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# Complex Analysis

Math 312 Spring 2016

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Fowler 309 MWF 11:45am-12:40pm

<http://sites.oxy.edu/ron/math/312/16/>

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## *Class 31*

**TITLE** Course Review

**CURRENT READING** Zill & Shanahan, §1.1, §1.2, §1.3, §1.4 §1.5, §1.6, §2.1, §2.2, §2.3, §2.4, §2.5, §2.6, §3.1, §3.2, §3.3, §3.4, §3.5, §3.6., §4.1, §4.2, §4.3, §5.1, §5.2, §5.3, §5.4 §5.5, §6.2, §6.3 §6.4, §6.5, §6.6, §7.2

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### **SUMMARY**

The last day of class!!

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### **WORKSHEETS**

**Class 1: Properties of Complex Numbers**

**Class 2: Graphical Representation of Complex Numbers and Inequalities**

**Class 3: Polar and Exponential Forms of Complex Numbers**

**Class 4: Polynomial Equations of a Complex Variable and Roots of a Complex Numbers**

**Class 5: Points Sets in the Complex Plane**

**Class 6: Complex Functions of a Complex Variable**

**Class 7: Graphical Interpretations Of Complex Functions**

**Class 8: Power Functions, the Reciprocal Function and the Point at Infinity**

**Class 9: Limits and Continuity of Complex Functions**

**Class 10: Differentiability of Complex Functions**

**Class 11: Analyticity, the Cauchy-Riemann Equations and Harmonic Functions**

**Class 12: Application of Harmonic Functions**

**Class 13: The Complex Exponential**

**Class 14: The Complex Logarithm**

**Class 15: The Complex Exponents  $z^c$  and  $c^z$**

**Class 16: Review for Exam 1\***

**Class 17: Introduction to Complex Integration**

**Class 18: Introduction to Contour Integration**

**Class 19: The Cauchy-Goursat Theorem**

**Class 20: The Implications of the Cauchy-Goursat Theorem**

**Class 21: The Cauchy Integral Formula(s)**

**Class 22: The Many, Many, Implications of the Cauchy Integral Formula(s)**

**Class 23: Poles, Zeroes and Residues**

**Class 24: Classifying Singularities (And Computing Residues) Using Laurent Series**

**Class 25: Using Complex Integrals To Evaluate Real (Trigonometric) Integrals**

**Class 26: Evaluating Improper Integrals Using Contour Integration**

**Class 27: Review for Exam 2\***

**Class 28: Introduction to Linear Fractional Transformations**

**Class 29: Linear Fractional Transformations, Continued**

**Class 30: Return to Laurent Series\*\*\***

\*\*YOU are NOT responsible for this material on the final exam

**QUIZZES**

**Quiz 1: Arithmetic and Algebra with Complex Numbers**

**Quiz 2: Solutions of a Complex Polynomial Equation**

**Quiz 3: Understanding Linear Complex Mappings**

**BONUS Quiz 1: Mappings and Points Sets in the Extended Argand Plane**

**Quiz 4: Harmonic Conjugates of Analytic Functions**

**Quiz 5: The Complex Exponential**

**BONUS Quiz 2: The Complex Logarithm**

**Quiz 6: Complex Integration**

**Quiz 7: Contour Integration**

**Quiz 8: Cauchy Integral Formula(s)**

**Quiz 9: Applications of Contour Integration to Real Trigonometric Integration**

**BONUS Quiz 3: Applications of Cauchy's Residue Theorem**

**Quiz 10: Applications of LFTs**

**FINAL EXAM TOPIC HEADINGS**

The following are the topic headings of the 2004 (and 2014) Final Exam, and will almost certainly be the topic headings of the 2016 Final Exam!

- 1. Operations on Complex Numbers, Visualization**
- 2. Complex Arithmetic, Elementary Functions**
- 3. Contour Integration, Parametrization**
- 4. Cauchy's Integral Theorems**
- 5. Harmonic Conjugates and Analytic Functions**
- 6. LFTs, Mapping**
- 7. Applications of Residues**
- 8. TRUE/FALSE**