Worksheet 7

Name: _____ Score: _____

1 New Stuff §6.2-6.5

1. Suppose W is the subspace of $\mathbb{R}^n$ spanned by the given vectors. Find a basis for $W^\perp$. Recall $(\operatorname{Col} A)^\perp = \operatorname{Nul}(A^T)$.

   - $$\begin{bmatrix}1\\1\\4\\1\end{bmatrix} \begin{bmatrix}1\\0\\1\\-1\end{bmatrix}$$

     Nul of [1, 0, 1, -1], [0, 1, 3, 2]

   - $$\begin{bmatrix}1\\0\\1\\-1\end{bmatrix} \begin{bmatrix}-3\\1\\0\\5\end{bmatrix}$$

     Nul of [1, 0, 1, -1], [0, 1, 3, 2]

2. Apply Gram-Schmidt to the columns and rescale if necessary to get an *orthonormal* matrix P, i.e., $P^TP = I$. You may need a calculator for the 3x3 case.

   - $$\begin{bmatrix}2&3\\1&1\end{bmatrix}$$

     $1/\sqrt{5}\cdot$ [2, 1] [1, -2]

   - $$\begin{bmatrix}0&1\\1&4\end{bmatrix}$$

     [0, 1], [1, 0]

   - $$\begin{bmatrix}1&1\\2&1\end{bmatrix}$$

     $1/\sqrt{5}$ [1, 2] [2, -1]

   - $$\begin{bmatrix}1&4&4\\0&1&1\\0&4&3\end{bmatrix}$$