Curtis, page 192, #3, 5, 6, 9, 10

Also hand in the following problems from the class notes.

1. Find the characteristic polynomial $f(x)$ of $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}$. Show that $f(A) = 0$, and find the minimal polynomial of $A$.

   *Hint:* To check that $f(A) = 0$, it may be easiest to work with $f(x)$ in factored form. That way you can check for the minimal polynomial along the way to showing that $f(A) = 0$.

2. Find the eigenvalues and corresponding linearly independent eigenvectors of $\begin{bmatrix} 1 & 0 & 0 \\ -8 & 4 & -6 \\ 8 & 1 & 9 \end{bmatrix}$.

3. Show that if $\alpha$ is an eigenvalue of $T$, then $\alpha^k$ is an eigenvalue of $T^k$. How are the corresponding eigenvectors related?

4. We know that if $A$ and $B$ are similar $n \times n$ matrices, say $B = S^{-1}AS$, for an invertible matrix $S$, then $A$ and $B$ have the same eigenvalues. How are the corresponding eigenvectors related?

5. Show that if $A$ and $B$ are invertible $n \times n$ matrices, then $AB^{-1}$ and $B^{-1}A$ have the same eigenvalues.