Math 244 Quiz 2

Names: _____

1. Let $A = \begin{bmatrix} 6 & 4 & -2 \\ -3 & -2 & 1 \end{bmatrix}$ and let S be the subspace of solutions to $A\mathbf{x} = \mathbf{0}$. Find vectors that span S.

2. Let A be an $n \times n$ matrix and λ a constant. Show the solutions to $A\mathbf{x} = \lambda\mathbf{x}$ form a subspace of $\mathbb{R}^n$.

3. Let S be the set of 3×3 matrices A such that $A^\top = A$. Find vectors that span S.

4. Show that the vectors $\begin{bmatrix} 1 \\ 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 2 \\ 2 \\ -2 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$ are linearly dependent. More generally, why must 4 vectors in $\mathbb{R}^3$ be linearly dependent?

5. Let S be the set of all 2×2 matrices A with $A^2 = I$. Show that S is not a subspace.