

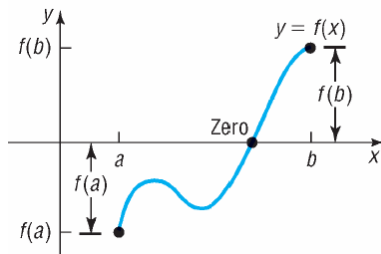
Theorem

Number of Real Zeros

A polynomial function of degree n , $n \geq 1$, has at most n real zeros.

Intermediate Value Theorem

Let f denote a continuous function. If $a < b$ and if $f(a)$ and $f(b)$ are of opposite sign, then f has at least one zero between a and b .



If $f(a) < 0$ and $f(b) > 0$ and if f is continuous, there is at least one zero between a and b .

Fundamental Theorem of Algebra

Every complex polynomial function $f(x)$ of degree $n \geq 1$ has at least one complex zero.

Theorem

Every complex polynomial function $f(x)$ of degree $n > 1$ can be factored into n linear factors (not necessarily distinct) of the form

$$f(x) = a_n(x - r_1)(x - r_2) \cdots (x - r_n)$$

where a_n, r_1, \dots, r_n are complex numbers.

Conjugate Pairs Theorem

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

Corollary

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