Mathematics

Learning Outcomes	*Sources and Resources*	*Week-wise suggested activities (to be guided by parents under the guidance of teacher)*
• identifies/classifies polynomials among algebraic expressions and factorises them by applying appropriate algebraic identities. • develops strategies to locate points in a Cartesian plane. • relates the algebraic and graphical representations of a linear equation in one or two variables and applies the concept to daily life situations.	**NCERT Mathematics Textbook for Class IX** **Chapter 2 : Polynomials** https://nroer.gov. in/55ab34ff81fccb4f1 d806025/age/580460d7 16b51c45e3cab428 https://nroer.gov.in /55ab34ff81fccb4f1d 806025/page/5b583 7d816b 51c01ca8ac058 **Chapter 3 : Coordinate Geometry** http://ncert.nic.in/ textbook/textbook. htm?iemh1=3-15	**WEEK 5** • A brief recall of algebraic expressions can be done by motivating students to form as many expressions as possible using different variables and operations. For e.g. $2x-7/3$, $3/x^2 + 4$, $2/3(t + 5)$ etc. • Students may now be asked to form algebraic expressions with increasing or decreasing powers of a variable. For e.g. $y^3 - 2y + 6$, $1/(m^2 + 1)$ etc. They may be involved in observing the difference in such types of expressions. • The expressions with a particular arrangement of variables can be discussed. Concept of a polynomial can be introduced now. • The terms related to polynomials, such as, term, coefficient can now be discussed. **WEEK 6** • Students may be encouraged to find situations from the concepts learnt earlier in which polynomials can be generated. For e.g. if the side of a square is $x+1$ units, then its area is $(x+1)(x+1) = x^2+2x+1$ sq. units or The volume of a cube with dimensions $x+2$, $x+1$, x units is $(x+3)(x+2)(x+1) = x^3+6x^2+11x+6$ cubic units. • The discussion about degree of a polynomial and their types may then follow. For example, $3x^2-5x+4$ is a polynomial of degree 2 and is a quadratic polynomial. • Shifting from the process of division of two numbers, such as, $236 ÷ 5$, the process of division of two polynomials, such as, $(3x^2+9x-3) ÷ (x-1)$, may be initiated. Students may be encouraged to create and send such examples. Students may tell the quotient and remainder obtained in each case.

	Chapter 4	**WEEK 7**
	Linear Equations in Two Variables	• The analogy between process of division of two numbers and that between two polynomials may be drawn. The remainder theorem and later factor theorem can be discussed. The statements of these theorems may be discussed. The ease of obtaining remainder and quotient can be made to realise through the discussion of different examples. The discussion about importance of theorems and their application may be encouraged among the students.
	http://ncert.nic.in/textbook/textbook.htm?iemh1=4-15	
	Books published by The Association of Mathematics Teachers of India (AMTI)	• Different identities, such as, $(a+b)^2 = a^2 + 2ab + b^2$ may be discussed. Students may be motivated to think how bigger expressions can be simplified using these identities.
		• Many of the concepts introduced can be verified through activities given in the NCERT Mathematics textbook for Class IX and Mathematics Laboratory Manual for Secondary Stage.
		• Examples can be further supplemented for deeper understanding of concepts by the use of exercises given in NCERT Mathematics Textbook and Exemplar Problem Book , both available on NCERT website.
		WEEK 8
		• Situations from daily life may be discussed where we are required to locate a certain building in a city or a house in a big colony. The given references need to be focused on. For example, To locate an office in another city, we may give directions as two kilometres from the railway station near X school. Many such situations may be created and discussed by the students.
		• This may be followed by sketching the locations on a paper thereby giving an idea about locating a point in a plane and the required parameters.
		• Activity: The students may be asked to mark a point on a blank sheet and make an attempt to describe its location so that the other person can locate the point nearly at the same position on a similar sheet. More such activities can be thought of.

• Beginning from locating a point on a number line it may be discussed how the use of a combination of such number lines can be extended to locate a point in a plane. Students may now be introduced to the formal concepts of coordinate axes, and their use in locating a point in a plane using coordinates.

WEEK 9

• Further concepts of quadrants and plotting points in a plane may then be talked about. As an activity students may be given the coordinates of points, such as, (5,0), (0,-3), (2,-3) etc. They may draw the coordinate axes and show the representation. Students may be encouraged to use a graph paper initially and later shift to a plain sheet of paper.

• Activities mentioned in Mathematics textbook of Class IX and Mathematics Laboratory Manual for Secondary Stage (available on NCERT website) may be referred.

• Exercises attempted by students from the chapter Coordinate Geometry of Class IX Mathematics Textbook and Exemplar Problem Book for Class IX will help in better understanding of the concepts.

WEEK 10

• A brief recall of linear equations in one variable can be done by motivating students to think of situations which can generate linear equations in one variable. For example, Sum of two numbers is 125. If one exceeds the other by 15, find the numbers. The equation would be $x+(x+15) = 125$.

• Situations may now be thought of where use of merely one variable does not suffice to give a solution. The situations involving two variables may be thought of. In the same example mentioned above: Sum of two numbers is 125. What are the numbers? Here the equation could be $x + y = 125$.

• Students may be encouraged to think of as many situations as possible and give them to others to make equations.

		## Week 11 • Solutions of such equations may now be thought of. It may be discussed as to how many solutions can there be? How are these equations similar or different from linear equations in one variable in terms of the number of solutions of these equations? Students may be motivated to find solutions having varying natures, such as ,whole numbers, integers, rational numbers or irrational numbers • The graphs of these equations may be plotted either on a graph paper or on a plain sheet to get a visual understanding of the nature of linear equations. It may be discussed how the graphs of ax + by +c = 0 and ax+ b = 0 differ. • The relation between a point say, (x, y) lying on a line ax + by +c = 0 and it being a solution of that equation may be observed through examples created by students. This gives a better understanding about the graphs of equations and their solutions. ## Week 12 • Students may discuss the application of equations in other subject areas, such as, science. That is, how can certain principles of science be written mathematically in terms of equations and how can they be useful in predicting certain parameters associated with them? For e.g.: You know that the force applied on a body is directly proportional to the acceleration produced in the body. Write an equation to express this situation and plot the graph of the equation. • Nature of the graphs of linear equations reduced to one variable may be discussed in one and two dimensions. For example, x= 3 represents a line parallel to Y axis and passing through the point (3,0) whereas it is a point on a number line marked at 3. • To deepen their understanding about all these concepts students may be encouraged to discuss exercises given in NCERT textbook and Exemplar Problem Book for Class IX. E-resources available on NROER will be useful to develop visual understanding.