MTH 236-001 Final Exam Information

Our final exam is scheduled for our last class period on Wednesday, May 8. The final exam will cover the objectives listed below. Focus your studying on these skills.

Final exam skill list

Chapter One, Section III

1. Use Gauss-Jordan elimination to find the RREF of a matrix.
2. Use the RREF of an augmented matrix to find the solution set of the corresponding linear system.

Chapter Two, Section I

1. Determine whether a set with operations is a vector space.
2. Determine if a subset of a vector space is a subspace.
3. Determine if a vector is in the span of a subspace.
4. Find vectors that span a subspace and parameterize the subspace's description.

Chapter Two, Section II

1. Show that vectors are linearly dependent/independent.

Chapter Two, Section III

1. Find a basis for a vector space.
2. Given a basis for a vector space, find the basis representation for a given vector.
3. Find the dimension of a vector space.
4. Determine a basis for the row space of a matrix. Determine row rank of a matrix.
5. Determine a basis for the column space of a matrix. Determine column rank of a matrix.
6. Know the relationship between row rank and column rank.

Chapter Three, Section I

1. Determine is a function is one-to-one.
2. Determine if a function is onto.
3. Determine if a map between vector spaces is an isomorphism.
4. Determine if vector spaces are isomorphic.

Chapter Three, Section II

1. Find the range space and rank of a homomorphism.
2. Find the null space and nullity of a homomorphism.

Chapter Three, Section IV

1. Perform operations (addition, scalar multiplication, and matrix multiplication) on matrices.
2. Find the inverse of a matrix and use the properties of inverse matrices.

Chapter Three, Section V

1. Find a change-of-basis matrix.
2. Know the properties of the change-of-basis matrix.

Chapter Three, Section VI

1. Use the Gram-Schmidt process to orthogonalize a basis.
2. Show that a set of nonzero orthogonal vectors is linearly independent.

Chapter Four, Section I

1. Know and use the properties of determinants.
2. Use row operations to compute a determinant.

Chapter Four, Section III

1. Use the Laplace expansion to compute a determinant.
2. Know and use properties of the Laplace expansion.
3. Use the matrix adjoint to compute an inverse matrix.
4. Use Cramer's rule to solve a system.

Chapter Five, Section II

1. Explain what it means for matrices to be similar.
2. Explain and demonstrate what it means for a matrix to be diagonalizable.
3. Determine the characteristic polynomial of a matrix.
4. Find the eigenvalues and eigenvectors of a matrix.
5. For each eigenvalue, determine the corresponding eigenspace of a matrix.
6. Diagonalize a matrix.

Inner Products

1. Determine whether a given "product" defined on a vector space is an inner product.
2. Show that vectors are orthogonal with respect to an inner product.
3. Find the norm of a vector in an inner product space.

Other general objectives

1. Determine if a relation is an equivalence relation.
2. Use induction in proofs.
3. Explain and use various ways to determine if a matrix is nonsingular.