1. Carefully state the definition of $P(t)$. Give a set of three vectors from $P(t)$.

2. You seek the Jordan Canonical Form for a $7 \times 7$ matrix. First, you find the characteristic polynomial $\Delta(t) = (t - 5)^7$. Next, you determine that the geometric multiplicity for the eigenvalue $\lambda = 5$ is 3. With this information, what are the possible minimal polynomials $m(t)$? For each possibility, determine what combinations of Jordan blocks are possible.
The remaining three problems all concern matrix $M = \begin{pmatrix} 0 & 1 & -1 \\ 2 & 0 & 3 \\ 3 & -2 & 4 \end{pmatrix}$.

3. Find the characteristic polynomial $\Delta(t)$ for $M$, and calculate each eigenvalue with its algebraic multiplicity. (hint: all eigenvalues are integers)

4. Find the geometric multiplicity of each eigenvalue, and a corresponding maximal independent set of eigenvectors.

5. Find the Jordan Canonical Form for $M$. 