

This is a *self-administered, closed-book, closed-note* exam. Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided. You have 50 minutes to complete this exam.

Name: _____

1. Find the inverse of the following equation. (20 points, 10 points each)

(a)

$$A = \begin{bmatrix} 3 & 2 \\ 8 & 5 \end{bmatrix}$$

(b)

$$B = \begin{bmatrix} 6 & 1 \\ 9 & 5 \end{bmatrix}$$

2. Calculate $\det C$ (15 points)

$$C = \begin{bmatrix} 0 & 0 & 0 & 0 & 2 \\ 0 & 0 & 0 & -3 & 0 \\ 0 & -4 & 0 & 0 & 0 \\ -1 & -4 & 1 & 0 & 0 \\ 3 & 2 & 0 & 0 & 0 \end{bmatrix}$$

3. For the matrices in Question 1, Calculate the following (20 points, 10 points each):

(a) $A + 2B$

(b) AB^2

4. Find the eigenvectors of the matrix D . (15 points)

$$D = \begin{bmatrix} 2 & 0 & 0 \\ 6 & 3 & 0 \\ -1 & 1 & 4 \end{bmatrix}$$

5. (30 points) For the following matrix E :

$$E = \begin{bmatrix} -1 & 0 & 0 \\ 4 & 5 & 0 \\ 0 & 8 & -2 \end{bmatrix}$$

- (a) Find the eigenvalue of the matrix E (10 points).
(b) Find the eigenspace of the matrix E (10 points).
(c) Find a diagonal matrix M such that $E = PMP^{-1}$ for some matrix P (10 points).

Eigenvalue _____

Eigenspace _____

Diagonal Matrix _____