Topics to know for the final:

Chapter 4: Know what orthogonal vectors/subspaces are.
- Projections: Know how to project vectors onto a subspace and how to compute projection matrices.
- Least squares approximations (application of projection)
- Orthogonal matrices and orthonormal basis. Know how to turn any basis into orthonormal using Gram-Schmidt process.

Chapter 5: Determinants
- Know how to compute using row operations and cofactor expansion.
- Applications to volumes, and cross products.

Chapter 6: Know how to find eigenvalues/eigenvectors. (Hint: on final, eigenvalues will never be more complicated than simple fractions.)
- Know how to diagonalize A (if there is a basis of eigenvectors), and use it to calculate A^N.
- Note: Differential equations will not be on the final exam.

Chapter 7: Know how to compute singular value decomposition of a 2×2 matrix, and know the geometric interpretation of singular values ($\sigma_1 = \max \text{ of } \|A\vec{x}\|/\|\vec{x}\|$)

Key topics to know from earlier in the course:

Matrix algebra:

- Matrix multiplication
- Inverses
- LU decomposition

} Know how to use these to solve linear equations.

Connections to geometry: Dot products, lengths, angles.

Chapter 3

- Definitions of subspace, null space, column space, row space, left null space.
- Finding all solutions to linear equations.
- Know what it means for vectors to be independent.
- Know how to find bases for subspaces, especially for the four subspaces associated to a matrix.