Week 1 Day 3

Mathematical Reading

Turn to someone sitting near you (maybe someone you haven't talked to much before!), and take about 2 minutes to discuss:

You've been coming to class every day having read one section from the book. How have you found these reading tasks? Is it challenging to read and understand math, and if so, what about it makes it challenging? What are some things you do alongside reading to help you make sense of things?

Matrix Equation $A\mathbf{x} = \mathbf{b}$

1. Which of the following products of a matrix with a vector is well-defined?

(A) $\begin{bmatrix} 1 & 2 \\ 3 & -1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix}$

(B) $\begin{bmatrix} -1 & 4 \\ 1 & -2 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} -1 \\ 2 \end{bmatrix}$

(C) $\begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \end{bmatrix}$

(D) None of the above OR more than one of the above

2. (A) True or (B) False? If A is the matrix given below, the matrix equation $A\mathbf{x} = \mathbf{b}$ has a solution for every $\mathbf{b}$ in $\mathbb{R}^2$.

$$\begin{bmatrix} 1 & 3 & -1 \\ 1 & 0 & 1 \end{bmatrix}$$

3. If A is the matrix given below, describe the set of vectors $\mathbf{b}$ such that the matrix equation $A\mathbf{x} = \mathbf{b}$ has a solution.

$$\begin{bmatrix} 1 & 3 & -1 \\ 2 & 6 & -2 \end{bmatrix}$$

4. Your friend Zahir writes down a 3×2 matrix A. He doesn't show you the matrix, but he tells you that the matrix equation $A\mathbf{x} = (1, 2, 4)$ is consistent. What can you say about the equation $A\mathbf{x} = (2, 4, 8)$ based on this information?

(A) It must be consistent.

(B) It must be inconsistent.

(C) Can't say either way for sure without knowing A.