MA 331 **Name (Print):** _____
Fall 2017
Homework 6: Matrices & Linear Algebra
Due: 10/19/17

1.) Consider the following matrices:

$$\mathrm{A} = \begin{pmatrix} 1 & -2 & 0 \\ 3 & 2 & -1 \\ -2 & 1 & 3 \end{pmatrix}, \qquad \mathrm{B} = \begin{pmatrix} 4 & -2 & 3 \\ -1 & 5 & 0 \\ 6 & 1 & 2 \end{pmatrix}$$

Find the following quantities:

a) 2A+B
b) A-4B
c) AB
d) BA

2.) Find the determinant and inverse (if it exists) of the following matrices

$$\text{a)} \begin{pmatrix} 1 & 4 \\ -2 & 3 \end{pmatrix}, \qquad \text{b)} \begin{pmatrix} 3 & -1 \\ 6 & 2 \end{pmatrix}$$

3.) Solve the following system of equations using matrices:

$$\begin{aligned} x_1 - x_3 &= 0 \\ 3x_1 + x_2 + x_3 &= 1 \\ -x_1 + x_2 + 2x_3 &= 2 \end{aligned}$$

4.) Find the eigenvalues and eigenvectors of the following matrices

$$\text{a)} = \begin{pmatrix} -2 & 1 \\ 1 & -2 \end{pmatrix}, \qquad \text{b)} = \begin{pmatrix} 2 & 2 \\ 5 & -1 \end{pmatrix}, \qquad \text{c)} = \begin{pmatrix} 3 & 2 \\ 7 & -2 \end{pmatrix}, \qquad \text{d)} = \begin{pmatrix} 2 & 6 \\ 1 & 3 \end{pmatrix}$$