§4.6 Complex Zeros; Fundamental Theorem of Algebra

Conjugate Pairs Theorem

Let f(x) be a polynomial whose coefficients are real numbers. If $r = a + bi$ is a zero of f, the complex conjugate $\bar{r} = a - bi$ is also a zero of f.

Corollary

A polynomial f of odd degree with real coefficients has at least one real zero.

Example 1: A polynomial f of degree 5 has zeros 1, 5i, and 1 + i. Find the remaining two zeros.

Find the Complex Zeros of a Polynomial

Example: Find the complex zeros of:

$$f(x) = 3x^4 + 5x^3 + 25x^2 + 45x - 18$$