

MATH 240 EXAM III TOPICS OF INTEREST

§4.5

- (1) Definitions: Orthogonal complement of a subspace.
- (2) Finding a basis for the orthogonal complement of a given subspace: #5, 7.
- (3) Proof problems: #26.

§5.1

- (1) Definition: Linear transformation, linear operator, standard matrix representing L .
- (2) (Proof) Problems: #11, 14, 22.

§5.2

- (1) Definition: Kernel and range.
- (2) Determining a given linear transformation L is 1 - 1 or onto from by examining $\ker(L)$ and $\text{range}(L)$: #4
- (3) Let A be an $m \times n$ matrix and $L : \mathbb{R}^n \rightarrow \mathbb{R}^m$ be defined by $L(\mathbf{x}) = A\mathbf{x}$. Prove that $\ker(L)$ is the null space of A and $\text{range}(L)$ is the column space of A .
- (4) Finding a basis for the kernel and range : #6, 10
- (5) Proof problems: Theorem 5.4, #20.

§5.3

- (1) #8, 10, 11

§5.5

- (1) Definition : Similarity
- (2) Statement of Theorem 5.13.
- (3) Proof problems: Theorem 5.15, #7.

§6.1

- (1) Definition : permutation, inversion, sign, determinant.

§6.2

- (1) Properties of determinant : Theorem 6.1 ~ 6.7
- (2) Computation of determinant using basic properties : #3, 5
- (3) Proof problems : Theorem 6.7, #8, 30, 32.