Expectations

1.1	The student will represent functions and relations numerically, graphically, and algebraically.
1.2	The student will describe and apply properties of functions and relations.
1.4	The student will describe and apply properties of functions and relations.
4.1	The student will describe and represent numbers and their relationships.
4.2	The student will estimate and compute using mental strategies, paper and pencil, and technology.

Essential Questions

How do polynomial functions model real-world problems and their solutions?

Why are complex numbers necessary?

How are operations and properties of complex numbers related to those of real numbers?

Enduring Understandings

The characteristics of polynomial functions and their representations are useful in solving real-world problems.

The domain and range of polynomial functions can be extended to include the set of complex numbers.

Indicators

1.1.A2.1   write a polynomial function given its real zeros or a graph with real zeros.

1.1.A2.2   write a polynomial function given its real or complex zeros.

1.2.A2.2   describe and compare the characteristics of polynomial functions, given numerical, graphical, and algebraic representations including domain and range, increasing, decreasing, continuous, maximum and minimum values, end behaviors, symmetry, zeros and their multiplicity, and turning points.

1.2.A2.11   apply finite differences to find the degree of polynomial functions.

1.4.A2.1   solve polynomial equations using graphs, the factor theorem, rational root theorem, and the quadratic formula.

1.4.A2.7   solve polynomial inequalities using the graph of the related polynomial function.

1.4.A2.8   solve polynomial inequalities of degree 2 graphically.

1.4.A2.9   solve polynomial inequalities of degree greater than 2 algebraically.

1.4.A2.11   interpret and solve problems involving polynomial functions.

1.4.A2.16   make predictions using quadratic, exponential, or logarithmic mathematical models given a set of data.

1.4.A2.17   choose appropriate models, quadratic, exponential, or logarithmic, based on an analysis of the pattern of change in data.

1.4.A2.18   apply the Fundamental Theorem of Algebra.

4.1.A2.3   represent complex numbers numerically and graphically.

4.1.A2.4   determine the magnitude of complex numbers.

4.1.A2.6   identify numbers as real or complex, and distinguish among rational, irrational, imaginary, and complex numbers.

4.2.A2.1   perform operations on complex numbers.