

**APPLIED COMPLEX ANALYSIS**

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1. Find an example of  $z \in \mathbb{C}$  such that

$$\text{Log } z^3 \neq 3\text{Log } z.$$

2. Let  $C : |z| = 2$  be positively oriented (or equivalently oriented counterclockwise). Evaluate

$$\int_C \frac{z+1}{z^2+1} dz$$

3. Evaluate

$$\int_0^\infty \frac{x^2+1}{x^4+1} dx.$$