Week 3 Day 2

“I Hate Math”

Make sure you know your neighbors’ names. Then take about 2 minutes to discuss:

You’ve probably heard someone say “I hate math” (or something similar) before; maybe you’ve even said it yourself! Do you think there’s a difference between how people react to this versus how they might react to something like, “I hate music”? If so, why do you think that is? What might be the social ramifications of how common it is for people to report “hating math”? Do you think it might be valuable to change this culture, and if so, how might we go about that?

Matrix Operations

1. Suppose A is a 4×6 matrix and the product AB is 5×6. Is this possible? If so, what is the size of B?

(A) The situation is impossible.

(B) The situation is possible, and B must be 5×6.

(C) The situation is possible, and B must be 4×6.

(D) None of the above.

2. Suppose A is a 5×3 matrix and the product AB is 5×7. Is this possible? If so, what is the size of B?

(A) The situation is impossible.

(B) The situation is possible, and B must be 5×7.

(C) The situation is possible, and B must be 3×5.

(D) None of the above.

3. (A) True or (B) False? If A is the 2×2 matrix given below, there exists a nonzero 2×2 matrix B such that AB is the zero matrix.

$$A = \begin{bmatrix} 2 & -8 \\ -1 & 4 \end{bmatrix}$$

4. Suppose A is a matrix $[\mathbf{a}_1 \quad \mathbf{a}_2]$, where $\mathbf{a}_1$ and $\mathbf{a}_2$ are the columns of A. Is it possible for there to exist a matrix B such that

$$AB = \begin{bmatrix} \mathbf{a}_1 + 2\mathbf{a}_2 & 2\mathbf{a}_1 - \mathbf{a}_2 \end{bmatrix},$$

and if so, what can be said about B?

(A) The situation is impossible.

(B) The situation is possible, and B must be 2×2.

(C) The situation is possible, and B must have 2 rows, but we cannot determine the number of columns.

(D) None of the above.

5. (A) True or (B) False? Suppose B is a matrix whose columns are linearly dependent. Then, for any matrix A such that the product AB is well-defined, the columns of the product AB must be linearly dependent.