This is a notes document regarding essential problem-solving methods for the Analysis qualifier.

Complex Analysis

There are some essential types of problems:

- evaluating contour integrals;
- Cauchy estimates (i.e., if $|f(z)| \leqslant M|z|^{\alpha}$, show that f is a polynomial);
- applying the Maximum Modulus principle;
- conformal maps and fractional linear transformations — i.e., functions of the form $f(z) = \frac{az+b}{cz+d}$, where $ad - bc \neq 0$;
- normal families;
- Rouché's theorem.

Cauchy Estimates