Directions:

- Work should be done neatly and on separate paper.
- Enough work must be shown so that the steps you are taking is clear.
- 1. For each of the following find examples of two 2×2 matrices A and B with $A \neq B$ such that:
 - (a) AB = BA
 - (b) $AB \neq BA$
- 2. Calculate the inverse of each of the following matrices. One has no inverse.

(a)
$$\begin{bmatrix} -2 & 1 \\ 5 & 2 \end{bmatrix}$$

(b)
$$\begin{bmatrix} 0 & 6 \\ 7 & -3 \end{bmatrix}$$

(c)
$$\begin{bmatrix} 4 & 8 \\ 2 & 4 \end{bmatrix}$$

3. Find the eigenvalues for each of the following matrices:

(a)
$$A = \begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix}$$

(b)
$$A = \begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$$

(c)
$$A = \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$$

(d)
$$A = \begin{bmatrix} 0 & 1 \\ 2 & 2 \end{bmatrix}$$

(e)
$$A = \begin{bmatrix} 3 & 0 \\ 4 & 3 \end{bmatrix}$$

(f)
$$A = \begin{bmatrix} 5 & 4 \\ -25 & -15 \end{bmatrix}$$

(g)
$$A = \begin{bmatrix} 4 & 0 \\ -1 & 4 \end{bmatrix}$$