Name: _____ Homework 6 | Math 256 | Cruz Godar

Due Wednesday of Week 7 at the start of class

Complete the following problems and submit them as a pdf to Canvas. 8 points are awarded for thoroughly attempting every problem, and I'll select three problems to grade on correctness for 4 points each. Enough work should be shown that there is no question about the mathematical process used to obtain your answers.

Section 8

In problems 1–5, evaluate the product.

1. $\begin{bmatrix} 3 & 0 \\ 6 & -2 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \end{bmatrix}$.

2. $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$.

3. $\begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$.

4. $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$.

5. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 & -1 \\ -1 & 1 & -1 & 1 \end{bmatrix}$.

6. Suppose that for a square matrix $\mathbf{A}$, there are matrices $\mathbf{B}$ and $\mathbf{C}$ so that $\mathbf{AB} = \mathbf{I}$ and $\mathbf{CA} = \mathbf{I}$. Show that it must be the case that $\mathbf{B} = \mathbf{C}$. Hint: multiply both sides of the second equation by something.

7. Let A be an $n \times n$ matrix with entries a_{ij}.

a) For the products AI and IA to make sense, what dimension must I have?

b) The ith row of A is $\begin{bmatrix} a_{i1} & a_{i2} & \cdots & a_{in} \end{bmatrix}$. If the jth column of I is denoted $\vec{e_j}$, what is the entry in row i and column j of AI? Your answer should be in terms of i and j.

c) What does part b) imply AI is equal to? Why does this make sense in the context of function composition?