

Theorem 1 (Residue Theorem). Let  $f$  be analytic in the region  $G$  except for the isolated singularities  $a_1, a_2, \dots, a_m$ . If  $\gamma$  is a closed rectifiable curve in  $G$  which does not pass through any of the points  $a_k$  and if  $\gamma \approx 0$  in  $G$  then

$$\frac{1}{2\pi i} \int_{\gamma} f = \sum_{k=1}^m n(\gamma; a_k) \operatorname{Res}(f; a_k).$$

Theorem 2 (Maximum Modulus). Let  $G$  be a bounded open set in  $\mathbb{C}$  and suppose that  $f$  is a continuous function on  $\bar{G}$  which is analytic in  $G$ . Then

$$\max\{|f(z)| : z \in \bar{G}\} = \max\{|f(z)| : z \in \partial G\}.$$

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