1. Consider the matrix $A = \begin{bmatrix} 2 & -3 \\ 3 & 2 \end{bmatrix}$. Find the eigenvalues, and for one of them (your choice) find a corresponding eigenvector.

2. Let $\mathbf{u} = \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 4 \\ 3 \\ 5 \\ 3 \end{bmatrix}$. Compute each of the following, or state that it isn't possible.

   a. $\mathbf{uv}$

   b. $\mathbf{u}^T\mathbf{v}$

   c. $\mathbf{uv}^T$

   d. $\mathbf{v}^T\mathbf{u}$

   e. $\mathbf{u}^T\mathbf{u}$

   f. $\mathbf{u} - \mathbf{v}$

3. Find the solution set to the system $x + 2y + 3z = 0$. (Find a basis for your solution set.)