Mate 4031 practice problems

Lacking any further indication, mere mention of a section means: “solve all syllabus problems from this section”.

For 21/08
§1.1, §1.2.

For 24/08
§1.3.

For 4/9
§1.4: 5, 7, 9, 12, 15, 19, 20, 21, 22, 23, 29. Hint for 29: a matrix is symmetric just in case it is equal to its transpose.
§1.5: two of problems 3–6. Also: 7, 8, 12, 15, 18, 19a, 22. Hint for 22: show, using definition of the inverse, that for any invertible matrix A, $(A^T)^{-1} = (A^{-1})^T$, and see hint for pb 29, §1.4. Topics presented in class, including reduction to QLU form.

For 18/9
§1.6: 1, 4, 6, 7, 10, 12, 14, 15, 16, 17.

For 22/9
§3.1.

For 25/9
§3.2: 2, 5, 6, 8, 9, 10.

For 9/10
§3.3: problems from syllabus. For exercise 9, do not use the Wronskian criterion, but use one of the two methods I showed in class (for full practice, try both).

For 19/10
§3.4. See comments on the webwork problems.

For 28/10
§3.2 (the rest of which I inadvertently left out) 11, 13, 18, 20.
§3.5.

For 30/10
§4.1.

For 6/11
§4.2, §4.3.

For 11/11
§5.1.

For 18/11
§5.2.

For 25/11
§5.3, 5.4. Exercises 21–26 of §5.4 deserve particular attention.

For 30/11

§5.5: 4, 5, 8, 11, 14, 19, 35. Hint for 19: which matrices X have the property that $X\mathbf{u}_j = \mathbf{u}_j$ for each column $\mathbf{u}_j$ of U? Hint for 35: write $x = u + v$, $u \in S$, $v \in S^{\perp}$, and find the coefficients of u along the basis $x_1, x_2, \ldots$, as we did in the Gram-Schmidt process.

§5.6: 1, 4, 7, 8. Gram-Schmidt process is the two-phase process we described in class - ignore the formulæ shown in the text. To find a basis for the span of a set of vectors (whether columns or rows of a certain matrix), refer to example 4 of §5.2.

Practice for final:

§6.1.

§6.3. Markov chains are described in the same section.

§6.4: 1, 4(d-e), 6, 8.