Name: _____

Section: _____

1. Let

$$W = \text{Span}\left\{ \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ -1 \\ 0 \\ 0 \\ 1 \end{bmatrix} \right\}.$$

Use the Gram-Schmidt procedure to find an orthonormal basis for W.

2. Find $\text{proj}_W(\mathbf{v})$, where

$$\mathbf{v} = \begin{bmatrix} 1 \\ 2 \\ 0 \\ -1 \\ 1 \end{bmatrix}$$

3. Write $\mathbf{v}$ as the sum of a vector in W and a vector orthogonal to W.