Quiz 3

Name: _____

1. Suppose $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{w}$ are vectors in an inner product space V, and suppose both $\mathbf{u}$ and $\mathbf{v}$ are orthogonal to $\mathbf{w}$. Show that every vector in span $\{\mathbf{u}, \mathbf{v}\}$ is orthogonal to $\mathbf{w}$.

2. Find an orthogonal basis for $W = \text{span}\left\{ \begin{bmatrix} 1 \\ 0 \\ 7 \end{bmatrix}, \begin{bmatrix} 4 \\ 1 \\ 3 \end{bmatrix} \right\}$.

3. Suppose $L : R^3 \to R^3$ is given by

$$L\left(\begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix} \right) = \begin{bmatrix} u_1 + 2u_2 + 4u_3 \\ 2u_1 - u_2 + 6u_3 \\ 3u_1 + u_2 + 10u_3 \end{bmatrix}.$$

Find a basis for range L.