Review for MAT 342 Final
December, 2015

Everything on the midterm review sheet

The absolute value of a contour integral is bounded by the length of the contour times the maximum absolute value of the integrand.
Using Anti-derivatives of analytic functions to evaluate contour integrals
The Cauchy-Goursat theorem and the the Cauchy integral formula including the formula for derivatives of analytic functions
The complex log function. Branches
Liouville's theorem and the fundatmental theorem of algebra
The maximum modulus principle
Morera's theorem
Series: geometric series, power series and Taylor series, especially for analytic functions
Radius of convergence of power series
Laurent series
Absolute and uniform convergence of power series. Differentiating and integrating power series term by term
Multiplication and division of power series
Isolated singular points: removable singularities, poles and essential singularities
An isolated singularity of a bounded function is removable
Residues and Cauchy's residue theorem
Zero's and poles of analytic functions
Using residues to evaluate integrals
Fractional linear transformations: Prove that they take lines and circles into lines or circles
Prove that given two sets of three points in the plane, there exists a fractional linear transformation that takes one set into the other
Describe all fractional linear transformations that take the upper half place into the unit disc about the origin.
Harmonic functions and harmonic conjugates. Show that on a simply connected region, every harmonic function has a harmonic conjugate
Proof that the composition of a harmonic function with an analytic function is harmonic.