Printed Name _____ Signature _____

Linear Algebra
Quiz #2

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 40 points. (There are 50 points possible.)

You have 45 minutes to complete the quiz.

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

Problem 1 (5 x 4 points)
Let A be a 3×3 matrix.

(a) What is the matrix P that makes the product PA switch rows 1 and 3 of A?

(b) What is the matrix E that makes the product EA scale row 2 of A by 5?

(c) What is the matrix F^t that makes the product AF add 6 times column 3 of A to column 2?

(d) What is the matrix G^{-1} that makes the product AG scale column 1 of A by -4?

Hint: Try examples on a sample 3×3 matrix, such as

$$A = \begin{pmatrix} 4 & -3 & 2 \\ 8 & 6 & 0 \\ 0 & 5 & -1 \end{pmatrix}.$$

Problem 2 (10 x 3 points)
Consider the linear system $A\vec{x} = b$ given by the equations

$$4x + 8y + 5z = 10$$
$$8x - 2y + 3z = 18$$
$$2x - 7y - 2z = 5.$$

(a) Solve the system of equations.

(b) Give the LDU factorization of the system's coefficient matrix.

(c) Give the inverse of the system's coefficient matrix.

(Hint: L and U should have 1 on their diagonals, and if you follow the elimination/substitution method, you'll do all three parts of the problem simultaneously. Be sure ALL answers are CLEARLY written and labeled. Check your answers.)