Unit 1: Linear Algebra Quiz

Question 1

Match the array to the appropriate dimensions:

A. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & -1 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & -5 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 4 \\ 2 & 4 \end{bmatrix}$

E. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix}$

F. $\begin{bmatrix} 2 & 1 & 1 & 2 \\ 1 & 2 & 2 & 1 \end{bmatrix}$

D _____ [2,2]

C _____ [2,3]

A _____ [3,3]

B _____ [1,3]

E _____ [4,2]

F _____ [2,4]

Question 2

Find the transpose of the following arrays:

$\mathbf{A} = \begin{bmatrix} 6 & 1 & 3 & 2 \\ 1 & 5 & 2 & 1 \\ 7 & 0 & 2 & 1 \\ 1 & 2 & 3 & 4 \end{bmatrix}$ $\mathbf{A}.\mathrm{T} =$ [[6,1,7,1], [1,5,0,2], [3,2,2,3], [2,1,1,4]]

$\mathbf{B} = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 3 & 2 \end{bmatrix}$ $\mathbf{B}.\mathrm{T} =$ [[2,1], [1,3], [1,2]]

Question 3

What is the L^2 norm (also known as the euclidean norm) of vector $\mathbf{x}$?

$\mathbf{x} = \begin{bmatrix} 1 & 2 & 3 & 4 \end{bmatrix}$

$||\mathbf{x}||_2 =$ ([1^2+2^2+3^2+4^2])^0.5 = [1+4+9+16]^0.5 = 30^0.5 = 5.477

Question 4

Match the appropriate name to each matrix:

A. $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 5 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -4 \end{bmatrix}$

B _____ Diagonal Matrix

A _____ Symmetric Matrix

Question 5

When normalizing a vector, which norm is used to find the magnitude of the vector?

a. L^1 norm
b. L^2 norm
c. Max norm
d. Frobenius norm