**Quiz 2**; Tuesday, September 6
**MATH 54** with Ming Gu
**GSI:** Eric Hallman

**Student name:**

You have 15 minutes to complete the quiz. Calculators are not permitted.

1. (4 points) If $A = \begin{bmatrix} 3 & -6 & 6 \\ -2 & 4 & -2 \end{bmatrix}$, describe all solutions of $A\mathbf{x} = \mathbf{0}$ **in parametric vector form.**

2. (4 points) Determine whether the vectors $\begin{bmatrix} -8 \\ 12 \\ -4 \end{bmatrix}$, and $\begin{bmatrix} 2 \\ -3 \\ -1 \end{bmatrix}$ are linearly independent. Justify your answer.

3. (4 points) Mark each statement as True or False. You do not have to explain your reasoning.

   (a) If $A$ is a $3 \times 2$ matrix, then the transformation $\mathbf{x} \mapsto A\mathbf{x}$ cannot be one-to-one.

   (b) A linear transformation $T : \mathbb{R}^n \to \mathbb{R}^m$ always maps the origin of $\mathbb{R}^n$ to the origin of $\mathbb{R}^m$.

   (c) If a set in $\mathbb{R}^n$ is linearly dependent, then the set contains more than $n$ vectors.

   (d) If $\mathbf{x}$ and $\mathbf{y}$ are linearly independent but $\{\mathbf{x}, \mathbf{y}, \mathbf{z}\}$ is linearly dependent then $\mathbf{z} \in \text{Span}(\mathbf{x}, \mathbf{y})$.