Math 344 Quiz 4

Names: _____

1. Find the function of the form $f(x) = a2^x + b2^{-x}$ that best fits $\{(0,0), (-1,1), (1,2)\}$.

2. Use the projection vector to find the single number $f(x) = a$ that best fits $\{(x_1, y_1), \cdots, (x_n, y_n)\}$.

3. Find the projection matrix P for span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \\ 1 \end{bmatrix} \right\}$. Use P to find the $\mathbf{w} \in$ span closest to $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$.

4. Let P be a projection matrix for the span of $\mathbf{u}_1, \mathbf{u}_2, \ldots, \mathbf{u}_n$. Explain why $P\mathbf{w} = \mathbf{w}$ if $\mathbf{w}$ is already in the span of $\mathbf{u}_1, \mathbf{u}_2, \ldots, \mathbf{u}_n$ and then explain why $P^2 = P$.