Quiz 6

SECTION: NAME:

> You have 30 minutes to complete this quiz. To receive full credit, you must justify your answers. For this quiz you may assume all vectors are in $\mathbb{R}^n$ unless otherwise stated.

Problem 1.(4 points) Let $\{\vec{u}, \vec{v}\}$ be an orthogonal set of nonzero vectors and let c_1, c_2 be constants. Show that $\{c_1\vec{u}, c_2\vec{v}\}$ is also an orthogonal set.

Problem 2.(5 points) Suppose $\vec{y}$ is orthogonal to the vectors $\vec{u}$ and $\vec{v}$. Show that $\vec{y}$ is also orthogonal to every vector in $Span\{\vec{u}, \vec{v}\}$.

Problem 3.(2 point each) Label the following statements true or false. If the statement is true, explain why. If it is false, explain why or provide a counterexample. Correct answers without justification will receive no credit.

(a.) The orthogonal projection of $\vec{y}$ onto $Span\{\vec{v}\}$ is not necessarily the same as the orthogonal projection of $\vec{y}$ onto $Span\{c\vec{v}\}$ whenever c is a non-zero constant.

(b.) If W is a subspace of $\mathbb{R}^n$ spanned by n nonzero, orthogonal vectors then $W = \mathbb{R}^n$.

(c.) Let $\vec{u}$ be a non-zero vector in R^2. Then the mapping, $T : \mathbb{R}^2 \to \mathbb{R}^2$ defined by $T(\vec{y}) = proj_{\vec{u}}(\vec{y})$ is a linear transformation.