

Linear Algebra (MATH 3333) Spring 2009 Section 2

Homework 8

Due: Wed. Apr. 8, start of class

Instructions: Please read the homework policies and guidelines posted on the course webpage. You may *not* use a calculator (or computer). Make sure to write your name, course and section numbers in the top right corner of your solution set, as well as the assignment number on top. Page/section numbers refer to the course text.

Reading

Read Sections 2.3 and 4.8.

(Optional) Look over Sections 3.2, 3.3 and 3.4 for more on determinants and a different way to compute the inverse.

Written Assignment

Total: 100 points

Each problem is worth 10 points unless otherwise noted.

Section 3.2 (p. 154): 1 (use any method you like) (20 pts)

Note: The term *singular* means “not invertible,” so non-singular means invertible.

Section 2.3 (p. 124): 9, 10(a)(b)

Section 4.8 (p. 267): 1, 2, 3, 7.

Problem A. (20 pts) (Left and right inverses for non-square matrices) Let

$$A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \\ -1 & 1 \end{pmatrix}.$$

We say B is a *left inverse* for A if

$$BA = I_2,$$

and C is a *right inverse* for A if

$$AC = I_3.$$

where I_n denotes the $n \times n$ identity matrix. (Note we use I_2 in the first equation because the input to A is \mathbb{R}^2 , and we use I_3 in the second equation because the output of A is \mathbb{R}^3 .)

(i) Does a left inverse B for A exist? If so, find it. If not, explain why.

(ii) Does a right inverse C for A exist? If so, find it. If not, explain why.

Bonus 1. p. 164, #19.

Bonus 2. Read Section 3.5 and do #3 on p. 172.