Unit 2: Polynomials

Content Area: **Mathematics**
Course(s): **Algebra 2H**
Time Period: **October**
Length: **4 weeks**
Status: **Published**

Unit Overview

- Represent and analyze mathematical situations using algebraic symbols
- Understand numbers, ways of representing numbers, relationships among numbers and number systems
- Understand patterns, relations and functions

Enduring Understandings

- division of polynomials
- factoring polynomials
- Performing operations on polynomials helps you solve and graph them.
- There are different approaches to solving polynomial functions.

Essential Questions

- How do you divide polynomials?
- How do you factor polynomials?
- How do you solve polynomial equations? (graphing and algebra)
- What is a polynomial?

Student Learning Objectives

- SWBAT divide polynomials
- SWBAT divide polynomials by using synthetic division
- SWBAT factor polynomials using the GCF, by recognizing special products, and by grouping terms
- SWBAT factor quadratic polynomials
- SWBAT find the GCF and LCM of integers and monomials
- SWBAT multiply polynomials
- SWBAT simplify, add, and subtract polynomials
- SWBAT solve polynomial equations
- SWBAT solve problems by using polynomial equations
- SWBAT use laws of exponents to multiply a polynomial by a monomial

Lesson Titles

- Adding and Subtracting Polynomials
- Applying the Laws of Exponents
- Completely Factoring Polynomials
- Dividing Polynomials
- Dividing Polynomials with Synthetic Division
- Factoring Quadratic Polynomials
- Finding the GCF and LCM of Monomials
- Multiplying Polynomials
- Solving Polynomial Equations

Standards

MA.A-APR	Arithmetic with Polynomials and Rational Expressions
MA.A-APR.A	Perform arithmetic operations on polynomials
MA.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.
MA.A-APR.B	Understand the relationship between zeros and factors of polynomials
MA.A-APR.C	Use polynomial identities to solve problems
MA.A-APR.D	Rewrite rational expressions
MA.A-CED	Creating Equations
MA.A-REI	Reasoning with Equations and Inequalities
MA.A-REI.C	Solve systems of equations

Equity Considerations

LGBTQ and Disabilities Considerations

Students will engage in learning different mathematicians from the LGBTQ community along with those with disabilities that have made significant impacts in math.

STEM

LGBTQ:

Sir Francis Bacon (1561–1626)

Florence NightingaleFrancis Bacon | Philosophy, Scientific Method, & Facts | Britannica(1820-1910)

George Washington Carver (1861-1943)

Sara Josephine Baker (1873-1945)

Alan Turing (1912-1954)

Allan Cox (1926-1987)

Sally Ride (1951-2012)

Ben Barres (1954-2017)

Ruth Gates (1962-2018)

Tim Cook (1960)

Disabilities:

Leonardo da Vinci (1452-1519)- Dyslexia

Isaac Newton (1664-1727)- Epilepsy

Thomas Edison (1847-1931)- Hearing

Charles Darwin (1809-1882)- Stutter, Dyslexia

Alexander Graham Bell (1847-1922)- Deaf

Albert Einstein (1879-1955)- Aspergers

Florence B. Seibert (1897-1991)- Mobility

Stephen Hawking (1942-2019)- ALS

John Forbes Nash (1928-2015)- Schizophrenia

Temple Grandin (1947)- Autism

Climate Change

Connection to math and STEM processes: Students will be able to build on previously taught science material particularly carbon footprints in regards to the mathematically processes centered around it.

http://www.climatechangeeducation.org/k-12/math/index.html

https://www.oercommons.org/authoring/7876-climate-change-cross-curricular-math-english-scien/view

SCI.HS-ESS3-6	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity (i.e., climate change). Using Mathematics and Computational Thinking Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Asian American and Pacific Islander Considerations

Students will engage in learning different AAPI mathematicians that have contributed to mathematical processes and developments.

https://www.youtube.com/watch?v=_pUHaSapfuo

https://www.ngpf.org/blog/math/math-monday-celebrating-aapi-mathematicians/

https://ideas.ted.com/8-asian-americans-and-pacific-islanders-whose-innovations-have-changed-your-life-really/

Indicators

MA.A-APR.A	Perform arithmetic operations on polynomials
MA.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.
MA.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.
MA.A-APR.C.4	Prove polynomial identities and use them to describe numerical relationships.

Career Readiness, Life Literacies & Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.

Inter-Disciplinary Connections

LA.RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking

Instructional Strategies/Learning Activities/Levels of Blooms

- intro. add. and subtract. of polynomials.
- Intro. Factoring by sums or differences of cubes
- intro. factoring quadratic polynomials with coefficients other than 1
- intro. polynomial equations
- intro. Polynomial times polynomial
- intro. power raised to a power.
- intro. same base add exponents.
- intro. solving polynomial equations by factoring.
- intro. solving problems by using polynomial equations.
- Review quiz
- review special types of factoring.
- Assessment
- intro. degree of terms and polynomials
- Intro. Factoring by GCF
- Intro. Factoring by using Difference of two squares
- Intro. Factoring by using perfect trinomial squares
- Intro. factoring quadratic polynomials by using the box method.
- intro. finding values within polynomials
- Intro. GCF with monomials
- intro. parenthesis raised to a power
- intro. simplfying polynomials
- intro. simplifying variable exponents
- Intro. Trinomial times binomial
- intro. Trinomial times trinomial
- LCM with monomials

- partner activity: students will work with a partner solving 10 problems involving special types of factoring
- Review Anticipatory Set
- Review Foil
- review game
- review hmwk

Modifications

ELL Modifications

- • Assess ELL students continuously using formative assessment methods
- • Be flexible with time frames and deadlines
- • During Delsea One - one on one with a student who speaks the same language
- • Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- • Khan Academy offers lesson in several languages https://es.khanacademy.org/
- • Offer resources for specific topics in primary language (Youtube web resources)
- • Repeat, reword, clarify
- • Use google translator, especially for application problems
- • Using technology, such as but not limited to: graphing calculator and desmos

IEP & 504 Modifications

- • Allowing co-teaching with general education and special education teachers in the same classroom so that the special education teacher can re-teach students with special needs in a different way in a smaller group (pulled to the side)
- • For assessments - allowing student to correct mistakes or answer wrong questions correctly for additional credit if failed the first test (another way to re-teach material)
- • For assessments - rewording questions so that there are not higher level vocabulary within the question (you are testing for understanding of the content not the ability to understand the question)
- • For assessments - students could use calculator and/or other math tools (x grids, chips, ect)
- • If not in a co-teaching setting allowing time in the schedule for a special education teacher to consult with general education teachers on what specifically can be modified or how to paraphrase things in a different way specific to that lesson
- • Khan Academy offers extra practice and examples in all areas. https://www.khanacademy.org/
- • Modeling and showing lots of examples
- • Non-verbal redirection of behaviors
- • Providing study guides that don't lead the student to study too much extraneous information (less unnecessary details)/scaffolded study guides
- • Scaffolded notes

- • Speaking to students privately when redirecting behaviors
- • Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

G & T Modifications

- • Determine where students' interests lie and capitalize on their inquisitiveness. (Is there a Invite students to explore different points of view on a topic of study and compare the two.
- • Encourage students to explore concepts in depth and encourage independent studies or investigations.
- • Invite students to explore different points of view on a topic of study and compare the two.
- • Math- provide additional rigorous challenge problems for advanced students
- • Refrain from having them complete more work in the same manner.
- • Specific career they are interested in? How would this apply to their interest?)

At Risk Modifications

- Keep contact with parents/guardians and guidance counselor on progress
- Refer to Organizational Management
- Require Delsea One Tutoring

Formative Assessment

- Anticipatory Set
- Closure
- Factoring Quiz
- Find the mistake factoring problems
- Laws of Exponents Quiz
- Multiplying Polynomials Quiz
- Partner activity
- Pass out of class
- Warm Up

Alternate Assessment

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Benchmark assessment

Skills-based assessment- math practice

Summative Assessment

- Benchmark Assessment
- Marking Period Assessment
- Unit Test on Factoring
- Unit Test on Laws of Exponents and Multiplying Polynomials

Resources & Materials

- Algebra and Trigonometry Book 2
- Establish a set of general strategies for student independence and self-evaluation
- Evoke student participation from their seats and at the board
- Independent/Cooperative learning explorations
- Mathispower4u math videos
- Powerpoint lessons
- Smartboard lessons
- Teacher Generated Worksheets
- Use youtube videos to introduce/demonstrate concepts in real-life situations.

Technology

- Chromebooks
- Desmos
- Equatio
- Graphing Calculators
- MathXLforschool.com

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.
TECH.8.1.12.E.CS4	Process data and report results.

TECH.8.2.12.A.CS3	The relationships among technologies and the connections between technology and other fields of study.