962-A1-431 **Louise Amick*** (louise.amick@washcoll.edu), 300 Washington Avenue, Chestertown, MD 21620. *Cauchy's Integral Theorem.* Preliminary report.

Cauchy's Integral Theorem, a fundamental theorem in the study of complex analysis, states that if f(z) is analytic on a simply connected domain D then the integral of f(z) over any simple closed contour C in D is 0. Historically, the first proof of the theorem made use of Green's Theorem with the added restriction that f'(z) be continuous in D. Because Goursat gave a proof which removed this restriction, the theorem is sometimes called the Cauchy-Gousat Theorem. A proof of the theorem can be subdivided into three progressive cases. The first step is to prove the theorem in the case where C is an oriented triangle. Secondly, the theorem is verified for any polygon by showing that any polygon can be triangulated (represented as a union of triangles such that only the boundaries overlap). Finally, the theorem for a general closed curve C follows by approximating C by polygonal arcs and showing that the approximation to the integral can be made arbitrarily small. Cauchy's Integral Theorem and extensions of it are central to the theory of functions of a complex variable. Furthermore, it can be used as a tool for evaluating various dfinite integrals of functions of a real variable, especially improper integrals. (Received September 14, 2000)