

Midterm 2 – Review

MAS 3105 Linear Algebra

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The midterm exam will be on March 20, 2014. You are responsible for the material in all homework and quizzes. The outline below highlights the main topics you need to know.

1. Matrix Algebra

- (a) Associative and distributive properties.
- (b) Cancellation does not hold.
- (c) Multiplication is not commutative.
- (d) Transpose.

2. Linear transformations

- (a) rank and nullity of a matrix
- (b) computing a basis for the null space
- (c) computing a basis for the column space

3. Matrix Inverses

- (a) How to compute using row reduction.
- (b) Consequences of invertibility.
- (c) Relations with properties of solutions to $Ax = b$. (If you know A is invertible, then what is the solution x to $Ax = b$ in terms of A^{-1} and b ?)
- (d) Relation with properties of column vectors.
- (e) Relation with properties of matrix transformations.
- (f) Relation with pivots.
- (g) What happens to the inverse when you multiply, take transpose, or add matrices?

4. Determinants

- (a) How to compute using cofactor method.
- (b) How to compute using row reduction.
- (c) Relation with invertibility.
- (d) What happens to the determinant when you multiply, take transpose, or add matrices?
- (e) What are situations when you can tell quickly that the determinant is zero?

5. Applications of Determinants

- (a) Cramer's rule
- (b) Volumes
- (c) Linear Transformations