**MATH 260, Homework 9, Spring '14**
**Due: April 4, 2014**
**Honor Code:**                                              **Name:**

1) Determine the eigenvalues and eigenvectors for each matrix.

a) (10 pts) $\begin{bmatrix} -22 & 18 \\ 12 & 8 \end{bmatrix}$

b) (10 pts) $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 2 & 0 \\ 3 & 3 & 3 \end{bmatrix}$

2) (12 pts) The trace of a square matrix is the sum of its diagonal entries. This is written $tr(A) = \Sigma a_{ii}$. 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:

$$
\begin{aligned}
tr(A) &= \Sigma \lambda_i \\
det(A) &= \Pi \lambda_i
\end{aligned}
$$

Use the trace and determinant properties to get a system of two (nonlinear) equations in $\lambda_1$ and $\lambda_2$ 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!