Math 240 – Review for the final Name:

**Final Exam Learning Objectives:** the student should be able to:

1. solve and to describe the solution set of a system of m equations with n unknowns.
2. write a system of linear equations as a single matrix equation.
3. solve homogeneous and non-homogeneous systems of linear equations using matrix techniques.
4. know the definition of vector space.
5. know the definition of and be able to determine the linear dependence or independence of a set of vectors.
6. know the definition of, and be able to find, a basis for a vector space.
7. know the definition of, and be able to find:
8. the length of a vector.
9. the dot (scalar) product of two vectors.
10. the projection of one vector onto, or orthogonal to, another vector.
11. orthogonal or orthonormal vectors.
12. normalize a set of vectors.
13. know the definition of, and be able to identify, a linear transformation.
14. find the inverse of an invertible square matrix.
15. know the definition of, and be able to construct, a matrix similar to a given matrix.
16. find eigenvalues and eigenvectors of a matrix.
17. find a diagonal matrix similar to a given matrix, if it exists.
18. calculate powers of matrices using diagonal matrices.

Your final exam will have two parts – one part where no calculators are allowed and another part were calculators are allowed

**Things I expect you to be able to do without a calculator:**

* Find dot products, cross products, magnitude, and sums of vectors.
* Row reduce matrices
* Find inverse matrices
* Find the sum of two matrices
* Find the product of two matrices
* Find the determinate of a matrix