Problems for Wednesday April 20

(1) Suppose P is non singular $(n \times n)$, A, B are both $(n \times n)$ matrices

Show that A and $P^{-1}AP = B$ have same Char. Eqn.

Tell them the leiminology: Similar Matrices

(2) Show that if A, B are square matrices of the same size $(n \times n)$

$I_n - AB$ invertible iff $I_n - BA$ invertible

Do AB and BA have the same eigen values?

(3) Prove that if Nullity of A is k then x^k divides Ch. poly $\det(xI - A)$

Hint: Determinantal Rank. How do you find. Coeff. of Char. polynomial?

Nullity $(A - \lambda I) = k$
$\Rightarrow \lambda$ is an eigen value that has Multiplicity at least k as a root of the Char. polynomial

(4) Find Eigen values and Eigen vectors of-

$$\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}; \quad \begin{bmatrix} 4 & -1 & -2 \\ 2 & 1 & -2 \\ 1 & -1 & 1 \end{bmatrix}$$

(5) Go over the quiz problems since this Tutorial will take place AFTER the quiz.