High School Algebra Playlist: Addition, Subtraction, and Multiplication of Polynomials

Aligns with *CCSS.MATH.CONTENT.HSA.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.

Related Standards

- *CCSS.MATH.CONTENT.6.EE.A.3:* Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

- *CCSS.MATH.CONTENT.7.EE.A.1:* Apply properties of operations as strategies to add subtract, factor, and expand linear expressions with rational coefficients.

- *CCSS.MATH.CONTENT.HSA.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 $p(x)$.

- *CCSS.MATH.CONTENT.HSA.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.

Objectives

In this playlist, you will learn and practice the following skills:

- Add and subtract polynomials by combining like terms

- Multiply monomials and polynomials by monomials

- Multiply two binomials, including special cases

- Multiply polynomials by polynomials

Let's get started!

Key Terms

- A **monomial** is a single term consisting of the product of a coefficient and one or more variables raised to non-negative integer powers.

- A **polynomial** is the sums and/or differences of terms, each term consisting of the product of a coefficient and one or more variables raised to a non-negative integer power.

- A **binomial** is a polynomial containing two terms.

- A **trinomial** is a polynomial containing three terms.

- A set is said to exhibit **closure** under an operation if, when any two elements are combined with that operation, the result is always another element of the same set. For example, since the sum, difference, or product of any two integers is an integer, integers are closed under addition, subtraction, and multiplication. Integers are not closed under division since the quotient of two integers is not always an integer.

Connections

- https://openstaxcollege.org/textbooks/algebra-and-trigonometry; section 1.4