Math 304, Section 5 — Quiz 15 – April 8

Name:_____

1. What is the definition of the characteristic polynomial of a matrix A?

2. Find the characteristic polynomial of the matrix A below:
$$A = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 2 & -1 \\ -1 & -1 & 2 \end{bmatrix}$$

3. After some calculation, you find that the matrix B below

$$B = \begin{bmatrix} -14 & -28 & -44 \\ -7 & -14 & -23 \\ 9 & 18 & 29 \end{bmatrix}$$

has characteristic polynomial $p_B(\lambda) = -\lambda^3 + \lambda^2 + 2\lambda = 0$. Find all eigenvalues of B.

4. Complete the following definition of eigenvector and eigenvalue: If M is an $n \times n$ matrix and $x \in \mathbb{R}^n$ is _____, then we say that x is an eigenvector of M associated to the eigenvalue α if

$$\rule{4cm}{0.4pt} = \rule{4cm}{0.4pt}$$