Unit 04: Alg2Ac (Chapter 5): Polynomial Functions

Content Area: **Math**
Course(s): **Level 1 Engineering Drawing, Algebra 2 CP, Algebra 2 A, Algebra 2 H**
Time Period: **Marking Period 1**
Length: **4 weeks**
Status: **Published**

Unit Introduction

Standards

MA.F-BF.A.1a	Determine an explicit expression, a recursive process, or steps for calculation from a context.
MA.F-IF.C	Analyze functions using different representations
MA.N-CN.C.7	Solve quadratic equations with real coefficients that have complex solutions.
MA.N-CN.C.8	Extend polynomial identities to the complex numbers.
MA.N-CN.C.9	Know the Fundamental Theorem of Algebra; show that it is true for quadratic 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.2	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 $p(x)$.
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.D.6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
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.
MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.

Essential Questions

- For a polynomial equation, how are factors and roots related?
- For a polynomial function, how are factors, zeros, and x-intercepts related?

- What does the degree of a polynomial tell you about its related polynomial function?

Content

- Sec 5.1 - Polynomial Functions (pg. 280)
- Sec 5.2 - Polynomials, Linear Factors, and Zeros (pg. 288)
- Sec 5.3 - Solving Polynomial Equations (pg. 296)
- Sec 5.4 - Dividing Polynomials (pg. 303)
- Sec 5.6 - Fundamental Theorem of Algebra (pg. 319)

Skills

- Checking factors
- Classifying Polynomials
- Comparing models
- Constructing a quartic function
- Describing End behavior of polynomials
- Evaluating a polynomial
- Expanding a binomial
- Find all the zeros of a polynomial
- Finding a rational root
- Finding multiplicity
- Finding real roots
- Finding zeros
- Finding zeros of a cubic function
- Graphing cubic functions
- Identify max and mins
- Modeling a problem situation
- Solving polynomial equations
- Transforming a cubic functions
- Using a polynomial function to model data
- Using a rational root theorem
- Using differences to determine degree
- Using pascal's triangle
- Using polynomial long and synthetic division
- Using the conjugate root theorem
- Using the fundamental theorem of algebra
- Writing a polynomial function from it's zeros
- Writing a polynomial in factored form