

Null Spaces, Column Spaces and More Linear Transformations

MATH 204: Linear Algebra

Prepare for class November 5, 2018

Name (Print): _____

After reading Section 4.2, work through the following ideas.

1. What is the definition of a column space?

2. (a) State Theorem 4.3: Col A is a Subspace.

- (b) Give a two sentence proof of the result.

3. State the Fact on page 204 and briefly explain where it comes from.

4. Suppose A is a 2×3 matrix.

- (a) Of what is $\text{Nul } A$ a subspace?

- (b) Of what is $\text{Col } A$ a subspace?

5. The table on the top of page 206 lists eight comparisons of NulA with ColA. List three of them here. Choose three that were not immediately obvious to you to write down. (It is OK if none were immediately obvious - this is new stuff!)

6. State the definition of a linear transformation. “Wait!”, you say. “I have done this before!” Why yes, you have. But now we are defining it a bit more generally, not restricting ourselves to \mathbb{R}^n . Don’t assume everything you know about linear transformations from \mathbb{R}^n to \mathbb{R}^m holds in general!

7. What are the definitions of kernel and range in this context? How do they relate to the null and column spaces?

8. Write down any questions you have on the reading.