

Math 868 — Topics for Midterm

The Midterm exam will be a 1-hour exam in class on Friday Oct. 26.

To review, you should look over your notes and your completed homework. Be sure that you **know definitions and the statements of the major theorems**. The exam will have questions of three types:

1. Complete the definition questions. Example: For a map $f : M \rightarrow N$ between manifolds, the *derivative of f at $p \in M$* is defined by $(Df)_p = ??$.
2. Short proofs (including one on the Regular Value Theorem).
3. Short calculations (including one involving 1-forms).

You should also look through the textbook. Use this as a way of finding topics that you need to review. We have covered the following sections of Lee's book:

Chapter	Pages	Topic
1-2	1-22, 32-49	Manifolds and maps.
3	50-72	Tangent vectors, tangent bundles, pushforwards, computations in coordinates.
4	77-90	Immersions, embeddings, submersions, the Inverse Function Theorem. (ignore the Constant Rank Theorem).
5	98-111	Submanifolds, Regular Level Set Theorem (to prove spaces are manifolds).
8	174-188	Vector fields and brackets.
9	205-216 227-233	Integral curves and flows. Lie derivatives, commuting flows.
19	490-493 496-505	Distributions, foliations and the Frobenius Theorem.
Appendix	617-628	Vector spaces and linear maps, especially dual spaces, dual maps and dual bases.
11	272-278 280-298	Cotangent bundle, 1-forms. Pullbacks, line integrals, exact and closed.
	Class notes	Basic facts about the exterior algebra Λ^*V^* .