

Name:

Recitation Section:

**Math 2802 N1-N3 Quiz**

February 23rd, 2018

*The quiz has a total of 10 points and you have 15 minutes. Read carefully and clearly justify how you obtained your answers.*

1. [3 points]

a) If  $\lambda + 5$  is a factor of the characteristic polynomial  $\det(A - \lambda I)$ , then an eigenvalue of  $A$  is: \_\_\_\_\_

b) Give an example of a  $2 \times 2$  matrix that is diagonalizable but not invertible.

2. [3pts] Let  $A = \begin{pmatrix} 10 & -5 \\ 5 & 10 \end{pmatrix}$

a) Compute the characteristic polynomial of  $A$ .

b) How many real eigenvalues does  $A$  have?

3. [4pts] Let  $A = \begin{pmatrix} 4 & -3 & 6 & -8 \\ 0 & 1 & -6 & 0 \\ 0 & 0 & 4 & 3 \\ 0 & 0 & 0 & -2 \end{pmatrix}$ .

a) What is the algebraic multiplicity of eigenvalue 4? \_\_\_\_\_

b) What is the maximum possible dimension of the 4-eigenspace? \_\_\_\_\_

c) Describe the steps to find the 4-eigenspace of  $A$ .