Math 346E: Elements of Linear Algebra

Homework for Extra Credit 1, Due on May 17, 2:00PM

Instructions: Make a practice final exam for a classmate, and take eachother's practice final exam.

Detailed Instructions:

(a) Compile a practice exam: make a selection of 20% Quiz questions, 20% Theory questions, 60% Homework questions from the course. In choosing the exercises, use your best judgment: don't make the exam too easy or short, but also not too hard or long. It should be about $1.5\times$ the length of the midterm exam. Make sure the exam covers a wide range of topics. In compiling your exam, use previously assigned homework questions, quiz questions, or problems from the midterm.

(b) Exchange the exam you compiled with one from a classmate.

(c) Set a timer and give yourself 2 hours and 15 minutes to finish the exam compiled by your classmate.

(d) Grade eachother's work.

(e) If there were exercises you were not sure about, answer the following question: what do you need to do to brush up your knowledge on these topics?

Note: Even if you did not get a perfect score on the practice exam, any serious attempt, with in addition serious answers to item (e) above, will recieve full credit.

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Homework for Extra Credit 2, Due on May 17, 2:00PM

Instructions: The following is a list of the 57 important linear algebra concepts that were covered in this course. Pick at least 15 concepts that you think are important for you to review, and answer the following questions about each of them:

(a) What is the definition of the concept? (Look up in textbook if needed.)

(b) In what section(s) does the concept appear?

(c) Find 3 previous homework exercises in which this concept appears?

(d) How comfortable do you feel with this concept, on a scale of 0 (no idea what it means) - 10 (understand it fully)?

(e) If your answer in (d) is lower than you'd like, what do you need to do between now and the final exam to become more comfortable with the concept?

1. Elementary row operation
2. Row echelon form
3. Reduced row echelon form
4. Homogeneous system of linear equations
5. Transpose of a matrix
6. Trace of a square matrix
7. Inverse of a square matrix
8. Elementary matrix
9. Diagonal matrix
10. Upper/lower triangular matrix
11. Symmetric matrix
12. Determinant
13. Minor
14. Cofactor
15. Row-equivalent matrix
16. Adjoint method
17. Cramer's Rule
18. Vector space
19. Vector
20. Subspace
21. Linear combination
22. Span
23. Linearly independent
24. Wronskian
25. Basis

26. Coordinates of a vector with respect to a basis
27. Dimension
28. Change of basis problem
29. Transition matrix
30. Row space
31. Column space
32. Null space
33. Particular solution of a system $A\mathbf{x} = \mathbf{b}$
34. General solution of a system $A\mathbf{x} = \mathbf{0}$
35. Dependency equations
36. Rank
37. Nullity
38. Dimension Theorem for Matrices
39. Orthogonal complement
40. Equivalence theorem
41. Matrix transformation
42. Eigenvalue
43. Eigenvector
44. Eigenspace
45. Similar matrices
46. Diagonalizable matrix
47. Geometric multiplicity
48. Algebraic multiplicity
49. Linear transformation
50. Kernel
51. Range
52. Dimension Theorem for Linear Transformations
53. One-to-one
54. Composition of linear transformations
55. Inverse transformation
56. Isomorphism of vector spaces
57. Matrix for a linear transformation