

High School Algebra Playlist: Factors and Zeros of Polynomials

Aligns with *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.

Related Standards

- *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.HSF.IF.B.4*: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
- *CCSS.MATH.CONTENT.HSF.IF.C.7c*: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
 - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.



Objectives

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

- Identify the zeros of a polynomial through factorization
- Use the zeros of a polynomial to construct a rough sketch

Let's get started!

Key Terms

- The expression $(x - a)$ is a **factor** of polynomial $p(x)$ if and only if the polynomial can be written as $p(x) = (x - a)q(x)$, where $q(x)$ is a polynomial of lower order than $p(x)$.
- The **zero** of a polynomial $p(x)$ occurs for any value of x where $p(x) = 0$; when the polynomial can be factored, zeros occur at each value of x where an individual factor is equal to zero.

Connections

- <https://openstaxcollege.org/textbooks/algebra-and-trigonometry>; section 5.5

