

MAT 415/515 Review For Test 2

Definitions of the words in **boldface** may be asked on the exam. Statements of Theorems in **boldface** may be asked on the exam.

Chapter 5

Cauchy Integral formulas, Cauchy's Inequality Liouville's theorem, Fundamental Theorem of Algebra, Gauss Mean value Theorem, Poisson Integral formula.

Proofs [Cauchy Integral formulas](#), ~~[Liouville's theorem](#)~~, [Gauss Mean Value Theorem](#)

Sample problems 5.2,5.5, 5.29, 5.52, 5.70

Chapter 6

Definitions: **Singularities, Poles, Taylors Series, Laurent Series**

Be able to compute Taylor and Laurent series, identify orders of poles and give examples.

Know Taylor series of $\frac{1}{1-z} e^z, \sin(z), \cos(z)$.

Proofs [Taylors Theorem \(6.22\)](#)

Sample problems 6.23a, 6.26,6.27,

Chapter 7

Definitions: **Residue, Cauchy Principal value**

~~Prove $\oint_C f(z)dz = 2\pi ia_{-1}$ pg 205, 7.7~~

Know and be able to apply the Residue Theorem, Calculate residues, Use residue theory to calculate real integrals

Sample problems 7.9, 7.10,7.12,7.18