Math 33A − Week 8

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Name: _____

1. Find the least squares solution of $A\mathbf{x} = \mathbf{b}$ where $A = \begin{pmatrix} 1 & 1 \\ -1 & 1 \\ 1 & 2 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 11 \\ 3 \\ 4 \end{pmatrix}$.

2. Find the least squares straight line $y = ax + b$ fit to the points $(1, 1), (3, 2), (4, 6)$.

3. (a) Apply Gram-Schmidt to the vectors $\mathbf{v}_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}, \mathbf{v}_2 = \begin{pmatrix} 1 \\ 2 \\ 4 \\ 5 \end{pmatrix}$.

   (b) Find the QR decomposition of the matrix $A = \begin{pmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 4 \\ 1 & 5 \end{pmatrix}$.

   (c) Find the least squares plane $ax+by-z = 0$ that best fits the points $(1, 1, 2), (1, 2, 1), (1, 4, 1), (1, 5, 2)$.