Math 535 **FINAL: THEORETICAL QUESTIONS** Winter 2008

1. **State the Argument Principle and Rouché's Theorem.**
2. **State Hurwitz's Theorem and its corollary (theorem on p.232).**
3. **State and sketch (any) proof of the Open Mapping Theorem.**
4. **Winding numbers (definition and basic properties).**
5. **State the Jump Theorem for Cauchy integrals.**
6. **State the main theorem on simply connected domains (provide the definitions).**
7. **State and sketch the proof of the theorem on conformal self-maps of the unit disk.**
8. **Hyperbolic geometry: definitions, geodesics, isometries, geometric properties.**
9. **Spherical geometry: definitions, geodesics, geometric properties.**
10. **Poisson integral formula: definitions and main statements (no proofs required).**
11. **State and sketch the proof of the characterization of harmonic functions.**
12. **State and sketch the proof of the Schwarz reflection principle for harmonic functions.**
13. **State the Schwarz reflection principle for analytic functions on domains with free analytic boundary arcs. Include the relevant definitions.**
14. **State the Riemann mapping theorem and indicate the main steps of the proof.**
15. **Normal families: definitions and main statements (no proofs required).**
16. **State the Montel's Theorem (p. 321) and Picard's Great Theorem. Indicate the main steps of the proof of one of the statements (your choice).**