Reading Questions 18

Example 7.2.1

- 1. The characteristic equation of a matrix A can be used to determine the eigenvalues of the matrix A.
- 2. To find the eigenvalues of a 3×2 matrix we need to solve a quadratic equation.
- 3. The algebraic multiplicity of an eigenvalue is the number of times it appears in the list of all eigenvalues.
- 4. Give your reasoning for your answer of the previous problem.

Section 7.2 Finding the eigenvalues of a matrix (Part 1)

Characteristic Equation

P 1. Let A be an $n \times n$ matrix.

- 1. Write down the characteristic equation of A.
- 2. Write down the characteristic polynomial of A where $\lambda_1, \lambda_2, \ldots, \lambda_n$ are the eigenvalues of A.
- **P** 4. What does it mean for a matrix A to have an eigenvalue of 2 with algebraic multiplicity 3.
- **P** 5. Find the eigenvalues for the matrix

-3	0	0	0	0	0
0	2	0	0	0	0
0	0	1	0	0	0
0	0	0	3	0	0
0	0	0	0	1	1
0	0	0	0	1	2

and their algebraic multiplicities.

P 6. Let $A = \begin{bmatrix} 1 & k \\ 1 & 1 \end{bmatrix}$ where k is some real number. For which values of k does A have two distinct real eigenvalues?