MATH 54 – HINTS TO HOMEWORK 5

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Here are a couple of hints to Homework 5. Enjoy!

SECTION 2.1: MATRIX OPERATIONS

Remember the rule $(m \times n) \bullet (n \times p) = (m \times p)$.

2.1.11. $D = 2I$ works!

2.1.15.

(a) **F** (oh, life would be awesome if this was true! But $\mathbf{a_1 a_2}$ doesn't even make sense!)
(b) **F** (the columns of **A** using weights from the column of **B**)
(c) **T**
(d) **T**
(e) **F** (in the *reverse* order, $(AB)^T = B^T A^T$)

2.1.23. Multiply the equation $A\mathbf{x} = \mathbf{0}$ by C.

2.1.27. First figure out the size of your matrix.

SECTION 2.2: THE INVERSE OF A MATRIX

2.2.1. Use theorem 4.

2.2.9. All statements are true, except for (b), because $(AB)^{-1} = B^{-1}A^{-1}$ and (c) (should be $ad - bc \neq 0$, take $A = \begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$ as an example)

2.2.13. Multiply both sides to the left by A^{-1}. This is definitely not true in general (take $A = O$ for example; there are many other examples)

2.2.21. In other words, you have to show that the only solution to $A\mathbf{x} = \mathbf{0}$ is $\mathbf{x} = \mathbf{0}$ (think about this in terms of linear combinations of the columns of A). For that, multiply the equation $A\mathbf{x} = \mathbf{0}$ by A^{-1}.

Date: Wednesday, September 17, 2014.

2.2.38.

$$D = \begin{bmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 1 \end{bmatrix}$$

The best way to get D is by using the equation $AD = I_2$ and guessing!

C cannot exist, because otherwise A would be invertible, and in particular its columns would be linearly independent, which is bogus!