

Note: the Midterm is on Friday, February 7

Section 4.4: 1, 3, 8

Section 4.5: 1, 2, 4

Additional problems:

1. Suppose that γ is a simple path in E , f and g are analytic on E , both f and g are non-zero on $\{\gamma\}$, and

$$\operatorname{Re}\left(\frac{f(z)}{g(z)}\right) > 0 \quad \text{for all } z \in \{\gamma\}.$$

Show that f and g have the same numbers of zeroes inside γ .

2. Given two points $z_0, z_1 \in \mathbb{C} \setminus [-i, i]$, show that

$$\int_{\gamma} \frac{1}{1+z^2} dz$$

has the same value for any path $\gamma : [0, 1] \rightarrow \mathbb{C} \setminus [-i, i]$ with $\gamma(0) = z_0$ and $\gamma(1) = z_1$.