



Algebra 2 Level 1 - Unit 4 - Polynomial Functions

Unit Focus

We move from quadratics to a study of polynomials and the relationship between the degree, the number of terms and the zeros. Multiplicity of zeros will be investigated and students will discover the relationship between the number of zeros the graph. The Rational Roots Theorem, Remainder Theorem and Factor Theorem will also be investigated in this unit.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 9-12 - 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. (CCSS.MATH.CONTENT.HSA.APR.A.1) - 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 $p(x)$. (CCSS.MATH.CONTENT.HSA.APR.B.2) - 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. (CCSS.MATH.CONTENT.HSA.APR.B.3) - Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1) - Model with mathematics. (CCSS.MATH.MP.4) - Use appropriate tools strategically. (CCSS.MATH.MP.5) - Attend to precision. (CCSS.MATH.MP.6) Madison Public Schools Profile of a Graduate - Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2) - Idea Generation: Studying a problem, need or model (mentor text, political piece, documents, art work, etc.) to consider limitations and imagine new solutions/transformations. (POG. 2.1)	<i>Students will be able to independently use their learning to...</i> T1 model relationships among quantities. T2 manipulate equations/expressions or objects to create order and establish relationships. T3 draw conclusions about graphs, shapes, equations, or objects.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians are able to make assumptions and approximations to simplify a complicated situation. U2 Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.	<i>Students will keep considering...</i> Q1 How can I break a problem down into manageable parts? Q2 What does the graph/function tell me?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 properties of polynomial functions - exponents and end behavior K2 how to find possible zeros of a function K3 how to identify multiplicity of a function K4 understand usefulness of the remainder theorem to evaluate complicated functions K5 the Fundamental Theorem of algebra	<i>Students will be skilled at...</i> S1 working fluently with exponents S2 fluently factoring polynomials. S3 performing all four operations on polynomials S4 using the factor theorem S5 using rational roots theorem to determine possible zeros

Stage 1: Desired Results - Key Understandings

	K6 the relationship between factors of a polynomial and intercepts K7 Vocabulary: multiplicity, roots, synthetic division, rational, real, complex, zeros	S6 using long and synthetic division to determine complete factorization of a polynomial S7 determining right and left end behaviors from leading term S8 sketch a graph of a polynomial function, using end behavior, degree, x and y intercepts, zeros and multiplicities S9 "building a polynomial function" from a graph or from a set of parameters such as degree and zeros (including complex)
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