

Prepare for the exam by studying your notes, reading, and graded/ungraded HW and practice problems in connection with this list.

Remember that any time you use software, you must write your initial input matrix (unless it's already given in the problem) and ALWAYS write your output matrix. Extra info from the software such as row operations or intermediate matrices aren't needed UNLESS I specifically ask in a particular problem.

Applications: Chem-balancing and network flow problems will NOT appear on the exam.

Matrix Operations:

1. Add, subtract, scalar-multiply, multiply given matrices; recognize/explain when impossible.
2. Create matrices that can/can't be added/multiplied, or that do/don't commute.
3. Predict information about B when given A and AB , as in p.102-103 Problems #7, 8, 12, 17.
4. Use tan box p.97 to discuss entire rows or columns of A , B , AB , as in p.103 #18-21 and HW #5.
5. Memorize and use the formula for a 2×2 inverse as a time-saver!
6. Find A^{-1} or determine that it doesn't exist by augmenting against I (via technology).
7. Use A^{-1} to solve a given system or matrix equation.
8. Master p. 114's Invertible Matrix Theorem (except (f) and (i)) for use in explanations about features of square matrices (as in p.117 HW).
9. Find one or more elementary matrices that turn a given matrix into another. Write answers in the correct sequence order!

Determinants:

1. Use a well-chosen cofactor expansion to find the determinant of a given matrix.
2. Use short-cuts to find determinants of special matrices: 2×2 , 3×3 , triangular, elementary.
3. Given a sequence of row reductions leading to the EF of a matrix, find the determinant of the original matrix (as in p.177 #5-10).
4. Include $\det(A) \neq 0$ among the many conditions of the Invertible Matrix Theorem (IMT)!!!!!!
5. Perform these tasks regarding Cramer's Rule:
 - (a) Set up my choice of ONE matrix $M_i = A_i(\vec{\mathbf{b}})$ for a particular system or matrix equation.
 - (b) Given some/all determinants necessary, use Cramer's Rule to solve a system/matrix equation.
 - (c) I may leave 1-2 determinants for you to find, but you will NOT be asked to find all.

Triangular Matrices:

1. For some of these tasks, I may give you a head-start/partial information to shorten the problem.
2. Find an LU-factorization of a given matrix.
3. Find the determinant of a triangular matrix as the product of its diagonal entries.
4. Given an LU-factorization, use it to solve a given system, as in p.132 #3,4.