

PRELIMINARY EXAM - COMPLEX ANALYSIS

1. What is the general form of a rational function which has absolute value 1 on the circle $|z| = 1$? In particular, how are the zeros and poles related to each other? Justify.

2. If a rational function is real on $|z| = 1$, how are the zeros and poles situated? Justify.

3. Find values: $3^i, (-1)^{2i}$. Find period of e^z . Justify.

4. Find real and imaginary part of z^z . Justify.

5. Compute integral:

(i) $\int_C \frac{z}{z^2+4} dz$, where C is a circle of radius 3 around 0.

(ii) $\int_C \frac{\cos(z)\sin(2z)}{z-2} dz$, where C is a circle of radius 3 around 0.