(Alg 1) Unit 7: Polynomial Equations & Factoring

Content Area: **Math**
Course(s): **Math**
Time Period: **February**
Length: **3 weeks**
Status: **Published**

Unit Overview

In this unit, students will learn about the following topics:

- Adding & subtracting polynomials

- Multiplying polynomials

- Special products of polynomials

- Solving polynomial equations in factored form

- Factoring trinomials in the form x^2+bx+c

- Factoring trinomials in the form ax^2+bx+c (a not equal to 1)

- Factoring Special Products

- Factoring Polynomials Completely

Enduring Understandings

SWBAT:

- Add & subtract polynomials of varying degrees

- Identify the degree of a monomial or polynomial

- Solve real-world problems involving the addition & subtraction of polynomials

- Combine like terms

- Multiply polynomials, applying the product of powers property

- Multiply special products of polynomials (perfect square trinomials & the plus/minus pattern)

- Apply the zero product property to solve polynomial equations in factored form

- Factor the greatest common factor from an expression

- Factor trinomials of the form x^2+bx+c

- Factor trinomials of the form ax^2+bx+c using the AC Method

- Factor special products of polynomials (perfect square trinomials and difference of squares)

- Factor polynomials completely to their some simplified form

- Factor 4-term polynomial by grouping

- Prove polynomial identities

Essential Questions

How can we:

- add polynomials?
- subtract polynomials?
- combine like terms to simplify expressions?
- apply the distributive property to simplify expressions?
- solve real-world problems involving the addition or subtraction of two expression simulating a real-world problem?
- multiply a monomial and a monomial?
- multiply a monomial and a polynomial?
- multiply a polynomial with a polynomial?
- multiply polynomials using a table?
- multiply binomials using the F.O.I.L. (First, Outter, Inner, Last) method?
- multiply polynomials using the distributive property?
- use the structure of two polynomials to obtain a product more efficiently?
- simplify special products of polynomials?
- use the zero product property to solve a polynomial equation in factored form?
- factor the greatest common factor from a polynomial expression?
- factor trinomials of the form x^2+bx+c?
- utilize GCF when factoring trinomials of the form ax^2+bx+c?
- utilize the AC Method when factoring trinomials of the form ax^2+bx+c?
- factor difference of squares?
- factor perfect square trinomials?
- factor polynomials completely, to their lowest terms?
- solve real-world problems involving the factoring of an expression?
- prove polynomial identities?

Instructional Strategies & Learning Activities

- Guided Practice
- Daily Do Now
- Extra Practice & Puzzle Time (Resources)

- Scavenger Hunts
- Coloring Activities
- Task Cards (Around the World)
- Maze Activities
- Quizizz Online Assignments
- Kahoot! Online Games
- GimKit Online Games

Technology & Design Integraiton

8.1.8.DA.5	Test, analyze, and refine computational models.
8.1.8.AP.4	Decompose problems and sub-problems into parts to facilitate the design, implementation, and review of programs.
8.1.8.AP.6	Refine a solution that meets users' needs by incorporating feedback from team members and users.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.8.E.CS1	Plan strategies to guide inquiry.
TECH.8.1.8.F.CS4	Use multiple processes and diverse perspectives to explore alternative.

Integration of 21st Century Themes and Skills

P.4	Demonstrate creativity and innovation.
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
9.4.8.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.CT.3	Compare past problem-solving solutions to local, national, or global issues and analyze the factors that led to a positive or negative outcome.
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through

	experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.

Interdisciplinary Connections

L.KL.8.2.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
L.KL.8.2.B	Gather vocabulary knowledge when selecting a word or phrase important to comprehension or expression.
L.VL.8.3.A	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.VL.8.3.B	Analyze the impact of specific word choices on meaning and tone.
L.VL.8.3.C	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
L.VL.8.3.D	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

Differentiation

Definitions of Differentiation Components:

- Content – the specific information that is to be taught in the lesson/unit/course of instruction.
- Process – how the student will acquire the content information.
- Product – how the student will demonstrate understanding of the content.
- Learning Environment – the environment where learning is taking place including physical location and/or student grouping

Differentiation occurring in this unit:

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
- Limit number/difficulty of problems for low-achieving students to demonstrate mastery.
- Narrow down problem choice to core concepts for low-achieving students.

- Leveled group-based activities, determined by formative assessment.

Modifications & Accommodations

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.
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Benchmark Assessments

Schoolwide Benchmark assessments:

- Linkit Benchmarks (Form A in September, Form B in January, Form C in June): Linked to NJSLA standards

Additional Benchmarks used in this unit:

- IXL Diagnostic + continued practice during IXL periods

Formative Assessments

Formative Assessments used in this unit:

- Kahoot! Games

- Quizizz Games

- Homework

- Q & A

- Scavenger Hunts

- Coloring Activities

- Task Cards

- Partner Activities

Summative Assessments

Summative assessments for this unit:

- Chapter Test
- Quizzes

Instructional Materials

1. Big Ideas Math: Math & You 6th Grade Textbook
2. Quizizz
3. Kahoot!
4. Scavenger Hunts
5. Task Cards
6. Coloring Activities
7. GimKit

Standards

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.
A.APR.C.4	Prove polynomial identities and use them to describe numerical relationships.
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.
A.SSE.A.2	Use the structure of an expression to identify ways to rewrite it.
A.SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.