

Panel 1

Complex Homework #15

- ① Show that $\left| \int_C \frac{z}{z^2-1} dz \right| \leq \frac{4\pi}{3}$ where C is the upper half of $|z|=2$
- ② Show that $\left| \int_C \frac{1}{z^4} dz \right| \leq 4\sqrt{2}$ where C is the line from $z=i$ to $z=1$
- ③ 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) $\int_C \frac{z}{2z+1} dz$
- b) $\int_C \frac{\cosh(z)}{z^4} dz$ d) $\int_C \frac{z}{z^2-1} dz$ hint: PFD

Panel 2

- ④ Let $g(z) = \int_C \frac{s^3 + 2s}{(s-z)^3} ds$ where C is a simple, closed curve. Show that $g(z) = 6\pi i z$ for all z inside C and $g(z) = 0$ for all z outside C .