

Break & Quiz

- **Q 1.1:** What is $\begin{bmatrix} 1 & 2 \\ 3 & 1 \\ 1 & 1 \end{bmatrix} \times \begin{bmatrix} 0 \\ 1 \end{bmatrix}$?
- A. $[-1 \ 1 \ 1]^T$
- B. $[2 \ 1 \ 1]^T$
- C. $[1 \ 3 \ 1]^T$
- D. $[1.5 \ 2 \ 1]^T$

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- **Q 1.2:** Given matrices $A \in \mathbb{R}^{m \times n}$, $B \in \mathbb{R}^{d \times m}$, $C \in \mathbb{R}^{p \times n}$

What are the dimensions of BAC^T

- A. $n \times p$
- B. $d \times p$
- C. $d \times n$
- D. Undefined

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- **Q 1.3:** A and B are matrices, neither of which is the identity. Is $AB = BA$?
- A. Never
- B. Always
- C. Sometimes

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Q 2.1: What is the inverse of

$$A = \begin{bmatrix} 0 & 2 \\ 3 & 0 \end{bmatrix}$$

A. : $A^{-1} = \begin{bmatrix} -3 & 0 \\ 0 & -2 \end{bmatrix}$

B. : $A^{-1} = \begin{bmatrix} 0 & \frac{1}{3} \\ \frac{1}{2} & 0 \end{bmatrix}$

C. Undefined / A is not invertible

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Q 2.2: What are the eigenvalues of $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

- A. -1, 2, 4
- B. 0.5, 0.2, 1.0
- C. 0, 2, 5
- D. 2, 5, 1

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Q 2.3: Suppose we are given a dataset with $n=10000$ samples with 100-dimensional binary feature vectors. Our storage device has a capacity of 50000 bits. What's the lowest compression ratio we can use?

- A. 20X
- B. 100X
- C. 5X
- D. 1X