**STAT 244 Linear Algebra** **Quiz 1** **February 7, 2025**

**Your Name:**

**Duration of the Quiz is 25 minutes. There are four problems, worth 20 points. Show all your work for full credit. Books, notes etc. are prohibited.**

(1) Determine which of the matrices below are in reduced row-echelon form:

(a) $\begin{bmatrix} 1 & 2 & 0 & 2 & 0 \\ 0 & 0 & 1 & 3 & 0 \\ 0 & 0 & 1 & 4 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$

(b) $\begin{bmatrix} 0 & 1 & 2 & 0 & 3 \\ 0 & 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

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

(d) $\begin{bmatrix} 0 & 1 & 2 & 3 & 4 \end{bmatrix}$

(2) Write down the augmented matrix of a system of linear equations to find all the polynomials $f(t)$ of degree $\leq 2$ whose graphs run through the points $(1, 1)$ and $(2, 0)$, such that $\int_1^2 f(t)\, dt = -1$.

(3) Represent the following vector geometrically and find its magnitude $\hat{v} = \begin{bmatrix} -3 \\ 4 \end{bmatrix}$

(4) Write the augmented matrix of the following system, bring it down to the reduced-row echelon form to determine whether the system is consistent or inconsistent. If consistent, find the solution(s).

$$\begin{aligned} x + y &= 1 \\ 2x - y &= 5 \\ 3x + 4y &= 2 \end{aligned}$$