

Homework Week 8

MATH 204: Linear Algebra

Due October 19, 2018 by 1:55pm

Remember that although you may discuss this assignment with others, your write up should be your own. **Do not share your write-up, look at other's write-ups, discuss word for word how something should be proved, etc.** Be sure to note with whom you collaborate if you do collaborate. Complete these exercises on a separate paper.

Remember to distinguish clearly between vectors and scalars! You must make it clear to earn full credit!

1. If X and Y are matrices such that $XY = I$, then Y is called a **right inverse** of X and X is called a **left inverse** of Y .

(a) Find a 1×2 matrix X and a 2×1 matrix Y such that $XY = I$. Justify your answer.

(b) Is it possible to find matrices X and Y that satisfy (a) and that also satisfy $YX = I_2$? Why or why not? Be careful to justify your answer in general.

2. Complete Number 7 from Section 2.2, page 111. For 7(a), see Example 4 in the text. For 7(b) reduce the entire “super-augmented” matrix they give in the question all at once. Check that the solutions you found in part (a) appear in the last four columns.

3. Complete Numbers 30 and 32 from Section 2.2, page 112.

4. Complete Number 16 from Section 2.2, page 112. Note that you CANNOT say, “since AB is invertible, then $(AB)^{-1} = B^{-1}A^{-1}$,” because you do not know that A^{-1} exists – you are trying to PROVE that A is invertible. (You can only apply the Shoes and Socks Theorem when you already know that the two matrices in question are both invertible.) After you use the Hint in the text, you will find that A equals some other matrix. Explain why this other matrix is invertible (read Shoes and Socks carefully!). So what can you conclude about A ? Remember to use definitions as well as theorems!