

Answer on Question #40881 – Math -Complex Analysis

Question:

Find the domain of analyticity of the function $f(z) = 1/(z-3) + \cos^2 z$. Is it true that the integral of this function between any two points in the domain is path independent.

Answer:

As function $\cos z$ is analytic everywhere in \mathbb{C} , so the domain of analyticity of the function $f(z) = 1/(z-3) + \cos^2 z$ is the same as for the function $f(z) = 1/(z-3)$ this function is analytic in $\mathbb{C} \setminus \{z=3\}$. So, $f(z)$ has next domains of analyticity $\{z = x+iy \in \mathbb{C} : x > 3\}$ and $\{z = x+iy \in \mathbb{C} : x < 3\}$.

And the integral of this function between any two points in the domain $\{z = x+iy \in \mathbb{C} : x > 3\}$ is path independent. And such statement is correct for domain $\{z = x+iy \in \mathbb{C} : x < 3\}$.