PRINT Your Name:_____

Quiz for June 14, 2007

Let $\boldsymbol{a}$ and $\boldsymbol{b}$ be vectors in $\mathbb{R}^3$, and let W be the subset of $\mathbb{R}^3$ defined by

$$W = \{\boldsymbol{x} \mid \boldsymbol{a}^{\mathrm{T}}\boldsymbol{x} = 0 \quad \text{and} \quad \boldsymbol{b}^{\mathrm{T}}\boldsymbol{x} = 0\}.$$

Prove that W is a subspace of $\mathbb{R}^3$.

ANSWER: We see that W is the nullspace of the matrix

$$\begin{bmatrix} \boldsymbol{a}^{\mathrm{T}} \\ \hline \boldsymbol{b}^{\mathrm{T}} \end{bmatrix}.$$

We know that the Null space of every matrix is a vector space.