Unit 5: Variation and Polynomial Equations

Content Area: **Mathematics**
Course(s): **Algebra 2H**
Time Period: **February**
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

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

Essential Questions

- How can we classify equations?
- What must you know in order to solve an equation
- Why is it necessary to have rules?

Student Learning Objectives

- SWBAT approximate the real roots of a polynomial equation P(X) = 0 by using the graph of y = P(x)
- SWBAT find or solve a polynomial equation with real coefficients and positive degree n by using theses facts: there are exactly n roots, the imaginary roots occur in conjugate pairs, Descartes' rule of signs gives information about the numbers of positive and negative real roots
- SWBAT find rational roots of polynomial equations with integral coefficients
- SWBAT solve problems using direct variation
- SWBAT solve problems using joint and inverse variation
- SWBAT use linear interpolation to find values not listed in a given table of data.
- SWBAT use the remainder and factor theorems to find factors of polynomials

Lesson Titles

- Direct and Indirect Variation
- Dividing Polynomials with Long Division

- Dividing Polynomials with Synthetic Division
- The Factor and Remainder Theorems

Standards

MA.A-SSE	Seeing Structure in Expressions
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.A-REI.D	Represent and solve equations and inequalities graphically

Indicators

MA.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
MA.A-REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. A graphing utility or a computer algebra system can be used to experiment with properties of these functions and their graphs and to build computational models of functions, including recursively defined functions. Functions describe situations where one quantity determines another. For example, the return on $10,000 invested at an annualized percentage rate of 4.25% is a function of the length of time the money is invested. Because we continually make theories about dependencies between quantities in nature and society, functions are important tools in the construction of mathematical models.

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.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
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

- Review quiz
- Review test
- students will be 5 questions. they will hand these problems in by the end of the period.
- Assessment
- Intro. Approximating irrational roots
- Intro. Conjugate root theorem
- Intro. direct variation
- Intro. Factor Theorem
- Intro. inverse interpolation
- Intro. Inverse Variation
- Intro. Joint Variation
- Intro. linear interpolation
- Intro. Pollynomial equations with complex coeffients and positive degree N roots.
- Intro. rational root theorem
- Intro. Remainder Theorem
- Intro. using linear interpolation to approximate zeros of a function
- review 5 questions collect previous day.
- Review Anticipatory Set
- 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
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

G & T Modifications

- Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning
- 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. Specific career they are interested in? How would this apply to their interest?)
- Employ differentiated curriculum to keep interest high
- Encourage students to explore concepts in depth and encourage independent studies or investigations
- Encourage students to make transformations- use a common task or item in a different way
- Invite students to explore different points of view on a topic of study and compare the two
- Khan Academy offers extra practice and examples in all areas. https://www.khanacademy.org/
- Provide additional rigorous challenge problems for advanced students
- Refrain from having them complete more work in the same manner

- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

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
- Group Work
- Guided Practice
- Partner activity
- Pass out of class
- Quiz on finding the discriminant
- Quiz on the Remainder and Factor Theorems
- Teacher Observation
- Warm Up

Summative Assessment

- Benchmark Assessment
- Marking Period Assessment
- Test on Division of Polynomials and the Factor and Remainder Theoerms

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