Math 220
Spring 2024
Assessment 6
Dusty Wilson

Name: _____

Mathematics is the queen of the sciences and number theory is the queen of mathematics.
Carl Friedrich Gauss (1777-1855)
German mathematician

No work = no credit

1. Warm-ups

   (a) (1 point) If $A\vec{v} = \lambda\vec{v}$, what is $A^2\vec{v}$

   (b) (1 point) Eigenvalue(s) of I_{2x2}

   (c) (1 point) If A is singular, then an eigenvalue is:

2. (1 point) Based upon the quote (above), what branch of mathematics did Gauss most esteem? Answer using complete English sentences.

   General instruction for all questions: Please do not give answers in decimal form.

3. (4 points) Find the eigenvalue(s) and their multiplicity for the matrix $A = \begin{bmatrix} 7 & 3 & -2 \\ 0 & 1 & 0 \\ 2 & 4 & 3 \end{bmatrix}$.

4. (5 points) Find the eigenspace of $A = \begin{bmatrix} -13 & -6 & -2 \\ 28 & 13 & 4 \\ 28 & 12 & 5 \end{bmatrix}$ with associated eigenvalue $\lambda = 1$. Is every vector in this eigenspace an eigenvector?

5. (4 points) Diagonalize the matrix $A = \begin{bmatrix} -3 & 15 \\ -6 & 16 \end{bmatrix}$.

6. (2 points) True or False: If A is invertible, then A is diagonalizable. Justify your answer.