Review for MAT342 Midterm
October 2015

Definition of complex numbers, their real and imaginary parts and absolute value and argument

Complex Conjugate, Complex numbers in polar form, Euler's formula

Exponential function and its property $\exp(z + w) = \exp(z)\exp(w)$

ϵ-neighborhood of a complex number and deleted neighborhoods, ϵ-neighborhood of ∞

Open and closed sets, boundaries and accumulation points

Convex and connected sets, domains and regions

Functions of a complex variable, polynomials and rational functions, mappings

Limits and derivatives, continuity, limits at ∞, Analytic functions, Entire functions, Cauchy-Riemann equations

Theorem: A bounded sequence has a convergent subsequence.

Corollary: A continuous real-valued function on a closed bounded set assumes a maximum and a minimum.

Rules for differention: derivatives of sum, difference, product and quotient of functions. Chain rule

Theorem: If a function has real and imaginary parts that have continuous partial derivatives and satisfy the Cauchy-Riemann equations, then it is analytic.

Harmonic functions, The real and imaginary parts of an analytic function are harmonic. harmonic conjugates

Logarithm function and trig. functions of complex variables and their derivatives and inverses, hyperbolic functions, complex exponents