# MATH355 MIDLIST

This is a rough list of what we have covered so far. I make no claim that this list is complete, i.e. if a topic not appearing here is on the exam, you are not allowed to complain. It is your responsibility to be aware of everything that was covered in class.

- Gauss's Method
  - Linear systems
  - Augmented matrix of a linear system
  - row reduction
  - echelon form
  - leading variables, free variables
  - solution sets can be written as particular + homogeneous
- vector spaces
  - vectors can be added
  - vectors can be scaled
  - examples: $\mathbf{R}^n$, $P_{\leq n}$, $M_{m\times n}$, etc.
  - Don't worry about HW 2 problems 3,4.
- subspaces
  - examples of subspaces (in $\mathbf{R}^n$, in matrices, ...)
  - non-examples of subspaces (things that don't satisfy one of the three properties)
- spans
  - describe the span of vectors
  - recognizing when a vector belongs or doesn't belong to a given span
  - spans are subspaces
  - when a given subspace is the span of given vectors, when it isn't
- linear dependence, linear independence
  - when are two vectors linearly (in)dependent, when they are not
- basis
  - what is a basis
  - how to recognize if a given collection of vectors is a basis
  - representing a given vector in different bases ($\mathrm{Rep}_B\ \vec{v}$)
- dimension
  - dimension of a vector space
  - how to find out the dimension of a vector space (or of a subspace)

There is a page 2, keep scrolling.

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Here is a list of recommended exercises. They are taken from the textbook, available here `http://joshua.smcvt.edu/linearalgebra/book.pdf`.

- p.10 - 1.19, 1.20, 1.22, 1.24, 1.25,
- p.20 - 2.17,
- p.21 - 2.20, 2.21, 2.22
- p.22 - 2.28, 2.31
- p.33 - 3.15, 3.16, 3.18,
- p.34 - 3.21
- p.97 - 2.20, 2.21, 2.22, 2.23, 2.25
- p.98 - 2.26, 2.27, 2.31
- p.99 - 2.32,
- p.100 - 2.44, 2.45, 2.46, 2.47
- p.109 - 1.20, 1.21, 1.22, 1.27, 1.28,
- p.110 - 1.31, 1.32, 1.36,
- p.112 - 1.42 part (a),
- p.118 - 1.18, 1.19, 1.20, 1.21, 1.23, 1.24, 1.25 part (c), 1.26, 1.28, 1.29
- p.120 - 1.31, 1.32, 1.33, 1.37, 1.38, 1.39
- p.125 - 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.25, 2.26, 2.27, 2.32, 2.33, 2.34, 2.38 parts (a), (b).

This was a long list of exercises. If you feel you are running out of time, try to go for *diversity* rather than quantity.

Notice that solutions to ALL of these exercises my be found on Hefferon's website!