

Review for Final Exam

Complex Analysis, MTH 431, Spring 2014

Information

- Final Exam will be held on **Wednesday May 21st, 12:20 - 2:15 pm, 3S-108**.
- Syllabus for Final Exam: Chapters 2 - 8, 9.1, 9.2.
- Final Exam will include definitions, statement of Theorems, true or false questions and some elementary proofs.
- For review on Chapters 2 - 7, see the reviews for Exam 1 and 2.
- See the homeworks and quizzes.

Key Concepts

Chapter 8

1. Laurent Series of f in a punctured disc (Page 137/ Theorem 8.1)
2. Principal part of f at c (Page 139)
3. Uniqueness of Laurent Series (Page 139/ Theorem 8.2)
4. Page 140/ Corollary 8.3
5. $a_{-1} = \text{res}(f, c)$ the residue of f at c
6. $\text{res}(f, c)$ the residue of f at a simple pole (Page 147/ Theorem 8.13)
7. $\text{res}(f, c)$ the residue of f at a multiple pole (Page 150/ Theorem 8.17)
8. order of f at c
9. Classification of singularities of f and Laurent series of f at the singularity.
10. The Residue Theorem (Page 146/Theorem 8.12)

Chapter 9

1. Theorem 9.1 (page 154).
2. Integrals involving circular functions (page 158).

Sample Review Questions

From Chapter 8

1. Page 140/ Example 8.4
2. Page 142/ Example 8.7
3. Page 143/ Example 8.8
4. Page 143/ Exercises 8.1-8.4
5. Page 145/ Exercises 8.5, 8.6a
6. Page 148/ Example 8.14
7. Page 149/ Example 8.16
8. Page 150/ Example 8.18
9. Page 151/ Example 8.19
10. Page 151/ Exercises 8.7, 8.8, 8.9 (cube roots of unity are double poles), 8.10 (0 is a triple pole).
11. Page 151/ Exercise 8.13
12. See problems on Homework 7.

From Chapter 9

1. Page 154/ Example before theorem 9.1
2. Page 155/ Example 9.2
3. Page 156-157/ Exercises 9.1 - 9.9 (can use solutions at back of the book).

4. Page 158/ Example 9.4
5. Page 159/ Example 9.5, 9.6
6. Page 160/ Example 9.7
7. Page 160-161/Exercises 9.12 - 9.15 (can use solutions at back of the book)

Proofs

Theorem 8.2 (Uniqueness of Laurent series), Corollary 8.3, Theorem 8.13 (residue for simple pole), Theorem 8.17 (residue for higher order pole).