The Inverse of a Matrix

MATH 204: Linear Algebra
Prepare for class October 10, 2018 Name (Print): _____

After reading Section 2.2, work through the following ideas.

1. Give the definition of what it means for a matrix to be **invertible**.

2. Suppose $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$, and $B = \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix}$.

   (a) Compute AB.

   (b) Compute BA.

   (c) What conclusions can you make based on your computations?

3. True or False: If $AB = I$, then A is invertible. Justify.

4. State Theorem 4: Invertibility of 2×2 Matrices Theorem. Note that this Theorem is very specifically about 2×2 matrices.

5. (a) Give the definition of the **determinant** of a matrix A.

(b) Rewrite Theorem 4 using det A.

5. Complete exercise 1 of Section 2.2 on page 111. Justify your answer. (How do you do this?)

6. (a) What steps would you need to take in order to prove that the formula in Theorem 4 works? (Note this is only proving a part of Theorem 4.)

(b) Now do those steps!

7. Suppose $A = \begin{bmatrix} 3 & 2 \\ 7 & 4 \end{bmatrix}$.

(a) Find A^{-1} using Theorem 4.

(b) Solve the system below using your result from part (a).

$$\begin{aligned} 3x_1 + 2x_2 &= 2 \\ 7x_1 + 4x_2 &= 10 \end{aligned}$$

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