

Math 544, Final Exam Information

Friday, Dec. 14, 2 - 5 pm, LC 405.

The Final Exam will be based on:

- Sections 1.1 - 1.3, 1.5 - 1.7, 1.9, 3.2 - 3.7, 4.1 - 4.5, 4.7, 5.2 - 5.5.
- The corresponding assigned homework problems
(see <http://www.math.sc.edu/~boylan/SCCourses/math5443/544.html>).
At minimum, you need to understand how to do the homework problems.
- Lecture notes: 8/24 - 12/7.

Useful materials:

- Exams 1, 2, 3 and their solutions.
- Quizzes 1 – 10 and their solutions.
- Handouts: Selected homework problems, and other handouts.

New Topic List (not necessarily comprehensive):

(Consult review handouts for Exams I, II, III for a list of old topics.)

You will need to know how to define vocabulary words/phrases defined in class.

§5.2: Vector spaces: The definition of vector space (a set V and a scalar field F together with an addition operation on V and a scalar multiplication operation); in particular, the ten vector space axioms: 2 closure axioms, 4 axioms for vector addition, 4 axioms for scalar multiplication. Examples of vector spaces: $\text{Mat}_{m \times n}(\mathbb{R})$, P_n . Check whether a set V together with an addition and scalar multiplication is or is not a vector space.

§5.3: Subspaces: Definition of a subspace. Determine whether a subset W of a vector space V is a subspace:

1. Is the “zero” vector in V also in W ?
2. For any $\vec{u} \in W$ and any scalar c , is $c\vec{u} \in W$?
3. For any $\vec{u}, \vec{v} \in W$, is $\vec{u} + \vec{v} \in W$?

If W is a subspace, a subset Q **spans** W if and only if $\text{Span}(Q) = W$, where $\text{Span}(Q)$ is the set of all linear combinations of vectors from Q . Given a subspace W , find a subset Q which spans it.

§5.4: Linear independence, bases, and coordinates: Definition of linear dependence / independence, basis of a vector space V , ordered basis for a vector space V , coordinates of a vector $\vec{v} \in V$ relative to an ordered basis B for V .

Given a subset of vectors $Q \subset W$, determine whether Q is linearly independent. Given a subspace W of a vector space V , determine a basis for W . Given a basis B for a vector space V and a vector $\vec{v} \in V$, determine $(\vec{v})_B$, the coordinates of \vec{v} relative to the basis B .

§5.5: Dimension: Definition and computation of the dimension of a subspace W of a vector space V .