

Panel 1

Complex Homework

① Let C be the boundary of the square with sides at $x = \pm 2$ and $y = \pm 2$. Compute,

$$a) \int_C \frac{e^{-z}}{z - \frac{\pi i}{2}} dz$$

$$b) \int_C \frac{z}{2z+1} dz$$

$$c) \int_C \frac{\cosh(z)}{z^4} dz$$

$$d) \int_C \frac{z}{z^2-1} dz$$

Hint: PFD

② Let $g(z) = \int_C \frac{s^3 + 2s}{(z-s)^3} ds$ and C any closed, simple curve. Show that $g(z) = 6\pi i z$ for all z inside C and $g(z) = 0$ for all z outside C .

Panel 2

③ Prove that if f is entire and $|f(z)| \leq M/|z|$ for all $z \in \mathbb{C}$ then $f(z) = cz$, c some constant.

Hint: use Cauchy's Inequality to show that $f''(z) = 0$ for all z . Note that the constant M_R used in Cauchy's inequality is $M(|z| + R)$.

④ Make sure you can state all theorems mentioned on slide one of lecture 16, for the "quiz" on Monday.