Study Guide

- Linear fns.) Def'n: how to check
  - $f(u+v) = f(u) + f(v)$
  - $f(cu) = cf(u)$ $\forall u, v \in$ vector space, $\forall c \in \mathbb{R}$
- Vectors — even funky ones (fns., conv. power series, etc.)
  - ↳ for "inner product", checked orthogonality of certain fns. ("vectors")
- Matrices
  - Physics to linear eq'ns
  - Lin. eq'ns to matrix eq'ns
  - Lin. eq'ns to vector eq'ns

- Basic defn & nomenclature.
- Column + row vectors are matrices
- Add'n of matrices
- Scalar mult. of matrices
- Matrix mult. — when is it commutative? — Abstrac'n.
  - when it's defined (inner dimensions match)
  - what ~~is~~ the dimension of the prod. (outer dim.)
  - how to do matrix multiplication! vector dot

    If $A \cdot B = C$, then $c_{ij} = (i^{th} \text{ row } A) \cdot (j^{th} \text{ col } B)$
  - Find all 2×2 matrices A s.t. $A \cdot A = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$
- Transposes — the i^{th} row of A = i^{th} col. of A^T.

- Row reduc'n.
  - REF, RREF
  - Extracting solns from RREF (even when 1 or more parameters is free)
  - Describing the nature of solns, based on how many free parameters exist.

- Performing elementary row operat'ns using elementary matrices.
  - Abstrac'n of matrix mult.
- Symmetric, skew-symmetric matrix
- Inconsistent vs. consistent linear system.
- Applied row reduc'n problem