Math 3013
Problem Set 7

For each of the matrices $\mathbf{A}$ below, find

(a) the characteristic polynomial of $\mathbf{A}$
(b) the eigenvalues of $\mathbf{A}$
(c) for each real eigenvalue λ of $\mathbf{A}$, determine
  (i) the algebraic multiplicity of λ
  (ii) the geometric multiplicity of λ
  (iii) a basis for the λ-eigenspace of $\mathbf{A}$

1. $\mathbf{A} = \begin{bmatrix} 7 & 5 \\ -10 & -8 \end{bmatrix}$
2. $\mathbf{A} = \begin{bmatrix} -7 & -5 \\ 16 & 17 \end{bmatrix}$
3. $\mathbf{A} = \begin{bmatrix} 1 & -2 \\ 1 & 2 \end{bmatrix}$
4. $\mathbf{A} = \begin{bmatrix} -1 & 0 & 0 \\ -4 & 2 & -1 \\ 4 & 0 & 3 \end{bmatrix}$
5. $\mathbf{A} = \begin{bmatrix} 1 & 0 & 0 \\ -8 & 4 & -5 \\ 8 & 0 & 9 \end{bmatrix}$
6. $\mathbf{A} = \begin{bmatrix} -4 & 0 & 0 \\ -7 & 2 & -1 \\ 7 & 0 & 2 \end{bmatrix}$