Name: _____ Sort #: _____

Worksheet 19

Least Squares & The Gram-Schmidt Algorithm MATH 2250, Fall 2018

1. Find a least squares solution of $A\vec{x} = \vec{b}$ by constructing the normal equations for $\vec{\hat{x}}$ and then solving for $\vec{\hat{x}}$ where

$$A = \begin{bmatrix} 2 & 1 \\ -2 & 0 \\ 2 & 3 \end{bmatrix} \qquad \vec{b} = \begin{bmatrix} -5 \\ 8 \\ 1 \end{bmatrix}$$

2. The set of vectors

$$\left\{ \begin{bmatrix} 0 \\ 4 \\ 2 \end{bmatrix}, \begin{bmatrix} 5 \\ 6 \\ 7 \end{bmatrix} \right\}$$

forms a basis for some subspace W. Find an orthogonal basis for W.

3. Find an orthogonal basis for the column space of the matrix

$$B = \begin{bmatrix} -1 & 6 & 6 \\ 3 & -8 & 3 \\ 1 & -2 & 6 \\ 1 & -4 & -3 \end{bmatrix}$$