Printed Name _____ Signature _____

Linear Algebra
Quiz #6

Show your work and clearly label your answers on this quiz.

No scrap paper or notes are allowed, but you may use a scientific or accounting calculator (no phones or computers). Use 6 digits of precision throughout your calculations (and answers), although fractions and roots will likely make for more intelligible answers.

This quiz is scored out of 50 points. (There are 60 points possible.)

You have
minutes to complete the quiz.

To get credit on a problem, you *must* give a clear, well-written explanation, justifying each step.

$$\text{Consider } A = \begin{bmatrix} 5 & 1 & 0 \\ 1 & 6 & -1 \\ 0 & -1 & 5 \end{bmatrix}.$$

Problem 1 (10+10 pts) What are the eigenvalues and eigenvectors of A?

Problem 2 (10 pts) Diagonalize A.

Problem 3 (10 pts) Compute A^4.

Problem 4 (5+5 pts) Verify the trace and determinant of A with the eigenvalues of A.

Problem 5 (10 pts) Describe the ellipsoid given by transforming the unit sphere in $\mathbb{R}^3$ by the quadratic form induced by A. (Writing out the equation is enough.)