

Cauchy's Integral Formula for Derivatives

Let f be analytic in a simply connected domain D , and let C be a simple closed contour lying entirely within D . If z_0 is any point interior to C , then

$$f^{(n)}(z_0) = \frac{n!}{2\pi i} \oint_C \frac{f(z)}{(z - z_0)^{n+1}} dz.$$