Unit 03: Polynomials & Optimization

Content Area: **Mathematics**
Course(s): **PreCalc Trig H**
Time Period: **Semester 1**
Length: **2 weeks**
Status: **Published**

Standards - NJCCS/CCSS

CCSS.Math.Content.HSF-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
CCSS.Math.Content.HSN-CN.A	Perform arithmetic operations with complex numbers.
CCSS.Math.Content.HSF-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
CCSS.Math.Content.HSN-CN.A.1	Know there is a complex number □ such that □² = –1, and every complex number has the form □ + □□ with □ and □ real.
CCSS.Math.Content.HSF-IF.C.7.a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
CCSS.Math.Content.HSN-CN.A.2	Use the relation □² = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
CCSS.Math.Content.HSN-CN.A.3	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.
CCSS.Math.Content.HSF-IF.C.7.c	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
CCSS.Math.Content.HSN-CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.
CCSS.Math.Content.HSN-CN.C.8	Extend polynomial identities to the complex numbers.
CCSS.Math.Content.HSN-CN.C.9	Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.

Enduring Understandings

The symbolic language of algebra and generalization of patterns in mathematics are used to communicate and understand mathematics.

Coordinate geometry can be used to represent and verify geometric/algebraic relationships.

Optimization is finding the best solution within given constraints.

Essential Questions

What do the zeros of a polynomial represent?
How does the value of a function compare to the remainder when the function is divided?
How do you find the minimum of a function?
How do you find the maximum of a function?
How many positive zeros does a polynomial have?
How many negative zeros does a polynomial have?

Knowledge and Skills

SWBAT differentiate between even and odd degree polynomials.
SWBAT quickly sketch polynomials.
SWBAT divide polynomials by the division algorithm.
SWBAT use synthetic division.
SWBAT demonstrate understanding of the use of the factor theorem and remainder theorem.
SWBAT use the rational root theorem to find zeros.
SWBAT use the complex zero theorem to find the zeros of a polynomial.
SWBAT solve optimization problems.
SWBAT apply Descartes' Rule of Signs.
SWBAT apply the complex root theorem.

Resources

Precalculus with Limits

Authors: Aufmann, Barker, Nation

Graphing Calculator

www.desmos.com

www.flipgrid.com

www.graphfree.com