

MATH 260, Homework 10, Fall '14
Due: October 31, 2014 at 2:20 PM
Honor Code:

Name:
Section:

1) Determine the eigenvalues and eigenvectors for each matrix.

a) (8 pts) $\begin{bmatrix} -22 & 18 \\ 12 & 8 \end{bmatrix}$

b) (9 pts) $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 2 & 0 \\ 3 & 3 & 3 \end{bmatrix}$

2) (8 pts) The trace of a square matrix is the sum of its diagonal entries. This is written $tr(A) = \sum a_{ii}$. Square matrices have a neat property where the trace of the matrix is equal to the sum of its eigenvalues. Also, the determinant of a matrix is equal to the product of its eigenvalues. Written in math speak:

$$\begin{aligned} tr(A) &= \sum \lambda_i \\ det(A) &= \prod \lambda_i \end{aligned}$$

Use the trace and determinant properties to get a system of two (nonlinear) equations in λ_1 and λ_2 and solve for those eigenvalues for the matrix $C = \begin{bmatrix} 5 & 10 \\ -2 & -3 \end{bmatrix}$. HINTs: You'll need to use the quadratic formula. Also, don't be surprised if your eigenvalues are complex!