EIGENVECTORS AND EIGENVALUES WORKSHEET

OCTOBER 23, 2017

1. (a) Is $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$ an eigenvector of $A = \begin{pmatrix} 2 & -12 \\ -3 & 2 \end{pmatrix}$?

(b) Is $\lambda = 3$ an eigenvalue of A?

(c) Without computing A^2, what is $A^2\mathbf{x}$? What is $A^k\mathbf{x}$ for any k?

2. Let
$$B = \begin{pmatrix} 4 & 0 & -2 \\ 8 & 2 & -8 \\ 4 & 0 & -2 \end{pmatrix}$$
and suppose we are given that $\lambda = 2$ is an eigenvalue of B. Find a basis for the corresponding eigenspace. What is its dimension?

3. Let $A = \begin{pmatrix} 2 & 3 \\ 3 & -6 \end{pmatrix}$. Compute $\det(A - \lambda I_2)$. (Your answer will be in terms of λ.) For which values of λ is this 0?