

Mth 413/513  
Spring 2009

## Topics for midterm exam

The midterm will include examples and counterexamples, and some exercises of the type and level discussed in the homework assignments and class problems.

You should know the proofs of the following theorems, not because you will be asked to reproduce them directly but rather because they provide useful techniques.

- Cauchy's inequality (Theorem 9.1)
- Closest point theorem (Theorem 9.2)
- Equivalences for an orthonormal set to be a basis (Theorem 9.6)
- Riesz representation theorem for functionals on a Hilbert space (Theorem 9.8)
- Hölder's inequality (Theorem 9.9)
- Minkowski's inequality (Theorem 9.10)
- Riesz's theorem on the completeness of  $L^p$  (Theorem 9.11)
- Riesz Representation theorem in  $L^p$  (Theorem 9.12)

You should be familiar with the definitions of all objects discussed. Collect examples and counterexamples to illustrate the various definitions and theorems.