LINEAR ALGEBRA, MATH 2522   Instructor: Dr. T.I. Lakoba

Preparation sheet for the Final Exam

Problems on this Test will be based on the homework problems listed below.

Note 0: I recommend that you **begin studying from the end of this Preparation sheet**, because problems from Chap. 4 will have a higher weight on the exam than other problems of a similar difficulty level.

Note 1: You should check the original homework assignment for Hints or Notes for any of the problems listed below with an asterisk (e.g., 2*). Some problems have more than one Hint or Note, so make sure to *find and use all of them*.
Note 2: A problem on the Test may combine concepts of more than one problems listed on this sheet, or it may use only part of the solution of a given homework problem.
Note 3: Groups of problems from the same section that may pertain to different test problems are separated by a space.
Note 4: For the proofs on this preparation sheet, always begin by writing down what is given and what you need to prove, in *mathematical* notations. Then each proof, if done properly, will take three or fewer simple logical steps.
Note 5: If you notice that some of the problems on this preparation sheet are similar to problems from midterms, you should consult the posted solutions for those midterms on how the corresponding problems were to be done.

> When preparing for the Test, it will be beneficial for your performance if you **redo** the problems listed below, and also review the related examples in the notes and in the book. Please **note**: It will **not help you much** if you simply browse those problems **without actually doing them**.

Use of calculators will be allowed.   You are also **allowed** to prepare and bring to the exam one double-sided formula sheet. Other materials, such as books, notes, etc., will **not** be allowed on the exam.

Note: The way you should prepare the formula sheet is this. As you go over the problems from this review sheet, you will discover that you do not remember some of the theorems or formulae or that you may simply forget them during the test. Then you should put those formulae on your formula sheet. Do *not* mechanically copy everything from the book or notes; this will *not* be helpful to you on the exam.

1. Sec. 1.2: ## 27, 29, 31.

2. Sec. 1.3: ## 27*, 29*, 32*, 33*. Make sure to review Example 3 in the posted Notes and Examples 8 and 9 in the textbook. Do not worry about intimidating numbers in Example 9 — you will not have anything like that on the exam. Instead, focus on the common salient feature of all these Examples.

3. Sec. 1.6: ## 31*.

4. Sec. 1.7: ## 9, 11, 21, 29, 41, 45.

5. Sec. 1.8: ## 5, 27.

6. Sec. 1.9: ## 13, 23;   35*, 38*, 39*, 41*, 43*, 45*, 49, 51; # 18* on p. 107; and the Word Problem*.
   Note for all problems *except* ## 13 and 23:   The emphasis in a test problem related to these problems will be on using the properties of an inverse matrix. Thus, you may save yourself some time by doing matrix

multiplication in some of these problems with Matlab. Note that you will **not** need to compute the inverse of a matrix in any of these problems. However, you *do need* to practice finding the inverse of a matrix as per ## 13 and 23.

7. Sec. 3.1: ## 19, 23, 27, 29, and Word Problems 1* & 2*.
   Also do ## 16*, 17, 18* from Sec. 1.1. [1]
   On the Test, you will be *required* to demonstrate that you can recognize and use the equations of lines and planes as described in Lecture Notes for Sec. 3.1. See also the next list item.

8. Sec. 3.2: ## 9, 10*, 12*, 15, 16*, 17, 23.
   Do *not* prove whether a set is a subspace. Instead, focus on the *geometric description* of the set. For a plane, state whether it goes through the origin and which vector it is perpendicular to. For a line, state whether it goes through the origin and which vector it is aligned with.

9. Sec. 3.4: ## 11(a–c), 15(a–c);   1*, 6*, 7*.

10. Sec. 3.5: ## 15, 17, 20*, 29*.

11. Sec. 3.7: ## 25, 29, 30*.

12. Sec. 3.8: ## 7, 9*. In addition, accurately sketch the best-fitting line obtained.

13. Sec. 4.4: ## 7*, 8*, 11*, and Word Problem 4*;   15, 16*, 18(a), Word Problems 1(a)* and 3;
    # 10* on p. 352,   # 7* on p. 351 (in Supplementary (not Conceptual!) Exercises).
    You must know the statements (not proofs) of Theorem 11 and Theorem 13; note that these two Theorems have a completely different focus.

14. Sec. 4.5: ## 1, 3, 4*, 6*, 12*, 17;   23*, 24*, 25*, 26*.
    Note that ## 23–26 were assigned as part of the homework for Sec. 4.7-Part 2.

15. Sec. 4.7: ## 1*, 2*, 3*, 4*, 5*;   33*, 35*, 36*;   28*, 29*, 30*;   # 14(a–d)* on p. 352.
    Make sure to study closely Example 3 at the end of the posted Notes.
    Note: Since this section was not covered in midterm tests, its share in the final test will be emphasized.

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[1]In HW 9, these problems were assigned along with problems in Sec. 3.1.