Quiz 7

1. Let $A = \begin{pmatrix} 1 & -1 & 5 \\ 2 & 0 & 7 \\ -3 & -5 & -3 \end{pmatrix} \in M_3(\mathbb{R})$ and let $\mathbf{u} = \begin{pmatrix} -7 \\ 3 \\ 2 \end{pmatrix} \in \mathbb{R}^3$. Is $\mathbf{u}$ in the null space $N(A)$ of A?

2. **True or False**: An $m \times n$ matrix $A = \begin{pmatrix} \mathbf{a}_1 & \cdots & \mathbf{a}_n \end{pmatrix}$ has trivial null space, $N(A) = \{\mathbf{0}\}$, iff (ïf and only if") the columns of A are linearly independent in $\mathbb{R}^m$.

3. Let $A \in M_{m,n}(A)$ and let $\mathbf{v} \in \mathbb{R}^n$. **True or False**: $\mathbf{v}$ is in the null space $N(A)$ of A iff $\mathbf{v}$ is orthogonal to each of the rows $\vec{A}_i$ of A $(i = 1, \ldots, m)$, in the sense of the dot product,

$$\vec{A}_i \cdot \mathbf{v} = 0$$