Quiz 3

1. Determine if the following set is orthogonal, orthonormal, or neither, where the inner product is the dot product on $\mathbb{R}^3$. (3 pts)

$$\left\{ \begin{bmatrix} 0 \\ -1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1/\sqrt{2} \\ 0 \\ -1/\sqrt{2} \end{bmatrix}, \begin{bmatrix} 1/\sqrt{3} \\ 1/\sqrt{3} \\ 1/\sqrt{3} \end{bmatrix} \right\}$$

2. Let V be an inner product space and let $\mathbf{v_1}, \mathbf{v_2}$ be vectors in V. Suppose that $(\mathbf{v_1}, \mathbf{v_1}) = 4, (\mathbf{v_1}, \mathbf{v_2}) = -2$, and $(\mathbf{v_2}, \mathbf{v_2}) = 1$. Let $\mathbf{w} = \mathbf{v_1} - 3\mathbf{v_2}$. Compute $\|\mathbf{w}\|$. (5 pts)

3. If W is a 1-dimensional subspace of $\mathbb{R}^4$, what is the dimension of $W^{\perp}$? (2 pts)