

The Inverse of a Matrix: Part 2

MATH 204: Linear Algebra
Prepare for class October 12, 2018

Name (Print): _____

After rereading Section 2.2, work through the following ideas.

1. (a) State Theorem 2.5 (Invertibility and Unique Solutions Theorem).

(b) Notice how this theorem helped you solve Question 7(b) on the Section 2.2 Prep reading sheet that was due on Wednesday (or go back and solve it now!).

2. (a) State Theorem 2.6a (The first part of the Algebra of Inverses Theorem).

(b) Without symbols, explain what Theorem 6a is saying.

(c) Prove Theorem 6a.

3. (a) State Theorem 6c (The third part of the Algebra of Inverses Theorem).

(b) Prove Theorem 6c.

4. (a) State Theorem 6b (The second part of the Algebra of Inverses Theorem).

(b) Theorem 6b is sometimes called the Shoes and Socks Theorem. Think about how the inverse is a way to undo what the original matrix does, and also think about what happens when you put your socks and shoes on and what the process is to take them off. Then explain why you think this theorem might be called the Shoes and Socks Theorem.

5. Suppose $A = \begin{bmatrix} 1 & 1 \\ 1 & 2 \end{bmatrix}$, and $B = \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix}$. Use these matrices to check that you believe Theorem 6b.

(a) Compute AB .

(b) Compute $(AB)^{-1}$.

(c) Compute $A^{-1}B^{-1}$.

(d) Compute $B^{-1}A^{-1}$.

6. State the definition of an elementary matrix.

7. Are elementary matrices invertible? Why or why not?

8. State Theorem 2.7: Invertibility and the Identity Matrix.

9. What is the algorithm for finding the inverse of an invertible matrix that works no matter how large the matrix is?

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