Unit 4: Solving Polynomial Equations

Content Area: **Math**
Course(s):
Time Period: **October**
Length: **8 classes**
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Solving Polynomial Equations

Learning Objectives

- Objective 1 - Define quantities for descriptive modeling problems. (Incorporate appropriate units).
- Objective 10 - Know the remainder theorem.
- Objective 11 - Apply the remainder theorem.
- Objective 12 - Identify zeros of polynomials using factoring.
- Objective 13 - Use the zeros to construct a rough graph of a polynomial function.
- Objective 14 - Rewrite rational expressions in different forms.
- Objective 15 - Use inspections, long division, or synthetic divison or CAS to rewrite rational expression.
- Objective 16 - Solve and recognize quadratic equations with complex solutions.
- Objective 17 - Solve quadratics by taking the square root.
- Objective 18 - Solve quadratics by completing the square.
- Objective 19 - Solve quadratics via the quadratic formula.
- Objective 2 - Know the definition of the complex number, i.
- Objective 20 - Solve quadratics by factoring.
- Objective 21 -
- Objective 3 - Know the form a+bi
- Objective 4 - Solve quadratic equations with real coefficients that have complex solutions.
- Objective 5 - Interpret parts of expressions including terms, factors, and coefficients.
- Objective 6 - Interpret expressions in terms of context.
- Objective 7 - Interpret parts of an expression in context, such as terms, factors, and coefficients.
- Objective 8 - Interpret complicated expressions by viewing its parts as a single entity.
- Objective 9 - Understand polynomials are closed under addition, subtraction, and multiplication.

Essential Skills

- Essential Skill 1 - Artists will be able to define quantities for descriptive modeling problems. (Incorporate appropriate units)
- Essential Skill 10 - Artists will know the remainder theorem and apply the remainder theorem.
- Essential Skill 11 - Artists will be able to identify zeros of polynomials using factoring.
- Essential Skill 12 - Artists will be able to use the zeros to construct a rough graph of a polynomial function.
- Essential Skill 13 - Artists will be able to rewrite rational expressions in different forms.
- Essential Skill 14 - Artists will be able to use inspections, long division, or synthetic division or CAS to rewrite rational expression.
- Essential Skill 15 - Artists will be able to solve and recognize quadratic equations with complex solutions.
- Essential Skill 16 - Artists will be able to solve quadratics by taking the square root.
- Essential Skill 17 - Artists will be able to solve quadratics by completing the square.
- Essential Skill 18 - Artists will be able to solve quadratics via the quadratic formula.
- Essential Skill 19 - Artists will be able to solve quadratics by factoring.
- Essential Skill 2 - Artists will know the definition of the complex number, i.
- Essential Skill 3 - Artists will know the form a+bi
- Essential Skill 4 - Artists will be able to solve quadratic equations with real coefficients that have complex solutions.
- Essential Skill 5 - Artists will be able to interpret parts of expressions including terms, factors, and coefficients.
- Essential Skill 6 - Artists will be able to interpret expressions in terms of context.
- Essential Skill 7 - Artists will be able to interpret parts of an expression in context, such as terms, factors, and coefficients.
- Essential Skill 8 - Artists will be able to interpret complicated expressions by viewing its parts as a single entity.
- Essential Skill 9 - Artists will be able to understand polynomials are closed under addition, subtraction, and multiplication.

Standards

MATH.9-12.A.APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MATH.9-12.A.APR.B.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $x - a$ is a factor of $p(x)$.
MATH.9-12.A.APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
MATH.9-12.N.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MATH.9-12.A.APR.D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated

	examples, a computer algebra system.
MATH.9-12.N.CN.A.1	Know there is a complex number i such that $i^2 = –1$, and every complex number has the form $a + bi$ with a and b real.
MATH.9-12.N.CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.
MATH.9-12.A.REI.B.4.b	Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
MATH.9-12.A.SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MATH.9-12.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.
MATH.9-12.A.SSE.A.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.

Instructional Tasks/Activities

- Academic games & Competitions
- Arts inspired projects
- Formative Assessment
- Ladder Activity
- Notes
- Worksheets

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- PowerPoint
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)

- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

The honors track will move at a faster pace for this unit. They will have more in depth critical thinking and analysis type questions. The honors track will also be able to factor using the sum and difference of cubes and u-substitution. They will also be able to use the rational root theorem to find solutions to a polynomial function.

Resources

- Resource 1 - https://njctl.org/courses/math/algebra-ii/