Polynomial Functions

This section is an exploration of polynomial functions, their uses and their mechanics.

By the end of this section students should be able to:

- Identify a polynomial function, and distinguish it from non polynomial functions.
- Know the Fundamental Theorem of Algebra and why it is important.
- Factor polynomials over the real numbers and over complex numbers.
- Know the definition of, and difference between; zeros, roots, and intercepts, of a polynomial.
- Be able to state and utilize the Rational Root Theorem to find rational roots of higher order polynomials.
- Use synthetic division and polynomial long division to test for, and factor out, roots of a polynomial.
- Know and list the fundamental differences of even and odd degree polynomials. eg: end-term behavior.
- Identify local and absolute extrema (maximums and minimums) on a graph of a polynomial.
- Identify the relationship between a polynomial's degree and the number of possible extrema.
- Identify the graphical relationship between roots and intercepts.
- Draw a sketch of a polynomial.

In this section we aim to answer the following questions

- What is (and isn't) a polynomial?
- What properties are noteworthy about polynomials?
- What are the tools we can use on Polynomials? Do these tools depend on the form of the polynomial?
- Why are polynomials important in mathematics in general and modeling in particular?
- Why are imaginary numbers even a thing?

Learning outcomes: