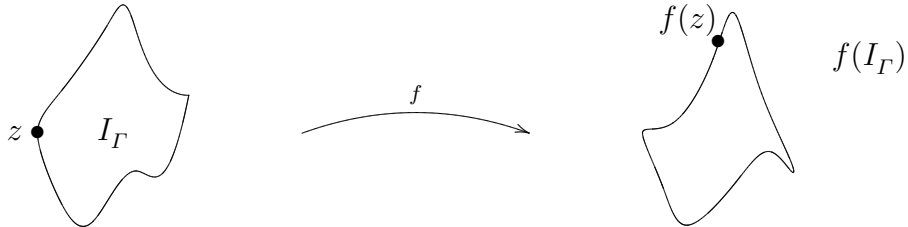


MA30056: Complex Analysis

SELF-ASSESSMENT SHEET 3: THE CAUCHY-RIEMANN EQUATIONS

- 1.) Consider the holomorphic image (under f) of a simple closed contour Γ s.t. the interior I_Γ is mapped to the exterior of $f(\Gamma)$.



If the parametrization γ of Γ is in the counter-clockwise direction around I_Γ (one may also say that the point z travels round Γ in counter-clockwise direction), what orientation does the parametrization $f \circ \gamma$ have (i.e., in which direction does $f(z)$ travel round $f(\Gamma)$)?

Please, tick the correct answer, then click on “Evaluate”.

Hint

- counter-clockwise; clockwise; depends on the specific f

Evaluate

- 2.) State the necessary and sufficient Cauchy-Riemann conditions.

For the solution, click on the following space:

- 3.) Can you give an example of a nonconstant function $f : D \rightarrow \mathbb{R} \subset \mathbb{C}$ that is holomorphic on a domain D ?

For the solution, click on the following space:

- 4.) Let $f = u + iv$ be holomorphic on a domain D with $u(x, y) = x^3 - 3xy^2$. What is v ?

For the solution, click on the following space:
