Section 3.4. Problem 12, 16, 18, 28, 32.

Section 4.2. Problems 4, 10, 12, 16, 29.

Problem A. Solve $A\vec{x} = \vec{b}$ by least squares if $A = \begin{pmatrix} i & 0 \\ 0 & i \\ 1 & 1 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} i \\ 2i \\ 3 \end{pmatrix}$, and $\vec{x} = \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$.

Split $\vec{b}$ into $\vec{p} + \vec{q}$, with $\vec{p}$ in the column space $C(A)$ and $\vec{q}$ orthogonal to $C(A)$. Is $\vec{b}$ in the column space $C(A)$? Explain.