MATH-332: Linear Algebra	Chapter: 4

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Vector Spaces

Section 4.1: Vector Spaces and Subspaces

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pgs. 216 - 222   *July 13, 2009*

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Lecture: Vector Spaces and Subspaces

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Topics:	Definition of vector space examples of vector spaces Subspaces w/ examples
Problems	Prac: 1, 2 Prob: 5-8, 13, 14, 23, 24, 25 - 30 (proofs!)

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Section Goals

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- Understand how the concept of $\mathbb{R}^n$ can be extended to the concept of a linear vector space and how this mathematical structure can appear in various forms that are critically **not** $\mathbb{R}^n$, but do share its algebraic structure.

- Study the concept of a vector subspace and understand how this naturally arises from the definition of spanning sets.

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Section Objectives

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- Define a vector space and show that $\mathbb{R}^n$ satisfies the definition of a vector space.

- Provide examples of 'abstract vector spaces.' That is, show that other mathematical structures share the same algebraic structure of $\mathbb{R}^n$ and thus are also examples of vector spaces.

- Define a vector subspace and provide examples.

- State theorem 4.1.1 on page 221, which says that given elements of a vector space the set spanned by these vectors forms a vector subspace, and provide a sketch of its proof.