CS691 Quiz 1 Name _____

1. **A** and **B** are 2x2 matrices. $\mathbf{A} \neq \mathbf{B}$.
   Does **AB**=**BA**, always, sometimes, or never? Circle one and prove it. (3 points)

2. Find the gradient of f. Show your work. (2 points)

$$f(x, y, z) = x^2yz^3 + 5xz + 3y^2 + z + 10$$

3. I want a model that can predict the cost of gas. Is this a classification or regression problem? Why? (2 points)

4. Show that **A** and **B** are orthogonal. Find another vector **C** that is orthogonal to **A**, such that $||\mathbf{C}||_2 = 1$. Show your work. (3 points)

$$A = \begin{bmatrix} 8 \\ 4 \\ 2 \end{bmatrix} B = \begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix} \quad (1)$$

CS491 Quiz 1 Name _____

1. Are the following matrices inverses? Prove it. (3 points)

$$\begin{bmatrix} -24 & 18 & 5 \\ 20 & -15 & -4 \\ -5 & 4 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix} \tag{2}$$

2. Find the gradient of f at (1,2,1). Show your work. (3 points)

$$f(x, y, z) = x^2yz^3 + 5xz + 3y^2 + z + 10$$

3. Are the following vectors orthogonal? How do you know? Show your work. (2 points)

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

4. What does it mean for a model to be *generalizable*? (2 points)