Math 427 – Final Exam Study Topics

In addition to Midterm Study Topics:

Section 2.6: The index function, and simple examples. The Cauchy integral formula and applications to evaluating integrals.

Section 2.7: Not much to study in this section; know that the index function is constant on components.

Section 3.1: Convergence of power series: root and ratio test to find radius of convergence R. Power series converge uniformly on $D_r(z_0)$ for each $r < R$.

Section 3.2: Differentiation and integration of power series. Power series are analytic functions where they converge. Analytic functions have power series expansions over any disc where they are analytic. Power series expansion equals Taylor series expansion. Cauchy's estimates.

Section 3.3: Know Liouville's theorem, and the Fundamental Theorem of Algebra. Typical problems are like the homework ones.

Section 3.4: Zeroes of analytic functions: are isolated, are of finite order, and order m is determined by $a_k = 0$ for $k < m$, $a_m \neq 0$; also given by vanishing of $f^{(k)}(z_0)$ for $k < m$ and $f^{(m)}(z_0) \neq 0$, since $k!a_k = f^{(k)}(z_0)$.
Isolated singularities: know the different kinds, and how to recognize each. Know the power series form of poles, and what the principal part is. Find principal part in simple cases.