Math 221-AB1: Quiz 4

1. Let $U = \text{Span}\{x_1, x_2\}$ where $x_1 = \begin{bmatrix} 1 \\ 0 \\ 2 \\ 2 \end{bmatrix}$ and $x_2 = \begin{bmatrix} -2 \\ 1 \\ 0 \\ -1 \end{bmatrix}$

   (a) (*4 pts*) Apply the Gram-Schmidt process to the basis $\{x_1, x_2\}$ to produce an orthonormal basis $\{u_1, u_2\}$ for U.

   (b) (*3 pts*) Find any basis for $U^{\perp}$.

2. (*3 pts*) Explain why $x^T Ay$ is not an inner product for x, y in $\mathbb{R}^2$ if $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$.

   (*Hint: Show that $x^T Ay$ fails to satisfy at least one property of inner products for a specific x and y.*)