



COMPLEX VARIABLES
FALL 2024

ASSIGNMENT 8.2
DUE OCTOBER 23

Exercise 1. Our textbook defines a path $\gamma : [a, b] \rightarrow \mathbb{C}$ to be C^1 provided:

- (1) $\gamma'(t)$ exists and is continuous on (a, b) ;
- (2) $\lim_{t \rightarrow a^+} \gamma'(t)$ and $\lim_{t \rightarrow b^-} \gamma'(t)$ both exist.

Use the Mean Value Theorem from Calculus I to show that this definition is equivalent to: $\gamma'(t)$ exists and is continuous throughout $[a, b]$ (where at a and b we use *one-sided* derivatives, e.g.

$$\gamma'(a) = \lim_{t \rightarrow a^+} \frac{\gamma(t) - \gamma(a)}{t - a},$$

and similarly for $\gamma'(b)$).

Exercise 2. Textbook exercise 1.5.28.

Exercise 3. Textbook exercise 1.R.18 (in part (b) use $\overline{f(\bar{z})}$ instead of what's stated).

Exercise 4. Textbook exercise 1.6.13.