

Math 311 - Spring 2014 Reading Assignments

Week 1:

• Monday, May 5, 2014

- $\S1.$ Sums and Products
- §2. Basic Algebraic Properties
- $\S 3.$ Further Properties
- §4. Vectors and Moduli
- §5. Complex Conjugates

• Tuesday, May 6, 2014

- §6. Exponential Form
- $\S7.$ Products and Powers in Exponential Form
- §8. Arguments of Products and Quotients
- $\S9.$ Roots of Complex Numbers

• Wednesday, May 7, 2014

Assignment 1 Due

- §10. Examples
- $\S11.$ Regions in the Complex Plane
- $\S12.$ Functions of a Complex Variable
- §13. Mappings

• Thursday, May 8, 2014

- $\S14.$ Mappings by the Exponential Function
- §15. Limits
- §16. Theorems on Limits
- $\S17.$ Limits Involving the Point at Infinity

• Friday, May 9, 2014

Assignment 2 Due

- §18. Continuity
- $\S19.$ Derivatives
- $\S 20.$ Differentiation Formulas
- $\S{21.}$ Cauchy–Rieman Equations

Week 2:

- Monday, May 12, 2014
- §22. Sufficient Conditions for Differentiability
- §23. Polar Coordinates
- §24. Analytic Functions
- §25. Examples
- Tuesday, May 13, 2014
- $\S 26.$ Harmonic Functions
- $\S 27.$ Uniquely Determined Analytic Functions
- §28. Reflection Principle
- Wednesday, May 14, 2014

Assignment 3 Due

- $\S 29$. The Exponential Function
- $\S 30.$ The Logarithmic Function
- $\S{31}$. Branches and Derivatives of Logarithms

• Thursday, May 15, 2014

- $\S{32}.$ Some Identities Involving Logarithms
- §33. Complex Exponents
- §34. Trigonometric Functions
- Friday, May 16, 2014

Assignment 4 Due

- $\S{35.}$ Hyperbolic Functions
- $\S 36.$ Inverse Trigonometric and Hyperbolic Functions
- $\S{37.}$ Integrals

Week 3:

- Monday, May 19, 2014
 - No Class
 - (Victoria Day)
- Tuesday, May 20, 2014
- §38. Definite Integrals of Functions w(t)
- §39. Contours
- §40. Contour Integrals
- Wednesday, May 21, 2014

Assignment 5 Due

- §41. Some Examples
- §42. Examples with Branch Cuts
- §43. Upper Bounds for Moduli of Contour Integrals

• Thursday, May 22, 2014

- §44. Antiderivatives
- $\S45$. Proof of the Theorem
- §46. Cauchy–Goursat Theorem

• Friday, May 23, 2014

Assignment 6 Due

Midterm $(\S\S1 - 45)$

Week 4:

• Monday, May 26, 2014

- $\S 47.$ Proof of the Theorem
- §48. Simply Connected Domains
- §49. Multiply Connected Domains

• Tuesday, May 27, 2014

- §50. Cauchy Integral Formula
- §51. An Extension of the Cauchy Integral Formula
- §52. Some Consequences of the Extension

• Wednesday, May 28, 2014

Assignment 7 Due

- §53. Liouville's Theorem and the Fundamental Theorem of Algebra
- §54. Maximum Modulus Principle
- §55. Convergence of Sequences

• Thursday, May 29, 2014

- §56. Convergence of Series
- §57. Taylor Series
- §58. Proof of Taylor's Theorem

• Friday, May 30, 2014

Assignment 8 Due

- $\S59$. Examples
- §60. Laurent Series
- §61. Proof of Laurent's Theorem

Week 5:

• Monday, June 2, 2014

- $\S62$. Examples
- §63. Absolute and Uniform Convergence of Power Series
- §64. Continuity of Sums of Power Series

• Tuesday, June 3, 2014

- §65. Integration and Differentiation of Power Series
- §66. Uniqueness of Series Representations
- §67. Multiplication and Division of Power Series

• Wednesday, June 4, 2014

Assignment 9 Due

- §68. Isolated Singular Points
- §69. Residues
- $\S70.$ Cauchy's Residue Theorem

• Thursday, June 5, 2014

- §71. Residue at Infinity
- §72. The Three Types of Isolated Singular Points
- §73. Residue at Poles
- Friday, June 6, 2014

Assignment 10 Due

- §74. Examples
- §75. Zeros of Analytic Functions
- §76. Zeros and Poles

Note: The reading and homework assignments refer to the **8th** edition of the text: *Complex Variables and Applications*, by James Ward Brown and Ruel V. Churchill.

Week 6:

• Monday, June 9, 2014

- §77. Behavior of Functions Near Isolated Singular Points
- $\S{78.}$ Evaluation of Improper Integrals
- §79. Example
- Tuesday, June 10, 2014

Assignment 11 Due

- §80. Improper Integrals from Fourier Analysis
- §81. Jordan's Lemma
- §82. Indented Paths

• Wednesday, June 11, 2014

- §83. An Indentation Around a Branch Point
- $\S 84.$ Integration Along a Branch Cut
- §85. Definite Integrals Involving Sines and Cosines
- Thursday, June 12, 2014
 - Assignment 12 Due
 - Final

 $\mathbf{E}\mathbf{x}\mathbf{a}\mathbf{m}$

• Friday, June 13, 2014

End of

Classes