Final Exam Formulation
Math 5320

The final exam will consist of problems of the following types:

1. Problems and/or direct calculations illustrating the operations/arithmetic of $\mathbb{C}$

   [Similar to problem 1 or 2 on Exam I]

2. Verification of a topological property of a metric space (a set A is open if condition XXX – a set A is closed if condition YYY – a point x is a limit point of a set A if condition ZZZ – a set K is compact if condition WWW, etc.)

   [Similar to problem 3, 4, 5 or 6 on Exam I]

3. Classification Problem (which of the following sets are open, closed, bounded, connected, compact, etc.)

   [Similar to problem 8 on Exam I]

4. Find the radius of convergence of a power series

   [Similar to problem 1 on Exam II]

5. Construct a conformal map from one region G to another H

   [Similar to problem 4 or 6 on Exam II - TakeHome]

6. Determine the image of a specific region under a specific Möbius transformation

   [Similar to problem 5 on Exam II]

7. Use the Cauchy-Riemann equations to:

   1. Verify a function is or is not analytic on a region

   2. Verify a function is constant on a region
      [Similar to problem 2 on Exam II]

   3. Construct a harmonic conjugate of a given harmonic function on a region
      [Similar to problem 7 on Exam II - TakeHome]

8. Verify a (complex) functional identity

   [Similar to problem 3 on Exam II]

9. Evaluate line integrals:
    1. Using Theorem 1.9 for piece-wise smooth paths of integration
    2. Using the Fundamental Theorem of Calculus for Line Integrals
    3. Using Cauchy’s Integral Formula #0 (and its corollaries)
    4. Using Cauchy’s Theorem #0
10. Apply Louisville’s Theorem
11. Apply the Identity Theorem
12. Apply Cauchy’s Estimate
13. Apply the corollaries to Theorem 2.8
14. State and prove certain theorems

Problems representing Question Types 1 - 8 will constitute 40% of the exam

Problems representing Question Types 9 - 14 will constitute 60% of the exam