

CLASS – IX
LESSON PLAN
CHAPTER-2: POLYNOMIALS

Unit	Number System (Chapter 1: Number System)
Class Transaction	Total: 15 periods (approx. 40 min each)
Pre-requisite for the course	This lesson requires 1. Basic knowledge of algebraic expression, terms, coefficient. 2. Knowledge of exponents. 3. Knowledge of division and remainder theorem 4. Knowledge of equations and how to solve them.
Assessment of qualifying knowledge	1. Written test 2. Lab activity 3. Group Discussion 4. HW notebook
Objective	Students would be able to identify polynomials with specified degree, also study the Remainder Theorem and Factor Theorem and their use in the factorisation of polynomials. In addition to the above, study some more algebraic identities and their use in factorisation and in evaluating some given expressions, thereby inculcating competencies like collaboration, critical thinking and creativity
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will develop the ability to understand</i> 1. The classification of polynomials on the basis of the number of terms and the degree. 2. The method of using zeroes in order to find the remainder of a polynomial and in order to check whether a given polynomial is the factor of the other given polynomial or not. 3. Where and how to use the remainder and factor theorem. 4. The method of using identities in order to find the product of two polynomials and in their factorization. <u>SKILLS</u>- <i>Students would be able to</i> 1. Understand and differentiate between rational and irrational numbers. 2. Solve surds and will also be able to rationalize the given irrational numbers. 3. Plot the square root of natural and decimal numbers on the number line. 4. Solve questions pertaining to laws of exponents.
Transaction Methodology (The teacher can use the mentioned techniques, wherever	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Brain Storming-The class would start with a discussion on what the students have already learnt in the previous classes and hence what is it that

applicable, and can use any other too.)	they would learn now. They would also be told the significance of the topic that they would be studying. Introduction of the topic- ppt and Digital Content would be shared Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom. Techniques to be used: Quiz Daily Practice Problem MCQ Peer Assessment Case Studies Lab Activities Any Other						
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar						
Self Study, Home Work, Assignments	Independent Practice: Students would do the questions in their H.W notebooks as mentioned in the monthly planner. HW notebooks to be marked as per the given plan: <i>Assessment Parameters:</i> The total marks for the activity is 5 marks On time submission.....1 mark Presentation/ Neatness.....1 mark Content.....3 marks It is also advised that the students come to the class with proper background knowledge of the topic under discussion. They can refer to the resources stated above.						
Assessments	Through Pen Paper Test Students will be assessed creatively and critically <table> <tr> <td>4 UNIT TESTS</td> <td>20 Marks each</td> </tr> <tr> <td>HALF YEARLY EXAMINATION</td> <td>80 Marks</td> </tr> <tr> <td>ANNUAL BOARD EXAMINATION</td> <td>80 Marks</td> </tr> </table> INTERNAL ASSESSMENT 10 Marks - Note Book Submission 05 Marks - Lab Practical (Subject Enrichment) 05 Marks Through lab Practical Students are assessed for Collaboration, Character building	4 UNIT TESTS	20 Marks each	HALF YEARLY EXAMINATION	80 Marks	ANNUAL BOARD EXAMINATION	80 Marks
4 UNIT TESTS	20 Marks each						
HALF YEARLY EXAMINATION	80 Marks						
ANNUAL BOARD EXAMINATION	80 Marks						

Addressing Classroom Diversity	Due to various social backgrounds and multiple intelligences, the classroom might be a diverse arena. The following techniques can be used for various groups: <i>For gifted students:</i> • Spiral Level 3 questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Spiral Level 1 to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes and formulae, if not written • Call parents at regular intervals • Provide grade-up classes • Encourage and motivate them at every level.
Marks	The weightage would be given by CBSE.
Assessment Questions	1. Find k if $x - 2$ is a factor $kx^2 - \sqrt{2}x + 1$ 2. If 1 and -5 are zeros of the polynomial $p(x)$. Write the polynomial $p(x)$. 3. Evaluate using appropriate identity: 1003×997 4. Factorise: $9 - 81(a - b)^2$. 5. Evaluate using the identity: (i) $60^3 - 28^3 - 32^3$

DAY	ONE
Objective	Enhance ability to accurately recognize and use appropriate terminology related to polynomials and developing the art of communication and critical thinking.
Assessment of qualifying knowledge	Students shall be given algebraic expressions, would then critically examine their addition, subtraction, multiplication and division.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will know and identify the coefficients and degree of polynomials <u>SKILLS and COMPETENCIES</u> Students will be able to Analyse effectively and will be able to critically explain the coefficients and degree of different polynomials.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1 Transaction would proceed in the following manner- Anticipatory Set: <u>10 min</u> Facilitator will ask few questions to introduce the topic • What is a polynomial? • What is the special name of the polynomial having one term, two terms or three terms? • How will you identify the linear, the quadratic and the cubic polynomials? Discussion of topic through Collaborative Learning: <u>15 min</u> <u>Inquiry based learning (Critical Thinking and Problem Solving)</u> Students would be asked to write different real life situations in which they are supposed to analyse the number of triangles involved. The facilitator would take rounds and ensure that each learner is engaged. Guided practice: <u>10 min</u> The students will solve the questions from NCERT book, solved examples before Ex 2.1 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. Independent Practice: Students will go through the solved examples before Ex 2.1 of NCERT text book. Closure: <u>5 min</u> A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar

Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral Test (5 minutes)
DAY	TWO
Objective	To solve the questions of Ex- 2.1 based on classification of polynomials
Assessment of qualifying knowledge	Worksheet based of finding the coefficients and degree of polynomials will be assessed in a collaborative manner through group activity.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will <i>learn to find</i> coefficients and degree of quadratic polynomial and understand the relation between constants and variables of polynomials. <u>SKILLS and COMPETENCIES</u>- Students will be able to analyse the coefficients and degree and constants and variables of polynomials.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 2.1 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 2.1 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.1 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral quiz (5 minutes)
DAY	THREE
Objective	Students will be able to • Comprehend and Explain the zeroes of a polynomial $p(x)$ that are precisely the x-coordinates of the points, where the graph of $y = p(x)$

	intersects the x-axis. Analyse that a quadratic polynomial can have at most 2 zeroes and a cubic polynomial can have at most 3 zeroes.
Assessment of qualifying knowledge	Worksheet based of finding the zeroes and value of polynomials will be assessed in a collaborative manner through group activity.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will learn to find roots of polynomial and understand the relation between zeroes and value of polynomials. <u>SKILLS and COMPETENCIES</u>- Students will be able to analyse the zeroes and value of polynomials
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) An oral quiz will be taken and students will be asked to identify the zeroes and value of polynomials Guided practice: 15 min The students, with the help of the facilitator, will solve the examples from NCERT book of Exercise – 2.2 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.2 in their Math HW notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral quiz (5 minutes)
DAY	FOUR
Objective	To solve the questions of Ex- 2.2 based on zeroes of polynomials
Assessment of qualifying knowledge	Worksheet based of finding the zeroes and value of polynomials will be assessed in a collaborative manner through group activity.

Learning Outcomes	<u>KNOWLEDGE</u>- Students will learn to find the zeroes and value of polynomials and understand the relation between the zeroes and value of polynomials. <u>SKILLS and COMPETENCIES</u>- Students will be able to analyse the zeroes and value of polynomials
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 2.2 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 2.2 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.2 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral quiz (5 minutes)
DAY	FIVE
Objective	Enhance ability to accurately recognize and use appropriately Remainder theorem and developing the art of communication and critical thinking.
Assessment of qualifying knowledge	Quiz and knowledge testing on how to find the zeroes and value of polynomials and understand the relation between the zeroes and value of polynomials
Learning Outcomes	<u>KNOWLEDGE</u>- Students will develop the ability to analyze that whether the given polynomial is divisible by another or not by checking on to its remainder’s value becoming zero or not. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the concept of division algorithm in given situations and collaboratively analyze and identify the remainder when two polynomials are operated under division.

Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Examples and questions will be discussed and students will be able to solve different questions per group and then the questions will be crosschecked. Digital content will be used. The facilitator will take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the examples from NCERT book of Exercise 2.3 in their notebook in the class with the help of their teacher. The teacher will ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.3 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Written test (5 minutes)
DAY	SIX
Objective	To solve the questions of Ex- 2.2 based on zeroes of polynomials
Assessment of qualifying knowledge	Quiz and knowledge testing on how to find the zeroes and value of polynomials <i>and understand the relation</i> between the zeroes and value of polynomials
Learning Outcomes	<u>KNOWLEDGE-</u> Students will develop the ability to analyze that whether the given polynomial is divisible by another or not by checking on to its remainder's value becoming zero or not. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the concept of division algorithm in given situations and collaboratively analyze and identify the remainder when two polynomials are operated under division.
Transaction Methodology (The teacher can use	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner-

the mentioned techniques, wherever applicable, and can use any other too.)	Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 2.3 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 2.3 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.3 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Written test (5 minutes)
DAY	SEVEN
Objective	Students will be able to • Comprehend and Explain the Factorisation of Polynomials $p(x)$ • Analyse Factor Theorem for polynomials.
Assessment of qualifying knowledge	Worksheet based of finding the factors of polynomials will be assessed in a collaborative manner through group activity.
Learning Outcomes	KNOWLEDGE- Students will <i>learn to</i> find factors of polynomial and understand the relation between zeroes and factors of polynomials. SKILLS and COMPETENCIES- Students will be able to analyse the zeroes and factors of polynomials
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) An oral quiz will be taken and students will be asked to identify the zeroes and value of polynomials

	Guided practice: 15 min The students, with the help of the facilitator, will solve the examples from NCERT book of Exercise – 2.4 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.4 in their Math HW notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral quiz (5 minutes)
DAY	EIGHT
Objective	To solve the questions of Ex- 2.4 based on <i>Factorisation of Polynomials</i>
Assessment of qualifying knowledge	Quiz and knowledge testing on how to find the zeroes and value of polynomials <i>and understand the relation</i> between the zeroes and factors of polynomials
Learning Outcomes	<u>KNOWLEDGE</u>- Students will develop the ability to analyze that whether the given polynomial satisfies Factorisation of Polynomials $p(x)$, thereby, analyze Factor Theorem for polynomials. And critically examine splitting the middle term method to find factors. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the concept of Factorisation of Polynomials in given situations and collaboratively analyze and identify the factors.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 2.4 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 2.4 in their

	notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.4 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Written test (5 minutes)
DAY	NINE
Objective	Students will be able to • Comprehend and Explain Algebraic Identities • Analyse the use of some of these algebraic identities to factorise the algebraic expressions and see their utility in computations.
Assessment of qualifying knowledge	Worksheet based on Algebraic Identities will be assessed in a collaborative manner through group activity.
Learning Outcomes	KNOWLEDGE- <i>Students will learn to factorise the algebraic expressions and understand their utility in computations</i> SKILLS and COMPETENCIES- <i>Students will be able to analyse and critically Find the value of expressions using appropriate identities</i>
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) An oral quiz will be taken and students will be asked to identify the zeroes and value of polynomials Guided practice: 15 min The students, with the help of the facilitator, will solve the examples from NCERT book of Exercise – 2.5 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.5 in their Math HW notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min

	A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Oral quiz (5 minutes)

DAY	TEN
Objective	To solve the questions of Ex- 2.5 based on <i>Algebraic Identities</i>
Assessment of qualifying knowledge	Quiz and knowledge testing on how to find the value of expressions using appropriate identities <i>and understand</i> their utility in computations.
Learning Outcomes	<u>KNOWLEDGE</u> - Students will learn to factorise the algebraic expressions <i>and understand</i> their utility in computations <u>SKILLS and COMPETENCIES</u> - Students will be able to analyse and critically Find the value of expressions using appropriate identities
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exercise 2.5 would be discussed and students would solve different questions per group and then the questions would be crosschecked. Digital content would be used. The facilitator would take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise – 2.5 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher’s guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 2.5 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar

Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Written test (5 minutes)