Class – IX

Mathematics

Time Frame Period	**Topic\Theme**	**Subject Matter**	**Activities\TLM**
		UNIT - I	
20	1. Real Numbers.	Review of the concept of natural numbers, whole numbers, integers and rational number and their representation on number line. Representation of terminating/non-terminating recurring decimals on the number line through successive magnification. Rational number as terminating \ non-terminating recurring decimals. Introduction of irrational numbers as non-terminating non recurring decimals. Representation on number line of irrational numbers of the type √2, √3, √5, etc. Discuss that π (pie) is irrational number. Explaining that every real number is	• Represent √2, √3, √5 on number line. • Construct the square root spiral. • To show that √2 is an irrational number • Find the value of √2 up to 5,6,7,---, places. • Visual proof of √x shall be emphasized and also geometrical representation should be given.

		represented by a unique point on the number line and conversely every point on the number line represents a unique real no. i.e., there is a one – one correspondence between points on a line and real numbers. Define absolute value of real numbers. Existence of $\sqrt{x}$ for a given non negative real number x (visual proof to be emphasized). Definition of x^{th} root of a non-negative number. Recall of laws of exponents with integral powers. Rational exponents with positive real basis. Rationalization of the real numbers of the type $\frac{1}{a + b\sqrt{x}}$, $\frac{1}{\sqrt{x} + \sqrt{y}}$ where x, y are natural numbers and a, b, are real numbers.	
Unit- II **Algebra**			
23	1 Polynomials	Review of the concept of monomial, binomial etc.	To write all the algebraic identities on a chart.

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<td>Definition of term, expression equation and identities with examples. Definition and concept of polynomials degree and coefficient of polynomials, Zero, constant, linear, quadratic and cubic polynomials.
Review of division of polynomial by monomial and binomial.
Division of a polynomial by a trinomial, --etc. Factors and multiples of a polynomial , zeros (roots) of a polynomial\equation</td>
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<td>Motivate and state Remainder theorem, with examples and analogy to integers. Statement and proof of factor theorem.
Factorization of $ax^2 + bx+ c = 0$ ($a\neq0$) where a, b, c are real numbers and of cubic polynomial using factor theorem.
Recall of algebraic expressions and identities namely. (x+a) (x+b), $(a\pm b)^2$, (a+b) (a-b), $(a\pm b)^3$ and additional identities of the type $(x+y+z)^2$ =</td>
<td>Proof of
$(a+b+c)^2$
=
$a^2+b^2+c^2+2ab+2bc+2ca$
<table><tr><td>A^2</td><td>Ab</td><td>Ac</td></tr><tr><td>ba</td><td>B^2</td><td>Bc</td></tr><tr><td>ca</td><td>cb</td><td>C^2</td></tr></table></td>
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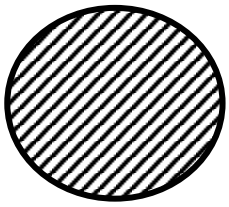
		$x^2+y^2+z^2+2xy+2yz+2zx$, $(x\pm y)^3= x^3\pm y^3\pm 3xy(x=y)$ $x^3+y^3+z^3-3xyz=3xy(x\pm y)$ $x^3+y^3+z^3-3xyz=(x^2+y^2+z^2-xy-yz-zx)$ and their use in factorization of polynomials. Simple expressions reducible to above forms.	
6	2. H.C.F. and L.C.M.	Introduction of concept of H.C.F. and L.C.M. of polynomials with simple questions. (H.C.F. to be done by factorization).	
9	Co-Ordinate Geometry	The cartesion plane, quadrants, concept of signs in different quadrants. Co-ordinates of a point. Alternate names of co-ordinates, notations plotting points in the plane Graphs of linear equation of the type ax+by+c=0, by writing as y=mx+c.	To find the coordinates of the objects being observed in a plane, by using meter rod or measuring tape.
		Unit-III	
10	3. Linear Equations in two variables.	Review of linear equations in one variable. Introduction to the linear equation in two variable. Show with the help of examples that linear equation in two variables	Discuss about the solution of linear graphically

		has infinitely many solutions and their representation (solution) as ordered pairs of real numbers. Plotting them and showing, that they seem to lie on a line.	
Unit-IV Geometry			
6	Introduction to Euclid's Geometry	History of Euclidean Geometry and Geometry in India. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/ obvious notions axioms\postulates and theorems. The five postulates of Euclid's. Equivalent version of the fifth postulate showing the relationship between axioms and theorems. 1. Given two distinct points, there exits one and only one line through them. 2. Prove that two distinct lines cannot have more than one point in common.	
10	2. Lines and	1. (Motivate) If a ray	

	angles.	stands on a line then the sum of two adjacent angles so formed is 180^0 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 intersects two parallel lines. 4. (Motivate) Lines, which are parallel to a given line are parallel. 5. (Prove) The sum of angles of a triangle is 180^0 6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.	
20	3. Triangles	1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to	Show bangles of different size and ask them to pick up identical pair of bangles with help of them tell the concept

		any two sides and the included angle of the other triangle (SAS congruency) 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 congruency) 3. (Motivate) Two triangles are congruent if the three sids of one triangle are equal to the three sides of other triangle (SSS congruence) 4. (Motivate) Two right triangles are 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 sides of a triangle are equal. 6. (Motivate) The sides opposite to angles of a	of congruency similarly. Repeat it with triangular shaped card board pieces.

		triangle are equal. 7. (Motivate) Triangles in equalities and relation between angle and facing sides in equalities in triangles.	
10	4. Quadrilaterals	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 its converse.	To cut pieces paper or cardboard in the form of quadrilateral, parallelogram, rhombus, rectangle and square to explain the concept of these figures using binding wire bend it in different four sided regular figures and explain the properties of rectangle, parallelogram rhombus, trapezium etc.

4	5. Area	Review concept of area, recall area of a rectangles. 1. (Prove) Parallelograms on the same base and between the same parallels have same area. 2. (Motivate) Triangles on the same base and between the same parallel are equal in area and its converse.	
15	6. Circles	Definition of locus with some examples, through examples arrive at the definition of circle and related concepts radius, circumference, diameter, chord arc, subtended angle etc. 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 bisect the chord and conversely line drawn through the center of a circle to bisect a chord is	Take a wire of certain length. Bend it in the form of a circle and shade it that will be the area of the circle, afterwords straighten the wire and measure the length of the wire that will be the circum-ference of the circle  Area _____

		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 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 seqment of a circle are equal . 7. (Motivate) If a line segment joining two points subtends equal angles 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	Circumference

		opposite angles of a cyclic quadrilateral is 180^0 and its converse.	
8	7. Constructions	1. Construction of bisectors of line segments and 60^0, 90^0, 45^0 angles etc. equilateral triangles. 2. Construction of a triangles, given its base\difference of the other two sides and one base angle. 3. Construction of a triangle of given parameter and base angle.	
Unit-V **Mensuration**			
4	1. Areas	Area of a triangle using Herons formula (Without proof) and its application in finding the area of a quadri lateral	
10	2. Surface Areas and Volumes	Surface area and volumes of cubes, cuboids, spheres (including hemisphere) and right circular cylinder \ cones.	

Unit-VI Statistics And Probability			
13	1. Statistics	Review of the techniques of data collection. Representation of data with the help of bar diagram histogram with varying base length), frequency polygon Pie-chart. Tabular form of ungrouped and grouped data. Qualitative analysis of data to choose correct form of presentation for the collected data. Mean Median and Mode of ungrouped data.	
12	2. Probability.	History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability.	Tossing a coin repeatedly, throwing of a dice, with the deck of cards, with a help of coloured pebbles and numbered cards