Math 308H Winter 2012

Assignment 3

Reading: Section 1.4, pp 39-42, Section 1.7, Section 1.9 and Section 1.8, pp. 80-83.

Also, you are STRONGLY encouraged to read Section 2.4. You need to know this material. If you know it, the reading will go fast. If you need to review/learn it, now is the time. Practice with some exercises from the section until you are confident you understand the section.

ONLINE ASSIGNMENT: WebQ A: (due Sunday, 1/22 by midnight)

WebQ A, is linked to the Catalyst workspace for 308H. You will need to refer vectors and matrices listed in the problems at the end of Section 1.7 to do this WebQ, so have these pages available. (Scans of the pages are on the workspace also.) You should have the information you need to do this WebQ by the end of class Wednesday, 1/18.

Written Assignment 3 (due Wednesday 1/25)

Section 1.4 #2 (Write the solution in vector form. Then use this to answer the question about the value when $x_4 = 100$.)

Section 1.7 #46, 48, 52

Section 1.8 #2

Section 1.9 #16, 18

Section 1.9 #38, 40, 44 -In each case, answer the question in 3 parts following these instructions. See the next page for an example.

a. First, write down an equation that expresses what Q^{-1} must be using only with symbols taken from the equation. (For example, the answer to #35 would be $Q^{-1} = C^{-1}A^{-1}$.)
b. Second, substitute the numbers into your symbolic equation and compute a matrix with numerical entries that is Q^{-1}.
c. Finally, compute numerical entries for Q from the original equation in the book; then check your work by multiplying two matrices with numerical entries: Q times your answer for Q^{-1}. This should be the identity matrix – and if not redo the problem!

Section 1.9 #46

PROBLEM C

Find the equation in the form $z = A + Bx + Cy$ of a plane that passes through these three points (x,y,z): the points (3, 2, 9), (2, 0, 8), (1, -1, 6).

Example for 308, 40, 44: Here is a sample answer for Problem 35.

a. $Q^{-1} = C^{-1}A^{-1}$

b. $Q^{-1} = C^{-1}A^{-1} = \begin{bmatrix} -1 & 1 \\ 1 & 2 \end{bmatrix}\begin{bmatrix} 3 & 1 \\ 0 & 2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ 3 & 5 \end{bmatrix}$

c. $Q = AC = \left(\frac{1}{6}\begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix}\right)\left(\frac{1}{3}\begin{bmatrix} -2 & 1 \\ 1 & 1 \end{bmatrix}\right) = \frac{1}{18}\begin{bmatrix} -5 & 1 \\ 3 & 3 \end{bmatrix}$ and $QQ^{-1}=I$.

(And, yes, you really need to compute QQ^{-1} to see that it really = I.)