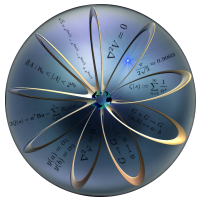

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antiderivative of complex function

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By the of a complex function f in a domain D of $\mathbb{C}$, we every complex function F which in D satisfies the condition

$$\frac{d}{dz}F(z) = f(z).$$

- If f is a continuous complex function in a domain D and if the integral

$$F(z) := \int_{\gamma_z} f(t)\,dt \tag{1}$$

  where the path γ_z begins at a fixed point z_0 of D and ends at the point z of D, is independent of the path γ_z for each value of z, then (1) defines an analytic function F with domain D. This function is an antiderivative of f in D, `http://planetmath.org/Iei`.e. at all points of D, the condition

$$\frac{d}{dz}\int_{\gamma_z} f(t)\,dt = f(z)$$

  is true.

- If f is an analytic function in a simply connected open domain U, then f has an antiderivative in U, `http://planetmath.org/Eg`e.g. the function F defined by (1) where the path γ_z is within U. If γ lies within U and connects the points z_0 and z_1, then

$$\int_\gamma f(z)\,dz = F(z_1) - F(z_0),$$

  where F is an arbitrary antiderivative of f in U.