**1.** Text: 11.16. You can assume that $A$ is $5 \times 5$. And don't bother with the "Does this make sense" part of the question.

**2.** Supplemental problem: 11.11. **Hint:** Consider block multiplication

$$\begin{bmatrix} A & a \end{bmatrix} \begin{bmatrix} B \\ 0 \end{bmatrix} = \begin{bmatrix} AB + a0 \end{bmatrix}$$

where $A$ and $B$ are $2 \times 2$, $a$ is $2 \times 1$ and the 0 is a $1 \times 2$ zero row.

**3.** The matrix

$$A = \frac{1}{\sqrt{2}} \begin{bmatrix} 3 & -2 \\ -3 & -4 \end{bmatrix}$$

admits the $QR$ factorization

$$A = \left( \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \right) \begin{bmatrix} 3 & 1 \\ 0 & -3 \end{bmatrix}$$

You don't need to show this. Instead, use the $QR$ factorization to solve $Ax = b$ with $b = (3, -5)$.

Note: For a matrix as small as a $2 \times 2$, we wouldn't bother with $QR$ factorization. We would simply write down the inverse matrix and use it to solve the system. The point of this problem is for you to get a little practice with what the the steps of solving the system with $QR$ factorization actually are, without having to do an enormous amount of arithmetic.

Recall: if $A = QR$ and you want to solve $Ax = b$ then $QRx = b$. Multiply both sides by $Q^T$. Since $Q^T Q = I$, $Rx = Q^T b$. Now solve for $x$.