RHS) congruence rule 7. Understand corresponding parts of congruent triangles(CPCT). | Lecture and Analytic Method | http://epathshala.nic.in/QR/?id=0962CH07 | Students will be able to understand the concept of congruency which will help them to plot figures of same shape and size |
| **OCTOBER** | SURFACE AREAS AND VOLUMES (17) Periods Surface areas and volumes of spheres (including hemispheres) and right circular cones. | Students will be able to: 1. Apply the concept of surface areas and volumes of a cone 2. Apply the concept of surface areas and volumes of a spheres and hemispheres | Lecture and Heuristic Method | http://epathshala.nic.in/QR/?id=0962CH13 | Through this chapter students will attain following behavioral objectives through solving variety of problems: They will be able to calculate and compare the surface areas and volumes of solid shapes like cuboids, cubes, right circular cylinders, right circular cones, spheres and hemispheres. |
| **NOVEMBER** | QUADRILATERALS (13) Periods 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 angles 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 in half of it and (motivate) its converse. | Students will be able to: 1. Describe the types of quadrilaterals and their properties. 2. Prove the angle sum property of quadrilaterals. 3. Describe the types of parallelogram and their properties. 4. Prove that the diagonal of a parallelogram divides it into two congruent triangles. 5. Prove that if each pair of opposite sides of a quadrilateral is equal then it is a parallelogram. 6. Prove that if each pair of opposite angle of a quadrilateral is equal then it is a parallelogram. 7. Prove that if each pair of opposite sides of a quadrilateral is equal and parallel in a quadrilateral, then it is a parallelogram. 8. Prove that if diagonals of a Quadrilateral bisect each other, then it is a parallelogram. 9. Prove the midpoint theorem and its converse. | Lecture and Analytic Method | http://epathshala.nic.in/QR/?id=0962CH08 | After getting the concept of quadrilateral, the student will analyze the application of their properties in day to day life, for example- □ *Use to create floor plans for new building □ *In graphic arts, sculpture, logo. □ *Packaging, web designing. □ *Square-like shapes are often used for uniformity: they are easy to tessellate, or pattern with. |
| **NOVEMBER** | CIRCLES (17) Periods 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) Equal chords of a circle (or of congruent circles) are equidistant from the center (or their respective centers) and conversely. 4.(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. 5.(Motivate) Angles in the same segment of a circle are equal. 6.(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. 7.(Motivate) The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse. | Students will be able to: 1) Understand the concept of Circles and its related terms. 2) Understand angle subtended by a chord, at any point on the circle. 3) Understand and apply the concept of cyclic quadrilateral. 4) Understand and apply the theorems based on circles. | Lecture and Analytic Method | http://epathshala.nic.in/QR/?id=0962CH10 | By solving variety of problems, students will attain following behavioral objectives 1. They will be able to understand and apply the properties of circles and circular regions. 2. They can apply the knowledge of circles in making drawings, model making, projects etc |
| **FEBRUARY** | **REVISION** | | | | |
| **MARCH** | **TERM II EXAMINATION** | | | | |