

Algebra 2 CP Unit 6: Polynomials

Unit #:	APSDO-00018154	Duration:	4.0 Week(s)	Date(s):	
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Grades:
 10, 11

Subjects:
 Mathematics

Unit Focus

In this unit, students will study polynomial functions and their graphs. Students will describe the graphs based on degree and leading coefficients. Students will use long division or synthetic division to find real, rational zeros. Students will graph and label critical points of polynomial functions. Summative assessments may include projects, labs and test.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer	
<p>Common Core <i>Mathematics: 11</i></p> <ul style="list-style-type: none"> • 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. <i>CCSS.MATH.CONTENT.HSA.APR.A.1</i> • Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. 	<p>T1 (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution.</p> <p>T2 (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense.</p> <p>T3 (T51) Examine alternate methods to accurately and efficiently solve problems.</p> <p>T4 (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.</p> <p>T5 (T21) Perform operations in a conventional order within the real and complex number system.</p> <p>T6 (T23) Use functions or equations to model relationships among quantities.</p> <p>T7 (T24) Classify, interpret, and compare functions or equations.</p>	
	Meaning	
	Understandings	Essential Questions

<p><i>CCSS.MATH.CONTENT.HSA.REI.B.4.A</i></p> <ul style="list-style-type: none"> Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. <p><i>CCSS.MATH.CONTENT.HSF.IF.C.8.A</i></p> <ul style="list-style-type: none"> 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 $p(x)$. <p><i>CCSS.MATH.CONTENT.HSA.APR.B.2</i></p> <ul style="list-style-type: none"> 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. 	<p>U1 (U502) Effective problem solvers identify and apply an appropriate model, tool, or strategy.</p> <p>U2 (U512) Mathematicians use diagrams, symbols, and terms to describe problems or situations</p> <p>U3 (U560) Patterns and structures are characterized by consistent relationships.</p> <p>U4 (U202) The application of specific properties and order of operations can simplify expressions, solve equations, and combine functions.</p> <p>U5 (U206) A function can represent how quantities in the real world relate to one another.</p> <p>U6 (U207) Recognition of predictable mathematical patterns supports the analysis of functional relationships and the prediction of data.</p>	<p>Q1 (Q503) What strategies/approaches are best for this problem?</p> <p>Q2 (Q512) What information is needed and how do I use it to solve a problem?</p> <p>Q3 (Q560) What is the pattern/structure in this problem?</p> <p>Q4 (Q205) How can I represent this relationship as a function or equation? (Gr. 6-12)</p> <p>Q5 (Q206) How do I evaluate this function or solve the equation? (Gr. 6-12)</p> <p>Q6 (Q207) How do I classify, interpret, and compare functions or equations? (Gr. 8-12)</p> <p>Q7 (Q208) What function best models the data? How do its characteristics help me make predictions? (Gr. 8-12)</p>
Acquisition of Knowledge and Skill		
Knowledge	Skills	
	<p>S1</p> <p>Identify the following components of a polynomial function (degree, name, zeros, end behavior, # of u-turns, maximum/minimum values, intervals of increasing/decreasing)</p> <p>S2</p> <p>Write the equation of a polynomials given a graph or roots (sum and product of roots)</p> <p>S3</p> <p>Solve optimization problems using polynomials</p> <p>S4</p>	

<p><i>CCSS.MATH.CONTENT.HSN.CN.C.8</i></p> <ul style="list-style-type: none"> • Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. <p><i>CCSS.MATH.CONTENT.HSN.CN.C.9</i></p> <ul style="list-style-type: none"> • Look for and make use of structure. <p><i>CCSS.MATH.MP.7</i></p> <ul style="list-style-type: none"> • Make sense of problems and persevere in solving them. <i>CCSS.MATH.MP.1</i> • Reason abstractly and quantitatively. <i>CCSS.MATH.MP.2</i> 		<p>Use provided roots to find remaining roots of a polynomial in exact form (synthetic division)</p> <p>S5</p> <p>Understand how the multiplicity of roots changes the graph</p> <p>S6</p> <p>Prove polynomial identities and use them to describe numerical relationships</p> <p>S7</p> <p>Solve polynomial inequalities</p>
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Stage 3: Learning Plan

Coding	Code	Description of Learning Activity
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