

## A SIMPLE PROOF OF CAUCHY'S INTEGRAL FORMULA FOR CIRCLES

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Let  $U$  be an open subset of the complex plane  $C$ . We say that a function  $f : U \rightarrow C$  is analytic if  $f$  is continuously differentiable on  $U$ . Using Green's theorem, one may obtain a simple version of the Cauchy integral theorem and then show that an analytic function is representable by power series. In most elementary complex variable textbooks, a function on  $U$  is called analytic if it is differentiable on  $U$  and the basic theory for analytic functions is developed in a manner in which representation of analytic functions by power series appears quite late. This approach is not pedagogically satisfying for undergraduate students.

Our purpose is to present a simple proof of the Cauchy integral formula for circular paths without appealing to Green's theorem. From this result, one immediately derives the fact that an analytic function on an open disk is representable by power series. An