18.06 Problem Set 3

Due at 4pm on Wednesday, September 28 in 2-106

Please PRINT your name and recitation information on your homework

1. Section 2.7, Problem 24

2. Section 3.1, Problem 4

3. Section 3.1, Problem 19

4. Section 3.1, Problem 27

5. Section 3.2, Problem 23

6. Section 3.2, Problem 25

7. Section 3.3, Problem 3

8, Section 3.3, Problem 6

9. Section 3.3, Problem 8

10. Section 3.4, Problem 5

11. Section 3.4, Problem 32

12. Section 3.4, Problem 33

13. Section 3.4, Problem 34

14. (a) Suppose A is an m by n matrix with $m < n$. A *right inverse* of A is a matrix B such that $AB = I$. What are the dimensions of B and I in this case?

(b) One can find a matrix B such that $AB = I$ by using MATLAB operation `A\I`. In MATLAB, type `A = [-5 3 2; 4 -2 0]` to create the matrix $A = \begin{bmatrix} -5 & 3 & 2 \\ 4 & -2 & 0 \end{bmatrix}$ and `I = eye(2)` to define I as the 2 by 2 identity matrix. Then input the command `A\I`. MATLAB will then solve the equation $AB = I$ for B. What output do you get?

(c) Now try to find a right inverse of A in the "usual" way by row-reducing the augmented matrix $[A\ I]$. You can do this in MATLAB by entering the command `rref([A I])`. What is the result? Use the resulting reduced matrix to construct a matrix B satisfying $AB = I$ different from the one obtained in part (b).

(d) Explain why A has no left inverse. In other words, why isn't there a matrix C such that $CA = I$? (What would the dimensions of C and I have to be in this case?)