1. True/False: You must use PCA to reduce the dimensionality of your data. Briefly explain. (3 points)

2. Given N data points, with D dimensions, what size will the covariance matrix be and how many eigenvectors will you get? (2 points)

3. Find the eigenvalues and eigenvectors of the following matrix. (5 points)

$$\begin{bmatrix} 1 & -2 \\ 3 & -4 \end{bmatrix}$$

$$|A - \lambda I| = 0$$