

Math 535 - Complex Analysis
Midterm Exam

Advice: *If you find yourself writing page after page of complicated calculations, you might want to stop and reconsider your approach. All of these problems have relatively “short” solutions.*

- (1) Let γ be the circle $|z| = 535$ oriented counter-clockwise. Calculate:

$$\int_{\gamma} \frac{\cos(z/2)}{4z^2 - \pi^2} dz$$

- (2) Suppose $f(z)$ has a zero of order 2 at $z = 0$. Show that there is an analytic function $g(z)$ defined in a neighborhood of the origin such that $f(z) = g(z)^2$ on their common domain.
- (3) Show that a nonconstant entire function has a negative real value at some point.